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DOES SOCIAL FACTOR PLAY A PART IN PHYSICAL FRAILTY AND PREDICT MORTALITY IN OLDER ADULTS? RESULTS FROM BEIJING LONGITUDINAL STUDY OF AGING Lina Ma* Lina Ma, Zhe Tang, (Xuanwu Hospital, Capital Medical University)

Background: Frailty is related to adverse health-related outcomes. However, research into the relationship between social factors and physical frailty (PF) remains limited. This study aimed to determine social frailty (SF) status via developing a simple self-reported screening tool, termed the HALFT scale, and to examine the association between social frailty and physical functioning, cognition, depression, and mortality among community-dwelling older adults. Methods: Data were from Beijing Longitudinal Study of Aging (BLSA). 1697 community-dwelling old adults with an 8-year follow-up from BLSA completed the HALFT scale including the five items: unhelpful to others, limited social participation, loneliness, financial difficulty, and not having anyone to talk to. PF was assessed using modified Fried frailty phenotype and frailty index. A Cox proportional hazards model was used to evaluate the effect of covariates on mortality. Results: The prevalence of SF was 7.7%. Participants with PF, dependent physical function, worse balance and chair-stand test, and activities of daily living and instrumental activities of daily living dependency had a high prevalence of SF. SF was associated with dementia, subjective memory decline, depression, cognitive impairment, and having experienced a recent significant life event. After adjusting for age and gender, the 8-year mortality hazard ratios were 2.5-4.3 and 1.6-2.3, respectively, for those with SF or pre-SF. Each component of SF predicted 8-year mortality. Conclusion: SF is associated with PF and predicts mortality. The HALFT scale could be a useful screening tool for determining SF in older adults. Interventions aimed at preventing or delaying SF are warranted.

0003 S/P

THE EFFECT OF MIDDLE LIFE MARITAL STATUS ON SUBSEQUENT COGNITIVE DECLINE OVER 21 YEARS: DISCOVERY FROM ATHEROSCLEROSIS RISK IN COMMUNITY (ARIC) COHORT STUDY Simo Du* Simo Du, Alden Gross, (Johns Hopkins Bloomberg School of Public Health)

Background: Previous researches show that marriage has protective effect against cognitive decline but definite evidence from prospective cohort study is limited and even less is known about the effect of marital status on different cognitive domains. We investigated the association between middle life marital status and subsequent cognitive changes with 21-year follow-up prospective ARIC cohort study. Methods: 14135 community dwelled adults (mean age= 54.07, SD= 5.73) underwent three cognitive assessments at visit 2 (1990-1992), visit4 (2004-2006) and visit 5 (2011-2013). Factor scores of cognition were developed based on the cognitive tests and grouped into three cognitive domains including executive, memory and language functions. Marital status was measured at visit 2 and categorized into four groups including married, divorced or separated, widowed and never married. We performed multivariate random-effects linear models adjusted for age, gender, race, education, hypertension, alcohol use at baseline. Results: Among the four groups, there are 11,193 married, 1601 separated or divorced, 1057 widowed and 284 never married participants. We discovered that compared to the married, separated or divorced group has a steeper decline of language function over 21 years with an average difference in cognitive decline slope to be -0.10(95%CI [-0.15, 0.06] ,p =0.036) but less executive function decline (0.021, 95% CI [0.0014, 0.04], p=0.036). Being widowed is showed to be strongly associated with steeper cognitive decline at visit 5 with a slope difference of general cognitive performance to be -0.26 (95%CI [-0.31, -0.20], p<0.001) while never married group doesn't show any significant difference from married group. Conclusion: We concluded that marital status is an independent predictor of cognitive decline. Being widowed in middle life will increase the risk of cognitive decline and divorce tends to worsen language decline but not memory or executive function.

ALLOSTATIC LOAD, UNHEALTHY BEHAVIORS, AND DEPRESSIVE SYMPTOMS AMONG OLDER ADULTS IN THE SACRAMENTO AREA LATINO STUDY ON AGING (SALSA) Erik J. Rodriquez, Ph.D., M.P.H.* Erik J. Rodriquez, Melanie Sabado, Ph.D., M.P.H., Mary N. Haan, Dr.P.H., M.P.H., Anna M. Nápoles, Ph.D., M.P.H., (NIH/NHLBI)

Background: Racial/ethnic inequalities may intensify the effect of chronic stress on mental health. Findings from research among minorities have been mixed on whether unhealthy behaviors interact in the relationship between self-reported chronic stress and depression. Research to understand the biological mechanisms in this relationship is sparse. We assessed whether unhealthy behaviors moderated the relationship between allostatic load (AL) and future significant depressive symptoms (SDS) among Latinos. Methods: Data from two waves of the Sacramento Area Latino Study on Aging were analyzed and included ten established biomarkers (categorized using clinically-relevant cut points) of AL, cigarette smoking, excessive and binge drinking, obesity, and significant (≥16 out of 20) depressive symptoms at follow-up. Participants included 871 U.S. born and 908 foreign born Latinos. Multivariable logistic regression; adjusted for age, gender, education, and baseline SDS; was used to model AL, an unhealthy behavior index (UBI, range: 0-3), and their interaction on follow-up SDS, stratified by nativity. Analyses were conducted using SAS 9.4. Results: Compared to the U.S. born, foreign born participants were slightly older (70.1 vs. 71.2 years), less educated (42% vs. 80% <9th grade), engaged in more unhealthy behaviors (0.52 vs. 0.60 behaviors), and had higher baseline SDS (20% vs. 31%). Foreign born participants who had greater AL and UBI had significantly higher odds of future SDS (AL and UBI=I: OR=I.46, 95%CI=[1.14,1.87], AL and UBI=2: OR=2.00, 95%CI=[1.18,3.41], and AL and UBI=3: OR=2.75, 95%CI=[I.18,6.44]). Conclusions: By linking the cumulative physiologic sequelae of stress and behavior to SDS, our findings support previous research among Latinos using self-reported chronic stress, add to our understanding of these relationships, and can inform clinical decisions to screen and advise older Latinos. Funding (in part): Intramural Research Program, National Institutes of Health

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CELLULAR RESPONSE TO CHRONIC PSYCHOSOCIAL STRESS: TEN-YEAR LONGITUDINAL CHANGES IN TELOMERE LENGTH IN THE MULTI-ETHNIC STUDY OF ATHEROSCLEROSIS Helen Meier* Helen Meier, Mustafa Hussein, Belinda Needham, Sharrelle Barber, Elizabeth Blackburn, Elissa Epel, Jue Lin, Teresa Seeman, Ana Diez Roux, (University of Wisconsin-Milwaukee)

Previous studies have demonstrated an inverse association between chronic psychosocial stress and leukocyte telomere length (LTL), a potential marker of cellular aging. Due to paucity of longitudinal data, responses of LTL and LTL aging trajectory to changes in chronic stress exposure remain unclear. Using data from Stress I and II ancillary studies of the Multi-Ethnic Study of Atherosclerosis, we estimated the 10-year longitudinal (n=I,158) associations of chronic stress with LTL, and with LTL aging trajectory, as well as the pooled, cross-sectional association of chronic stress and LTL (n=2,231). We measured chronic stress from both individual and neighborhood-environment sources. At the individual level, summary scores were calculated from ongoing (>6 months) material/social problems rated as moderately/very stressful on the Chronic Burden Scale. Neighborhood-level stress was measured using a summary score of reverse-coded MESA Neighborhood safety, aesthetic quality, and social cohesion scales. Deciles of these scores were empirically categorized as high, moderate, or mild stress. Individual- and neighborhood-level categorical variables were summed for a total stress measure. Longitudinal associations were estimated with fixed effects models inherently adjusting for all time-invariant confounding, with additional control for timevarying demographics, lagged behaviors, chronic conditions, and for storage duration and baseline LTL. Based on within-person longitudinal changes, high chronic stress, particularly individual-level, was associated with shorter LTL than mild stress, consistent with cross-sectional findings. With regards to LTL aging trajectory, our results were suggestive of two patterns: 1) LTL attrition rate was lower by 0.027 units/year [95%CI: 0.003, 0.051] among those with high vs. low total stress; and 2) LTL attrition was strongest among those exposed to worsening chronic stress [-0.076 units/year, 95%CI: -0.368, 0.215, for total stress].

THE ASSOCIATION BETWEEN FINANCIAL RESOURCES AND HOMEBOUND STATUS AMONG A NATIONAL SAMPLE OF OLDER ADULTS Katherine Ornstein* Katherine Ornstein, Evan Bollens-Lund, M. Maria Glymour, (Department of Geriatrics and Palliative Medicine, Icahn School of Medicine at Mount Sinai)

A large and growing population of individuals with multimorbidity, cognitive impairment and functional decline live in the community but are homebound, defined as rarely or never leaving home. Homebound status is associated with decreased access to medical services, poor health outcomes, and increased mortality. The goal of this study was to understand which resources may enable individuals to delay homebound status and remain in the community. We hypothesized that individuals with low financial resources may be especially vulnerable to becoming homebound. Using waves 1-6 of the National Health and Aging Trends Study (NHATS), a nationally representative sample of Medicare beneficiaries, we examined whether baseline income (<\$15,000; \$15,000-\$29,999; \$30,000-\$59,999; \$60,000+) predicted risk of becoming homebound among initially non-homebound community-dwelling older adults over 5 years. We used Cox Proportional Hazards Models to predict time to homebound status, censoring for death, loss to follow up and nursing home status, adjusting for NHATS analytic weights Among 7042 community-dwelling non-homebound individuals, 15% of those in the lowest income bracket became homebound vs. only 4% of those in the highest income bracket. In adjusted analyses controlling for clinical characteristics (including dementia status and function) and demographic factors including age, gender, marital status, race, education, Medicaid status, geographic region and caregiving resources, those in the highest income bracket had 45% lower hazard of becoming homebound (95% CI Hazards Ratio =.39-.71). Across income brackets, we found evidence for an inverse dose-response relationship with homebound status. Homebound status is a common, understudied, and adverse outcome for older adults. Our work demonstrates the potential impact of financial resources on how older adults live in the community. Future work will examine the role community and family resources play in becoming homebound.

0007 S/P

LONGITUDINAL ASSOCIATIONS BETWEEN CES-D SUBCOMPONENTS AND CLINICALLY SIGNIFICANT WEIGHT LOSS IN OLDER WOMEN Lynsie R. Ranker* Lynsie R. Ranker, Alan H. Breaud, Meghan L. Smith, Timothy C. Heeren, Kristine E Ensrud, Lisa Fredman, (Boston University School of Public Health)

Depression often leads to weight loss in older adults and weight loss of 5% or greater is a risk factor for mortality. Yet studies suggest weight loss may be driven by the absence of positive affect (PA), not the presence of high negative affect (NA). We hypothesized older women with high PA would have reduced risk of weight loss compared to women with low PA, and that other depression components (NA, somatic symptoms, interpersonal difficulties) would not be associated with weight loss. Participants were 1027 women from the Caregiver-Study of Osteoporotic Fractures The 20-item Center for Epidemiologic Studies Depression Scale (CES-D) and measured weight were collected at three annual interviews (1999-2003; 2.01 mean years follow-up). We dichotomized each of the four CES-D subscales into High (top quartile) versus Low (all other quartiles), calculated annualized weight loss of 5%+ from baseline to first or second follow-up interview, and imputed missing values. Logistic regression analyses included all four CES-D subcomponents, caregiving status and baseline covariates. At baseline, mean age was 81.7 years (+/-3.6); 35% were caregivers; 20% experienced 5%+ weight loss during follow-up. Women with high PA were significantly less likely than women with low PA to lose weight (18% vs. 23%): adjusted OR (aOR)=0.70, 95% CI 0.49-0.99. Women with high NA had decreased risk of weight loss (aOR=0.63, 95% CI 0.40-0.99), while those with high somatic symptoms had increased risk (aOR=1.24, 95% CI 0.83-1.84) and no association was seen for high interpersonal difficulties (aOR=1.14, 95% CI 0.73-1.79). In exploratory analyses, caregiving modified associations only between somatic symptoms and weight loss. In conclusion, both high PA and high NA were independently associated with reduced risk of weight loss in older women. Results may reflect different underlying mechanisms, effects of dichotomizing, or over-adjusting for CES-D subcomponents; thus further exploration is warranted.

FRAILTY, INFLAMMATION, AND WAITLIST MORTALITY AMONG PATIENTS WITH END-STAGE RENAL DISEASE Mara McAdams DeMarco* Mara McAdams-DeMarco, Hao Ying, Alvin Thomas, Fatima Warsame, Ashton Shaffer, Christine Haugen, Ravi Varadhan, Jeremy Walston, Dorry Segev, (JHU)

Background: Among community-dwelling older adults, frailty is associated with heightened markers of inflammation and subsequent mortality. Although frailty is common among ESRD patients, the role of frailty and markers of inflammation in this population remains unclear. We quantified these associations in patients on the kidney transplant (KT) waitlist and tested whether frailty and/or markers of inflammation improves waitlist mortality risk prediction. Methods: We studied 1,975 ESRD patients on the KT waitlist (11/1/09-2/28/17) in a multi-center cohort study of frailty. Serum inflammatory markers (interleukin-6 [IL-6], soluble tumor necrosis factor-a receptor-1 [sTNFR1], and C-reactive protein [CRP]) were analyzed in 605 of these participants; we calculated the inflammatory index score using IL-6 and sTNFR1. We compared the C-statistic of an established registrybased prediction models for waitlist mortality adding frailty and/or inflammation (1SD change in log IL-6, sTNFR1, CRP, or inflammatory index). Results: The registry-based model had moderate predictive ability (c-statistic=0.655). Frailty was associated with increased mortality risk (2.19, 95%CI:1.26-3.79) but did not improve risk prediction (c-statistic=0.646; P=0.65). Like frailty, IL-6 (2.13, 95%CI:1.41-3.22), sTNFR1 (1.70, 95%CI:1.12-2.59), CRP (1.68, 95%CI:1.06-2.67), and the inflammatory index (2.09, 95%CI:1.38-3.16) were associated with increased mortality risk; unlike frailty, adding IL-6 (cstatistic=0.777; P=0.02), CRP (c-statistic=0.728; P=0.02), or inflammatory index (cstatistic=0.777; P=0.02) substantially improved mortality risk prediction. Conclusion: Frailty and markers of inflammation were associated with increased waitlist mortality risk, but only markers of inflammation significantly improved ESRD risk prediction. These findings help clarify the accelerated aging physiology of ESRD and highlight easy to measure markers of increased waitlist mortality risk.

0008

LONGITUDINAL ASSOCIATIONS BETWEEN HAVING AN ADULT CHILD IN THE US AND COGNITIVE FUNCTION AMONG OLDER MEXICAN ADULTS Jacqueline M. Torres* Jacqueline M. Torres, Kara E. Rudolph, Oleg Sofrygin, Rebeca Wong, Mary N. Haan, M. Maria Glymour, (University of California, San Francisco)

Adult child migration may both positively and negatively impact cognition for older adults who remain in places of origin. Possible mechanisms include reduced social engagement and improved socio-economic status. We used longitudinal targeted maximum likelihood estimation (LTMLE) to estimate associations between having an adult child in the US and cognitive function for Mexican adults > 50 years. TMLE is doubly robust and can incorporate data adaptive estimation. Data come from three waves (2001, 2003, 2012) of the Mexican Health and Aging Study (n=11806 with at least one living child at baseline). Respondents completed verbal, visuospatial, and visual scanning domains of the Cross-Cultural Cognitive Evaluation at baseline; orientation, numeracy, and verbal fluency domains were added to subsequent waves. We adjust for time-varying confounding affected by prior exposure and attrition. Mean age at baseline was 62 years; nearly a quarter had at least one child in the US. Mean baseline cognition scores were 35.8 for women and 38.3 for men (range: 0-80). There were no associations between having an adult child in the US and cognition overall. In age-stratified models, women 50-59 years at baseline who had an adult child in the US at all three study waves had worse average cognition scores in the final wave (2012) compared to their counterparts with no adult children in the US over the same time period (marginal risk difference: -1.86, 95% CI: -3.12, -0.60). In contrast, women> 60 years with at least one adult child in the US at all three study waves had better cognitive scores in the final wave compared to those with no adult children in the US (marginal risk difference: 2.13, 95% CI: 0.92, 3.35). Similar but weaker patterns were observed in models for the second (2003) wave. We find preliminary evidence of associations between having an adult child in the US over multiple years and cognition for women > 50 years in Mexico, with divergent associations by baseline age.

KIDNEY TRANSPLANT OUTCOMES IN RECIPIENTS WITH COGNITIVE IMPAIRMENT: A NATIONAL REGISTRY AND PROSPECTIVE COHORT STUDY Alvin G. Thomas* Alvin G. Thomas, Jessica M. Ruck, Ashton A. Shaffer, Christine E. Haugen, Hao Ying, Fatima Warsame, Nadia Chu, Michelle C. Carlson, Alden L. Gross, Silas P. Norman, Dorry L. Segev, Mara McAdams-DeMarco, (Johns Hopkins University)

BACKGROUND. Cognitive impairment is common in end-stage renal disease patients and is known to impede adherence to complex treatment regimens. Given the need for post-transplant immunosuppression, we hypothesized that cognitive impairment might be associated with an increased risk of all-cause graft loss (ACGL) in kidney transplant (KT) recipients. METHODS. Using the Modified Mini-Mental State (3MS) examination, we measured global cognitive function at KT hospital admission in a prospective, multi-center cohort of 864 KT candidates (8/2009-7/2016). We estimated the association between pre-KT cognitive impairment and ACGL using Cox regression and hybrid registry-augmented regression (HRAR), a statistically efficient method that uses precisely estimated coefficients from the registry population (SRTR N=101,718) into the prospective cohort model. We extrapolate the national prevalence of cognitive impairment in KT recipients using multiple imputation by chained equations. RESULTS. The prevalences of any impairment (3MS<80) and severe impairment (3MS<60) were 10.0% and 2.9%, respectively. We estimated that 11.7% (8.5-14.9%) of KT recipients had pre-KT cognitive impairment. Living donor KT recipients with any impairment had substantially higher ACGL risk than unimpaired recipients (5-year ACGL: 45.5% vs. 10.6%; aHR Cox: 5.40 [1.78-16.34], p<0.01; aHR HRAR: 3.22[1.22-8.50], p=0.02). Similarly, deceased donor KT recipients with severe impairment had higher ACGL risk than recipients without severe impairment (5-year ACGL: 53.0% vs. 24.2%; aHR Cox: 2.92 [1.13-7.50] p=0.03; aHR HRAR: 2.93[1.35-6.35], p<0.01). CONCLUSIONS. Given the prevalence and elevated risk of ACGL among KT recipients, efforts to explore the mechanisms of graft loss and mortality and identify potential interventions preserve or improve cognitive function are warranted. Transplant hospitals may consider screening for cognitive impairment to inform pre- and post-transplant clinical management of these patients.

0011 S/P

PREVALENCE OF FRAILTY AMONG KIDNEY TRANSPLANT RECIPIENTS IN THE UNITED STATES Alvin G. Thomas* Alvin G. Thomas. Ashton A. Shaffer, Hao Ying, Silas P. Norman, Dorry L. Segev, Mara McAdams-DeMarco, (Johns Hopkins University)

BACKGROUND. Frailty, a measure of physiologic reserve, increases the risk of delayed graft function, longer length of stay, early hospital readmission, immunosuppression intolerance, and mortality among kidney transplant (KT) recipients Despite the clinical importance of frailty in predicting KT outcomes, there are no national estimates of the prevalence of frailty among KT recipients. METHODS: The Fried frailty phenotype was prospective measured in 1,065 KT recipients (12/2008-12/2016) in our multi-center cohort. Using SRTR data on 126,376 KT recipients, we projected frailty (≥3 of 5 components) and intermediate frailty prevalence (2 of 5 components) by multiply imputing Fried frailty scores using predictive mean matching and accounting for recipient, donor, transplant, and post-transplant factors. We assess the quality of our predictive model using the area under the receiver-operator curve (AUC). RESULTS: In complete cases, the model AUC was 0.74. In our multi-center cohort, frailty and intermediate frailty prevalence was 18.4% and 30.0%, respectively, among deceased-donor KT (DDKT) recipients and 14.5% and 28.1%, respectively, among living-donor KT (LDKT) recipients Projected nationally among DDKT recipients, frailty and intermediate frailty prevalence was 18.0% (95% CI: 14.7-21.3%) and 29.9% (95% CI: 27.5-32.2%), respectively. Projected nationally among LDKT recipients, frailty and intermediate frailty prevalence was 12.5% (95% CI: 10.8-14.3%) and 28.4% (95% CI: 23.8-33.0%), respectively. Frailty prevalence did varied by geography (p<0.001) and increased by age (p<0.001). CONCLUSION: We project that nearly 20% of US KTs 2000-2016 were performed with frail recipients. These recipients might not have been aware of their higher risk for adverse post-KT outcomes. Given the prevalence of frailty, transplant centers should consider assessing frailty during KT evaluation to improve informed consent and perhaps consider pre-habilitation.

EPIDEMIOLOGICAL CHARACTERISTICS OF INPATIENTS WITH ALZHEIMER'S DISEASE AND MORTALITY FACTORS: A NATIONWIDE POPULATION-BASED STUDY IN TAIWAN Fu-Huang Lin* Fu-Huang Lin, Hsiang-Jen Cheng, Daphne Ng Yih, Yu-Ching Chou, Chi-Hsiang Chung, Wu-Chien Chien, (School of Public Health, National Defense Medical Center, Taipei, Taiwan)

There are approximately 1.07% of people with dementia in Taiwan. This study discussed about the epidemiological characteristics of inpatients with Alzheimer's disease and the mortality factors. Data from the file of Inpatient expenditures by admissions and Registry for contracted medical facilities in the National Health Insurance Research Database in 2013 is used in this study. Alzheimer's disease (ICD-9-CM code 331.0) is selected, and exclude the patients under the age of 18. The independent variables included patient characteristics and event characteristics and were analyzed using SPSS 21.0 statistical software. A total of 4,878 patients with Alzheimer's disease were hospitalized, and female have a higher proportion of 52.5% and the average age is 58 years old. Most patients were treated in the district hospitals (51.4%), 87.2% prefer the neurology department, and 16.9% had performed surgery. The average length of admission was 8.7 days and the average hospitalization cost was \$1696. The factors influencing the in-hospital mortality in Alzheimer's disease were gender, age, Charlson's Comorbidity index, hospital accreditation level, whether taken the medical treatment in neurology, and the number of days in hospitalization. The risk of hospital mortality in men was 1.39 times that of women, the risk of death at a regional hospital is 1.58 times that of a district hospital, the risk of death increased by 0.8% for each additional year of age, Charlson's comorbidity index increased by 10% for each additional risk of death. The risk of death to a neurologist was 0.24 times higher than that to a nonneurologist, 1.55 times higher than those who did not receive surgery, and 3.6% increase as the number of hospitalized decreased by for each additional day. Alzheimer's patients seeking medical attention in neurology can reduce the risk of hospitalized mortality. It is recommended that men and older patients to seek medical services in neurology as soon as possible.

0012 S/P

THE ROLE OF CARDIOVASCULAR DISEASE IN THE RELATIONSHIP BETWEEN CHRONIC EXPOSURE TO AIR POLLUTION AND DEMENTIA Sindana D. Ilango* Sindana D. Ilango, Hong Chen, Tarik Benmarhnia, (University of California, San Diego)

Background: Cardiovascular disease is a known determinant of dementia. Epidemiologic studies have also shown that chronic exposure to air pollution may play a role in the development of dementia and cardiovascular disease. This motivated us to apply a formal causal mediation analysis to examine the relative contribution of cardiovascular disease to the relationship between air pollution and dementia. Methods: A population-based cohort comprised of Canadian-born residents of Ontario, Canada who participated in the Canadian Community Health Surveys from 1996-2003 was followed through 2013 or until dementia diagnosis. Chronic exposure to selected ambient air pollutants (i.e., fine particulate matter [PM2.5] and nitrogen dioxide [NO2]) was assessed using a 3-year running average with a 5-year lag before dementia diagnosis. Incident cardiovascular disease occurring prior to dementia was evaluated as a potential mediator. We used Poisson regression models, adjusting for individual- and neighborhood-level risk factors (e.g., smoking, physical activity, education, and neighborhood income), to estimate incidence rate ratios (IRR) for every interquartile range increase in exposure to PM2.5 and NO2. We applied the generalized product method to estimate the total, direct, and indirect effects of air pollution on dementia and the proportion mediated through cardiovascular disease. Results: The risk of dementia was moderately higher among those exposed to NO2 (IRR=1.11 95% CI=1.03, 1.19) and PM2.5 (IRR=1.06 95% CI=0.97, 1.14) after adjusting for covariates. We estimate 4.0% and 10.5% of the observed association between NO2 and PM2.5, respectively, and dementia to be mediated through cardiovascular events. Conclusion: These results suggest that some of the association between chronic air pollution and dementia is mediated through its effect on cardiovascular disease. Improving cardiovascular health may prevent dementia in areas with higher exposure to air pollution.

THE ASSOCIATION OF SLEEP WITH METABOLIC PATHWAYS AND METABOLITES: EVIDENCE FROM THE DIETARY APPROACHES TO STOP HYPERTENSION (DASH)-SODIUM FEEDING STUDY Qian Xiao* Vanessa L.Z. Gordon-Dseagu, Andriy Derkach, Qian Xiao, Ishmael Williams, Joshua Sampson, Rachael Stolzenberg-Solomon, (NCI)

Background: Sleep is increasingly being viewed as an important determinant of health, and appears to be associated with cardiovascular disease, diabetes and several site-specific cancers. Few epidemiologic studies have used data from a feeding study to explore the impact of sleep habits upon metabolomic profile. Methods: The Dietary Approaches to Stop Hypertension (DASH)-Sodium feeding trial randomized individuals to either the DASH (low fat, high protein, low-fat dairy and high fruits and vegetables) or control diet for 12 weeks and three levels of sodium intake (30 days each). In a subgroup of 97 participants, we measured the levels of 531 metabolites in serial fasting plasma samples. We assessed the association between each metabolite and sleep using an adjusted linear random effects model. The resulting p-values were combined using Fisher's method to estimate the association with 38 metabolic pathways. Data about sleep were collected at the end of two diet intervention phases. Participants recorded times for going-to-sleep and waking and we produced two sleep variables-sleep mid-point (median) and sleep duration. Results: 26 pathways were associated (p < 0.05) with sleep mid-point, but only theyglutamyl amino acid metabolism pathway at the Bonferroni-corrected threshold (0.0013. 57) metabolites were associated with sleep mid-point (FDR<0.20), although none of them reached Bonferroni-corrected significance (p-value <10-5). Notable top metabolites associated with sleep mid-point and wake-time were erythrulose, several y-glutamyl pathway metabolites, CMPF, isovalerate & HWESASXX. Conclusion: Within our study we found multiple metabolites associated with sleep timing. In particular, the y-glutamyl pathway metabolites were associated with sleep mid-point and wake-time. Several of the metabolites and pathways identified within our study are understood to play a role in the etiology of diseases such as cancer, diabetes and CVD and sleeps impact upon them requires further investigation.

0022

TOBACCO USE AND COMMUNICATION CHANNEL PREFERENCES AMONG APPALACHIAN YOUTH Delvon T. Mattingly* Joy L. Hart, Delvon T. Mattingly, Lindsay K. Tompkins, Jayesh Rai, Clara G. Sears, Kandi L. Walker, Joy L. Hart, (University of Louisville)

Introduction: Youth tobacco use rates in the Appalachian region exceed the US national average, and newer tobacco products, such as e-cigarettes, have grown in familiarity and use. Given that e-cigarettes and conventional tobacco are commonly used by these youth, further research is needed to better understand how youth receive and share product information by use patterns. Methods Middle and high school students in rural Appalachia were surveyed (N=1049). The primary exposure in this analysis, tobacco use, was categorized as Never Users, E-cigarette Users, and Conventional Tobacco Users (e.g., cigarettes or smokeless). Descriptive characteristics were compared among the three use groups. Associations between tobacco use and receiving or sharing tobacco- ore-cigarette-related information via specific communication channels were assessed using multivariable logistic regression models adjusted for education. Results: Compared to Never Users, Ecigarette Users were more likely to receive tobacco information from family and friends (OR: 1.83; CI 1.327-2.511), public displays (OR: 1.58; CI 1.156-2.161), and digital media (OR: 1.89; CI: 1.281-2.590), and were more likely to receive ecigarette information via the same communication channels (OR: 3.55; CI: 2.567-4.906), (OR: 2.03; CI: 1.477-2.785), (OR: 2.52; CI: 1.827-3.463), respectively. E-cigarette Users (OR: 2.61; CI: 1.882-3.625) and Conventional Tobacco Users (OR: 1.83; CI 1.212-2.772) were more likely to share tobacco information with family and friends compared to Never Users, and E-cigarette Users were more likely to share e-cigarette information with family and friends (OR: 5.55; CI: 3.927-7.832). Conclusions: Appalachian youth E-cigarette Users receive and share tobacco- and e-cigarette-related information via various communication channels. Thus, several channels many need to be utilized in health communication campaigns to reach youth.

0021 S/P

MORE THAN JUST SLEEPING IN: LATE CHRONOTYPES PREDICT VARIOUS HEALTH PROBLEMS IN ADOLESCENTS Genevieve Gariepy* Genevieve Gariepy, Frank J, Elgar, (McGill University)

Objective: Recent studies suggest that the preference in the timing of sleep, or chronotype, contributes to the health and well-being of adolescents but the evidence remains scant and disparate. We used data on a national survey of Canadian students to investigate the associations between chronotype and a wide range of health outcomes and behaviours in youth. Methods: Data were collected in the 2014 Canadian Health Behaviour in School-Aged Children survey (29,635 students; ages 10-18). Chronotype was estimated using the mid-sleep time on weekends, corrected for catch-up sleep. We examined indicators of physical health (frequency of headache, stomach ache, backache, dizziness; obesity; self-rated health) and health behaviours (smoking, physical activity, consumption of fruits, vegetables, soft drinks, and alcohol). We used school random-effects regressions, adjusted for sleep duration, school start time, individual, family, and geographic characteristics. Bonferroni correction accounted for multiple testing. Results: The average midsleep time (chronotype) was 4:21 a.m. Each hour delay in mid-sleep was associated with higher odds of frequent headache (1.09, 95% CI 1.07,1.12), stomach ache (1.08, 95% CI 1.05,1.11), backache (1.08, 95% CI 1.05,1.11) and dizziness (1.10, 95% CI 1.07,1.13), poor health (1.09, 95% CI 1.05,1.13), but not obesity (1.06, 95% CI 0.98,1.14). Further, an hour delay in mid-sleep was associated with higher odds of current smoking (1.36, 95% CI 1.28,1.45), daily soft drinks consumption (1.26, 95% CI 1.20, 1.33) and monthly alcohol consumption (1.21, 95% CI 1.17, 1.26), and lower odds of daily consumption of fruits (0.93, 95% CI 0.92,0.94) and vegetables (0.93, 95% 0.91,0.94) and fewer physically active days (-0.07, 95% CI -0.10, -0.03) per week. Conclusion: The circadian typology of adolescents relates to the physical health and health behaviours of adolescents even after adjusting for sleep duration. Studies are needed to clarify the underlying mechanisms.

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NETWORK ANALYSIS OF WEIGHT LOSS METHODS IN A NATIONALLY REPRESENTATIVE SAMPLE Alexis Duncan* Alexis Duncan, Yongqi Zhong, Jenine Harris, Ginger Nicol, S. Bryn Austin, (Washington University in St. Louis)

Individuals employ many different methods to lose weight; however, it is unknown how these methods are related to one another. We applied a network approach to examine which of 20 weight loss methods were most commonly used together, that is, if a person mentioned both exercise and eating less, these two would be linked in the network. Data came from 2156 men and 3598 women aged 16-80 years who had indicated that they had "tried to lose weight in the past year" in the Weight History Questionnaire of the National Health and Nutrition Examination Survey (NHANES) in 2009-2010, 2011-2012 and 2013-2014. Exercise and eating less were the most commonly endorsed weight loss methods (62.7% and 58.5%, respectively). Network structures differed substantially by gender. In women, the strongest associations were observed among fasting, smoking and vomiting/laxatives (unhealthy weight loss methods) and among drinking more water, eating more vegetables and fruits, eating less junk food, and eating less sugar (healthier weight loss methods). Other weight loss methods had either direct or indirect connections with each other. In men, several weight loss methods, including unhealthy weight loss methods and prescription diet pills, were neither directly nor indirectly related to any other weight loss methods; whereas the relationships among healthier weight loss methods displayed a similar pattern to that among women. Our results suggest that individuals tend not to engage in healthy and unhealthy weight loss methods simultaneously and that women who engage in an unhealthy weight loss behavior are more likely to engage in additional unhealthy weight loss behaviors. Nationally representative data on these behaviors from individuals who have not tried to lose weight in the past year are needed to determine similar network structures exist among men and women who engage in these behaviors for the purpose of weight control.

RISK FACTORS FOR DELAYED DIAGNOSIS AND TREATMENT OF LYME DISEASE, AND THE IDENTIFICATION OF LYME DIAGNOSIS AND TREATMENT STAGES THROUGH ELECTRONIC MEDICAL RECORDS AND FREE TEXT ANALYSIS Jonathan Pollak* Jonathan Pollak, Katherine Moon, Annemarie G. Hirsch, Brian Schwartz, (Johns Hopkins University Bloomberg School of Public Health, Department of Environmental Health and Engineering)

Early identification and treatment of Lyme disease, typically presenting as Erythema Migrans (EM), is important to prevent serious complications; including arthritis, meningitis, neuropathy, and carditis. In this analysis, we aimed to identify and categorize cases, as early or delayed, as well as to evaluate risk factors for delayed diagnosis and treatment among patients in an endemic region. Using Geisinger electronic medical records (EMR) and clinical notes from 1,283,488 primary, specialty, emergency, or urgent care patients in the EMR from 2012 through 2017, we identified 8,457 new Lyme cases though ICD-10 codes. Cases were categorized as early or disseminated Lyme through the processing of clinical notes with a freetext pattern-matching algorithm, or, where available, through specific ICD-10 codes. Early disseminated EM had to be evaluated through text in all cases. Lab results, procedures, and medications were used to further describe cases. Risk factors evaluated were age, sex, race, and proportion of utilization of medical assistance (MA) over observed time; a proxy for socioeconomic status (SES). We intend to further evaluate a variety of community factors including SES as well as health system factors such as utilization of urgent care. We were able to extract sufficiently detailed information from clinical notes to categorize 44% of cases as either early or disseminated, while 42% of cases were found to have an ICD-10 code identifying a specific disease stage or complication. Clinical note quality or absence were limiting factors. Combing information allowed us to categorize 66% of cases by stage. Where both were available there was agreement on classification in 93% of cases (chi2=849, P<0.000). In a three-way analysis of early, disseminated, and uncategorized Lyme, we found age (F= 86.84, P<0.0000), MA utilization (F=12.26, P<0.0000), and sex (chi2=7.813, P=0.020) to be significant risk factors for delayed diagnosis and treatment of Lyme.

OAF IS A NOVEL DNA METHYLATION BIOMARKER FOR COLORECTAL CANCER IN TAIWAN: DATA MINING FROM THREE PUBLIC DATABASES AND VALIDATED BY METHYLATION-SPECIFIC PCR Yu-Ching Chou* Yu-Ching Chou, Fu-Huang Lin, Cheng-Wen Hsiao, Chien-An Sun, Chi-Hua Huang, (School of Public Health, National Defense Medical Center)

Background: Colorectal cancer (CRC) has been a serious public health issue nowadays. Epigenetic alterations underlying the pathogenesis of CRC have been reported. It is imperative to develop new biomarkers to predict the occurrence of CRC. The purpose of this present study is to find novel genes having the potential utility of promoter methylation status to detect CRC risk. Methods: Integrating three open source databases (Prediction of Clinical Outcomes from Genomic Profiles [PRECOG], Methylation and gene expression in Human Cancer [MethHC] and University of California Santa Cruz [UCSC] Genome Browser), we selected the most influential genes as candidates. Subsequently, we recruited 134 CRC patients to verify the DNA methylation status of these candidate genes. OLIGO 7 primer analysis software was used to design and analyze PCR primers for adequate conditions. DNA promoter methylation status was performed using Methylation-Specific PCR (MS-PCR). Results: We used PRECOG to select 763 genes which expression level in tumor tissues was disparate from normal ones, and to evaluate the methylation status of promoter in these genes by MethHC. Moreover, we used UCSC Genome Browser to verify whether the frequency of the CG rich sequence was higher than other regions. Based on the above steps, we found 69 influential genes. Considering cost and time, we randomly selected 5 genes from these 69 influential genes to do MS-PCR validation. Fortunately, one of the 5 genes named out at first homolog (OAF) can be detected in the biospecimens of CRC patients. The hypermethylation frequency of OAF promoter in tumor tissues was 47.8% significantly higher than 26.1% in normal ones (chi-square test, p<0.001). Conclusion: Targeting of OAF promoter methylation status may be a biomarker to detect CRC, and this result suggested that the development of technologies and accumulation of data would help us collect more complete and precise biomarkers.

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PLEURECTOMY DECORTICATION VERSUS EXTRAPLEURAL PNEUMONECTOMY IN MALIGNANT PLEURAL MESOTHELIOMA: SPARCS DATA AND META-ANALYSIS Maaike van Gerwen* Maaike van Gerwen, Emanuela Taioli, Raja Flores, Andrea Wolf, Jorge Gomez, Kenneth Rosenzweig, Bian Liu, (Department of Population Health Science and Policy, Icahn school of Medicine at Mount Sinai, New York)

Introduction: Malignant pleural mesothelioma (MPM) is a rare but grave cancer with poor survival. To date, the debate on the surgery of choice in patients with operable MPM is still ongoing. We evaluated surgery-related mortality and post-operative complications among patients with Extrapleural Pneumonectomy (EPP) vs Pleurectomy Decortication (P/D) in the New York Statewide Planning and Research Cooperative System (SPARCS) database and conducted an extensive meta-analysis. Methods: SPARCS is an all payer claim database for the State of New York. Data of inpatient stays (1995-2012) were used to extract 3826 unique patients with a diagnosis of MPM (ICD-9-CM: 163) and had procedure for EPP and P/D (ICD-9-CM codes: 325, 3250, 3259 and 345, 3451, 3452, respectively). We also identified original research studies evaluating 30-day mortality and postoperative complications of EPP versus P/D by searching the PubMed database using key words "mesothelioma", "pleurectomy", "pneumonectomy", "pneumectomy", "30-day mortality", "survival", "complications", "morbidity". Results: SPARCS data showed that in-hospital mortality (ORadj: 2.6 (95% CI: 0.89-7.7), and postoperative complications (ORadj: 1.25 (95% CI: 0.73-2.14) were higher for EPP compared to P/D. The meta-analysis of 26 eligible studies showed a significant difference in 30-day mortality: EPP 5% (95%CI: 4-6) and P/D 2% (95% CI: 1-3). The proportion of complications was significantly higher for EPP compared to P/D, 46% (95% CI: 36-56) vs 24% (95% CI: 15-34). The proportion of patients with postoperative arrhythmias was significantly higher for EPP compared to P/D, 20% (95% CI: 12-31) and 5% (95% CI: 2-8). Conclusion: These analyses showed that postoperative mortality, postoperative complications, and arrhythmias particularly, are less frequent after P/D compared to EPP. P/D, a less invasive surgical approach, may provide a better option when technically feasible for MPM patients.

BREAST CANCER RISK IN CHRONIC USERS OF PHTHALATE-CONTAINING MEDICATIONS: A DANISH NATIONWIDE COHORT STUDY Thomas P. Ahern* Thomas P. Ahern, Deirdre P. Cronin-Fenton, Anne Broe, Sinna P. Ulrichsen, Bernard F. Cole, Timothy L. Lash, Peer Christiansen, Henrik Toft Sørensen, Rulla M. Tamimi, Per Damkier, (University of Vermont)

Background: Phthalates interfere with hormonal signaling and may affect breast cancer risk. Preclinical evidence implicates some phthalates in breast cancer progression-particularly dibutyl phthalate (DBP), which potentiates the estrogen receptor (ER). Users of phthalate-containing medications represent a highly exposed population for efficient study of phthalate health effects. Methods: We identified all phthalate-containing oral medications marketed in Denmark, recording product codes and the type and mass of phthalate per pill. We enrolled a nationwide cohort of women at risk for a first cancer and without previous exposure to phthalatecontaining drugs in 2005. Using the Danish National Prescription Registry we characterized time-varying, medication-borne phthalate exposure. Incident cancers were ascertained with the Danish Cancer Registry. We fit Cox regression models to estimate associations between cumulative phthalate exposures and breast cancer incidence, adjusting for established risk factors, comorbidity, and co-medications. Results: We identified 481 products from 24 drug classes containing DBP, diethyl phthalate (DEP), cellulose acetate phthalate (CAP), hypromellose phthalate (HPMCP), or polyvinyl acetate phthalate (PVAP). Phthalate mass ranged from 3µg-I.3g per pill. We followed 1.12 million women over 9.99 million personyears, during which 27,111 breast cancers occurred. Fourteen percent of the cohort (n=161,751) was prescribed a phthalate-containing drug. CAP, DEP, HPMCP, and PVAP were not associated with breast cancer. The highest level of DBP exposure (>10,000mg; range: 10,024-71,340mg; median=15,390mg) was associated with an 80% increase in breast cancer risk (HRad j=I.8; 95% CI: 1.0, 3.1). The association was strongest for ER+ disease (HR ad j=1.9; 95% CI: 1.1, 3.5). No published evidence associates the drugs represented by DBP-containing products (bisacodyl, budesonide, mesalazine, multienzymes, diclofenac, and lithium) with breast cancer risk.

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SUBSTITUTION OF DIETARY PROTEIN SOURCES IN RELATION TO COLORECTAL CANCER RISK IN THE NIH-AARP COHORT STUDY Linda M Liao* Linda M Liao, Erikka Loftfield, Arash Etemadi, Barry I. Graubard, Rashmi Sinha, (NCI DCEG)

Previous studies have shown positive associations between red meat intake and colorectal cancer (CRC). However, less is known about the impact of substituting plant for animal protein on CRC risk. In the large prospective National Institutes of Health-AARP cohort study, we evaluated this substitution effect with risk of CRC. Protein intake was assessed at baseline using a food frequency questionnaire. HRs and 95% CIs were estimated using multivariable adjusted hazard ratios from Cox proportional hazards models. We used a substitution model with total protein intake held constant, so that an increase in plant protein was offset by an equal decrease in animal protein. Among 489,625 individuals, we identified 8,995 incident CRCs (3,990 proximal, 2,514 distal, and 2,276 rectal) after a median follow-up of 15.5 years. The substitution of plant protein for animal protein was associated with a reduced risk of CRC (HR for highest vs. lowest fifth 0.91; 95% CI: 0.83-0.99). This reduction in CRC risk appeared to be primarily due to the substitution of plant protein for red meat protein (HR: 0.89; 95%CI: 0.81-0.97); not white meat protein (HR: 0.96; 95%CI: 0.88-1.05) or other animal protein (HR: 0.94; 95%CI: 0.86-1.03). When further evaluated by source, reduction in CRC risk was limited to the substitution of protein from bread, cereal and pasta for red meat protein (HR: 0.86; 95%CI: 0.80-0.93). The association between the substitution of protein from bread, cereal and pasta for red meat protein was stronger for distal colon (HR: 0.78; 95% CI: 0.67-0.90) and rectal cancer (HR: 0.79; 95% CI: 0.68-0.91), but not present for proximal colon (HR: 0.99; 95% CI: 0.88-1.11). This study shows that substitution of plant protein for animal protein, especially red meat protein, is associated with a reduced risk of CRC, and suggests that protein source has an impact on CRC risk.

THE EFFECT OF BETEL-QUID USE DISORDER ON ORAL PRECANCEROUS DISORDER AND ORAL SQUAMOUS CELL CARCINOMA Yugh Tzu Ching Yugh Tzu Ching Leg (De

CARCINOMA Yueh-Tzu Chiu* Yueh-Tzu Chiu, Chien-Hung Lee, (Department of Public Health, College of Health Science, Kaohsiung Medical University, Kaohsiung, Taiwan)

Betel-quid (BQ) is the fourth most commonly consumed psychoactive substance in the world, and abuse and dependence have occurred in subsets of tobacco-free BQ chewers. Oral submucous fibrosis, epithelial hyperplasia, epithelial dysplasia, and hyperparakotosis are a group of oral precancerous disorders (OPD) believed to be associated with the development of oral squamous cell carcinoma (OSCC). Although BQ chewing has been recognized a risk factor for oral cancer. The effect of BQ addictive use on OPD and OSCC has not been well understood. We conducted a multicenter case-control study in the Kaohsiung Medical University Hospital and Taichung Veterans General Hospitals in Taiwan. A total of 63 OPD and 156 OSCC pathologically confirmed patients and 261 controls were recruited. A 11 disorder symptom-included questionnaire developed from DSM-5 substance use disorder was used to measure BQ use disorder (BUD) and other covariates. Participants with 0-1, 2-3, 4-5 and ≥6 DSM-5 symptoms were defined no, mild, moderate and severe BUD, respectively. The multivariable logistic regression models were used to assess the effect of BUD on the risk of OPD and OSCC. Adjusting for confounding factors, we found that BQ chewers with mild to moderate BUD had a 10.6-17.1-fold higher OPD risk and a 6.2-10.4-fold elevated OSCC risk than non-chewers. The risk was observed to be 65.0- and 42.4-fold for the two oral disorders among chewers with severe BUD. Our findings highlight the effect of BUD on OPD and OSCC.

0045

MAKING RESEARCH IMPACT ON CANCER PREVENTION: AN INTEGRATED KNOWLEDGE TRANSLATION STRATEGY FOR THE CANADIAN POPULATION ATTRIBUTABLE RISK (COMPARE) STUDY Zeinab El-Masri* Zeinab El-Masri, Leah Smith, Prithwish De, Elizabeth Holmes, Robert Nuttall, (Cancer Care Ontario)

Background: The Canadian Population Attributable Risk (ComPARe) study brings together expertise from Canadian researchers and the Canadian Cancer Society (CCS) to estimate the number and proportion of incident cancers in Canada, now and to 2040, that could be prevented through changes in modifiable lifestyle and environmental exposures. The findings have the potential to have a major impact on cancer control and prevention in Canada. Objective: To develop a knowledge translation (KT) strategy to enhance the utility of results from the ComPARe study. Methods: KT leads among ComPARe investigators were tasked with developing and implementing a KT strategy aimed at enhancing the relevance and uptake of ComPARe results to cancer control in Canada. The strategy is divided into four phases: planning, knowledge product development, dissemination, and evaluation, with knowledge user engagement built in throughout. Results: A logic model was developed to map the inputs, activities, desired outputs and outcomes of the KT activities. Next, an Advisory Committee of key stakeholders from across Canada was formed as a mechanism for engaging knowledge users and obtaining their input on the KT strategy. Knowledge product development is underway, including an interactive data dashboard to house all ComPARe results and a toolkit to enable stakeholders to develop customized KT strategies. Anticipated dissemination activities include conference presentations, social media, and targeted webinars. Conclusion: Through an integrated KT approach, the expertise of the key mobilizers of the results (CSS) and the producers of knowledge (researchers) were brought together. The development of an Advisory Committee allows for meaningful engagement of knowledge users. The KT strategy, developed through collaboration between the producers, mobilizers and users of knowledge, is expected to greatly enhance the impact of ComPARe results on cancer prevention planning and decisionmaking in Canada.

0044 S/P

EFFICACY OF CRIZOTINIB, CERITINIB, AND ALECTINIB IN THE TREATMENT OF ALK-POSITIVE NON-SMALL CELL LUNG CANCER: A META-ANALYSIS OF CLINICAL TRIALS Tung Hoang* Tung Hoang, Thi-Thu Pham, Boyoung Park, Seung-Kwon Myung, (National Cancer Center, South Korea)

Objectives: This study aimed to evaluate the efficacy of anaplastic lymphoma kinase (ALK)-inhibitors in the treatment of ALK-positive non-small cell lung cancer (NSCLC) by using a meta-analysis of clinical trials. Methods/Materials We searched PubMed, EMBASE, Cochrane Library, and Clinicaltrials gov by using key words related with the topic in October 2017. The pooled effect sizes were calculated based on the random-effects model. Also, we performed subgroup analysis by type of ALK inhibitors (crizotinib, ceritinib, and alectinib) and publication bias where 10 or more study groups were available. Results: A total of 18 clinical trials with nine single-arm trials and nine double-arm trials were included in the final meta-analysis. The median overall survival (OS), progression free survival (PFS), overall response rate (ORR), disease control rate (DCR), 1-year survival rate, and 2-year survival rate were 19.89 months, 8.58 months, 64%, 81%, 74%, and 62%, respectively. Also, ALK inhibitors performed the significantly superior effect compared to chemotherapy (hazard ratio (HR) for OS, 0.83; HR for PFS, 0.48; rate difference (RD) for ORR, 0.22; and RD for DCR, 0.08). Further, while the risk of disease progression was 53% lower in patients treated with alectinib than those treated with crizotinib (HR for PFS, 0.47; 95% Cl, 0.35-0.63), the effect on ORR was still comparable. Conclusions: The current meta-analysis of trials showed the significant effect of ALK inhibitors in the treatment of ALKpositive NSCLC. Further randomized controlled trials should be conducted to compare the efficacy of ALK inhibitors each other and with other NSCLC treatments.

0046 S/P

NON-HERBAL TEA CONSUMPTION AND OVARIAN CANCER RISK. A SYSTEMATIC REVIEW AND META-ANALYSIS OF OBSERVATIONAL EPIDEMIOLOGIC STUDIES WITH INDIRECT COMPARISON AND DOSE-RESPONSE ANALYSIS Dongyu Zhang* Dongyu Zhang, Alpana Kaushiva, Yuzhi Xi, Tengteng Wang, Nan Li, (University of North Carolina at Chapel Hill)

Background: Ovarian cancer (OC) accounts for 4% of female malignancies worldwide and its prognosis is unfavorable. Currently available epidemiologic data suggest that non-herbal tea consumption may reduce OC risk but these evidences are inconsistent. Methods A comprehensive literature search for observational epidemiologic studies reporting associations between non-herbal tea consumption and OC risk was conducted in electronic databases. A random-effects model was used to synthesize effect measures in binary meta-analysis, and adjusted indirect comparison was used to compare if there was a difference in effects between green tea (GT) and black tea (BT). Both linear and non-linear models were used to explore the dose-response relation. Results: Fourteen studies were included and we obtained an inverse and significant pooled estimate in binary meta-analysis (RRpool=0.76, 95% CI 0.61-0.95, PCochrane<0.001, 12=81.5%). No publication bias was identified in binary meta-analysis In binary meta-analysis stratified by tea types, we observed a significant association for GT (RRpool=0.64, 95% Cl 0.45-0.90, PCochrane=0.071, I2=53.6%) but not BT (RRpool=0.85, 95% CI 0.65-1.12, PCochrane=0.007, I2=65.9%). Indirect comparison, which treated BT as the reference, showed an inverse but non-significant association (RRGT vs. BT=0.74, 95% CI 0.48-1.15). Both linear and non-linear models found that OC risk decreased as the consumption levels of total non-herbal tea increased. However, the doseresponse relationship was stronger for GT as compared to BT. Conclusion: Our results suggest that non-herbal tea, especially GT, is associated with a reduced risk of OC. Future studies should explore biochemical evidence regarding the variation in chemopreventive effects between different types of non-herbal tea.

A MULTIGROUP CONFIRMATORY FACTOR ANALYSIS OF THE EXPANDED PROSTATE CANCER INDEX COMPOSITE SHORT FORM (EPIC-26) IN ENGLISH AND SPANISH SPEAKERS. Ashly C Westrick* Ashly C. Westrick, Maria Carmen Mir, Olatz Garin Boronat, Montserrat Ferrer Fores, Ferran Ferrer, Manel Castells, Lluis Fumado, Raymond R. Balise, (University of Miami, Miller School of Medicine, Miami, Florida)

Despite being widely used to assess the health-related quality of life (HR-QOL) for men undergoing treatment for localized prostate cancer, little is known about the psychometrics of the Expanded Prostate Cancer Index Composite Short Form (EPIC-26). Using post treatment information, we conducted a multi-group confirmatory factor analysis (MG-CFA). MG-CFA was used to test if the EPIC-26 measurement model was invariant across English and Spanish-speakers. A baseline model was used to test whether the two groups have the same factor structure. The metric-invariance model, where factor loadings are set to be equal, tested whether the strength of the association between each item and the corresponding latent factor is equal across groups. The scalar invariance model, setting both the factor loadings and item intercepts to be equal, tested if individuals with the same underlying level of the construct have equivalent observed item scores. Data were from 638 men from the original EPIC validation cohort and 450 men from the "Spanish Multicentric Study of Clinically Localized Prostate Cancer". A change in CFI of greater than 0.01 signified a significant difference between models. The overall model and configural models exhibited reasonably fit [(RMSEA = 0.053; SRMR = 0.063; CFI = 0.882) and (RMSEA = 0.077; SRMR = 0.079; CFI = 0.86), respectively] indicating that the groups conceptualize the construct (HR-QOL) similarly. The metric model, produced a reasonable fit (RMSEA = 0.083; SRMR = 0.094; CFI = 0.831) but demonstrated significant degradation in fit from the configural model (CFI = 0.031) suggesting that the two groups might be responding to the items in different ways. If measurement invariance is lacking conclusions based on the scale could be ambiguous or erroneous thus impacting clinical care negatively. We found evidence of similar factor structure but did not obtain metric invariance across groups suggesting that the groups are responding to items differently.

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MORTALITY FROM HEAD AND NECK CANCER IN CHILE 2003-2014 Doris Duran* Doris Duran, Oscar Arteaga, Maria Jose Monsalves, (Facultad de Medicina, Universidad San Sebastián)

Head and neck cancer includes malignant neoplasms from the lips to the larynx. Represent 3.2% of total cancer in the world and affects mainly men. The behavior in Chile is unknown. Goals: To describe mortality from head and neck cancer in Chile and its 15 regions between 2003 and 2014. Methodology Secondary analysis of mortality records. Ecological study considering 15 regions as the unit of analysis. The trend of mortality from head and neck cancer was analyzed, considering 4 triennia from 2003-2014. Differences in age-standardized mortality rates (ASMR) were evaluated in each region. The Chilean population of 2014 was used as a standard (census projections). The annual change rate of the ASMR was calculated to evaluate change over time. Results: Deaths from head and neck cancer represent 1.58% of cancer deaths in Chile with 348 (SD: 37) deaths per year on average. 75.68% are men. 77.27% were in older adults The 2003-2014 mortality rate was 2.08 per 100,000 inhabitants, being 3.18 x 100,000 in men and 1x 100,000 in women. rates are higher in the north of the country. Mortality in all regions decreased in time, except in Araucanía, Los Lagos, and Los Ríos, neighboring regions of the south of the country. Antofagasta between 2003 and 2005 was the highest of the period with an ASMR of 35.3 deaths in 100,000 (95% CI 24.8, 45.7). The global change between 2003 and 2014 was -1,46%. Conclusion: Mortality has remained stable, despite slight increases in the south. This group of cancers should be addressed considering an analysis of incidence and survival to assess the complete phenomenon.

GENERALIZING RANDOMIZED CLINICAL TRIAL RESULTS TO CALENDAR-YEAR SPECIFIC COHORTS OF OLDER STAGE II-III COLON CANCER PATIENTS INITIATING ADJUVANT CHEMOTHERAPY Jennifer L. Lund* Jennifer L. Lund, Michael A. Webster-Clark, Hanna K. Sanoff, Alexander P. Keil, Daniel Westreich, M. Alan Brookhart, Til Sturmer, (University of North Carolina at Chapel Hill)

In 2004, the landmark MOSAIC trial reported that FOLFOX (combined) vs. 5FU (single) therapy reduced all-cause mortality among stage II-III colon cancer patients (hazard ratio (HR)=0.84 (0.71, 1.00), but benefits were confined to stage III and younger (age<70 years) patients. Differential uptake of FOLFOX in clinical practice could impact its population-level effectiveness. We compared the effectiveness of FOLFOX vs. 5FU in a target population of Medicare beneficiaries with colon cancer aged 65-75 years, overall and by calendar year. Analyses were restricted to MOSAIC participants aged 65+ years (max age=75). Target population data from linked cancer registry and Medicare claims data (2004-2013) included stage II-III colon cancer patients initiating FOLFOX. We estimated the intention-to-treat effect of FOLFOX vs. 5FU on mortality overall and in year-specific Medicare cohorts by applying inverse odds of sampling weights to the MOSAIC data; weights were derived using age, sex, and cancer substage. We estimated overall and year-specific HRs and 95% confidence intervals using weighted Cox proportional hazards models. We analyzed 780 MOSAIC and 4032 Medicare patients. In MOSAIC, 40% were 70+ years compared to 58% in Medicare, which varied over time (55-65%). The proportion of stage II patients was lower in Medicare vs. MOSAIC (17% vs. 41%). Among MOSAIC participants, the unweighted HR for mortality comparing FOLFOX vs. 5FU was 1.06 (0.82, 1.38). Patients with stage IIIC disease benefitted from FOLFOX (HR=0.62 (95% CI: 0.39, 0.99)), while lower stage patients did not. Reweighting MOSAIC data did not substantially change results [overall weighted HR: 0.98 (0.72, 1.35); year-specific weighted HRs (range): 0.90 (0.62, 1.29) in 2012 to 1.12 (0.81, 1.56) in 2013]. Despite observed differences between trial and target populations, the weighted overall and year-specific HRs for mortality were similar to unweighted estimates when restricted to those age 65+ years.

0050 S/P

AROMATASE INHIBITOR AND TAMOXIFEN USE AND THE RISK OF VENOUS THROMBOEMBOLISM IN A LARGE POPULATION BASED COHORT STUDY Xiaoqing Xu* Xiaoqing Xu, Rowan T. Chlebowski, Ana Barac, (Dept. of Research & Evaluation, Kaiser Permanente Southern California)

Background Venous thromboembolism (VTE) is the second most common cause of death in hospitalized patients with cancer, and cancer treatments may exacerbate VTE risk. Patients with hormone-receptor positive breast cancer usually receive ad juvant endocrine therapy for five years or longer. Our goal was to examine the long-term effect of aromatase inhibitor (AI) on VTE compared with tamoxifen use among breast cancer survivors. Methods A prospective cohort 12,904 insured postmenopausal women who were diagnosed with a first primary hormone-receptorpositive breast cancer and free from previous cardiovascular disease or VTE from 1991-2010 were followed through December 2011. Data elements were captured from the comprehensive electronic health records of a large California health plan, Kaiser Permanente. Women who developed deep vein thrombosis (DVT) or pulmonary embolism (PE) were classified as having VTE. We calculated personyear rates of VTE by AI and tamoxifen use. Multivariable Cox proportional hazards models were used to assess the effect of time-dependent endocrine therapy use and VTE risk after accounting for key covariates (tumor characteristics, diabetes, hypertension, statins, and other cardiovascular medication use). Results We identified 623 VTE events during the follow-up. The crude rates were 4.6 per 1,000 person-years and 2.8 per 1,000 person-years for DVT and PE, respectively. Compared with tamoxifen use, AI use was associated with a 36% lower VTE risk (ad justed HR=0.64, 95% CI: 0.47, 0.87), as well as reduced risks of DVT and PE as individual outcomes after accounting for the potential detection bias. However, we had insufficient evidence to conclude if longer duration of AI use and reduced VTE events. Conclusion In our large cohort of insured postmenopausal women with breast cancer, AI use was associated with a statistically lower risk of VTE. The findings can supplement existing evidence to inform treatment decisions that balance cancer control and cardiotoxic outcomes.

TISSUE MARKERS ASSOCIATED WITH RESIDUAL DISEASE AFTER DEBULKING SURGERY IN OVARIAN CANCER Naoko Sasamoto* Naoko Sasamoto, Megan S. Rice, Mary K. Townsend, Allison F. Vitonis, Douglas C. Marchion, Anthony M. Magliocco, Kathryn L. Terry, Jonathan L. Hecht, Shelley S. Tworoger, (Brigham and Women's Hospital)

Background: Optimal debulking with no macroscopic residual disease is strongly predictive of ovarian cancer survival. However detailed debulking data is not available in many epidemiologic studies, limiting the ability to conduct survival analyses that account for confounding by or assess independence from debulking status. Though surgical skill is important, evidence suggests debulking status is dependent on tumor biology. Three protein markers (POSTN, CXCL14, and pSmad2/3) were previously reported to predict optimal debulking in high-grade serous (HGS) ovarian cancers with an area under the curve (AUC) of 0.89. Here we evaluate these markers and four others (ADH1B, FABP4, FAP, COL11A1) identified in mRNA expression studies as potential debulking markers in 96 HGS tumors (11.5% suboptimally debulked) from the New England Case Control study (NEC), a population based case control study of ovarian cancer (1992-2008). Methods: Seven markers of residual disease were measured by immunohistochemistry on tissue microarrays. The IHC signatures were scored by a pathologist (0 to 3 by staining intensity of cancer tissue) or evaluated by the Definiens automated platform (percent of area stained). We used logistic regression to estimate the association between the 1HC scores and debulking status. Results: High expression of POSTN in the cancer tissue was associated with 12.6-fold increased odds of having residual disease after debulking surgery and high expression of FABP4 was associated with 1.8-fold increase in the odds of having residual disease after debulking surgery (p <0.05). A model including POSTN, CXCL14, and pSMAD had an AUC of 0.81 and a model including all seven markers had an AUC of 0.82. Conclusion: Our data suggest that 1HC markers may be useful in the creation of tissue-based debulking signatures that facilitate survival analysis where debulking status from surgical reports is not available. Efforts to increase sample size and conduct validation are ongoing.

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FACTORS ASSOCIATED WITH SHORT-TERM ADVERSE EVENTS AND LONG-TERM SURVIVAL AFTER LUNG-CANCER DIRECTED SURGERIES: AN ANALYSIS OF NEW YORK STATE CANCER REGISTRY DATA LINKED WITH INPATIENT ADMINISTRATIVE DATA Bian Liu, Francis Boscoe, Raja M Flores, Emanuela Taioli, (lcahn School of Medicine at Mount Sinai)

Lung cancer continues to be the leading cause of cancer deaths. We investigated predictors of short-term and overall survival among lung cancer patients using New York State cancer registry data linked with the inpatient claims from the Statewide Planning and Research Cooperative System. We identified 20,093 patients from the linked database (2004-2014), with a primary diagnosis of lung cancer between 2004 and 2013, and had a subsequent lung resection. Factors associated with postoperative adverse events (complications and in-hospital mortality) and with overall survival were investigated using logistic model and stepwise Cox proportional hazard model, respectively. The median (interquartile range) age at diagnosis was 66 (58-74) years; 28% of the patients had in-hospital complications, and 2% patients died in the hospital. Significant risk factors for increased odds of complications and in -hospital mortality were advanced age at diagnosis (OR= 1.01; 95%CI: 1.01-1.02 and 1.05; 1.04-1.07 per increased year), higher comorbidity index (OR: 1.02; 95% Cl: 1.02-1.03 and 1.1; 1.1-1.13) and longer length of stay (OR:1.12; 95% Cl: 1.1-1.2 and 1.04; 1.04-1.05). In-hospital mortality was also associated with tumor size (OR: 1.27; 95% CI: 1.11-1.47). The median follow-up time since cancer diagnosis was 3 (1.7-6) years, and 42% of the patients died at the end of the study. Factors statistically associated with worsened long-term survival were advanced age at diagnosis, later stage, larger tumor size, non-lobectomy surgery, increased length of stay, and comorbidities. The linkage of cancer registry and administrative healthcare data provides a highly cost-effective way to investigate surgical lung cancer patterns, helping identify main prognostic factors for patients in need of surgical treatment.

RISK FACTORS FOR MAMMOGRAPHY SCREENING FAILURES BY CLINIC AL PROGNOSTIC STAGE AT DIAGNOSIS Anne Marie McCarthy* Anne Marie McCarthy, Michaela Welch, Matthew Melesky, Constance Lehman, Aditya Bardia, Katrina Armstrong, (Massachusetts General Hospital)

Introduction: Mammography screening failures occur when breast cancer is diagnosed after a negative mammogram before the next screening. The study objective was to examine risk factors for mammography screening failures by cancer prognosis. Methods: Women ≥40 years who had a negative screening mammogram at Massachusetts General Hospital from 2006-2014 were included. Women with prior breast cancer, breast implants, and non-MA residents were excluded. Screening failures were defined as breast cancers diagnosed within 1 year of negative mammogram based on linkage with the MA Cancer Registry. Prognosis was defined using new AJCC Cancer Staging Manual 8th Edition breast cancer clinical prognostic stage groups, which incorporate grade and tumor molecular subtype. Logistic regression was used to estimate the associations of patient characteristics with screening failures, and multinomial logistic regression was used to assess associations with good (stage 0-1) versus poor prognosis (stage II-1V). Results: Among 271,080 negative mammograms, 232 screening failures occurred. The median age was 57 and most patients were white (83%). Fourteen percent reported family history of breast cancer and 44% had dense breasts Breast density (OR=3.4 95% CI 2.5-4.6) and family history (OR=1.9 95% CI 1.4-2.6) were strongly associated with screening failure. One third of screening failures had poor prognosis. In the multinomial model, breast density and family history were associated with good prognosis; only breast density was associated with poor prognosis. Though not statistically significant, women <50 yrs had greater odds of poor prognosis (OR=1.5 95% Cl 0.9-2.4). Conclusions Most screening failures had good prognosis based on clinical prognostic staging, and risk factors differed among screening failures by tumor prognosis. Identifying women at high risk for poor prognosis screening failures would allow supplemental screening among women at highest risk of dying from breast cancer.

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PREVALENCE OF FINANCIAL BURDEN AND ASSOCIATED PSYCHOLOGICAL DISTRFSS AMONG US ADULT CANCER SURVIVORS WHO REPORTED HAVING HEALTH INSURANCE THAT PAID FOR ALL OR PART OF CANCER TREATMENT Betsy Wilson* Vinay K. Cheruvu, Betsy Wilson, Sabana Bhatta, Saroj Bista, (College of Public Health, Kent State University, Kent, OH, 44242)

Several studies have well documented the association between financial burden of cancer care and mental health in adult cancer survivors (ACS). The objective of the current study is to study this association in ACS for whom health insurance paid for cancer treatment and are currently not on treatment. Cross-sectional data from the 2010 Behavioral Risk Factor Surveillance System (BRFSS) were used for this study (n = 2,809). Financial burden, the primary exposure of interest, was binary (Yes / No). Psychological distress (Yes / No) was assessed based on the responses to the eight-item Patient Health Questionnaire (PHQ-8) depression scale. Weighted prevalence estimates of financial burden and psychological distress along with corresponding 95% confidence interval (C1) were computed. Logistic regression was used to examine the association between financial burden and psychological distress after adjusting for all potential confounders. Statistical analysis accounted for complex sampling design of the BRFSS. The prevalence of self-reported financial burden and psychological distress among ACS was 10.4% (95% CI: 7.9 - 13.0) and 12.1% (95% CI: 9.7 - 14.4) correspondingly. The prevalence of psychological distress was significantly higher in ACS who reported financial burden compared to those who did not report financial burden: 43.5% (95% Cl: 30.1 - 56.9) vs. 8.4% (95% CI: 6.4 - 10.3). After adjusting for all potential confounders (age, age since cancer diagnosis, gender, race, marital status, education, employment, income level, number of chronic conditions, general health, having a primary care provider, annual checkup, and having a health plan), ACS who reported financial burden were at a significantly higher likelihood to report psychological distress compared to those who did not report financial burden: 5.7 (95% Cl: 3.1-18.8). Financial burden of cancer care after treatment is significantly associated with higher odds of selfreported psychological distress.

THE CHILE BILIARY LONGITUDINAL STUDY (CHILE BILS): A COHORT PROFILE Emma E. McGee* Emma E. McGee, Vanessa Van De Wyngard, Paz Cook, Ruth M. Pfeiffer, Noldy Mardones, Hector Losada, Juan Carlos Roa, Allan Hildesheim, Juan Carlos Araya, Catterina Ferreccio, Jill Koshiol, The Chile BiLS Study Group, (National Cancer Institute)

Background: Gallbladder cancer is a leading cause of cancer death among women in Chile. Gallstones occur in >90% of Chileans with gallbladder cancer, but only a small proportion of gallstone patients develop cancer. Because gallstone prevalence is high, the Chilean government prioritizes gallstone patients aged 35-49 for cholecystectomy, regardless of symptoms, causing overtreatment of some and undertreatment of others. The aim of this study is to prospectively assess risk factors and early markers for gallbladder dysplasia/cancer (GDC). Methods: In 2016, we began recruiting a cohort of ~6,000 Chilean women aged 50-74 with gallstones identified via ultrasound. We expect to complete recruitment in 2018. Women will be followed for 6 years, with yearly contacts and follow-up visits every other year. We are collecting blood, ultrasound, physical exam, and questionnaire data at baseline and follow-up. We will also collect surgical specimens (e.g. gallbladder tissue) from those who go to surgery. The primary outcome of interest is GDC. Primary exposures of interest include ultrasound characteristics, inflammatory markers, and obesity/metabolic syndrome; secondary exposures of interest include genomic factors, Salmonella typhi, and aflatoxin. Results: To date, we have recruited 3,361 women. Among 3,011 women with baseline data currently available, the mean age is 60 years (SD: 7.0), 47.0% have completed ≤8 years of school, 25.0% are Amerindian, 29.5% are overweight, 61.1% are obese, 26.9% have diabetes mellitus, 29.6% report biliary colic in the last year, and 55.3% report gallstones in at least 1 immediate family member. Upon ultrasound examination, 45.4% have >1 gallstone, 10.7% have scleroatrophic gallbladders, and 4.2% have severe fatty liver. Conclusions: The largest prospective study of gallstone patients at risk of GDC will improve our understanding of the etiology and natural history of GDC, inform GDC prevention, and provide a rich resource for future investigations.

IMPACT OF COMPREHENSIVE HOSPICE PALLIATIVE CARE ON USE OF POTENTIALLY AGGRESSIVE END-OF-LIFE CARE IN SUDBURY, ONTARIO, CANADA (2012-2015): A PROPENSITY SCORE-MATCHED OBSERVATIONAL STUDY Mike Conlon* Mike Conlon, Joseph Caswell, Barbara Ballantyne, Margaret Meigs, Stacey Santi, Craig Earle, Andrew Knight, Mark Hartman, (Health Sciences North Research Institute)

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Comprehensive Hospice Palliative Care (HPC) offers important direct benefits to cancer patients and their families and potential benefits to the health system through reduced use of potentially aggressive end-of-life care (EoL). The Symptom Management Clinic (SMC) of the Northeast Cancer Centre, in Sudbury, Ontario, Canada, was established in 2011 and provides HPC treatment primarily to residents of Greater Sudbury and District (approx. population 180,000). All residents in Ontario, Canada, have universal public health insurance, the Ontario Health Insurance Plan (OHIP), and almost all medically necessary services are captured in large linked administrative datasets. We used these data, from the Institute for Clinical Evaluative Sciences (ICES) through the Ontario Cancer Data Linkage Project, to select a propensity score-matched control group (1:1), and to derive system level quality measures associated with the use of potentially aggressive EoL care. EoL measures were defined using published methodology, and included: multiple emergency department visits, hospital admissions, ICU admissions, chemotherapy use, and place of death. Proportions were derived and used to calculate Absolute Risk Reduction (ARR), number needed to treat (NNT), relative risk (RR) and associated 95% Confidence Intervals (95% CI). Most (n=853/914; 93.3%) of the treatment cohort was matched, and groups were adequately balanced. Analyses revealed significantly protective treatment effects of all measured variables. As examples, treatment group members were significantly less likely to receive multiple hospitalizations within the last month of life, with an ARR of 0.033 (95% CI 0.011-0.056) and RR of 0.56 (95% CI 0.38-0.84) or die in an acute care hospital, with an ARR of 0.226 (95% CI of 0.182-0.270) and RR and 95% CI of 0.514 (0.447-0.591). Comprehensive HPC delivered through this ambulatory program has substantial and measureable impact on use of EoL care variables.

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ETHNIC DISPARITIES IN THE RECEIPT OF GUIDELINE CONCORDANT TREATMENT IN COLORECTAL CANCER PATIENTS, WITH CAUSAL MEDIATION ANALYSIS Chelsea Obrochta* Chelsea Obrochta, Caroline Thompson, James Murphy, (Doctoral Student, Epidemiology. SDSU/UCSD)

Background: Colorectal cancer (CRC) is the third most commonly diagnosed cancer in the United States. If CRC is diagnosed at an early stage and adherence to guideline concordant care is met, CRC is highly treatable. Despite these proven guidelines, there are ethnic disparities in receipt of guideline concordant treatment (GCT) and timeliness of care, some of which may be attributable to socioeconomic status (SES). We studied the relationship between patient race/ethnicity and receipt of GCT among colorectal cancer patients in California, and used a causal mediation analysis to separate the direct and indirect effects. Methods: 29,428 patients diagnosed with stage I-III colon or rectal cancer (2009-2013) in the California Cancer Registry were included in our study. GCT was defined as initiation of timely treatment, administration of proper treatment(s), and administration of proper treatment(s) in the correct order. Multiple logistic regression models were used to examine the association of race/ethnicity with GCT, and timeliness of care. Lastly, a causal mediation analysis was conducted to disentangle the impact of race/ethnicity and SES. Results In minimally adjusted models, Hispanics, blacks, and Asians were significantly less likely to receive guideline concordant treatment or initiate treatment within 60 days of diagnosis, compared to whites. After further adjustment, some of the effect appears to be attributed to SES. Preliminary causal mediation analysis results revealed that 50.4% of the total effect of overall GCT and 76.7% of the total effect of initiation of treatment within 60 days is explained by race/ethnicity. Conclusion: Ethnic disparities in receipt of GCT and timely treatment exist, independently of SES. Researchers and clinicians should focus their attention to minority communities that need additional health resources, and a continued effort needs to be made to eliminate discrimination and provider bias.

USING MARGINAL STRUCTURAL MODELS TO ESTIMATE EFFECTS OF DIALYSIS MODALITIES ON BLOOD PRESSURE IN ESRD PATIENTS Melissa Soohoo* Melissa Soohoo, Elani Streja, Matthew B. Rivara, Kamyar Kalantar-Zadeh, Rajnish Mehrotra, Onyebuchi A. Arah, (UCLA)

Background: Among end-stage renal disease patients, intradialytic hypotension often stems from the inability to tolerate ultrafiltration following dialysis treatment and other cardiovascular related complexities. However, there are limited data on the comparative effects of dialysis modalities with longer treatment time or higher frequency on blood pressure. Methods: This cohort study used data on 116,930 incident dialysis patients treated with any of the following modalities conventional thrice-weekly in-center hemodialysis (HD), nocturnal in-center hemodialysis (NICHD), or home hemodialysis (HHD). Using marginal structural models fitted with inverse probability weights to adjust for confounding from fixed and timevarying covariates, we sought to examine the effects of different treatment modalities on time-varying levels of these outcomes pre-dialysis systolic blood pressure (PreSBP), ultrafiltration rate (UFR) and frequency of intradialytic hypotension (defined as <90 SBP). We used a generalized linear model framework, specifying appropriate distributions and links for each outcome in pooled analysis. We also analyzed the data using conventional covariate-adjusted outcome regression models. Results: Compared to conventional HD patients, NICHD patients had higher mean PreSBP (3.0 mmHg [95% CI 0.1, 5.9] higher), whereas HHD patients had lower mean PreSBP (9.4 mmHg [95% CI 7.4, 11.3] lower). Both NICHD and HHD patients had lower mean UFR compared to HD patients (1.78 mL/hr/kg [95% CI 1.36, 2.20] and 2.38 mL/hr/kg [95% CI 2.03, 2.73]). Compared to HD, the relative risks for the effects of NICHD and HHD on the frequency of intradialytic hypotension were 1.46 [95% CI 0.84, 2.56] and 1.05 [95% CI 0.80, 1.37] respectively. Conclusion: Treatment with dialysis modalities with longer treatment time (NICHD) or higher frequency (HHD) compared to treatment with HD led to different patterns of pre-dialysis SBP and ultrafiltration rate, but not hypotension frequency.

0062 S/P

ASSOCIATION OF CHANGE IN GALECTIN-3 AND RISK OF CHRONIC KIDNEY DISEASE (CKD) PROGRESSION IN THE CHRONIC RENAL INSUFFICIENCY COHORT (CRIC) STUDY: A CASE-COHORT STUDY Zihe (Emma) Zheng* Zihe Zheng, Jason Roy, Paula Ferreira Orlandi, Harold I Feldman, Nisha Bansal, Amanda Hyre Anderson, (University of Pennsylvania)

Background: Kidney fibrosis is a final common pathway of CKD progression. However, it is unknown whether the change in plasma galectin-3 levels, a key marker of inflammation and fibrosis, is independently associated with kidney function decline among adults with CKD. Methods We conducted a case-cohort study including a random subcohort of 1300 individuals from the baseline visit of the CRIC study, an ongoing, multi-center, prospective cohort of men and women with CKD. Participants were followed for the composite outcome of a 50% reduction in estimated glomerular filtration rate (eGFR) or onset of end-stage renal disease (ESRD). Change in galectin-3 (from baseline to Year 2) were calculated among the random subcohort and all non-subcohort cases. Weighted logistic regression models estimated the relationship between two-year change in galectin-3 and CKD progression after Year 2. Results: After excluding prevalent ESRD cases and those with missing data, 1180 individuals were included. Two-year change in galectin-3 (mean: 4.0 ng/mL, SD: 8.1) was significantly associated with female gender, greater BMI, higher systolic blood pressure, lower baseline eGFR, and baseline galectin-3 levels lower than 20 ng/mL. Analyses of the association between change in Galectin-3 and subsequent loss of kidney function showed that each 5 unit increase in galectin-3 was associated with a 14% greater odds (OR=1.14, 95% CI 1.01, 1.28) of CKD progression, independent of baseline biomarkers of eGFR, urine protein-to-creatinine ratio, NGAL, Na, K, serum phosphate, FGF-23, high sensitivity-CRP, ILIRA, IL-1β, TNF-α, high sensitivity troponin T, and NTproBNP. Similarly, the highest, compared to the lowest, quartile of galectin-3 change was observed to have over a two-fold higher odds (OR=2.2, 95% CI 1.29, 3.75) of CKD progression. Conclusion: Changes in plasma galectin-3 levels hold promise to become a novel marker of higher risk for CKD progression among diverse populations of adults with CKD.

0061 S/P

PERIODONTAL DISEASE, EDENTULISM, AND HYPERTENSION RISK AMONG POSTMENOPAUSAL WOMEN IN THE WOMEN'S HEALTH INITIATIVE OBSERVATIONAL STUDY Joshua H Gordon* Joshua H Gordon, Michael J LaMonte, Robert J Genco, Thomas R Cimato, Kathleen M Hovey, Matthew A Allison, Charles P Mouton, Jean Wactawski-Wende, (University at Buffalo)

An association between periodontal disease and hypertension has been reported in mostly cross-sectional studies, but prospective evidence supporting this observation is lacking. We evaluated the prospective association of self-reported history of periodontal disease diagnosis and edentulism with hypertension incidence among 35,712 postmenopausal women enrolled in the Women's Health Initiative Observational Study. Participants were followed annually from initial periodontal assessment (1998-2003) through 2015 for newly reported treated hypertension. Cox proportional hazards regression was used to calculate crude and multivariable adjusted hazard ratios (HR) and 95% confidence intervals (Cl) for these associations. Edentulism was significantly associated with incident hypertension in crude (HR= 1.39, 95% CI: 1.28-1.50) and adjusted (HR= 1.20, 95% CI: 1.11-1.29) models. The multivariable association was stronger among women <60 compared to ≥60 years old (interaction P=0.04) and among those with systolic blood pressure <120 compared to ≥120 mmHg (interaction P=0.004). No association was observed between history of periodontal disease diagnosis and hypertension. Edentulous postmenopausal women may represent a group at risk of developing future hypertension and may benefit from additional preventative measures or closer blood pressure monitoring. Further studies of edentulism are needed to support these findings and further elucidate the mechanism for the role of edentulism and other periodontal conditions on hypertension risk.

0063 S/P

REPEATED HEART FAILURE HOSPITALIZATIONS IN ADULTS WITH CONGENITAL HEART DISEASE: HOW DOES IT AFFECT MORTALITY AND WHAT PREDICTS IT? Fei Wang* Fei Wang, Aihua Liu, Michal Abrahamowicz, James M Brophy, Liming Guo, Gilles Paradis, Ariane Marelli, (McGill University)

Background: Heart failure (HF) is associated with multiple hospital admissions in adults with congenital heart disease (CHD). Nevertheless, there is a lack of comprehensive data of the impact of repeated heart failure hospitalizations (HFH) on mortality and predictors for readmission in patients with adult congenital heart disease. Methods: We used a population-based cohort from the Quebec CHD database from 1998 to 2010. A complex extension of Cox regression was adopted to estimate how the current risk of mortality depended on the frequency and timing of past HFHs, while adjusting for potential confounders. A duplication-method Cox regression was constructed to identify predictors of readmission considering competing risk of death. Results The risk of death increased with each additional HFH, with an estimated 44% cumulative incremental risk (HR=1.44, 95% CI 1.29-1.61). Compared with patients with only one HFH, HRs are 2.38 (95% CI 1.51-3.76) for two, 6.03 (95%CI: 3.33-10.93) for three and 7.48 (95%CI: 4.13-13.53) for four and more HFHs, respectively. Only readmission occurring within the past 12 months will significantly increase the current risk of death. Significant predictors of mortality included male sex (HR=1.30, 95%CI: 1.11-1.52), chronic kidney disease (HR: 1.86, 95%CI: 1.51-2.28), pulmonary hypertension (HR: 1.60, 95%CI: 1.36-1.88), coronary artery disease (HR: 1.23, 95%CI: 1.04-1.42), atrial arrhythmia (HR: 1.21, 95%CI: 1.04-1.42) and previous HFH in the past 12 months (HR: 1.71, 95%CI: 1.45-2.02). Conclusions Repeated HFH is a strong predictor of mortality in ACHD patients with more recent HFH conferring a higher risk of mortality. This will further aid physicians in targeting high risk patients for accelerated referral to specialized ACHD centers. Identification of predictors for readmission will play an important role in developing ACHD-specific HF managements to improve the prognosis of ACHD-HFH patients.

NEW BLOOD PRESSURE CLASSIFICATION AND RISK OF PERIPHERAL ARTERY DISEASE IN THE ATHEROSCLEROSIS RISK IN COMMUNITIES (ARIC) STUDY Yifei Lu* Yifei Lu, Shoshana Ballew, Hirofumi Tanaka, Moyses Szklo, Gerardo Heiss, Josef Coresh, Kunihiro Matsushita, (Johns Hopkins University)

Background: The AHA/ACC 2017 Hypertension Guideline redefined hypertension as blood pressure (BP) ≥130/80 mmHg, but data are sparse regarding this new definition and the risk of peripheral artery disease (PAD). We aim to assess the contribution of BP in developing PAD and its severe form of critical limb ischemia (CLI) in the context of the new guideline. Methods: The study was conducted among 13666 ARIC participants aged 45-64 years at baseline (1987-1989). Cox proportional hazards models were used to quantify the multivariately adjusted associations of systolic BP (<120, 120-129, 130-139, and ≥140) and diastolic BP (<70, 70-79, 80-89, and ≥90) with incident PAD. PAD was defined as hospitalizations with its diagnosis or leg revascularization. Among PAD cases, those with tissue loss were considered as CLI. Results: During a median follow-up of 25.3 years, there were 533 incident PAD cases including 196 CLI cases. We found a marked dose-response relationship between systolic BP and both incident PAD and CLI. Compared to systolic BP <120, systolic BP 130-139, newly defined as hypertension, was associated with a hazard ratio of 1.53 (95%CI 1.17-1.99) for PAD and 2.52 (1.67-3.79) for CLI. The contribution of this category to CLI was similar to that of systolic BP ≥140. In contrast, the elevated risks of PAD and CLI were only seen in those with diastolic BP ≥90 (adjusted HRs: 1.62 [1.18-2.22], and 1.82 [1.15-2.90], respectively). Largely consistent patterns were seen in demographic and clinical subgroups. Conclusions: Individuals with newly defined hypertension of systolic BP 130-139 are at increased risk of PAD, particularly its severe form, CLI, and warrant attention to leg health.

0066 S/P

THE ASSOCIATION BETWEEN SERUM PHTHALATE CONCENTRATIONS AND THYROID CANCER AND CEREBROCARDIOVASCULAR DISEASES: THE KCPS-II BIOBANK Keum Ji Jung* Keum Ji Jung, Sun Ha Jee, (Yonsei University)

Background: Phthalates is known as endocrine disruptors, and there is a growing concern about exposure to these chemicals and their adverse health outcomes in humans. Only a few epidemiological studies, however, have evaluated the association between serum phthalate levels and incident diseases. In this study, we measured serum concentrations of phthalate and examined their associations with thyroid cancer and cerebrocardiovascular diseases. Methods: Using the Korean Cancer Prevention Study-II Biobank, serum concentrations of three phthalate metabolites (MnBP, MiBP, and MEHP) were measured and divided into thirds (T1, T2, and T3). In a case-control design, we included [thyroid cancer (n=338), and controls (484)] and cardiovascular and stroke events [ischemic heart disease (n=218), stroke (n=258), and controls (n=263)]. Multivariable logistic regression model was used to examine an independent association of three phthalate metabolites with disease outcomes. Results: Serum phthalate concentrations were detectable in 92.3% (MNBP and MIBP) and 51.9% (MEHP) of the participants After adjusting for age, sex, systolic blood pressure, body mass index, and smoking status, odds ratios (95% Cl) for thyroid cancer, comparing the lowest versus highest third, were estimated as follows: MnBP 1.7 (1.1-2.5), MiBP 1.6 (1.1-2.3), and MEHP 1.7 (1.2-2.3). In addition, MnBP 2.4 (1.4-4.2), MiBP 1.8 (1.1-3.1), and MEHP 2.0 (1.1-3.9) for ischemic heart disease and MnBP 1.7 (1.0-2.9) and MiBP 1.7 (1.0-2.9) for stroke were obtained. Conclusion: Higher phthalate exposures may be associated with thyroid cancer, ischemic heart disease, and stroke in Korean population. Further studies are warranted to determine the association between phthalate levels and thyroid cancer and cerebrocardiovascular disease. This research was supported by a grant (15162MFDS631) from Ministry of Food and Drug Safety in 2015. Keywords: phthalate, thyroid cancer, ischemic heart disease, stroke

SEX DIFFERENCES IN THE CROSS-SECTIONAL AND LONGITUDINAL ASSOCIATIONS OF ELECTROCARDIOGRAPHIC GLOBAL ELECTRICAL HETEROGENEITY WITH CARDIAC STRUCTURE AND FUNCTION IN THE ATHEROSCLEROSIS RISK IN COMMUNITIES (ARIC) STUDY Larisa Tereshchenko* Larisa Tereshchenko, Tor Biering-Sørensen, Wendy Post, Scott Solomon, Amil M. Shah, Elsayed Soliman, Alfred Buxton, Jonathan Waks, Muammar Kabir, Jason Thomas, (Oregon Health and Science University)

Introduction: Sudden cardiac death (SCD) incidence is greater in men than women. ECG global electrical heterogeneity (GEH) is associated with SCD. The goal of this study was to describe sex differences in the associations between GEH and cardiac structure/function. Methods: Participants from the Atherosclerosis Risk in Communities study (N=5,114; 58% female; 22% blacks) with resting 12-lead ECGs (visits 1-5) and echocardiographic left ventricular (LV) structure and function at visit 5 were included. GEH was quantified by spatial ventricular gradient (SVG), QRS-T angle, and sum absolute QRST integral (SAI QRST) at each exam. Statistical interaction with sex was tested in cross-sectional analyses using linear regression models predicting LV structure and function adjusted for cardiovascular disease (CVD) and its risk factors, and longitudinal analyses using linear generalized estimating equations adjusted for time-updated CVD, risk factors, and biomarkers Longitudinal GEH changes were compared in men and women stratified by LV dysfunction. Results: Cross-sectional associations of measures of GEH with LV structure/function were stronger in men [LV ejection fraction (EF) -1.48 (-1.78 to -1.19)% lower per 1 SD of QRS-T angle] vs women [-0.88(-1.12 to -0.64)%]; Pinteraction=0.001. There were no changes in GEH between exams in men or women with LV dysfunction at exam 5. However, there was an interaction with sex (P<0.001) for changes in QRS-T angle, SAI QRST, SVG magnitude and azimuth in those with normal echocardiograms. Women had increasing SAI QRST and SVG magnitude, decreasing QRS-T angle, and posterior rotation of SVG. Men had less SVG changes [square-root transformed SVG azimuth decreased -0.07(-0.12 to -0.02)/median 3y] than women [-0.13(-0.17 to -0.09)/median 3y]. Conclusion: Aging women with normal echocardiograms have a distinct pattern of GEH changes. Further study of GEH is needed to understand the mechanisms of the "female advantage" in SCD risk.

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A SUBSTITUTION ANALYSIS OF RED MEAT INTAKE AND INCIDENT CORONARY HEART DISEASE AMONG MEN IN THE US Ambika Satija* Ambika Satija, Stephanie A. Smith-Warner, Eric B. Rimm, Meir Stampfer, Frank B. Hu, Walter Willett, (Harvard TH Chan School of Public Health)

Red meat intake has been found to predict higher risk of coronary heart disease (CHD). However, few studies have evaluated specific substitutions for red meat. We examined the associations of substituting protein-source and other plant foods for red meat with incident CHD among men in the Health Professionals Follow-up Study (HPFS) (1986-2012). Participants received a biennial questionnaire to assess lifestyle factors and disease diagnoses, and a semi-quantitative food frequency questionnaire to assess dietary intake every four years. There were 43,259 men after baseline exclusions (chronic diseases; implausible energy intake; age >85 years). We used Cox proportional-hazards models to evaluate associations between red meat intake and incident CHD. For substitution analysis, we included all substitution foods as continuous variables in the same model, and used the difference in the coefficients of two foods and their covariance to estimate the HR and 95% CI for substituting one for the other. During 932,698 person-years, we documented 4,147 incident CHD cases of which 1,680 were fatal CHD cases. In multivariable analysis, red meat intake was associated with a modestly higher risk of total CHD (HR per serving/day: 1.07, 95% CI: 1.01-1.14). In the substitution analysis, we found significantly lower total CHD risk when intake of red meat was replaced with various plant foods [replacing 1 serving/day of red meat with 1 serving/day of nuts (HR: 0.91, 95% CI: 0.84-0.99), replacing ≥ 2 servings/week of red meat with ≥ 2 servings/week of soy (HR: 0.62, 95% CI: 0.43-0.89), replacing 1 serving/day of red meat with 1 serving/day of whole grains (HR: 0.71, 95% CI: 0.60-0.84)]. Associations were stronger for fatal CHD [substituting nuts (HR: 0.79, 95% CI: 0.68-0.90), soy (HR: 0.50, 95% CI: 0.27-0.93), whole grains (HR: 0.55, 95% CI: 0.41-0.73) for red meat]. Substituting high-quality plant foods such as nuts, soy, and whole grains for red meat may substantially lower CHD risk.

ASSOCIATION BETWEEN MIDLIFE OBESITY AND KIDNEY FUNCTION TRAJECTORIES: THE ATHEROSCLEROSIS RISK IN COMMUNITIES STUDY Zhi Yu* Zhi Yu, Morgan Grams, Chiadi Ndumele, Lynne Wagenknecht, Eric Boerwinkle, Kari North, Josef Coresh, (Johns Hopkins Bloomberg School of Public Health)

Background Kidney function trajectories are used in the estimation of time to endstage renal disease (ESRD) and have been associated with cardiovascular disease risk and all-cause mortality. Obesity has been related to increased risk of incident chronic kidney disease (CKD), ESRD, and mortality. However, the effect of midlife obesity on kidney function decline in late life, when the prevalence of kidney diseases is the highest and increasing most rapidly, is not known. Methods Using data from the Atherosclerosis Risk in Communities (ARIC) cohort (visit 1, 2, 4, 5, and 6), we examined the association between midlife overweight and obesity (body mass index (BMI) between 25-30 kg/m2 and ≥30 kg/m2 at visit 1, respectively) and estimated glomerular filtration rate (eGFR) change over 29 years of follow-up. We included ARIC participants who were diabetes-free and had BMI > 18.5 kg/m2 and eGFR > 60 ml/min/1.73 m2 at visit 1. We used mixed models with random intercept and random slope to estimate eGFR trajectory differences by BMI, adjusting for age, sex, race, current smoker, high-density lipoprotein cholesterol, systolic blood pressure, hypertension medication use, prevalent coronary heart disease and diabetes, as well as interaction terms of each variable with follow-up time. Results Among the 13,639 participants, those who were overweight or obese had slightly lower baseline eGFR (105 vs 106 ml/min per 1.73 m2, p=0.03) and greater eGFR decline over the 29 years of follow-up than those with BMI < 25 kg/m2. After adjusting for risk factors, individuals who were overweight or obese had slightly greater mean annual decline in eGFR (overweight: -0.06 ml/min per 1.73 m2; p=0.003; obese: -0.08 ml/min per 1.73 m2, p=0.0002) compared to individuals with BMI < 25 kg/m2. Conclusion Midlife BMI is associated with subsequent eGFR decline. Associations between obesity and kidney function warrant further exploration.

0069

SURVIVAL ANALYSIS OF HOSPITALIZED OUT-OF-HOSPITAL CARDIAC ARREST PATIENTS: A NATIONWIDE POPULATION-BASED STUDY IN TAIWAN Fu-Huang Lin* Fu-Huang Lin, Daphne Ng Yih, Chung-Yu Lai, Yu-Ching Chou, Giuen-Hsian Wu, Chi-Hsiang Chung, Wu-Chien Chien, (School of Public Health, National Defense Medical Center, Taipei, Taiwan)

Out-of-Hospital Cardiac Arrest has always been a serious topic in national health issue. In Taiwan, OHCA patients have a survival rate of about 12-17% to discharge. The survival rate of patients has gradually improved with the well development of the medical system in recent years, however there are quite a few studies on this issue. The study analyzed out-of-hospital cardiac arrest patients with the code 427.41 ventricular fibrillation and 427.5 cardiac arrest according to the ICD-9-CM. The dependent variables include one-day survival rate, survival to discharge rate and in-hospital mortality rate. The independent variables included patient characteristics and event characteristics. The research used SPSS 21.0 to analyze data. There were 7986 patients in total who suffered from cardiac arrest before reaching the hospital in 2013 with 60.7% of male and 39.3% of female. There were 1199 ventricular fibrillation patients (250 patients (20.9%)who did not survive after the treatment) and 6787 people with cardiac arrest (2486 patients (36.6%) who did not survive after the treatment). The average age of the patients was 67.61 years (61% of elders over 65 years old, 2.3% of children and 6.3% of youth, respectively). OHCA occurs most in the winter (27.8%), following by spring which 25.4% of the patients. A total of 2218 patients hospitalized during winter and 784 were not survive. Winter has the highest proportion no matter in the rate of the occurrence of OHCA (27.8%), number of hospitalized patients (35.3%) and death (28.6%) compare with other seasons. Something quite surprising is that even though the older OHCA population was the most in hospitalized (61%), however, children have the highest mortality rate (45%) among all the age groups. To decrease the mortality rate of OHCA patients, it is recommended that the Taiwan emergency medical system in Taiwan should put in more effort and take precautions in the high risk population especially during the winter.

DIET PREFERENCE TO HAVE MEAT INCREASED THE RISK OF INCIDENT TYPE 2 DIABETES MELLITUS- THE RURAL DEQING COHORT STUDY Yuzhuo Wang* Yuzhuo Wang, Xiaolian Dong, Yue Chen, Xuecai Wang, Jianfu Zhu, Na Wang, Qingwu Jiang, Chaowei Fu, (Fudan University)

Objective: To explore the associations between dietary behavior and type 2 diabetes mellitus (T2DM) among rural adults in Deqing County, Zhejiang Province, China. Methods: A dynamic prospective cohort study was conducted as The Rural Deging Cohort Study since 2006. Totally, 28233 diabetes-free subjects were recruited from rural communities during 2006-2014. Information on dietary behavior including diet preference (to have vegetable, meat or balanced diet) and average amount of vegetables and fruit consumed every week was self-reported with a questionnaire at baseline study. The incident T2DM was ascertained by Deqing electronic health records. COX regression was applied to calculate the crude hazard risk (cHR), adjusted Hazard Risk (aHR) and their 95% confidence intervals (CI). Results: With an average follow-up of 4.2 ± 2.6 years, 369 incident T2DM were identified in November 2015, and the overall incident rate was 3.13 per 1000 person-years. The risk of incident T2DM of subjects preferring to having meat diet significantly raised up than that of those having balanced diet (cHR=2.6, 95%CI 2.0-3.3) and compared to those intaking fruits <200g daily, such risk of those intaking fruits ≥200g daily decreased (cHR=0.7, 95%CI: 0.5-0.9) statistically. After the adjustment for covariates, diet preference to have meat still increased risk of incident T2DM (aHR=2.5, 95%CI: 1.9-3.3) statistically but the latter did not. Conclusion: Diet preference to have meat increased the incident risk of T2DM among rural Chinese adults, which should be targeted in the future prevention and health care of T2DM. Key words: dietary behavior; type 2 diabetes mellitus; prospective cohort study

0081 S/P

THE 5-YEAR RISK OF SEVERE HYPOGLYCEMIA IN PATIENTS WITH TYPE 2 DIABETES Rachel Zmora* Rachel Zmora, Sisi Ma, Elizabeth R. Seaquist, Pamela J Schreiner, Lisa S Chow, (University of Minnesota)

Objective: To construct a predictive model to estimate the long-term (5- year) risk of severe hypoglycemia (SH), or hypoglycemia requiring assistance, in patients with type 2 diabetes (T2D). Methods: Data were from the Action to Control Cardiovascular Risk in Diabetes (ACCORD) glycemia trial (n=10,251), a randomized, multicenter, double 2x2 factorial study which examined intensive vs. standard glycemic control on cardiovascular outcomes in patients with diagnosed T2D. Over follow up (mean±SD, 4.7±1.4 years), patients experienced 721 incident (SH) events. Stepwise Cox regression models and Akaike information criteria (AIC) were used to reduce the number of predictors until a set of statistically significant SH risk factors was identified. C-statistics were used to assess the discriminatory ability of models. Results: We identified 13 predictors for the model: intensive glycemic management, age, race, education, use of insulin and anti-hypertensive medication, family history of CV disease, years since diabetes diagnosis, history of hypoglycemia in the last week, systolic and diastolic blood pressure, glomerular filtration rate, and hemoglobinAlc. This model had a c-statistic of 0.76. In the multivariable model, the 3 strongest predictors for SH over 5 years were: intensive glycemic management (HR= 2.59, 95% CI= 2.20-3.06), insulin use (HR= 2.29, 95%, CI = 1.93-2.72), and history of hypoglycemia in the last week (HR= 1.76, 95% CI= 1.43-2.14). Conclusions: Using data readily available from the clinical setting, we identified a parsimonious set of variables that can help identify patients at high risk for SH over long-term follow up. Further evaluation in more generalizable populations is needed to replicate findings and apply to clinical management of T2D.

0082

BISPHENOL A EXPOSURE AND DIABETES MELLITUS RISK: A META-ANALYSIS Sun Ha Jee* Sun Ha Jee, Keum Ji Jung, (Yonsei University)

Background: Bisphenol A (BPA) is one of the endocrine disruptor chemicals (EDCs). Although many researches have been conducted, there is still no direct meta-analysis of BPA concentration measured in human samples and diabetes. Objectives: In this study, we focused on the relationship between risk of type 2 diabetes and BPA concentration through meta-analysis. Methods: We searched the PubMed and Embase databases using relevant keywords between February, 1997 and September, 2016. A total of 7 papers were aggregated in 5 cross-sectional and 2 case-control studies and then the odds ratio (OR) and its 95% confidence interval (CI) were extracted. The OR and its 95% CI of diabetes associated with BPA were estimated using both fixed-effects model and random-effects model. Results: A total of 2,415 diabetes patients among 6,891 subjects were included using 6 studies of urine BPA level and 1 study of serum BPA level BPA concentrations in human biospecimens showed positive associations with diabetes risk (OR 1.86, 95% CI 1.20, 20.87). In sensitivity analysis, urine BPA concentration was positively associated with diabetes (OR 1.23, 95% CI 0.95, 1.59). Conclusions: This meta-analysis presented that BPA exposure was positively associated with diabetes risk in human. This research was supported by a grant (15162MFDS631) from Ministry of Food and Drug Safety in 2015. Keyword: Bisphenol A, Diabetes Mellitus, Endocrine disrupting chemicals (EDCs), Meta-analysis

0083 S/P

ASSOCIATIONS BETWEEN SERUM VITAMIN D CONCENTRATIONS AND DIABETES AMONG U.S ADULTS Kyeezu Kim* Kyeezu Kim, Maria Argos, (Division of Epidemiology and Biostatistics, School of Public Health, University of Illinois at Chicago, Chicago, Illinois)

Lower concentrations of serum vitamin D (25[OH]D) have appeared to play a role in impaired β-cell function, insulin resistance, and impaired glucose tolerance. Based on these underlying mechanisms, it has been suggested that lower serum levels of 25[OH]D are associated with increased risk of type 2 diabetes (T2D). We aimed to examine the associations between serum 25[OH]D and T2D among U.S. adults. A total of 29,041 adults were included in the analysis, from the National Health and Nutrition Examination Survey (NHANES) 2001-2012. T2D status was defined as doctor's diagnosis of diabetes, medication use, or HbAlC > 6.5%. Levels of 25[OH]D were modelled as continuous as well as quartile variables. To evaluate the effects of 25[OH]D on T2D, logistic regression models using PROC SURVEYLOGISTIC in SAS software were adopted. Participants' age, gender, race/ethnicity, body mass index (BMI), smoking status, and vitamin D supplements intake were included as covariates. We also performed a sensitivity analysis by sun exposure. Among the 29,041 participants, 2,081 men and 1,936 females had diabetes. After covariate adjustment, we observed a dose-response relationship between 25[OH]D and T2D status. Individuals in the lowest quartile of 25[OH]D had nearly twice the odds of T2D compared to participants in the highest quartile group (OR=1.97, 95% C1=1.68-2.31). The 2nd and 3rd quartiles also showed increased risk of T2D compared to the highest quartile group (OR=1.63, 95% C1=1.40-1.89, for Q2 vs. Q4; OR=1.18, 95% C1=1.02-1.37, for Q3 vs. Q4, respectively). Sensitivity analyses suggest potential effect modification by sun exposure status, with individuals reporting sun exposure having higher ORs than individuals without sun exposure. Lower 25[OH]D level was associated with higher risk of T2D. Sun exposure may play a role as an effect modifier for the relationship between serum vitamin D and T2D.

HETEROGENEITY IN DIABETES PREVALENCE BY MODE OF PHYSICAL ACTIVITY AND RACE/ ETHNICITY AMONG U.S. ADULTS Sandra E. Echeverria* Sandra E. Echeverria, Anna Divney, Chloe Mirzayi, Rosenda Murillo, Elizabeth Vasquez, (CUNY Graduate School of Public Health & Health Policy)

Substantial research shows that leisure-time physical activity (PA) is associated with reduced diabetes risk. We present novel results examining if this established association holds across mode of physical activity and race/ ethnicity. Adults aged ≥20 years (n=16,903) sampled in NHANES 2011-16 were classified as engaging in none, some (1-149 min/week) or meeting national PA guidelines (150+ min/week) for leisure-time, work, and transportation PA. Diabetes status was based on laboratory-confirmed HbAlC $\geq 6.5\%$ or participant self-report. We fit log binomial models to estimate prevalence ratios (PR) for each mode of PA, controlling for age, gender, education, income and BMI. We tested for heterogeneity of main effects with cross-product terms between each mode of PA and race/ ethnicity, plus nativity status for Latino participants. Across each mode of PA, participants who completed 150+ minutes of PA were less likely to have diabetes compared to those with no PA (Leisure-time PA: PR=0.67, 95% Confidence Interval (CI)=0.58,0.77; work PA: PR=0.67, 95% CI=0.58,0.76); transportation PA: PR=0.64, 95% CI=0.55,0.76), after controlling for covariates Non-Latino whites had the lowest prevalence of diabetes across all modes and levels of PA compared to other racial/ethnic groups (P for interaction <0.01). Diabetes prevalence was comparable for non-Latino Blacks and Latinos and tended to converge with that of non-Latino whites at the highest PA levels of leisure-time and transportation PA only. Moreover, foreign-born Latinos were more likely to engage in vigorous work PA than their U.S.-born counterparts and non-Latino whites. Meeting physical activity guidelines via any mode appears to confer protection from diabetes, with some heterogeneity observed by race/ ethnicity and select modes and levels of PA. Findings suggest the need for public health policies and interventions to increase active living in all segments of the population to reduce diabetes risk.

THE INFLUENCE OF E-CIGARETTE USE ON INDOOR FINE AND ULTRAFINE PARTICLE CONCENTRATIONS Karena Volesky* Karena Volesky, Anthony Maki, Christopher Scherf, Louis Watson, Keith Van Ryswyk, Bruce Fraser, Scott Weichenthal, Paul J. Villeneuve, (Department of Epidemiology, Biostatistics and Occupational Health, McGill University)

Background: Indoor electronic cigarette (e-cigarette) use exposes bystanders to a new source of particulate matter pollution. This is a public health concern because short-term exposure to elevated concentrations of fine particulate matter (PM2.5; aerodynamic diameter $\leq 2.5 \ \mu$ m), and ultrafine particles (UFPs, aerodynamic diameter $\leq 0.1 \ \mu$ m) are associated with increased risks of adverse respiratory and cardiac events. Objective: To estimate indoor bystander concentrations of PM2.5 and UFPs at distances of 0.5 and 1 meter from an e-cigarette user, and to investigate if these concentrations vary across 3 e-cigarette models containing the same nicotine solution in near-to-real conditions. Methods: Particulate matter was measured for 22-minutes for 3 periods: 5.5 minutes pre-exposure, 6.5 minutes exposure (included 7 puffs), and 10 minutes post-exposure. We calculated cumulative exposures to PM2.5 and UFPs using the sum of the 1-second concentrations divided by the length of the period. The experiment was replicated 3 times. We tested for differences between e-cigarettes using analysis of variance. Results: During the exposure period, the mean cumulative PM2.5 concentrations per minute across replicates for each ecigarette model, at 0.5 meters, were 22 (adjustable voltage), 43 (1st generation), and 67 (tank style) thousand µg/m3; at 1 meter they were: 14, 10, and 72 thousand µg/m3 respectively. The mean cumulative exposure per minute in counts of UFPs at 0.5 meters were 483 (adjustable voltage), 666 (1st generation), and 872 (tank style) thousand particles/cm3. The corresponding UFP particle counts at 1 meter were 582, 622, and 1,585 thousand particles/cm3. Concentrations were highly variable across replicates and different between e-cigarettes (p < 0.03). Conclusion: Ecigarette vapors in indoor settings lead to short-term elevations of PM2.5 and UFPs concentrations at close proximity distances.

0092 S/P

ELEMENTAL EXPOSURE TO COPPER AND ATTENTION DEFICIT HYPERACTIVITY DISORDERS (ADHD) AMONG CHILDREN IN PROXIMITY TO COAL ASH STORAGE SITES Chisom Odoh* Chisom Odoh, Lonnie Sears, Barbara Polivka, Guy Brock, Kristina Zierold, (University of Louisville)

Background: Elements like copper are essential for daily functioning of children, however, long term exposure can result in deleterious effects. Copper is one of the elements found in coal ash, a waste product generated from burning coal. ADHD, which is prevalent in 5% of children in the U.S. is marked by behaviors such as impaired attention, hyperactivity, and impulsivity. Few studies have linked copper with neurobehavioral disorders. The purpose of this study is to evaluate the association between copper exposure and ADHD among children residing close to coal-ash storage sites. Methods Research is being conducted among children ages 6-14 living within a 10-mile radius of two coal ash storage sites in Kentucky. Copper exposure was estimated using filters from air samplers placed inside the homes of children. Concentrations of copper were determined by Proton Induced X-Ray Emission (PIXE) analysis. Scores from the Child Behavior Checklist were analyzed to measure ADHD. Logistic regression and the Wilcoxon test were used to assess the relationship between ADHD and copper exposure. Results: Among our child population, 28% had ADHD. Copper was found in 49% of participants' homes. After adjusting for sex, age, ethnicity, and smoking, an odds ratio (OR) of 1.75 (95% CI=0.68-4.54) was determined. In addition, ADHD t-scores for children exposed to copper were higher compared to children not exposed to copper. Conclusion: This is the first study to assess ADHD and copper exposure in children residing near coal ash storage sites. While not significant, the OR was elevated, and the Wilcoxon results were higher in exposed children, indicating a possible relationship between copper exposure and ADHD. Copper is ubiquitous in the environment and it is important to understand exposures linked to behaviors so appropriate intervention and policies can be identified.

0091

LONGITUDINAL BIOMONITORING OF POLYBROMINATED DIPHENYL ETHERS (PBDES) IN A COHORT OF GREAT LAKES BASIN RESIDENTS Michelle Raymond* Michelle Raymond, Brooke Thompson, (University of Wisconsin, Madison/ Wisconsin Department of Health Services)

Polybrominated diphenyl ethers (PBDEs) are a class of chemical additives used widely in flame retardant applications starting in the 1970s until the 2000s/10s. This analysis describes longitudinal trends in serum PBDE levels from 1994 through 2015 using data from the Great Lakes Fish Consumption Study cohort. PBDEs (BDE 28, 47, 85, 99, 100, and 153) were measured in serum in a subsample of participants in 1994, 2001, 2004, and 2014. Linear mixed effect regression models were used to evaluate effects of time and covariates (age, sex, BMI, and consumption of sport-caught fish) on log-PBDE exposure (ng/g-serum), as well as percent contributions of BDE-47 and 153 to total PBDEs. Estimates of geometric least square means were derived from model results using Tukey-Kramer adjustments to account for multiple comparisons. Serum levels of total PBDEs and several congeners increased between 1994 and 2001 (∑PBDEs geometric mean [95%CI]: 0.19 [0.16, 0.22] to 0.26 [0.23, 0.30]), followed by a plateau between 2001 and 2004, and decreased between 2004 and 2014 (0.25 [0.22, 1.29] to 0.15 [0.12, 0.18]). Overall, ∑PBDEs decreased by 47% (median) among 64 individuals with measurements in both 2004 and 2014. Across time, PBDEs increased with age and BMI, with the exception of BDE-153 for which BMI was not a significant predictor. Sex and consumption of sport-caught fish were not significant predictors of PBDEs in adjusted models. While percent BDE-47 did not change across time, percent BDE-153 was significantly higher in 2014-2015 compared to previous time periods (23% in 2014 vs. <18% in 1994, 2001, and 2004). These findings support initial observations of declining PBDEs and shifting congener profiles in the U.S. and Europe following production bans Biomonitoring should be continued in the coming years as more consumer products containing PBDEs are recycled and disposed of at the end of their lifespan.

0093 S/P

INJECTION-INDUCED EARTHQUAKES IN OKLAHOMA ASSOCIATED WITH MOTOR VEHICLE CRASHES Joan A. Casey* Joan A. Casey, Holly C. Stewart, Ralph Catalano, (UC Berkeley)

Anxiety-inducing life events increase the risk of motor vehicle crashes. We test the hypothesis that earthquakes, known to increase anxiety in the population, also increase the incidence of crashes. Our study took place in Oklahoma where wastewater injection has resulted in a dramatic increase in earthquakes between 2010-2016. We identified dates of earthquakes \geq magnitude 4 (a level felt by most people) with data from the U.S. Geologic Survey. The Oklahoma Highway Safety Office provided monthly number and timing of vehicle crashes. In a time-series analysis, we evaluated monthly counts of earthquakes \geq magnitude 4 in relation to daytime and nighttime vehicle crashes. We observed 0-7 earthquakes ≥ magnitude 4 per month and a mean of 4138 daytime (6:00AM-5:59PM) crashes per month. Granger-Wiener tests found a positive association between earthquakes \geq magnitude 4 in a month and vehicle crashes the following month The relationship appeared due to daytime crashes, which increased by 50 (SE= 19.2) for each earthquake \geq magnitude 4. Autocorrelation alone explained 45% of the variation in daytime crashes, the addition of earthquakes in the prior month increased the variance explained to 53%. Findings persisted with alternative specifications of the earthquake variable. When changing the earthquake variable to a binary indicator scored 1 for months with 3 or more quakes of magnitude 4 and 0 otherwise, we observed an additional 159 daytime crashes in the following month Consistent with our hypothesis, there was no association between earthquakes of magnitude ≤2.5 and crashes. We provide evidence of a novel association between induced earthquakes in Oklahoma and motor vehicle crashes that warrants future research given the high economic and social costs-approximately \$242 billion nationwide in 2010-of such vehicle crashes.

THE UTILITY OF CAUSAL INFERENCE METHODS ON ESTIMATING THE EFFECT OF TRAFFIC POLLUTANTS ON EMERGENCY DEPARTMENT VISITS IN A COHORT OF CHILDREN WITH ASTHMA Ryan Gan* Ryan Gan, Sheryl Magzamen, (Colorado State University)

Introduction: Traffic-emitted Nitrogen dioxide (NO2) triggers adverse events in children with asthma. We modeled the effect of NO2 on emergency department (ED) visits in school aged children two ways: NO2 as a continuous predictor in a logistic regression, and NO2 as a binary predictor in a causal inference model. Methods: Our study population were school-aged children diagnosed with asthma, living in Oakland, California (n=796). Concentrations of NO2 (µg/m3) exposure was assessed via land use regression conducted at the same time as school-based surveys to assessed outcome status (ED visit). The conditional association between continuous NO2 and ED visit was assessed using logistic regression, adjusting for confounders. The marginal association between ED visit and binary cutoff of NO2 > 19 µg/m3 was assessed using targeted maximum likelihood estimation (TMLE); potential confounders were accounted for through an ensemble of prediction algorithms. Results: Our logistic regression model showed a 1 µg/m3 increase in NO2 was associated with increased odds of an ED visit (OR: 1.05, 95% CI: 0.94-1.17). Our TMLE model showed exposure to NO2 > 19 μ g/m3 was associated with an increased risk of an ED visit (RR: 2.36, 95%CI: 2.00-2.79). Conclusions: We implemented a standard and causal inference framework to assess the relationship between NO2 and ED visits and found strengths and limitations to both approaches. The standard modeling approach allowed us to evaluate the concentration-response relationship between the exposure and outcome, but these results are harder to translate in to actionable policy or public health decisions. In contrast, results from our TMLE formalizes our counterfactual question on the population effect if we reduced NO2 below 19 µg/m3. However, this association cannot be interpreted causally due to violations in assumptions of positivity and conditional exchangeability; common situations in environmental epidemiology.

0096 S/P

RESIDENTIAL PROXIMITY TO ANIMAL FEEDING OPERATIONS AND CANCER RISK IN THE AGRICULTURAL HEALTH STUDY Jared A. Fisher* Jared A. Fisher, Laura E. Beane Freeman, Jonathan N. Hofmann, Aaron Blair, Christine Parks, Peter S. Thorne, Mary H. Ward, Rena R. Jones, (Division of Cancer Epidemiology and Genetics, National Cancer Institute, Bethesda, MD, USA)

Background: Concentrated animal feeding operations (AFOs), where animals and their wastes are housed over a small land area, are major sources of hazardous emissions into the surrounding environment. There is limited research on health outcomes among populations living near intensive animal agriculture, and no studies have assessed relationships with cancer. Methods: We evaluated the association between residential proximity to AFOs and cancer risk in the Agricultural Health Study, a rural cohort of licensed pesticide applicators (mostly farmers) and their spouses. We linked geocoded enrollment (1993-1997) addresses for 52,444 participants in Iowa (32,674 farmers and 19,770 spouses) to a statewide regulatory database of AFOs. We created metrics to reflect exposure proximity and intensity, enumerating AFOs and total animal density (animals/sq km) within 2 and 5km of the residence. Cox regression was used to estimate associations (hazard ratio, HR; 95% confidence interval, 95%CI) for major tumor sites, while adjusting for demographic and farming-related factors (e.g., raising animals and direct animal contact). Results: A total of 4,741 and 2,320 incident cancers (1993-2015) were identified among pesticide applicators and their spouses, respectively. We observed increased risk of lymphohematopoietic malignancies (LHM) among applicators (N cases=511) residing within 5km of \geq 1 AFO (HR=1.8; 95%C1=1.2-2.6), with the strongest association for non-Hodgkin lymphoma (NHL, N cases=424) (HR=1.9; 95%C1=1.3-3.0). Risks were elevated across quartiles of animal density, without significant trend (LHM ptrend=0.29; NHL ptrend=0.31). AFO exposures within 2km of the home generally yielded similar associations. Patterns of association among spouses and for other tumor sites were inconsistent. Conclusions: In this first prospective investigation of AFO exposure and cancer risk, our preliminary findings suggest that residential proximity to AFOs may increase the risk of NHL.

ASSOCIATIONS OF SERUM PERFLUOROALKYL SUBSTANCE AND VITAMIN D BIOMARKER CONCENTRATIONS IN THE NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY (NHANES), 2003-2010 Taylor M. Etzel* Taylor M. Etzel, Joseph M. Braun, Jessie P. Buckley, (Johns Hopkins University Bloomberg School of Public Health)

Perfluoroalkyl substances (PFAS) are persistent endocrine disrupting chemicals found in industrial and commercial products. Previous research has shown that other endocrine disrupting chemicals such as phthalates and bisphenol A may alter circulating levels of vitamin D; however, no research has examined associations between PFAS and vitamin D biomarkers. We conducted a cross-sectional analysis of 7,040 individuals aged 12 years and older participating in the 2003-2010 cycles of the United States National Health and Nutrition Examination Survey (NHANES). Concentrations of four PFAS and total 25-hydroxyvitamin D [25(OH)D] were measured in serum samples. We used multivariable linear regression to estimate covariate-adjusted differences in total 25(OH)D per log 10-unit increase in PFAS concentrations. We assessed potential effect measure modification by gender, age, and race/ethnicity in stratified models. PFAS were detected in over 98% of the samples. After adjusting for confounders, a 10-fold increase in perfluorohexane sulfonic acid was associated with a 2.6 nmol/L increase (95% CI: 1.0, 4.2) in total 25(OH)D. Age, gender, and race/ethnicity did not modify this association. A 10-fold increase in perfluorooctane sulfonic acid was associated with a 2.8 nmol/L decrease (95% CI: 0.6, 4.9) in total 25(OH)D, with associations significantly stronger among whites (p: -5.3; 95% CI: -8.4, -2.3) and individuals older than 60 years of age (p: -5.8; 95% CI: -9.7, -1.8). Other PFAS were not associated with total 25(OH)D. Our results suggest that some perfluoroalkyl substances may be associated with altered vitamin D levels in the United States population, and associations may vary by chemical, age, and race/ethnicity.

0097 S/P

REGIONAL AIR POLLUTION AND RISK OF ASTHMA INCIDENCE IN THE SOUTHERN CALIFORNIA CHILDREN'S HEALTH STUDY Erika Garcia* Erika Garcia, Kiros T. Berhane, Talat Islam, Rob McConnell, Robert Urman, Zhanghua Chen, Frank D. Gilliland, (Department of Preventive Medicine, University of Southern California, Los Angeles, California)

Although air pollution is linked with adverse pulmonary effects in children, including airway inflammation, decreased lung function, and asthma exacerbation, it remains unclear whether pollution causes asthma. Taking advantage of a natural experiment, we examined whether decreasing regional air pollution was associated with reduced asthma incidence rates in nine communities during a 20-year period across three cohorts in the Southern California Children's Health Study. Incident asthma (N=525) was identified prospectively via questionnaires from 4th through 12th grade for each cohort (i.e., 1993-99, 1996-02, 2006-12). Regional ozone (O3), nitrogen dioxide (NO2), particulate matter $\leq 10 \mu m$ (PM10) and $\leq 2.5 \mu m$ (PM2.5) were continuously monitored. We used multilevel Poisson regression with an offset to model the associations between asthma incidence during follow up and community-level average pollutant concentration in the baseline year for each cohort (i.e., 1993, 1996, 2006). Models included a fixed effect for town, a random effect for cohort nested within town, and adjustment for age at baseline, sex, ethnicity, race, gas stove, sports participation, and ambient temperature. The three cohorts included 4,140 children (mean baseline age: 9.5 years; 53% female; 55% White; 41% Hispanic) with no history of asthma at baseline. The RR for asthma, scaled to the mean change in community-level pollutant concentrations from 1993 to 2006, was 0.73 (95% CI: 0.61-0.86) for a mean reduction of 6.2 ppb in NO2 and 0.83 (95% CI: 0.70-0.99) for a mean reduction of 7.1 µm/m3 in PM2.5. Reduced risk associated with decreasing O3 and PM10, were not statistically significant. This study exploited an existing long-term multi-cohort study recruited and followed over a period of decreasing Southern California air pollution to show significant lower risk of childhood asthma in association with reductions in community-level concentrations of NO2 and PM2.5, with stronger results for the former.

MATERNAL PRENATAL WELL WATER ARSENIC EXPOSURE AND ENDOCRINE-RELATED PHENOTYPES IN BANGLADESHI CHILDREN AGED 5-7 YEARS: PRELIMINARY RESULTS Yu-Hsuan Shih* Yu-Hsuan Shih, Mohammad Hasan Shahriar, Tariqul Islam, Alauddin Ahmed, Golam Sarwar, Victoria Persky, Habibul Ahsan, Maria Argos (Division of Epidemiology and Biostatistics, School of Public Health, University of Illinois at Chicago)

Background: Chronic exposure to arsenic is widespread, with elevated concentrations of arsenic in groundwater posing a threat to millions of people worldwide. Arsenic has been associated with several carcinogenic consequences and chronic diseases. In animal studies, arsenic toxicity has resulted in endocrine alterations. However, the association between arsenic exposure and endocrinerelated phenotypes in early childhood is not well studied. Objectives: We evaluated the association between maternal arsenic exposure and endocrine-related phenotypes at baseline in 228 children aged 5-7 years using data from a subset of the Bangladesh Environmental Research in Children's Health cohort. Methods: Maternal arsenic exposure was assigned based on the arsenic concentrations of the primary well used for drinking water during pregnancy and modeled as a continuous variable as well as quartiles. For endocrine-related phenotypes, including measurements of linear growth, blood pressure (BP), and fasting plasma glucose, z-scores adjusted for child's age and gender (as well as height for BP and pulse pressure) were calculated and modeled as continuous variables. Crude and adjusted linear regression models were used to estimate beta coefficients and their 95% CIs for the associations between maternal arsenic exposure and z-scores of endocrine-related phenotypes. Results: Results suggest borderline associations between maternal arsenic exposure and z-score of waist circumference. An interquartile (48.58 µg/L) increase in arsenic exposure was associated with 0.08 (95% CI: -0.02, 0.18) increase in z-score of waist circumference, with p for trend of 0.14. Conclusions Preliminary results suggest a possible association between maternal arsenic exposure and endocrine-related phenotypes in children. Additional analyses will evaluate associations with cumulative lifetime arsenic exposure in relation to endocrine-related phenotypes in children as well as effects of metal exposure mixtures.

0100 S/P

THE ROLE OF AGE ON RESPIRATORY HEALTH OUTCOMES AMONG ELEMENTARY SCHOOL CHILDREN LIVING IN POOR AIR QUALITY AREAS Anette Costa* Anette Costa, Christopher Yee, Rhonda Spencer-Hwang, (Loma Linda University)

Background: San Bernardino Railyard (SBR) is a major commerce hub and significant source of air pollution Mounting evidence suggests that air pollution promotes adverse health effects in children including low birthweight and premature births. Increased exposure may also mean higher risk of adverse respiratory health outcomes during rapid-growth periods. Loma Linda University's Project ENRRICH investigates potential age-related vulnerability with increased proximity to SBR. Methods: Data was collected from children at two elementary schools: an elementary school adjacent to SBR (ES) and a socio-demographically matched comparison school 7-miles away (CS). The children underwent a respiratory screening that included non-invasive airway inflammation (FeNO) and lung-function (peak expiratory flow) testing, plus a questionnaire. Chi-square and logistic regression were used to assess associations between age (5-9 years vs. 9-12 years) and health-endpoints between schools. Results: Over 70% of children (N=865; 5-9 years: 653, 9-12 years: 212) in both schools participated. Overall, older children of nine years and older were at greater odds of experiencing low lung-function (OR: 1.43; 95% CI: 0.96-2.14) and increased airway inflammation (OR: 1.57; 95% CI: 1.00-2. 46). When comparing children across schools by age-group (younger vs. younger and older vs. older), the children, in either age-group, at ES had significantly worse outcomes than their CS counterparts (OR: 1.95; 95% CI: 1.03-3.69 and OR: 1.27; 95% CI: 0.74-2.19, respectively). Conclusion: Although increased proximity to SBR was associated with increased respiratory challenges among all elementary school children, older children in this group experienced the greatest levels of airway inflammation and declining lung-function. Further research is warranted for understanding air-pollution impact on the respiratory health of children and potential age-related differences.

0099 S/P

LONG-TERM AMBIENT AIR POLLUTION AND DNA METHYLATION: RESULTS FROM THE SISTER STUDY Cuicui Wang* Cuicui Wang, Katie O'Brien, Zongli Xu, Jack Taylor, Dale Sandler, Clarice Weinberg, (BCBB/NIEHS/NIH; T.H. Chan School of Public Health, Harvard University)

ENVIRONMENT/CLIMATE CHANGE

Background: Long-term exposure to air pollution has been associated with inflammation and cardiovascular disease. Although underlying molecular mechanisms remain to be elucidated, effects may be partially mediated through changes in methylation. Objective: We examined associations between long-term air pollution and candidate-gene-specific and global methylation in two random subcohorts selected from the Sister Study, a nationwide prospective cohort study of US women. Methods: In one sub-cohort we measured global DNA methylation (long interspersed nucleotide element, LINE1), by pyrosequencing; in the other we measured methylation at 3 selected CpG loci related to inflammatory pathways (genes TNF-α and TLR2), using the Illumina HumanMethylation450 BeadChip. Five-year average ambient fine particulate matter (PM2.5) and nitrogen dioxide (NO2) concentrations were estimated for the current residence. We used quantile regression models adjusting for age, body mass index, and cell type proportions. Analysis was restricted to nonsmokers who had lived at their enrollment address for at least 5 years. Results: Among 332 women from random sub-cohort 1 and 262 from subcohort 2, we observed that higher ambient air pollution was weakly associated with reductions in lower percentiles and increases in percentiles above the median, i.e. a spreading of the methylation distribution. For example, a 5 µg/m3 increase in 5-year PM2.5 concentration was associated with a 0.98 fold (95% CI: 0.97, 1.00) decrease in the 25th percentile of LINE1 methylation. A 5 ppb increase in NO2 was associated with both a 0.93 fold (95% CI: 0.87, 1.00) decrease in the 5th percentile of methylation at the TNF- α locus, and a 1.07 fold (95% CI: 1.03, 1.11) increase in the 95th percentile. Conclusions: In our study there was evidence that residence in regions with higher ambient air pollution was associated with increased inter-individual variability in methylation patterns.

GENETIC VARIATIONS AND RISK OF PLACENTAL ABRUPTION: A GENOME-WIDE ASSOCIATION STUDY AND META-ANALYSIS OF GENOME-WIDE ASSOCIATION STUDIES Tsegaselassie Workalemahu* Tsegaselassie Workalemahu, Daniel A Enquobahrie, Bizu Gelaye, Sixto E Sanchez, Pedro J Garcia, Fasil Tekola-Ayele, Anjum Hajat, Timothy A Thornton, Cande V Ananth, Michelle A Williams, (National Institute of Child Health and Development)

Introduction: Accumulating epidemiological evidence points to strong genetic susceptibility to placental abruption (PA). However, characterization of genes associated with PA remains incomplete. We conducted a genome-wide association study (GWAS) of PA and a meta-analysis of GWAS. Methods: Participants of the Placental Abruption Genetic Epidemiology (PAGE) study, a population based casecontrol study of PA conducted in Lima, Peru, were genotyped using the Illumina HumanCore-24 BeadChip platform. Genotypes were imputed using the 1000 genomes reference panel, and >4.9 million SNPs that passed quality control were analyzed. We performed a GWAS in PAGE participants (507 PA cases and 1,090 controls) and a GWAS meta-analysis in 2,512 participants (959 PA cases and 1,553 controls) that included PAGE and the previously reported Peruvian Abruptio Placentae Epidemiology (PAPE) study. We fitted population stratification-adjusted logistic regression models and fixed-effects meta-analyses using inverse-variance weighting. Results Independent loci (linkage-disequilibrium<0.80) suggestively associated with PA (P-value<5e-5) included rs4148646 and rs2074311 in ABCC8, rs7249210, rs7250184, rs7249100 and rs10401828 in ZNF28, rsl 1133659 in CTNND2, and rs2074314 and rs35271178 near KCNJ11 in the PAGE GWAS. Similarly, independent loci suggestively associated with PA in the GWAS metaanalysis included rs76258369 near IR X1, and rs7094759 and rs12264492 in ADAM12. Functional analyses of these genes showed trophoblast-like cell interaction, as well as networks involved in endocrine system disorders, cardiovascular diseases, and cellular function. Conclusions: We identified several genetic loci and related functions that may play a role in PA risk. Understanding genetic factors underlying pathophysiological mechanisms of PA may facilitate prevention and early diagnostic efforts.

0112 S/P

DIFFERENTIAL DNA METHYLATION AND EXPRESSION OF SLFN12 IN MULTIPLE SCLEROSIS PATIENTS' CD4+ AND CD8+ T CELLS Brooke Rhead* Brooke Rhead, Ina S. Brorson, Tone Berge, Cameron Adams, Hong Quach, Dipen P. Sangurdekar, Paola G. Bronson, Rodney A. Lea, Sean Burnard, Vicki E. Maltby, Rodney J. Scott, Jeannette Lechner-Scott, Hanne F. Harbo, Steffan D. Bos, Lisa F. Barcellos, (University of California, Berkeley)

Multiple sclerosis (MS) is an immune-mediated disease in which T cells damage the myelin sheath surrounding nerves in the brain and spinal cord, leaving lesions. Several genetic and environmental risk factors have been identified for MS, but their mechanisms are not fully understood. DNA methylation is an epigenetic modification that can alter gene expression and is influenced by genetic and environmental factors. It is a potential mechanism by which exposures affect MS pathogenesis. Methylation was assessed in DNA from purified CD4+ and CD8+ T cells of 94 women with relapsing-remitting multiple sclerosis and 94 healthy women using Infinium BeadChips. Data were processed in R using Minfi, and SVA was used to estimate latent variables that might confound results. Genomic regions of differential methylation were identified with Bumphunter, using regression models adjusted for latent variables. Expression of genes near differentially methylated regions was assessed in whole blood in a separate population of 1,329 women with MS and 97 healthy women. Differential methylation was found in five regions near the following genes: SLFN12, HLA-DRB1, ZFP57, MOG, NINJ2, and LOC100049716. Hypermethylation near SLFN12 was found in CD4+ and CD8+ T cells, and remained present after restricting analyses to MS-treatment-naïve patients. HLA-DR Bl, NINJ2 and SLFN12 were expressed at a lower level in whole blood of MS patients compared to controls. Consistent increased methylation and corresponding decreased expression of SLFN12 in MS cases is particularly compelling, as it belongs to the family of "schlafen" proteins, which play a role in disrupting viral replication and are induced by type I interferons. Viral exposures are a risk factor for MS, and interferon beta type I is a common first line treatment in MS. This study provides evidence that the dysregulation of several genes through altered DNA methylation contributes to MS risk.

PREGNANCY INTERACTS WITH GENETIC VARIANTS TO MODIFY RISK OF MULTIPLE SCLEROSIS Cameron Adams, MPH* Cameron Adams MPH, Xiaorong Shao, Stephan Bos-Haugen, Hanne Harbo, Ina Brorson, Lars Alfredsson, Tomas Olsson, Ingrid Kockum, Annette Langer-Gould, Lisa F. Barcellos, (School of Public Health, Division of Epidemiology, UC Berkeley)

Multiple sclerosis (MS) is a demyelinating autoimmune disease of unknown etiology. Genetic and environmental risk factors have been identified, but their mechanisms are not understood. MS predominantly affects women, and first symptoms typically appear during childbearing years. Immunologic changes in pregnancy are hypothesized to contribute to risk of MS. However, studies of the marginal effect of pregnancy on risk of MS have mixed results. Gene-environment (G-E) interactions provide insight into disease pathways that involve both genes and environmental exposures. This study investigated interaction between established MS genetic risk variants and pregnancy among women using a case-only GxE study design. We hypothesized that interactions between MS genetic risk variants and pregnancy are associated with risk of MS. All cases were adult females of European ancestry with confirmed diagnosis selected from Kaiser Permanente California, Norwegian, and Swedish MS studies (n=2,525). Pregnancy exposure was defined as live-birth pregnancies before onset of first MS symptoms. Genotype data were obtained through whole-genome profiling and imputation. Logistic regression was used to estimate G-E interaction adjusting for cohort and correcting for multiple tests (q<0.2). Probabilistic bias analysis (PBA) and sensitivity analyses were conducted to assess bias from pregnancy exposure misclassification and latent disease on observed associations. Results demonstrated evidence for interaction between pregnancy and HLA-DRBI*01:01 (OR=1.36, 95% CI: 1.09-1.69) and HLA-DQA1*01:01 (OR=1.39, 95% CI: 1.15-1.68). PBA and sensitivity analyses indicated slight bias away from the null from exposure misclassification and no effect of latent disease on observed associations. Our results provide evidence that biologic pathways for risk of MS include the interaction between HLA genes and pregnancy. Further studies are needed to elucidate mechanisms linking pregnancy and genetic risk for MS.

0113

PRENATAL HOME VISITING MODIFIES THE ASSOCIATION OF MATERNAL ADVERSE CHILDHOOD EXPERIENCES WITH INFANT SCG5 DNA METHYLATION Alonzo T Folger* Alonzo T Folger, Lili Ding, Hong Ji, Kimberly Yolton, Robert T. Ammerman, Judith B. Van Ginkel, Katherine A. Bowers, (Cincinnati Children's Hospital Medical Center)

Previous research has demonstrated a large negative correlation between maternal prenatal objective stress (e.g., physical hardship, traumatic experiences) and DNA methylation (DNAm) of the SCG5 (Secretogranin V) gene promotor. Offspring epigenetic responses to maternal adversity and trauma may undermine healthy child development. Early childhood home visiting (HV) programs aim to engage mothers during pregnancy and mitigate the potentially deleterious intergenerational effects of maternal adversity. However, it is unknown whether HV programs can impact early epigenetic responses to adversity, potentially promoting more resilient phenotypes We followed a cohort of 53 mother-child pairs enrolled in a HV program in Cincinnati, Ohio and examined (1) the association between maternal adverse childhood experiences (ACEs)-a measure of adversity and trauma-and neonatal DNAm at the SCG5 gene and (2) modification of this effect by the dose of prenatal HV. Methods Mothers completed the ACE measure prenatally, and infant buccal samples were collected for pyrosequencing at 1-month post-partum. A multivariable general linear model was used to examine the association between maternal ACEs (≥3 versus <3 ACEs) and infant DNAm expressed as M-values averaged across 4 CpG sites. We tested for an interaction between maternal ACEs and prenatal HV (≥ the median of 10 versus 1-9 home visits). Results: A significant interaction was observed between the levels maternal ACEs and prenatal HV in predicting the outcome of SCG5 DNAm (p=0.028). Among mothers who received ≥10 prenatal home visits, the LS mean difference in offspring SCG5 DNAm was 9.8 (95% CI: 2.6, 17.1) for mothers with ≥3 versus <3 ACEs, whereas, the same LS mean difference was 3.8 (95% CI: 2.5, 10.1) among mothers with 1-9 prenatal home visits. Conclusion: In a home visited population, preliminary evidence indicates that maternal ACEs have relationship with offspring SCG5 DNAm that differs based on dose of prenatal HV.

THE EFFECTS OF BODY COMPOSITION ON ASTHMA CONTROL AND QUALITY OF LIFE IN ADULT ASTHMA: A STRUCTURAL EQUATION MODELING STUDY Liang JH* Yu-Ting Tseng, Liang JH, Wang TN, (Department of Public Health, College of Health Science, Kaohsiung Medical University)

Background Previous studies have linked asthma and obesity, suggesting that higher BMI presents poor asthma control and life quality. The increased markers of inflammation in adipose tissue and serum are associated with obesity. In this study, we examined body composition and serum biomarkers to explore relationships between obesity, Asthma Control Test (ACT) scores, quality of life (QoL) and severity of asthma in adult asthma patients. Methods This was a patient cohort study that included 253 asthmatic patients from a medical center in southern Taiwan. We used ACT scores to determine the level of asthma control, and collected Taiwanese version asthma quality-of- life (TAQLQ) questionnaires, and the severity of asthma was determined by patient medication history. We used structural equation modeling (SEM) to test the association between each body composition indicator and ACT, TAQLQ and severity of asthma. Result In our study, 253 patients were available after four years of follow-up (87.8%). We used SEM to construct the predicted model to examine the relationship between risk factors and outcome variables, and estimate standardized coefficients (β) for each pathway. The final predicted model of asthma patient's ACT, AQLQ, severe asthma in SEM had a great model fit (Chisquare=262.348, p-value<0.001,, CFI=0.945, TLI=0.932, GFI=0.897,

RMSEA=0.074). The WHR, torso body fat%, leptin, CRP, body fat% and BMI had significant direct and/or indirect association with asthma control, quality of life and severity of asthma in adult asthma patients. Conclusion In this study, we demonstrated that higher body fat (%) and BMI may reveal an under asthma control, poor quality of life and more severity of asthma, and the serum biomarkers (leptin, CRP) had indirect effects on outcome variables. Our findings suggested that asthma patients should have more awareness of their fat and weight control in order to get better control of asthma and a higher quality of life.

0122 S/P

USE OF REMOTE SENSING DATA AND MACHINE LEARNING TO PREDICT ROOF TYPE FOR INDOOR RESIDUAL SPRAYING CAMPAIGNS Amanda Irish* Amanda Irish, Alemayehu Midekisa, Hugh Sturrock, (Department of Epidemiology and Biostatistics, UC San Francisco)

To help guide indoor residual spraying (IRS) of insecticide for malaria, information on the number and distribution of residential structures is essential. While open access datasets, such as those curated by the OpenStreetMap (OSM) project, provide valuable sources of data on buildings, information pertaining to whether or not they are residential is typically missing. Previous work has shown that it is possible to differentiate residential from non-residential buildings using building characteristics available in OSM data such as size, shape, and proximity to other buildings and roads. We investigated whether we could accurately predict a structure's roof type from remotely sensed data and whether adding roof type as a covariate to the building type algorithm improved its performance. Structures in Botswana and Swaziland were tagged as having metal, tile, or thatched roofs using Google Earth's (GE) high-resolution imagery. Spectral bands, normalized difference vegetation index, normalized difference water index from Sentinel 2, and night-time light data from the Visible Infrared Imaging Radiometer Suite were used as covariates in a stacked machine learning algorithm to model and predict the three roof type classes. Roof type predictions were then included as an additional covariate in the building type algorithm and compared to results without including roof type. We found that training the stacked algorithm on satellite data in Botswana and Swaziland resulted in classification that was 83% and 73% accurate respectively compared to the GE tag in the validation dataset, with Cohen's kappas of 0.75 and 0.67 respectively. Including roof type as a covariate in the building type prediction algorithm resulted in an improvement in prediction accuracy of ~3%. While small in percent, at a country level this gain in accuracy translates to thousands more buildings classified correctly, and to more efficient IRS campaigns.

COUNTRY LEVEL ANALYSIS OF THE ASSOCIATION BETWEEN MATERNAL OBESITY AND NEONATAL MORTALITY IN SUB-SAHARAN AFRICA: A CROSS-SECTIONAL STUDY OF THE DEMOGRAPHIC AND HEALTH SURVEYS Ifcoma D. Ozodiegwu* Ifcoma D. Ozodiegwu, Liang Wang, Hadii M. Mamudu, Henry V. Doctor, (Department of Biostatistics and Epidemiology, East Tennessee State University)

Objective: Neonatal deaths represent 45% of under-five deaths globally, with sub-Saharan Africa (SSA) contributing to half of these deaths. There is conflicting evidence on the role of maternal obesity in fueling neonatal mortality in the region. The goal of this study was to investigate the relationship between maternal obesity and neonatal mortality at a regional and country-level. Methods: We conducted a retrospective analysis of nationally representative data from the Demographic and Health Survey (DHS) program in 33 SSA countries. We used multivariable logistic regression analyses to examine the association between maternal obesity and neonatal mortality at a regional and country level. Further, in the pooled data, we examined the separate effect modification of access to prenatal care and skilled birth attendant at delivery in the relationship between maternal obesity and neonatal mortality. Results: Compared to women of optimal weight, maternal obesity was associated with 47% increased odds of neonatal mortality (Odds Ratio: 1.47, 95 Confidence Interval: 1.19 - 1.81). The observed association between maternal obesity and neonatal mortality was positive in Togo (OR: 4.94, 95% CI: 1.67 -14.6), Tanzania (OR: 2.73, 95% CI: 1.17 - 6.37), and Nigeria (OR: 1.67, 95% CI: 1.04 - 2.68). There was no interaction between maternal obesity and access to prenatal care or skilled birth attendant at delivery in its relationship with neonatal mortality. Conclusion: This study provides further confirmation that maternal obesity may be linked to neonatal mortality in SSA. Current standards of prenatal care and skilled birth attendance at delivery may not lead to reductions in neonatal deaths in obese women. Cohort studies are needed in countries with high neonatal deaths in the region to strengthen the knowledge in this topic area.

0123 S/P

EXPLORING THE ASSOCIATION BETWEEN SICK CHILD CARE UTILIZATION AND HEALTH SERVICE FACILITY QUALITY IN MALAWI Lingrui Liu* Hannah H Leslie, Lingrui Liu, Humphreys Nsona, Margaret E Kruk, (Harvard TH Chan School of Public Health)

Background Increasing basic healthcare access in low-and-middle-income countries to enhance child survival is not enough to meet Sustainable Development Goals 3 in high-mortality settings, where inconsistent healthcare utilization and poor quality of care may undermine the benefits of health system access. We assess whether quality of sick child care in Malawi is linked to reduced utilization of essential services. Methods We defined two measures of quality of sick-child care: facility structural readiness and process of care, following WHO guidelines and using data from the 2013 Malawi Service Provision Assessment. We extracted demographic and health data from the 2013 Malawi MDG Endline Survey of households and linked households to facilities using geocodes to identify the nearest facility. We used logistic regression to examine the association of facility quality with utilization of formal health services for sick children under 5, controlling for demographic and socioeconomic characteristics. Results 568 facilities were linked with 12,258 children with recent illness symptoms, 56% of whom had been brought to a health facility. Facilities showed gaps in structural quality (68% readiness) and major deficiencies in process quality (28%), for an overall quality score of 44%. Utilization of sick child care services was consistently associated with facility quality (Adjusted OR [AOR] 2.06, SE 0.46). Both structural (AOR=I.44, SE 0.21) and process quality (AOR=I.42, SE 0.26) measures were associated with higher odds of care seeking. Conclusion Although Malawi's health facilities for curative child care are widely available, quality of care is inadequate; children were more likely to be brought to health facilities where better care is available. Improved structural and process quality could drive households to utilize care services more consistently. Quality of health services for children must be strengthened to end preventable childhood disease and death.

THE EVALUATION OF LABIAL CLOSURE STRENGTH AND QUALITY OF LIFE IN PEOPLE WITH INTELLECTUAL DISABILITY USING PATAKARA, A TWO-MONTH INTERVENTION STUDY Cheng-Hung Tsai* Cheng-Hung Tsai, Yu-Ching Chou, Jin-Ding Lin, Gunng-Shinng Chen, (School of Public Health, National Defense Medical Center, Taipei, Taiwan.)

Background: Health promotion is one of the important elements in public health. People with intellectual disability are one of the most vulnerable populations in society and known to have poorer oral function than general population. The liptrainer, Patakara, was used to improve labial closure strength and was beneficial for intake of food, swallowing and forming facial expressions. Objective: The aim of this study was to describe the assessment of two-month lip training using Patak ara in people with intellectual disability, and the association between labial closure strength and quality of life. Methods: This is a pretest-posttest of quasi-experimental study design, with a total of twenty participants recruited in the two-month study. We used Patakara for lip training 5 days a week, 3 times a day and takes 3 minutes per session. We evaluated the lip force with a Beauty Health Checker (BHC-V01) before training (baseline data), after training for two weeks (2W), one month (1M) and two months (2M). In order to assess oral function, oral examination was conducted by a dentist. Short Form 36 (SF-36) questionnaire was used as a tool to evaluate quality of life. We compared the differences in data among baseline, 2W, 1M, and 2M using repeated measured analysis of variance (ANOVA). SPSS version 22.0 for Windows was used to analyze all the data. All statistical significance was set as p<0.05. Results: The result showed a statistically significant increase of labial closure strength (p=0.004). The mean force of the participants increased from 2.4 (standard deviation [SD]=4.8) to 4.3 (SD=3.6). However, the score of SF-36, weight and blood pressure did not change significantly, and there was no significant difference in oral function. Conclusion: In this study, we found that using Patakara for training was effective in improving labial closure strength. Further studies for over 2 months training period and randomized clinical trial are needed.

0132 S/P

BIOLOGICAL AGE AND DEPRESSION IN THE CORONARY ARTERY RISK DEVELOPMENT IN YOUNG ADULTS (CARDIA) STUDY. Sarah Forrester* Sarah Forrester, David Jacobs, Rachel Zmora, Pamela Shreiner, Veronique Roger, Catarina Kiefe, (University of Massachusetts Medical School)

Background: Biological age (BA) has been posited as a mechanism to measure the "weathering" hypothesis, Blacks biologically aging earlier than Whites due to psychosocial stress Conceptually, BA represents the chronological age (CA) at which most "normal" persons share a physical state. Generally, younger biological is considered a marker of better health We explored the association between BA and depressive symptoms Method: We used data from 549 Black and 853 White participants from CARDIA, followed over 30 years starting from age 18-32 at baseline. Depressive symptoms were measured by the Center for Epidemiological Studies Depression Scale (CES-D) score. Race was self-reported at baseline. We created a BA variable using the 2006 Klemera & Doubal Method (KDM) defined as equal to CA plus a random variable, RBA, with a mean zero and variance of s2BA derived through a mathematical equation that minimizes the distance between m regression lines and m biomarker points, within an m dimensional space of all biomarkers. We selected 7 biomarkers based on knowledge of their association with aging, availability, and significant association with CA: total and HDL cholesterol, glucose, waist-to-hip ratio, c-reactive protein, forced expiratory volume in 1 second, and mean arterial pressure for the KDM calculation of BA. Linear regressions, overall with an interaction term and stratified by race, examined the relationship between CES-D score at year 20 (2005-06) and BA at year 30 (2015-16). All models controlled for sex and CA. Results: A I-point higher CES-D score at year 20 was directly associated with year 30 biological age [0.08 (95% CI: 0.0001-0.16)], differently by race (p-value for interaction = 0.050). In stratified analyses, for Blacks, the difference was 0.10 years (0.034-0.16) and for whites, 0.016 years (-0.038-0.070). Conclusion: Depressive symptoms were related to higher biological age among Blacks but not Whites, independent of chronological age.

ASSOCIATION OF GENETIC ANCESTRY ADMIXTURE AND EARLY CHILDHOOD OBESITY Sahel Hazrati * Sahel Hazrati, , (Inova Translational Medicine Institute)

Background: Genetic ancestry and race may have controversial influence in research. Race and ethnicity do not capture all the heterogeneity; therefore, ancestral genetic background may help to better understand the prevalence and disparity of childhood obesity. Objective: To investigate relationship between children's genetic admixture proportions and obesity at 12 month of age Methods: Children of 12 months of age were included in this cross-sectional study. Whole genome sequencing was performed and the ancestry of children was estimated by the ancestry and kinship toolkit by projecting the samples into the 1000 genomes principal components. Weight for Length Percentile (WFLP) at 12 months of age were categorized as <95th and ≥95th. Multiple logistic regression analysis was performed to calculate odds ratios (ORs) with 95% confidence intervals (CIs) for association of admixture proportion including European (EUR), American (AMR), African (AFR), East Asian (EAS) and South Asian (SAS) with WFLP categories ad justing for maternal education, birth weight, frequency of breast feeding and juice consumption. Results: 821 children from 83 parental countries of birth were included; WFLP were 671 (81.7%) <95th and 150 (18.3%) ≥95th. Crude odds ratios showed EUR admixture was protective (OR 0.45 (95% CI 0.27-0.74)) whereas AMR (OR 3.85 (95% CI 1.92-7.70)) and AFR (OR 5.70 (95% CI 2.19 -14.85)) were positively associated with obesity. After adjusting for confounding variables, only AFR was associated with WFLP≥95th (OR 7.38 (95% CI 2.31 -23.59), while AMR was no longer associated with WFLP≥95th and EUR was no longer a protective factor. No association was observed between EAS or SAS with obesity. Discussion: AMR and AFR admixture were associated with WFLP ≥95th at 12 months, while EUR admixture was protective. After adjusting for obesogenic factors, only AFR remained significantly associated with obesity suggesting this genetic background may contribute to the observed differences in obesity.

0133 S/P

CARDIOMETABOLIC DYSFUNCTION AMONG U.S. ADOLESCENTS AND AREA-LEVEL POVERTY: RACE/ETHNICITY-SPECIFIC ASSOCIATIONS Andrew Williams* Andrew Williams, Edmond Shenassa, Natalie Slopen, Lauren Rossen, (Eunice Kennedy Shriver National Institute of Child Health and Human Development)

The purpose of this study was to examine race/ethnicity-specific associations between area-level poverty and cardiometabolic (CM) dysfunction among U.S. adolescents. Data were from 10,415 adolescents aged 12-19 in the National Health and Nutrition Examination Survey (1999-2012), linked with census tract data on area-level poverty (the percent population living in poverty, grouped into race/ethnicity-specific quartiles). CM dysfunction was parameterized by summing zscores of six CM biomarkers, grouped into quintiles. Hierarchical ordinal models estimated overall and race/ethnicity specific associations. Post-hoc analysis explored associations between area-level poverty and family poverty-to-income ratio. Overall, compared to the first quartile of area-level poverty, residents in third (OR:1.32, 95% CI: 1.13, 1.53) and fourth (OR: 1.27, 95% CI: 1.08, 1.50) quartiles of area-level poverty experienced elevated odds of CM dysfunction. Area-level poverty predicted CM dysfunction among non-Hispanic white and Mexican American adolescents, but not among non-Hispanic black adolescents. In post-hoc analyses, among non-Hispanic whites, mean family poverty-to-income ratio declined from 3.53 in the first quartile to 1.60 in the fourth quartile (p< .05), a greater difference than among non-Hispanic blacks or Mexican American adolescents. We found race/ethnicityspecific associations between area-level poverty and CM dysfunction among U.S. adolescents, highlighting the moderating effect of race-ethnicity. Analyses suggest that higher area-level or family SES among non-Hispanic black teens is not associated with improvements in CM health, in contrast to non-Hispanic white adolescents. These findings suggest that as socioeconomic status increases, non-Hispanic black individuals do not experience improvements in health status like non-Hispanic whites do. Future studies of effect of area-level determinants of CM dysfunction may consider race/ethnicity-specific associations.

FOOD DESERTS IN MINNEAPOLIS-ST. PAUL: SPATIAL ANALYSIS OF RISK FACTORS FOR HEALTH OUTCOMES Emily A Groene* Emily A Groene, Ashley M. Hernandez, Joseph L. Servadio, Subin Jang, (Division of Epidemiology and Community Health, School of Public Health, University of Minnesota)

Background: The Centers for Disease Control and Prevention (CDC) defines food deserts as areas with inadequate access to healthy and affordable foods. Living in a food desert has been associated with cardiovascular disease (CVD), chronic kidney disease (CKD), diabetes, and obesity. Recent studies have underutilized spatial analysis and have not accounted for public transportation access. This study uses spatial analysis to relate food deserts to health outcomes in the Minneapolis-St.Paul area controlling for public transportation access. Methods: Data were obtained from the Food Access Research Atlas, Minnesota Department of Transportation, and the CDC's 500 Cities Project. Data were analyzed at the census-tract level (n=246) using a conditional autoregressive model to account for spatial autocorrelation and estimate differences in prevalence. We controlled for race, median family income, public transportation access, vehicle ownership, Supplemental Nutrition Assistance Program enrollment, smoking status, and health insurance access. Initial results: Census tracts with low access to food had significantly higher prevalence of diabetes $(\beta = 0.567, 95\% \text{ CI}: 0.071, 1.062)$, obesity $(\beta = 0.591, 95\% \text{ CI}: 0.004, 1.776)$, CKD $(\beta = 0.178, 95\% \text{ CI} \cdot 0.054, 0.302)$, and CVD $(\beta = 0.437, 95\% \text{ CI} \cdot 0.083, 0.790)$ in the fully-adjusted models. Tracts with a greater proportion of households without a vehicle had significantly lower prevalence of obesity (β =-2.12*10^-3, 95% CI: -3.96*10^-3,-0.27*10^-3), and tracts with greater public transportation access had significantly higher prevalence of CVD (B=9.21*10^-4, 95% CI: 1.22*10^-4, 17.2*10^-4). Discussion: Our findings suggest that low access to healthy and affordable food is significantly associated with poorer health in the Minneapolis-St.Paul metropolitan area. Transportation characteristics showed modest associations with health. Future studies should examine the role public transportation access plays in determining food access and health.

0136 S/P

GENDER DISPARITY IN SELF-REPORTED SLEEP QUALITY AMONG CANADIAN ADULTS Ashleigh J Rich* Ashleigh J Rich, Mieke Koehoorn, Najib T Ayas, Jean Shoveller, (University of British Columbia)

Background: Poor sleep is associated with short- and long-term health consequences, increased healthcare services use and high economic burden. Women disproportionately experience poor sleep quality; yet, they remain an understudied and potentially undertreated population. This study investigated gender differences in sleep quality among Canadian adults in a nationally representative populationbased survey. Methods: Respondents (n = 39,762) who completed the sleep module in the 2011-12 Canadian Community Health Survey were included in the analysis. Multinomial logistic regression investigated the relationship between gender and a five-level composite sleep quality measure among adults 18 years or older, adjusted for the confounders of age, visible minority status, educational attainment, and current mental health disorder diagnosis. Results: Overall, poor sleep quality was more prevalent among women than men (95.0% versus 92.2% reported any poor sleep quality, respectively). In the adjusted logistic model, female gender was independently associated with higher odds of poor sleep quality overall, and a doseresponse effect was observed the more frequent the poor sleep quality (from 'a little of the time' AOR = 1.42, 95% CI: 1.21, 1.67 to 'all of the time' AOR = 2.10, 95% CI: 1.74, 2.54). Discussion: This study provides evidence of a sleep quality disparity for Canadian women, and a population-level dose-response relationship between gender and sleep quality for Canadian adults. Using a mixed gender populationbased sample and a robust sleep quality measure, this study contributes to a growing understanding of poor sleep as a population health issue. Further research is needed to understand the mechanisms underlying this relationship, and investigate effective public health and policy interventions for addressing sleep-gender population health disparities.

CITIZENSHIP AND IMMIGRATION STATUS ON THE BURDEN OF CARDIOMETABOLIC RISK FACTORS AMONG HISPANIC/LATINO ADULTS LIVING IN THE UNITED STATES Lindsay Fernandez-Rhodes* Lindsay Fernandez-Rhodes, Carmen R. Isasi, Linda C. Gallo, Krista M. Perreira, (UNC-CH)

Of the more than 43 million US immigrants, approximately 28% do not have current legal authorization to be in the US. Lack of US citizenship and unauthorized status are important life stressors, but few studies have examined citizenship/immigration (C/I) status in relation to physical health. We aimed to describe the association between C/I status and the number of cardiometabolic-risk factors (CMRs: obesity, type 2 diabetes, hypertension, hypercholesterolemia, and current smoking) in an urban population-based US sample: Hispanic Community Health Study/Study of Latinos (Visit 2 Preliminary Release: 2014-2016). Of the 9,414 adults, 24% were US-born citizens (15% Puerto Rican), 35% foreign-born (FB) citizens, 26% FB noncitizens, 12% unauthorized and 2% missing/refused. Regression analyses adjusted for complex sampling and non-response, demographics (age, gender, center, background) and sociocultural factors (years in the US, language preference, education). The number of CMRs differed across the four C/I statuses, with FB citizens having the highest burden (p<0.0001). Adjusting for demographics, as compared to FB citizens all statuses had modestly higher average number of CMRs (\beta=0.01-0.06). After adjustment for sociocultural factors, both FB non-citizens and US-born citizens had less CMRs than FB citizens (\beta=0.01-0.05), but only the unauthorized-CMR protective effect was significant (β=-0.19, 95%CI: -0.33, -0.06). The effect of lack of authorization on CMRs was strongest among Mexican heritage men, who reported at baseline (2008-2011) having a greater work-related physical activity than any other group. Our preliminary results suggest that C/I status has modest consequences on CMR burden. Yet, future analyses will assess how C/I status associates with changes in CMRs and disease control, to further test the unhealthy assimilation hypothesis, and to inform which C/I statuses may be in most need of public health interventions to improve their CMR burden.

0137 S/P

TRENDS IN EMERGENCY DEPARTMENTS AND HEALTH CLINICS UTILIZATION IN A SOUTH EASTERN SEMI-URBAN CITY IN US Thomas Joshua* Thomas Joshua, Lucy Marion, (University of Georgia and Augusta University)

Background: The population in Richmond County, Georgia was 201,793 according to US census estimate for 2015, and the Black population was 55.6% compared to 39.2% Whites High school graduates and higher comprised 83.7% of the population, and for those above 25 years of age, 20.4% held a bachelor's degree or higher. Almost 19% were uninsured in 2016 and adult obesity was 35%. The Greater Augusta Healthcare Network (GAHN), a nonprofit safety net organization has focused on the uninsured population since 2007. Aims: 1. Describe current Emergency Department (ED) use for Ambulatory Care Sensitive conditions (ACSC). 2. Assess primary care delivery by GAHN agency members and community health care needs, demands, and trends. Methods: GAHN collected data on patients, including age and gender, zip code, ethnicity and race, diagnoses, encounters, pay status, socioeconomic status, ACSC and E&M level 1 to 5 from year 2007 onwards. Results: For the three hospital ED utilization, total patient visits (seen and discharged) were approximately 150,000 per year from 2007 to 2013. Approximately 27% of total visits were made by individuals under 20 years, 63% by those from 20 to 64 years, and 10% by those from 65 and older. From the five clinics, the number of unique patients utilizing the clinics increased from 3,755 in 2007 to 18,871 in 2016. That was an increase of almost 15,116 (5.03 times). Total patient visits to the five clinics increased from 13,613 in 2007 to 58,695 in 2016. Conclusion: From 2007 to 2016, clinic utilization by the uninsured population rose sharply, but ED utilization remained fairly stable. The Ed visits rated as ACSC and E&M levels 1&2 may be better managed by the GAHN and other primary care clinics and thus reducing burden on area EDs.

INCOME INEQUALITY AND SOCIOECONOMIC DISPARITIES IN SELF-RATED HEALTH IN THE UNITED STATES: A SPATIAL ANALYSIS Chun-Tung Kuo* Chun-Tung Kuo, Ichiro Kawachi, (Department of Social and Behavioral Sciences, Harvard T.H. Chan School of Public Health)

Background: Income inequality has been hypothesized as an important social determinant of population health. However, few studies have investigated whether income inequality is damaging to health because of its impact on widening socioeconomic disparities in health. Also, prior studies failed to account for the spatial dependence of health disparities. We thus used spatial lag regression to examine the relationship between state-level income inequality and socioeconomic disparities in self-rated health in the US. Methods: We calculated the Slope Index of Inequality (SII) for self-rated health in the fifty US states using data from the 2016 Behavioral Risk Factor Surveillance System. The SII reflects the absolute disparities in self-rated health according to income and education groups. Data on the statelevel Gini coefficient, median household income and educational attainment in 2011 were obtained from the US census. Using a spatial lag model, we examined associations between the state-level Gini and SII while accounting for spatial autocorrelation. Results: Average income- and education-based SII in reporting poor/fair health was -41.3 (SD=6.6) and -30.5 (SD=6.3), while ranged from -53.6 to -25.1 and -42.5 to -16.0, respectively. Moran's I score for income- and educationbased SII was 0.52 and 0.55, indicating the distribution of SII was spatially clustered. The spatial lag model showed that the state-level income inequality was associated with larger health disparities after controlling for income and educational level. One unit rise in the Gini coefficient was associated with increased -1.52 in income-based SII (95% CI=-0.86, -2.17) and -1.75 in education-based SII (95% CI=-1.11, -2.40). Additionally, the Gini was also associated with higher percentage of people reporting poor/fair health. Conclusion: Higher income inequality is not only associated with worse health outcome but also associated with wider socioeconomic disparities in self-rated health in the US.

0139

TRENDS IN SOCIOECONOMIC INEQUALITIES IN ISCHEMIC HEART DISEASE IN ONTARIO, CANADA, 2000-2012 Brendan T Smith* Brendan T Smith, Chantel Ramraj, Peter Smith, Hong Chen, Heather Manson, Jack Tu, Laura Rosella, (Public Health Ontario/University of Toronto)

Background: Low socioeconomic position (SEP) is an important risk factor for ischemic heart disease (IHD). Current surveillance methods use area-based SEP measures to monitor trends in socioeconomic inequalities in IHD. The extent to which these methods underestimate individual-level socioeconomic inequalities in IHD is unclear. Objectives: To estimate and compare socioeconomic trends in IHD by household income and material deprivation in Ontario from 2000 to 2012. Methods: A population-based, pooled cross-sectional study was conducted using data from the Ontario respondents of 6 Canadian Community Health Survey cycles (2000-2012) linked to the administrative Discharge Abstract Database (n=119,529 over 35 years of age, 55% female). Prevalent IHD included an IHD hospitalization within 10 years, measured across quintiles of equivalized household income and the Ontario Marginalization Index's material deprivation scale. Relative-weighted Poisson regression models were used to estimate IHD rates representative of the Ontario population adjusted for age, sex, ethnicity, marital status and immigration. Socioeconomic inequalities in IHD were estimated using the slope index of inequality (SII) and relative index of inequality (RII). Results: Socioeconomic inequalities in IHD were observed across income quintiles on both absolute (SII:345 per 10,000, 95%CI:207,483) and relative (RII:2.52, 95%CI:1.58,3.46) scales in 2000, decreasing by 2012 (SII:167 per 10,000, 95%CI:40,293; R1I:1.80, 95%CI:0.97,2.63). A similar pattern was observed across material deprivation quintiles, however with smaller inequalities in 2000 (SII:195 per 10,000, 95% CI:79,312; RII:1.64, 95% CI:1.16,2.1 1) and 2012 (SII:142 per 10,000, 95% CI:16,268; RII:1.54, 95% CI:0.94,2.14). Conclusions: Consistent socioeconomic inequalities in IHD were observed in Ontario, with decreasing trends between 2000 and 2012. Area-level material deprivation underestimated individual-level socioeconomic inequalities in IHD.

0140 S/P

SOCIAL DISPARITIES IN CARIES EXPERIENCE IN CHILDREN FROM 1 TO 6 OF THE METROPOLITAN REGION, CHILE Maria Jose Monsalves* Maria Jose Monsalves, Josiane Bonnefoy, (Universidad de Chile)

Caries damage in childhood continues to be a health problem relevant to public health in Chile, although prevention and health promotion policies have been implemented. Objective was to analyze the social disparities in caries experience in children from 1 to 6 of the Metropolitan Region, Chile. A cross-sectional study was conducted, considering three levels: administrative communities (13 communes), educational establishment (40 school and pre-school) and child. Children 1 to 6 years of age were selected using a stratified probability sampling using the Community Human Development Index (CHDI). Information was collected through a clinical-examination form and caregiver survey. Clinical exam was performed in each school by a dentist and an assistant. We measured absolute and relative social disparities in caries experience related to the CHDI and family income using the Slope (SII) and Relative Index of Inequality (RII), respectively. 2275 children were examined. Of the two social variables studied, the family income was most strongly related to inequalities in caries experience in childhood (SII=-2.14). The inequality was greatest in rural communes and the large gap observed between communes (2) teeth with damage of a maximum of 20) represented by relative difference of 26% in caries experience between the top and bottom of the Community Human Development Index (RII=-0,26). The results point towards the need to carry out two approaches from public policies: focus on the poorest families in all the communes of the metropolitan region and on the children who study in rural communes.

THE IMPACT OF EMPLOYMENT AND SOCIOECONOMIC POSITION CHANGE ON SCREENING MAMMOGRAPHY UTILIZATION DURING THE GREAT RECESSION: THE HEALTH AND RETIREMENT STUDY Joshua Demb* Joshua Demb, Isabel E. Allen, Robert A. Hiatt, Dejana Braithwaite, (University of California, San Francisco)

Despite recent large-scale efforts to improve screening access, major structural events could radically impact screening behaviors. Between 2007 and 2009, the Great Recession led to spikes in unemployment nationwide, and left many low and middle-income families uninsured due to an acute decrease in employer-sponsored health insurance. These changes in employment and employer-sponsored insurance could have exacerbated inequalities in cancer screening access. Using data from the 2004, 2008 and 2012 waves of the longitudinal, population-based Health and Retirement Study (HRS), we assessed how individual-level employment and socioeconomic position (SEP) changes affected screening mammography utilization during the Great Recession. Multilevel models accounted for state-level factors as random intercepts and study year as random slopes. The HRS study population of 11,611 women (at baseline) was weighted to represent the general US population. At baseline, 220 women were unemployed (2%). From 2004 to 2012, proportions of uninsured women increased from 28% to 39% and retired women from 28% to 39%. Our findings showed interaction of individual-level employment status and year, and SEP and year (both p<0.01). Comparing screening utilization among unemployed women versus those employed full-time, the odds ratios associated with screening utilization were 1.05 (95% CI 1.05-1.06) in 2004, 0.57 (95% CI 0.57-0.58) in 2008 and 0.83 (95% CI 0.82-0.83) in 2012. Comparing screening utilization among women living in a household under the poverty line compared to above the poverty line, the odds ratios associated with screening utilization were 0.80 (95% CI 0.79-0.80) in 2004, 0.94 (95% CI 0.93-0.94) in 2008, and 0.80 (95% CI 0.80-0.81) in 2012. These findings indicate unemployment during the Great Recession had a strong impact on mammography screening utilization among US women, and highlights the need for policy solutions to prolong healthcare access during periods of unemployment.

0152

DOES RAPID FEDERAL EXPANSION OF PREVENTIVE HEALTH SERVICES REDUCE DEPENDENCY ON THE EMERGENCY DEPARTMENT? THE CASE OF FEDERALLY QUALIFIED HEALTH CENTERS Tim Bruckner* Tim Bruckner, Parvati Singh, (Public Health, University of California, Irvine)

Federally Qualified Health Centers (FQHCs) provide preventive health services, regardless of patients' ability to pay, in low-income communities. The reach of FQHCs has expanded by an unprecedented 70% in the last decade. Over 21 million Americans receive health care from FQHCs. Scant research, however, examines whether the rapid expansion of preventive services in FQHCs over time reduced dependency on the emergency department (ED). This issue is crucial from a policy standpoint given mixed results from a previous health care experiment in Oregon which attempted to promote primary care over crisis services. We test the hypothesis that increases over time in FQHC services for three "prevention quality indicator" conditions (i.e., diabetes, hypertension, and heart attacks) coincide with fewer than expected visits to the ED for these conditions. We examined 148 counties from nine US states, with over 25 million ED visits for these three conditions (2006-11). We retrieved FOHC data from the Uniform Data System (n=15,963,909 primary care visits for these three conditions) and ED data from the AHRQ-sponsored SEDD. Our county-level fixed-effects methods controlled for unmeasured confounding across counties, time-trends in chronic diseases, and changes over time in health care infrastructure, racial/ethnic composition, and poverty. Results support the hypothesis for diabetes (coef. = -.15, 95% confidence interval [CI]: -25, -04) and heart attacks (coef = -03, 95% CI: -.02, -.04) but cannot reject the null for hypertension (coef = -04, 95% CL - 10, 02). The FQHC diabetes coefficient indicates that an annual increase of 100 diabetes-related primary care visits at FQHCs per 100,000 persons coincides with 15 fewer than expected diabetes ED visits per 100,000 persons. Findings for diabetes and heart attacks across nine populous states indicate that rapid FQHC expansion may have reduced ED visits for these conditions.

0151 S/P

FACTORS TO INFLUENCE ANXIETY SCORES WHEN FACING MEDICAL PROBLEMS IN SDM PARTICIPANTS Tzu Han Yang* Tzu-Han Yang, Fu-Gong Lin, Pei Liu, (National Defense Medical Center)

Introduction: Shared Decision Making (SDM) was first proposed in the Commonwealth Program of Patient Care in the United States in 1982 to increase communication between health care providers and patients. Taiwan's Ministry of Health and Welfare launched the SDM Practice Campaign in 2017. The aim is to explore the difference of anxiety scores before and after SDM in cases facing their health problems, moreover to analyze the possible influencing factors. Methods: Cases were taken from a medical center hospital in Taipei, utilizing 41 SDM aids. A total of 322 patients or their family were recruited. Utilizing purposive sampling, cases were referred to SDM by their attending physician, then transferred to health professionals within the same unit to execute SDM(Coaching) . Finally, cases answered a questionnaire including demographic variables and anxiety level. The before and after anxiety scores used t test, whereas the potential factors affecting the before and after anxiety level discrepancy were tested by multiple regression analysis. Results: The scores of anxiety before and after SDM were significantly different (before 2.80, after 1.99, CI (0.67, 0.94). In multivariate results, it was found that the discrepancy may be affected by different medicine divisions and whether the patient was accompanied; patients in the surgical division showed less anxiety reduction than patients in the medical division by 0.98(CI (0.70, 1.26); whereas, compared to patients who visited the hospital alone, patients accompanied by family members and others showed a more decline in anxiety. Conculsions: This study found that the average anxiety level of participants in the SDM process decreased before and after. And, it was found that the discrepancy between the levels of anxiety decline may be affected by different medicine divisions and whether the participant was accompanied during hospital stay. The reason behind this result and the assessment of SDM should be altered.

HIV DIAGNOSIS FOLLOWING AN STI DIAGNOSIS AMONG MALES INCLUDING MSM: WHAT IS THE INCIDENCE? Carla Tilchin* Carla Tilchin, Christina Schumacher, Kevin Psoter, Ravi Muvva, Elizabeth Humes, Patrick Chaulk, Jacky Jennings, (Center for Child and Community Health Research, Department of Pediatrics, Johns Hopkins School of Medicine)

Background: The release of the first drug for HIV pre-exposure prophylaxis (PrEP) in 2012 marked the beginning of a new era of HIV prevention. Although PrEP has been shown to be highly efficacious, identifying and ultimately increasing uptake among the highest risk male subgroups remains a challenge. Methods We created a retrospective cohort of HIV-uninfected males with an early syphilis or gonorrhea infection using public health surveillance data from 2009 to 2015 in Baltimore City. Incidence rate ratios and cumulative incidence estimates were used to assess the relationship between each bacterial STI and HIV seroconversion stratified by sexual transmission risk category, i.e. men who have sex with men (MSM) vs. non-MSM. Results: Among MSM, one in ten syphilis or gonorrhea diagnoses were followed by an HIV diagnosis within two years of the STI diagnosis. Identifying as MSM (vs. non-MSM) was also significantly associated with a more than 4.08 (95% CI: 2.25-7.91) or 5.82 (95% CI: 3.42-10.34) fold increase in HIV incidence after a syphilis or gonorrhea infection, respectively. Among non-MSM with gonorrhea, another STI infection was associated with a 3.47 (95% CI 1.26-9.64) fold increase in HIV incidence as compared to non-MSM with only one gonorrhea infection. Conclusions The findings suggest that local providers should offer PrEP to any MSM diagnosed with an early syphilis or gonorrhea infection and non-MSM with another STI diagnosis after a gonorrhea diagnosis. The short time to an HIV diagnosis among MSM after a syphilis or gonorrhea infection suggests immediate PrEP initiation. On-demand PrEP may also warrant consideration among MSM.

0162 S/P

SKIN TONE, COLORISM, AND RISK OF SEXUALLY TRANSMITTED INFECTION AMONG BLACK-AMERICANS: RESULTS FROM THE 2016 NATIONAL SURVEY ON HIV IN THE BLACK COMMUNITY Jowanna Malone* Jowanna Malone, Laura Bogart, Wanda Allen, Bisola Ojikutu, (Johns Hopkins Bloomberg School of Public Health, Department of Epidemiology)

Background: Black-Americans have disproportionately higher rates of sexually transmitted infections (STIs). Racism and discrimination have been associated with adverse health outcomes, including increased incidence of STIs. Skin tone and colorism (i.e. discrimination against darker skinned individuals) have also been associated with adverse health outcomes among Blacks and could affect STI risks. Objective: To determine associations between reported skin tone and/or colorism with lifetime STI incidence and sexual risk behaviors (condom use and having multiple sex partners) using cross-sectional data from the National Survey on HIV in the Black Community (NSHBC). Methods: We used a nationally representative sample of 868 self-identified Black individuals between the ages of 18-50. Participants reported having "light", "medium", or "dark" skin tone and their degree of colorism using a 5-item validated scale. The associations between reported skin tone and colorism with lifetime STI incidence and sexual risk behaviors were estimated using logistic regression. Results: Overall, 53% of the sample reported a "high" degree of colorism. The sample included 24% light skinned individuals, 53% "medium", and 23% dark. Thirty percent of participants reported having an STI within their lifetime. After adjusting for sex, age, education, income, depression, and arrest history, having "dark" skin was marginally associated with a lower odds of lifetime STI incidence compared with having "light" skin (OR: 0.33, p=0.05). Skin tone was not associated with condom use or sex partner number. Colorism had a significantly positive association with having at least 1 sex partner within the last 3 months (OR: 2.03, p=0.02); however, there were no associations between colorism and STI incidence or condom use. Conclusion: Our findings show potential significant relationships between skin tone, colorism, and STI risks in the Black community that deserve further investigation.

DEFINING GAY NEIGHBORHOODS USING CENSUS DATA AND GAY BARS IN FLORIDA Daniel E Mauck* Daniel E Mauck, Kristopher P Fennie, Gladys Ibanez, Eric Fenkl, Diana M Sheehan, Merhawi Gebrezgi, Lorene M Maddox, Emma C Spencer, Mary Jo Trepka, (Department of Epidemiology, Florida International University)

Background: Studies have defined gay neighborhood residence using the percent of households composed of male-male unmarried partners according to the US census. However, this method may be insufficient to define a gay neighborhood. Neighborhoods with social venues, such as gay bars, have been proposed as an alternate definition. Objective: To examine agreement between residential concentration of male-male unmarried partners and number and density of gay bars as measures to define gay neighborhoods. Methods: Gay neighborhoods were defined in 3 ways. The number of male-male unmarried partner households in a census tract was divided by total households in a census tract (from the 2011-2015 American Community Survey) to obtain a residential concentration percentage. Cutoffs varied in 1-unit increments from 1-10% to classify neighborhoods as "gay" or "not gay" (e.g., ≥1% was a "gay" neighborhood). Gay bar density was calculated as number of gay bars in a census tract divided by total households in a census tract; cutoff for a "gay" neighborhood was set at ≥99th percentile. The number of gay bars in a census tract was used, with ≥1 gay bar as cutoff for "gay" neighborhood. Cohen's Kappa coefficient was used to examine agreement between gay bar measures and varying cutoffs of residential concentration. Results: Cohen's Kappa coefficient was less than 0.2 for all associations, indicating poor agreement. Cohen's Kappa coefficient increased from the 1% cutoff to the 4% cutoff, and then decreased for residential concentration and gay bar density. The highest agreement between residential concentration and gay bar density was at the 4% cutoff (0.15). A similar trend was seen for residential concentration and number of gay bars, with highest agreement for the 3% cutoff (0.17). Conclusion: There was little agreement between residential concentration and gay bars, suggesting they are not measuring the same construct. HIV prevention should target both where MSM socialize and live.

0163 S/P

UTILITY OF PEER EDUCATORS TO CONDUCT SEXUALLY TRANSMITTED DISEASE SURVEILLANCE AMONG YOUNG WOMEN SEEKING CARE IN AN URBAN PUBLIC HEALTHCARE SYSTEM Jessica M. Madrigal* Jessica M. Madrigal, Ashlesha Patel, Patrice Williams, (University of Illinois at Chicago, School of Public Health, Division of Epidemiology and Biostatistics)

Background: People 15-24 years old account for nearly two-thirds of the sexually transmitted disease (STD) cases in Cook County, IL Effective screening, treatment, and education are necessary to prevent spread. Our goal was to identify factors associated with STDs among adolescents presenting for reproductive health services at an urban public healthcare system. Methods: Women 13 to 24-years-old who presented for a first trimester termination at a county clinic in 2015-2016 were approached to have a visit with a health educator. Data collection included age, race/ethnicity, factors related to sexual behaviors, and use of preventative care. We reviewed 3,853 patient charts to abstract STD testing [chlamydia (CT) and gonorrhea (GC)] and follow-up results. Log-binomial regression was used to identify factors associated with positive STD status Results: On average, women were 21 (SD=2.2) years old, 90% African American, and the majority were eligible for financial assistance. Overall, 14.9% had a positive STD test. CT prevalence was 12.6% (n=487), GC was 1.4% (n=56), and <1.0% (n=32) were GC and CT positive. Positive screening varied by age, race, and sexual risk behaviors. In a multivariable model, number of sex partners, prior STD testing, and having sex in exchange for a place to stay were associated with STD prevalence. Compared to women who never had a HIV test, those with a prior HIV test had 15% decreased prevalence (PR=0.85, 95% CI 0.71, 1.0) of a STD. Women who had received the CT/GC testing in the prior two years had 24% decreased prevalence (PR=0.76 (95% CI 0.63, 0.92) compared to women who did not. Treatment rates were 96% for CT and 68% for GC. Conclusion: Providing comprehensive health education, STD screening, and follow-up services to young women presenting for abortion care may help reduce the transmission of STDs in the community. We observed lower prevalence of STD among women with prior health screenings. Surveillance and evaluation of prevention efforts should continue.

DISPARITIES IN LATE HIV DIAGNOSIS BY RACE/ETHNICITY, NATIVITY AND LANGUAGE PREFERENCE AMONG MSM AND TRANSGENDER PERSONS LIVING IN KING COUNTY, WA Tigran Avoundjian* Tigran Avoundjian, Amy Bennett, Roxanne Kerani, Matthew R Golden, Susan E. Buskin, Julia C. Dombrowski, David Katz, (University of Washington)

Late HIV diagnoses represent missed opportunities in HIV prevention and testing. Disparities in late diagnosis can identify populations in need of increased outreach. We examined the association between late HIV diagnosis and race/ethnicity, nativity, and language preference among men who have sex with men (MSM) and transgender (trans) people in King County, WA. Using HIV surveillance data, we identified MSM/trans people newly diagnosed with HIV from 1/1/2010-12/31/2016. CDC defines late HIV diagnosis as an AIDS diagnosis ≤1 year of HIV diagnosis. We combined country of birth and language preference into 3 categories: US-born, foreign-born (FB) English-speaking, and foreign-born non-English-speaking (4 USborn non-English speakers were excluded). We used logistic regression to evaluate characteristics associated with late HIV diagnosis. From 2010-2016, 1136 MSM/trans people were newly diagnosed with HIV in King County. 924 (81%) were US-born, 151 (13%) FB English speakers, and 61 (5%) FB non-English speakers. Most were White (62%), followed by 17% Latino, 10% Black, 6% Asian, and 5% other. Among FB cases, median time from entry to the US and HIV diagnosis was 10 years (IOR=3.75-19). 284 (21%) cases had a late HIV diagnosis. 21% of USborn, 19% of FB English speakers, and 36% of FB non-English speakers were diagnosed late. Adjusting for age, race/ethnicity, and injection drug use, FB non-English-speakers were 2.9 times more likely than US-born MSM to be diagnosed late (95%CI=1.14-4.51). FB English speakers did not differ from US-born MSM (OR=0.77; 95% CI=0.44-1.33). Race/ethnicity was not associated with late diagnosis (p=0.3). In the absence of overall racial/ethnic disparities in late HIV diagnosis among MSM/trans people in King County, foreign-born non-English speakers were at increased risk of late HIV diagnosis, suggesting a need to improve outreach to non-English speakers and collect data about immigration to better address disparities in late diagnoses.

GLOBAL TRENDS IN THE DIAGNOSED INCIDENCE OF HIV FROM 2017 TO 2027: EFFECTS OF CHANGING DEMOGRAPHICS AND PRE-EXPOSURE PROPHYLAXIS USE Sunali Goonesekera* Sunali Goonesekera, , (Decision Resources Group LLC)

0165

Background Twenty years since the introduction of highly-active antiretroviral therapy, HIV infection remains a major global health problem with 1.8 million new infections reported in 2016 (UNAIDS, 2018). We forecast global trends in the diagnosed incidence of HIV over the next decade, taking into account changing demographics and pre-exposure prophylaxis (PrEP) use. Design/Methods We obtained recent incidence data on HIV infection (CDC, 2017; ECDC, 2015; UNAIDS, 2017). We forecast changes through 2027 by incorporating changes in population demographics and, in instances where risk factors were unquantifiable, historical trends. Given recent reports on plans to implement programs that provide PrEP to high-risk populations in the United Kingdom (Gallagher, 2017), and its more widespread use in the United States, we applied incidence trends to our forecast to incorporate the effect of PrEP use in certain high-income nations. We assumed a 90% efficacy of PrEP based on RCT data (Molina, 2017), that only the "men who have sex with men" at-risk group will be eligible for PrEP, and that PrEP use will increase over five years until it reaches 70% of the eligible population. Results In 2017, the estimated HIV diagnosed incidence ranged from 2 per 100,000 in the high-income Asia-Pacific countries to 90 per 100,000 in Africa. The % change in the number of HIV diagnosed incidence cases over our forecast period from 2017 to 2027, ranged from a 46% decline in North America to a 93% increase in Europe, mostly driven by Eastern European countries. We estimate more than 300,000 fewer cases by the end of the forecast in North America and Western Europe due to PrEP use, and more than 1 million additional cases in Eastern Europe due to non-demographic factors. Conclusion We expect HIV incidence to gradually decline or stabilize in many world regions over the next decade, except in Eastern Europe, where we estimate a substantial increase likely due to inadequate HIV prevention measures.

USING A NOVEL SPATIAL ANALYSIS TO PREDICT ZIKA DISTRIBUTION IN THE MEXICO-U.S. BORDER, 1947-2017 Sarah Ayton* Sarah Ayton, Esteban Picazzo Palencia, Dora Elia Cortés Hernandez, (Department of Epidemiology, Mailman School of Public Health, Columbia University)

Ecological niche models are used to characterize the potential global range of a species and global ecological shifts. However, these models may misrepresent the spatial distribution of disease if they fail to account for phylogenetic shifts and sociocultural contributors to transmission. We propose a regional niche modeling approach that utilizes within-hemispheric occurrence to characterize probable Zika distribution in the Mexico-United States border, and compare projections from this novel method with traditional niche models. Our approach oversamples occurrence from areas of interest, producing regional species projections. Traditional niche models used pre-2017 Zika occurrence data (64 georeferenced point locations), predominantly from the eastern hemisphere. Regional models added occurrence data (108 georeferenced point locations) from 2017 Pan American Health Organization reports Models were built with 60% occurrence data (randomly selected) and validated with the remaining 40%, and included modeling methods with a sensitivity and specificity over 85%. As expected, traditional models had a greater global weighted mean sensitivity (100.000) and lower specificity (89.330) than those (99.412 and 92.052, respectively) of regional models. Traditional models failed to project Zika in regions of Latin America, where Zika distribution is known. Regional models projected a broader niche in the southwestern U.S. and in Central and South America. These findings indicate phylogenetic and sociodemographic differences between hemispheric transmission pathways, which dramatically impact niche projections of Zika virus in the Americas. The use of within-hemispheric occurrence strengthens projection validity, and can account for viral mutations, sociocultural aspects of transmission, and inform prevention in the Mexico-U.S. border.

0172 S/P

AFFORDABLE HPV TESTING FOR COMMUNITIES THAT LACK

SCREENING Edmundo J Torres Gorzalez* Edmundo J Torres González, Maria C. Agudelo, María Rodríguez-Herrera, Lisa Garland, Yi Xie, Gloria Sánchez, Michael Dean, (Laboratory of Translational Genomics Genomics, Division of Cancer Epidemiology and Genetics, National Cancer Institute)

There are an estimated 266,000 deaths from cervical cancer worldwide in 2012, accounting for 7.5% of all female cancer deaths. Almost nine out of ten (87%) cervical cancer deaths occur in low and middle income countries (LMIC). In Colombia, an estimated 4661 new cases of cervical cancer (an estimated incidence of 12.6%) and 1986 deaths to cervical cancer (mortality of 10.4%) occurred in 2012. Cervical cancer is a slow, progressive, and preventable disease. However, cervical cancer screening can be costly to implement, thus leaving LMICs with higher rates of the disease. Human Papilloma Virus (HPV) causes 95% of all cervical cancer and this high mortality can be reduced with the implementation of HPV primary testing, in addition to cytologic screening. The Hybrid Capture 2 (HC2) test is a widely-used assay that targets, as a pool, the 13 high-risk types of HPV. It uses an RNA hybridization probe that attaches to target HPV DNA. The HybriBio H13 kit is an inexpensive qPCR test that is highly specific to the 13 high risk HPV types. It can be used at a reagent cost of \$3 per sample, and can run in any Real-Time PCR instrument with at least two probe detection. The ease of performing the reaction and the lower cost of equipment make it appealing enough to compare its performance to HC2. We tested H13 in 843 Colombian women that had been previously evaluated with the Qiagen Hybrid Capture 2 assay (HC2). The agreement (concordance) between the tests was 85.7% (95% CI: 83-88), and Cohen's kappa was 0.70 (95% CI: 0.65-0.75). Sequencing of the 113 discordant samples yielded 8.5 times more LR- HPV false positives in HC2 results (17/790) than in H13 (2/790). This, in combination with the very small amount of H13 false positives and HC2 false negatives (only 16/113 of all discordant samples), suggests a higher specificity in the H13 test but a lower sensitivity when compared to HC2.

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PULMONARY TUBERCULOSIS IN MOROCCO: THE

EPIDEMIOLOGICAL EVIDENCE Hanaa Mouchrik* Hinde Hami, Hanaa Mouchrik, Abdelmajid Soulaymani, Mhammed Jabri, Hinde Hami, Abdelrhani Mokhtari, (Laboratory of Genetics and Biometry, Faculty of Science, Ibn Tofail University, Kenitra, Morocco)

Background: Pulmonary tuberculosis is a major cause of morbidity and mortality worldwide, with about one-third of the world's population infected. Between 10% and 20% of those infected will progress to active tuberculosis (TB), posing a serious health threat. The aim of this study is to determine the epidemiological features of pulmonary tuberculosis in the region of Gharb-Chrarda-Beni Hssen in Morocco. Methods: This is a descriptive retrospective study of pulmonary tuberculosis cases, diagnosed and treated at the Diagnostic Center of Tuberculosis and Respiratory Diseases (DCTRD) in Kenitra between January 2010 and December 2011. Results There were 456 cases diagnosed with pulmonary tuberculosis at the DCTRD, which was 51.3% of all tuberculosis cases reported during the study period. Of these, 69% were men, with a male-female ratio of 2.2 and 3.3% were children under the age of 15 years. The average age of the patients was 37.1±0.8 years. According to the results, 89% of pulmonary TB cases were positive by microscopic examination and 1.5% had a primary pulmonary TB infection. Nearly three-quarters of the cases (71%) were smokers, 21% were cannabis addicts and 7% were alcoholics. The average body weight at diagnosis of tuberculosis was 56.2±0.5 kg for all patients. The mean duration between the onset of symptoms and pulmonary TB diagnosis was 57.2 days (range 1-365 days). The majority of patients (80.3%) showed signs of tuberculous impregnation. Among the 427 cases for whom the treatment outcome is known, 63% were successfully treated, 25% completed their treatment, 8% were lost to follow-up, 3.3% were transferred out to other health facilities and 0.7% died. Conclusions: Tuberculosis can be controlled by preventing transmission and infection, by stopping the progression from latent infection to active tuberculosis, and by treating active disease.

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RISK FACTORS ASSOCIATED WITH HEPATITIS C VIRUS EXPOSURE IN A NATIVE AMERICAN POPULATION Mary B. Williams* Mary B. Williams, Lindsay Boeckman, Kaitlin McGrew, David Gahn, Stefanie Buckskin, Diana Fishinghawk, Jorge Mera, Whitney Essex, Olivia Wright, Michael Garbe, Andrea Lorden, David Durham, Alison Galvani, Doug Drevets, Helene Carabin, (University of Oklahoma Health Sciences Center, College of Public Health, Department of Biostatistics and Epidemiology)

Background: In 2013, data showing high prevalence of Hepatitis C Virus (HCV) in both younger (born 1966-96) and older adults (born 1945-65) prompted the Cherokee Nation Health Services (CNHS) to implement a HCV elimination program including screening of all patients aged 20-69 seeking care at the CNHS hospital and nine clinics. This analysis aims to estimate the cross-sectional association between potential risk factors and the prevalence of HCV antibodies among CNHS clients. Methods: Data included 24,852 CNHS clients from II/I/2015-10/31/2017 with information on HCV antibody tests and patients' selfreported history of injection drug use (IDU), tattoos, incarceration, blood transfusion before 1992, and living with someone infected with HCV. HCV antibody prevalence was estimated overall, among those with IDU history, older and younger adults, and pregnant women. Hierarchical log binomial regression models were used to estimate prevalence proportion ratios (PPR) of the self-reported risk factors, age groups, gender (and their interactions) and HCV antibodies among the nsk groups. Results: HCV antibody prevalence was 3.0% (95% CI: 2.8%-3.2%) overall with similar estimates among older and younger adults and pregnant women. The prevalence was much higher among patients reporting IDU history (32.2%; 29.4%-34.9%). IDU history had the strongest effect on the presence of HCV antibodies (PPR=21.8; 19.0-24.9). Among those without IDU history, living with someone with HCV (7.5; 5.8-9.6) and incarceration history (4.8; 3.9-5.9) were most strongly associated with HCV antibodies, with a stronger association as prison time increased. Discussion: The strong effect of IDU history is consistent with previous studies. Additionally, strong effects of incarceration and living with someone with HCV among those without IDU history could guide development of control strategies in this population. Ongoing analyses are exploring associations of these risk factors with active HCV infection.

ENVIRONMENTAL RISK FACTORS FOR TOXOPLASMA GONDII SEROPOSITIVITY AND ITS ASSOCIATION WITH ALLOSTATIC LOAD IN RESIDENTS OF CENTRAL NORTH CAROLINA Andrey I. Egorov* Andrey I. Egorov, Reagan Converse, Shannon M. Griffin, Jennifer N. Styles, Elizabeth Klein, Elizabeth Sams, Edward Hudgens, Timothy J. Wade, (US EPA)

Toxoplasma gondii infection can be acquired through ingestion of undercooked meat or environmental oocysts excreted by cats. This cross-sectional study of 206 adults in the Durham-Chapel Hill, North Carolina metropolitan area had two objectives: 1) to assess environmental risk factors for Toxoplasma gondii infections and 2) to evaluate an association of chronic infections with biomarker-based measure of physiologic dysregulation known as allostatic load (AL). Serum samples were tested for IgG antibody to T. gondii using commercial diagnostic ELISA kits. AL was estimated as a sum of 15 biomarkers of health dichotomized at distributionbased cutoffs. Vegetated land cover within 500 m of residences was estimated using 1 m resolution data from USEPA's EnviroAtlas. Odds ratios (OR) of T. gondii seropositivity (N = 17, 8.3%) were 5.3 (95% Confidence Limits 1.4; 20.7) for handling soil with bare hands at least weekly and 10.0 (2.0; 50.6) for current cat ownership, adjusting for sociodemographic covariates and eating undercooked meat. The interaction effect of having an outdoor cat and handling soil was also statistically significant. An interquartile range (IQR) increase in distance-weighted vegetated land cover within 500 m of residence was associated with 1.7 (1.04; 2.7) OR of handling soil weekly, and, in separate analysis, with 3.7 (1.5; 9.1) OR of T. gondii seropositivity adjusting for covariates and spatial autocorrelation. Adjusted mean AL was 61% (13%; 130%) greater in seropositive individuals. Greater vegetated land cover was associated with lower AL in serone gative (p < 0.0001) and seropositive (p = 0.004) individuals. The results suggest that some individuals residing in green areas could be at a higher risk of acquiring T. gondii infections through inadvertent ingestion of soil contaminated with cat feces. These zoonotic infections may partially offset the health benefits of green spaces in a subset of the population. This abstract does not reflect EPA policy.

0176 S/P

KNOWLEDGE AND AWARENESS OF HBV, HCV, AND HIV INFECTIONS BY THE INFECTION AND CO-INFECTION STATUS AMONG BLOOD DONORS IN KUMBA DISTRICT, CAMEROON Mokom Kendric Asongwed* Mokom Kendric Asongwed, Min Kyung Lim, Nerisa-Hope Neg Tetang, (Department of Cancer Control and Population Health, National Cancer Center Graduate School of Cancer Science and Policy, Republic of Korea)

Background In 2015, the global estimated burden of chronic infections with hepatitis B virus (HBV) and hepatitis C virus (HCV) was 257 and 71 million people respectively. Cameroon is known to be endemic for these infections with a prevalence of 11.2% and 6.5% for HBV and HCV respectively. However, like most other sub-Saharan African countries where Human immunodeficiency virus (HIV) has been predominant and concerned with great public health efforts, awareness and control of HBV and HCV infection have been in lack. Therefore, the knowledge and awareness of these infections have been investigated among blood donors to give basic information for planning on effective control. Methods A cross-sectional study has been conducted among 700 adults who visit four major hospitals in the Kumba District for blood donation from October 2017 to February 2018 and voluntarily participated in the current study with informed consent. Information on knowledge and awareness on HBV, HCV, and HIV infections has been collected with structured questionnaires, while the infection status identified from the result of serologic tests done in the blood donation units. Results Until December 31, 2017, 405 participants were recruited (385 male and 20 female, age range: 17-68years old). HBV, HCV and HIV infection prevalence were 13.3%, 4.0%, and 5.9%, respectively. Among HIV positive cases, 13.0% were co-infected with HBV (n=7) and 8.3% were with HCV (n=2). Coinfection of HBV and HCV was 1.9% (n=1). Only 4.4% of subjects had received HBV vaccination. Approximately half of the respondents had ever heard about HBV (49.1%) and HCV (44.9%) infection while it was 100% for HIV. Comprehensive analysis of awareness and knowledge and other associated factors would be done after finalizing recruitment using multivariate model. Conclusion Data collection is on-going. Relevant conclusions and recommendations will be made based on final results obtained upon completion of analysis at the end of the study period.

0175 S/P

INCIDENCE OF ACUTE MYOCARDIAL INFARCTION AND STROKE AFTER TUBERCULOSIS TREATMENT: A RETROSPECTIVE COHORT STUDY OF FORMER TB PATIENTS IN TAIWAN, 2002-2013 Argita Salindri* Argita Salindri, Jann-Yuan Wang, Hsien-Ho Lin, Matthew Magee, (Division of Epidemiology and Biostatistics, School of Public Health, Georgia State University, Atlanta, GA, USA)

Background: Increasing evidence indicates that active-tuberculosis (TB) disrupts host metabolism and may contribute to subsequent chronic non-communicable disease risk, but little is known about the risk of acute myocardial infarction (AMI) and stroke after TB. We aimed to determine the association of treatment duration and extrapulmonary TB with the risk of AMI and stroke among former TB patients in Taiwan. Methods: We analyzed a retrospective cohort of patients with active-TB in the Taiwan National Health Insurance Research Database during 2002-2013. Eligible patients included adults with active TB (≥25 years old) confirmed by ICD-9 codes and anti-TB drug prescriptions for ≥28 days. Patients with previously diagnosed cardiovascular disorders (diabetes, AMI, stroke, hypertension, and dyslipidemia) were excluded. Incident AMI and stroke were defined by ICD-9 codes indicated ≥1 years after TB diagnosis date. Cox models were used to estimate relative hazard rates of disease incidence. Results: During the study period, 157,444 patients were diagnosed with active-TB. Of 63,327 eligible patients, 460 had incident of AMI (age-adjusted incidence rate (IR) 1.3 per 1000 person-years; 95%CI 1.2-1.4) and 1366 had incident of stroke (age-ad justed IR 3.9 per 1000 person-years; 95%CI 3.7-4.1). Adjusting for age, gender, diabetes, dyslipidemia and hypertension, the hazard rate of AMI (ad justed hazard ratio [aHR] 1.1 95%CI 0.9-1.3) and stroke (aHR 1.0 95% CI 0.9-1.1) were similar among patients treated for >6 months compared to those treated for ≤6 months. The hazard of AMI (aHR 0.9 95%CI 0.7-1.2) and stroke (aHR 1.0 95%CI 0.9-1.2) among extrapulmonary TB patients were similar relative to those with pulmonary TB. Conclusion: We found higher incidence rates of AMI and stroke in previously treated TB patients compared to Taiwanese national estimates. Among former TB patients, treatment duration and site of TB were not significantly associated with increased incidence of AMI or stroke.

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COMPARISON OF SEASONAL INFLUENZA TRENDS: TIMELINESS VALIDATION OF STATE OUTBREAK REPORTS IN MEXICO 2007-2014. Hojoon Lee* Hojoon Lee, Carlos Castillo-Salgado, (Johns Hopkins Bloomberg School of Public Health)

Background Seasonal influenza is a common cause of acute respiratory infections with distinct annual epidemic characteristics. Monitoring temporal trends in different States is a key to understanding the national influenza activity and can be used as predictors of national level high seasonal activity. Objective we aim to compare temporal trends of seasonal influenza from 2007 to 2014 at the State level in Mexico. Methods We used weekly seasonal influenza reports of confirmed cases in this trend analysis. We defined the annual timeline of seasonal influenza from first year's 28 weeks to last year's 27 weeks by state/national seasonal trends. We used peak time difference, aberration time reporting difference by EARS and timeseries correlation algorithms to quantify the time difference from states to the national report. Results We have a total of 5 years of complete surveillance reports by 32 states. For peak time difference, the mean time difference for each state for 5 years ranged from -14.6 weeks to 3.8 weeks. Specifically states 12, 13, and 31 showed 5 years which had an earlier peak than the national level. For aberration time difference by EARS, the mean time difference for each state for 5 years ranged from -2.3 weeks to 14.8 weeks, -1 week to 5.8 weeks, and -1.4 weeks to 3.6 weeks by each algorithm. For correlation, the mean lag time difference for each state for 5 years ranged from -9.8 weeks to 1.3 weeks. Specifically states 4,5,7,12 and 31 show an earlier epi curve than the national level. Conclusion Each state shows different temporal trends of seasonal influenza activity compared to the national level, and some states show significant early outbreaks of seasonal activity by peak time and correlation. Public health professionals and state governments should focus on those states for an early sign of influenza activity.

ESTIMATING DISEASE PROGRESSION AND SYMPTOM-SPECIFIC CARE SEEKING BEHAVIOR FOR TB-INFECTED INDIVIDUALS IN CAMBODIA Karl Johnson* Karl Johnson, Hojoon Sohn, David Dowdy, (Krieger School of Arts and Sciences, Johns Hopkins University, Baltimore, MD, USA)

Background: Mechanistic understanding can enhance our ability to draw epidemiological inference, but most data are not mechanistic in nature. We provide an example of using clinical and surveillance data on tuberculosis (TB) to improve our mechanistic understanding of disease progression and healthcare seeking in Cambodia. Methods: We created a simple Markov state-transition model of TB symptom progression consisting of three states: asymptomatic, mildly symptomatic, and strongly symptomatic (defined such that TB treatment would be initiated upon presentation to the healthcare system for those symptoms). We calibrated an open cohort (under an equilibrium assumption) to reflect surveillance estimates of TB disease (prevalence/incidence ratio, estimated prevalence of asymptomatic disease) and a closed cohort (of individuals with active TB) to reflect pre-chemotherapy-era clinical data (the disease duration, mortality risk of untreated TB). These cohorts were used to infer monthly transition probabilities between the three states and monthly probabilities of contacting the healthcare system, subject to reasonable simplifying constraints. Results: Monthly state transitions were estimated to be 12% (mild to asymptomatic), 21% (asymptomatic to mild), 16% (mild to strong) and 9% (strong to mild); monthly probabilities of seeking care for TB symptoms were estimated to be low (5% for mild, 10% for strong). Conclusion: By calibrating a small mechanistic model to observational data from surveillance and clinical studies, we can infer that TB follows a dynamic trajectory of symptom progression, with frequent transitions between symptom categories. We also infer that the long duration of disease at the population level likely reflects infrequent healthcare seeking, even for symptoms severe enough to trigger treatment for TB. These results can be used to subsequently estimate the epidemiological impact of strategies to find and treat undiagnosed TB cases in the community.

PERSISTENT RACIAL DISPARITIES IN HOMICIDE FROM 1999-2015 IN THE UNITED STATES Berna Buyukozturk* Berna Buyukozturk, Joanna Drowos, Charles Hennekens, (FAU Charles E Schmidt College of Medicine)

Objective: To examine race-specific trends in homicide rates in the US from 1999-2015 among those aged 15 to 54 years. Methods: Public domain data was used from the Multiple Cause of Death (MCD) File. Homicide rates were age-adjusted and calculated with 95% confidence interval (CI) according to gender, race, and cause of death. Valid ethnicity data was available for non-Hispanic blacks (NHB), African Americans, and non-Hispanic whites (NHW). Results Between 1999 and 2015, two-thirds of homicides among NHB, African Americans, and NHWs ages 15 to 54 occurred among NHB. The relative risk of mortality from homicide in NHB compared to NHW increased. Homicide rates for both NHB and NHW reached their lowest point in 2014, but increased in 2015. Among NHB men, there was no overlap in 95% CI from 2014 to 2015. Conclusions: Homicide had declined between 2006 and 2014 until an apparent trend reversal in 2015, particularly among NHB men. Policy Implications The present data contribute to a recent report sponsored by the United States Department of Justice that called for investigation of racial trends in the 2015 increase in homicide mortality.

TITLE: LONGITUDINAL ANALYSIS OF EMERGENCY DEPARTMENT UTILIZATION BY ASSAULTED ADOLESCENTS Kevin Kwan* Kevin Kwan, Jonathan Boyajian, Magdalenda Cerda, Sidra Goldman-Mellor, (University of California, Merced)

Assault injuries are a leading cause of morbidity among youths in the U.S. Prior research indicates that assaulted adolescents are also at high risk for future drug utilization, self-harm behavior, and repeat violence victimization. However, this work typically uses data from a single hospital or clinic, and these associations are poorly understood from a population perspective. We examined use of emergency department (ED) services-overall and for drug, self-harm, and assault outcomes-among adolescents with an index assault visit in 2010. Statewide ED data from California were obtained for all adolescents aged 10-19 who presented to the emergency room in 2010 and had a valid unique identifier (n=408,703). Identifiers were used to link each patient's index visit to all subsequent visits through September 30th, 2015, as well as to prior ED visits during 2006-2009, to any facility in the state. Odds of subsequent ED visits for drug abuse, self-harm, and assault (assessed using diagnostic codes) were compared for patients who experienced assault-related injuries in 2010 and patients who received care for all other complaints (controls). Analyses utilized logistic regression, controlling for patient age, sex, rurality, insurance status, and prior histories of assault, suicide attempt, and drug use visits. On average, assaulted adolescents (mean age = 17.0; 34.8% white) had 2.5 more total ED visits during follow-up compared to controls 17.8% of assaulted individuals had a subsequent visit to the ED; average time between these visits was 25 months. Odds of follow-up visits for drug use, self-harm, and assault were 1.31 (95% CI: 1.2, 1.5), 2.3 (95% CI: 2.1, 2.5), and 4.1 (95% CI: 3.9, 4.3) times higher, respectively, among assaulted adolescents compared to controls Assault victimization among the adolescent population is associated with negative health outcomes, including future ED utilization for drug use and suicide attempt as well as repeat violent victimization.

USE OF PRESCRIPTION OPIOIDS AND INITIATION OF FATAL TWO-VEHICLE CRASHES: A PAIR-MATCHED ANALYSIS Stanford Chihuri* Guohua Li, Stanford Chihuri, , (Columbia University)

The impact of the opioid epidemic on traffic safety is of great concern as the prevalence of drugged driving continues to rise. Although driver use of prescription opioids is known to double the risk of crash involvement, the individual and joint effects of prescription opioids and alcohol on crash causation have not been adequately studied. Using a pair-matched design, we assessed the association of driver use of prescription opioids and alcohol with the initiation of fatal two-vehicle crashes. Toxicological testing data for 36,642 drivers who were involved in fatal twovehicle crashes were analyzed with conditional logistical regression modeling. In each of the 18,321 fatal two-vehicle crashes studied, the driver whose error led to the crash was treated as the crash initiator and the other as non-initiator. Failure to keep in proper lane accounted for 41.1% of the fatal two-vehicle crashes, followed by failure to yield right of way (25.3%), failure to obey traffic signs (14.9%) and speeding (11.6%). Crash initiators were more likely than non-initiators to test positive for prescription opioids (5.0% vs. 3.0%, P<.0001), alcohol (28.7% vs. 9.9%, P<.0001), and both (1.0 % vs. 0.3%, P<.0001). Relative to drivers who tested negative for both substances, the adjusted odds ratios of fatal two-vehicle crash initiation were 2.28 (95% confidence interval [CI]:1.99 to 2.61) for those testing positive for prescription opioids and negative for alcohol, 5.27 (95% CI: 4.86 to 5.72) for those testing positive for alcohol and negative for prescription opioids, and 5.82 (95% CI: 4.10 to 8.27) for those testing positive for both prescription opioids and alcohol. The results indicate that driver use of prescription opioids is associated with a significantly increased risk of initiating fatal two-vehicle crashes. Further research is warranted to evaluate the potential interaction effects on crash causation of prescription opioids with alcohol, other drugs and driver characteristics.

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TIMING OF STRESS FRACTURES AFTER INITIATING A NEW PHYSICAL TRAINING REGIMEN Craig J McKinnon* Craig J McKinnon, Julie M Hughes, Joseph Kardouni, (United States Army Research Institute of Environmental Medicine)

Study Design: Retrospective Cohort Study Objectives: Report the incidence rate and timing of stress fractures in a population beginning a new physical training regimen. Background: Stress fractures (SF) are an injury that can result from beginning new or higher volume physical training regimens. The length of time for clinical manifestation of a SF after starting a new or more demanding physical training regimen is not well defined in medical literature. Methods: This study was conducted using medical encounter and personnel data on U.S. Army Soldiers from 2002-2011 (n=1,206,168). Overall SF incidence rates, as well as sex-specific and location-specific rates, were calculated for the first 6 months of military service. Results: Although SF diagnoses were seen during the first two weeks of military training, the steepest increase in SF diagnoses occurred in weeks 3-5, with a peak in the overall rates of SF diagnoses occurring during week 9. The overall rate of SF was 7.65 SF per 1,000 Soldiers, with sex-specific rates of 5.02 per 1,000 in male Soldiers and 21.26 per 1,000 in female Soldiers. SF diagnoses steadily decreased over the remainder of the 6 month period. The temporal patterns of SF diagnoses for the regions examined followed a similar pattern as was seen overall for SF; the exception was femoral neck SF rates, which peaked around 3-4 weeks of service for men but peaked for women around week 8. Conclusion: The greatest increase in the rate of clinical diagnoses of SF occurred 5-9 weeks after beginning military-specific physical training and activities. These data suggest that heightened awareness of SF as a differential diagnosis for individuals with lower extremity pain may be warranted around the third week of entry into a new training program, although some diagnoses occur sooner. After 13 weeks of training was reached without SF, the risk for this injury steadily decreased.

TRENDS IN MORTALITY DUE TO NON-BATTLE INJURIES AMONG U.S. SERVICE MEMBERS DEPLOYED IN AFGHANISTAN AND IRAQ WARS: 2001-2014 Tuan D. Le* Tuan D. Le, Melissa Kottke, Amanda Marshall, Jennifer Gurney, Shawn Nessen, Anthony Pusateri, (U.S Army Institute of Surgical Research)

Background: Non-battle injuries (NBI) accounted for ~ 35% of military casualties and led to ~20% of death in U.S. Service Members (SM) in Afghanistan and Iraq Wars (OEF/OIF). Although NBI has been well studied in US Army, there remains a gap in our understanding of etiologies and trends that contribute to fatal NBI (FNBI) among all deployed SM. Methods: Data from the Defense Casualty Analysis System (DCAS) and Department of Defense Trauma Registry (DODTR) were reviewed. FNBI cases identified and descriptive analyses were performed. Trend in FNBI defined as FNBI/all death was assessed using a weighted moving average (WMA) and a time-series analysis with autoregressive integrated moving average. Results: From DCAS, 23,435 patients injured in 10/2001-12/2014 in OEF and 36,364 patients injured in 3/2003-8/2010 in OIF were analyzed. Overall mortality was 10.0% in OEF and 12.1% in OIF. Of all deaths, FNBI accounted for 21.4% (n=502) in OEF and 21.1% (n=929) in OIF. Trend in FNBI first decreased from 82% in 2002 to 21% in 2011 in OIF and from 35% in 2003 to 21% in 2006 in OIF; since those times, both conflicts were consistently at 21 %. From DODTR, 29,958 patients injured in 1/2002-12/2014 were identified for in depth analysis. Of these, 34.1% were NBI cases. Cumulative incidence rate of NBI was higher in female (63.3%), in Air Force (66.3%) and Navy (48.3%) compared to Army (34.7%) and Marines (25.7%). The top five mechanism of NBI were fall (21.4%), motor vehicle crash (18.8%), machinery/equipment (12.6%), blunt objects (10.7%) and sports (6.8%). The leading causes of FNBI were gunshot (33.5%), vehicle crash (32.5%), airplane crash (10.2%), flame/inhalation injury (5.8%), machinery/equipment (2.9%), drowning (2.9%) and fall (2.4%). About 25% of FNBI was intentional. Conclusion: FNBI was high and consistent among deployed forces during the study period. The findings may guide targeted safety interventions which reduce a preventable death on military force during war.

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RELIABILITY OF SELF-REPORTED TRAUMATIC BRAIN INJURIES IN RESEARCH STUDIES Kathryn Taylor* Kathryn Taylor, Kristin Heaton, Susan Proctor, (U.S. Army Research Institute of Environmental Medicine)

Clinically diagnosed traumatic brain injuries (TBI) are the gold standard for TBI ascertainment in research studies. However, this information is not always available and many studies rely on self-reported TBIs. In athletes, self-reported TBIs exceed the number of clinically diagnosed TBIs. This study evaluates the concordance between reported and medical record-identified TBIs and whether factors such as prior deployment or a diagnosis of either post-traumatic stress disorder (PTSD), depression or anxiety affects accuracy of TBI recall in large cohort of US Army Soldiers Between 2007 and 2010, 416,296 Soldiers were asked about past head injuries in the prior 4 years as part of the DoD pre-deployment Automated Neuropsychological Assessment Metrics (ANAM) program. Information on clinically diagnosed TBIs, PTSD, anxiety and depression and prior deployment from medical encounter data was obtained from the Total Army Injury and Health Outcome Database (TAIHOD). Intraclass correlation coefficients (ICC) were used to evaluate agreement between reported and clinically diagnosed TBI and results stratified by deployment status and identified diagnoses. Soldiers reported having more TBIs than were identified via medical encounter reports. The concordance between the reported and clinically diagnosed TBIs was minimal (ICC=0.18 95% CI: 0.18, 0.19). Agreement was higher among those who had been deployed previously (ICC=0.20 95% CI: 0.20, 0.20) or had a diagnosis of PTSD (ICC=0.29 95% CI: 0.27, 0.31), depression (ICC=0.26 95% CI: 0.23, 0.29) or anxiety (ICC=0.23 95% CI: 0.22, 0.23). Whether self-reported TBIs meet clinical diagnostic criteria is unknown but reliance on diagnosed TBIs alone may miss relevant TBIs. Factors such as certain co-morbitities and deployment history only minimally improved the agreement. Further work is warranted to better understand factors relating to identification of TBIs in epidemiological research.

CARDIORESPIRATORY FITNESS AND RISK OF SLEEP APNEA IN 1.5 MILLION MEN Casey Crump* Casey Crump, Jan Sundquist, Marilyn A. Winkleby, Kristina Sundquist, (Icahn School of Medicine at Mount Sinai)

Background: Sleep apnea is increasing in prevalence and an important cause of morbidity and mortality. Male sex, obesity, and advancing age are established risk factors. However, the independent effects of cardiorespiratory fitness (CRF) on risk of sleep apnea have not been previously examined. Identification of new risk factors early in life may help facilitate earlier and more effective primary prevention. Methods: A national cohort study was conducted to examine CRF in all 1,547,478 Swedish military conscripts during 1969-1997 (97-98% of all 18-year-old men nationwide each year) in relation to risk of sleep apnea through 2012 (maximum age 62 years). CRF was measured as maximal aerobic workload in Watts using a wellvalidated bicycle ergometer test, and sleep apnea was identified from nationwide outpatient and inpatient diagnoses. Poisson regression was used to compute incidence rate ratios (IRR) for the association between CRF and long-term risk of sleep apnea, adjusted for age, height, weight, and other potential confounders. Results: There were 44,612 (2.9%) men diagnosed with sleep apnea in 39.7 million person-years of follow-up. Low CRF was independently associated with increased risk of sleep apnea in adulthood, after adjusting for age, height, weight, socioeconomic factors, and family history of sleep apnea (lowest vs. highest CRF tertile: IRR, 1.41; 95% CI, 1.37-1.46; P<0.001; continuous CRF variable per 100 Watts: IRR, 0.72; 95% CI, 0.71-0.75; P<0.001). Low CRF was associated with increased long-term risk of sleep apnea even among men with normal body mass index (BMI). Conclusions: In this large national cohort, low CRF at age 18 years was independently associated with higher risk of developing sleep apnea later in life, even among men with normal BMI. These findings suggest that primary prevention of sleep apnea should begin early in life and include cardiorespiratory fitness, even among those with normal BMI.

POSTTRA UMATIC STRESS DISORDER AND RISK OF SELECTED AUTOIMMUNE DISEASES IN US MILITARY PERSONNEL Deborah Boggs Bookwalter* Deborah Boggs Bookwalter, Kimberly Roenfeldt, So Yeon Kong, Cynthia A. LeardMann, Rudolph P. Rull, (Henry M. Jackson Foundation)

Prior research increasingly suggests a link between posttraumatic stress disorder (PTSD) and physical health. Stress disorders may lead to impairment of the immune system and development of autoimmune disease. Among active duty US military personnel enrolled in the Millennium Cohort Study, we prospectively investigated the association between PTSD and risk of selected autoimmune diseases (ADs): rheumatoid arthritis, systemic lupus erythematosus, inflammatory bowel diseases, and multiple sclerosis Incident cases were identified from medical encounter records in the Military Health System Data Repository. Participants were classified as having a history of PTSD if they (1) self-reported receiving a health care provider's diagnosis of PTSD, or (2) screened positive using the PTSD Checklist-Civilian Version. Participants were classified as having a history of another mental health condition if they (1) self-reported receiving a health care provider's diagnosis of depression, or (2) screened positive for major depression, panic disorder, or other anxiety disorders using standardized Patient Health Questionnaire algorithms Hazard ratios (HRs) and 95% CIs were estimated using multivariable Cox regression models adjusted for demographics Among 115,028 participants followed for a mean of 5.2 years, risk of any of the selected ADs was 80% higher for those with a history of PTSD (HR, 1.80; 95% CI, 1.45-2.24) compared with those with no mental health condition. Risk was also modestly elevated for those with a history of another mental health condition (HR, 1.28; 95% CI, 1.01-1.62). For each selected AD, risk was higher for those with PTSD relative to those with no mental health condition, though the HR was not significant for lupus. Results did not differ by sex. These findings suggest that active duty military personnel with PTSD may be at an increased risk of a range of ADs and that other mental health conditions may be associated with a more modest increase in risk.

0202

ESTIMATING THE EXTENT TO WHICH CURRENT MENTAL HEALTH SYMPTOMS MAY BE ATTRIBUTABLE TO INTIMATE PARTNER VIOLENCE IN A COMMUNITY-BASED SAMPLE Pamela T Roesch* Pamela T Roesch, Jana Hirschtick, Sayli Sant, Lauren Habermann, (Sinai Urban Health Institute, Sinai Health Systems)

Background: Although a large body of evidence links intimate partner violence (IPV) to poor mental health, existing studies often restrict to women in clinical or shelter settings, limiting generalizability and assessment of differential associations by gender. Using a community needs assessment, we provide action-oriented public health statistics on the association of IPV with current mental health status for men and women. Methods Using Sinai Community Health Survey 2.0 (2015-2016), a face-to-face probability survey in 10 diverse Chicago neighborhoods, we examined the association of ever being emotionally or physically abused by a partner or someone important (IPV) with prevalence of current depressive (DEPsym) or current posttraumatic stress disorder symptoms (PTSDsym), stratified by gender. After logistic model building, we used direct model based standardization to calculate adjusted relative prevalence and population attributable prevalence fractions for men and women. Results Of 1,535 eligible respondents, 8% of men and 15% of women had DEPsym and 15% and 20% had PTSDsym; 12% and 26% ever experienced IPV, respectively. Men who experienced IPV had a 4.0 times (95%CI: 1.6, 8.0) higher prevalence of DEPsym and a 2.5 times (95%CI: 1.3, 4.6) higher prevalence of PTSDsym. Women who experienced IPV had a 2.3 times (95%CI: 1.2, 4.2) higher prevalence of DEPsym, but no significant difference in PTSDsym (alpha=0.05). Controlling for potential confounders, about 1 in 3 cases of DEPsym (32.7% and 28.4%, respectively) among males and females and 1 in 5 cases of PTSDsym (19.2%) among males could be attributed to IPV, assuming a causal relationship Conclusions: Within a diverse, urban, community-based sample, IPV was strongly associated with mental health outcomes. Health care professionals in similar settings, notably those providing mental health services, should incorporate trauma-informed practices into patient care.

0201 S/P

INITIAL ASSESSMENT OF HURRICANE HARVEY EXPOSURES AND MENTAL HEALTH IMPACT Wil Lieberman-Cribbin* Wil Lieberman-Cribbin, Rebecca Schwartz, Stephanie Tuminello, Samantha Kerath, Janelle Rios, Emanuela Taioli, (Icahn School of Medicine at Mount Sinai)

Background: The full psychological and physical effects of Hurricane Harvey are still unknown. We assessed hurricane exposure and the immediate mental health needs of the population to define public health priorities for a larger epidemiological study. Methods: Convenience sampling was used to recruit participants (n = 41)from the greater Houston area aged > 18 years, who completed a question naire about demographics, hurricane exposures, and physical/mental health. Post-Traumatic Stress Disorder (PTSD) was measured with the PCL-S (a score> 30 indicated probable PTSD symptoms). The Patient Health Questionnaire- 4 (PHQ4) was used to assess symptoms of depression and generalized anxiety disorder. Results: The majority of the cohort was female (56%), White (35%), Black (33%) or Hispanic (20%), and experienced an exposure during Harvey (88%). The mean age was 44 years (SD=10 years). The average PTSD score was 32.9 (SD=17.1); 46% of participants met the threshold for probable PTSD. Increased personal exposure (ORadj 2.65; 95% CI: 1.14-6.12) and property-related exposure (ORadj 1.57; 95% CI: 1.12-2.21) were both statistically significantly associated with an increased odds of probable PTSD symptoms. A perception of chemical/toxin exposure due to Hurricane Harvey was reported by 44% of participants Conclusions: The number of personal or property exposures was positively associated with mental health symptoms three weeks post-hurricane. Perceived chemical exposure needs objective validation and has implications for the ongoing response to Hurricane Harvey.

0203

PREDICTORS OF REPEATED ADOLESCENT EMERGENCY DEPARTMENT VISITS FOR SELF-INJURY: A STATEWIDE COHORT STUDY FROM CALIFORNIA Sidra Goldman-Mellor* Sidra Goldman-Mellor, Kevin Kwan, Jonathan Boyajian, Paul Brown, Deborah Wiebe, Paul Gruenewald, Magdalena Cerda, (University of California, Merced)

Self-harm is a growing cause of morbidity and mortality among U.S. adolescents. Most serious self-harm injuries are treated in emergency departments (EDs), which often serve as a nexus for intervention programs seeking to reduce self-harm recurrence. Identifying which youths face excess risk for recurrent self-harm, however, has been hindered by lack of rigorous epidemiologic data. We used statewide, all-payer ED data from California to examine incidence and predictors of repeated self-harm visits (assessed using ICD-9 injury codes E950-E959) among a cohort of adolescents with any nonfatal self-harm visit in 2010 (n=5,484). Subsequent ED visits for self-harm were tracked through 2015, to any facility in the state, using unique patient identifiers. Predictors of future self-harm included sociodemographic and geographic factors at index visit and patients' 2006-2009 histories of prior ED utilization. Cumulative incidence of any repeat ED self-harm visit was 10.7% within 1 year and 19.1% by end of follow-up. In covariate-ad justed negative binomial hurdle models, self-harm recurrence during follow-up was higher among adolescents admitted as inpatients at index visit (OR = 1.38; 95% CI [1.20, 1.60]), those with prior ED visits for self-harm (OR = 3.00 [2.41, 3.73]), and those with prior visits for other mental health problems (OR= 2.16 [1.78, 2.61]). Repeat visits were also more likely among adolescents who were younger, female, Medicaid insured, and who had more total ED visits in 2006-2009, but less likely among those of minority race. Other factors, including violence of the index self-injury, patient history of ED visits for substance use and assault, and patient urbanicity, did not predict recurrence. The high rate of repeat self-harm in our population-based study of adolescent ED patients underscores the need for more effective treatments in this vulnerable group. Youths with prior mental health problems and high ED utilization rates face particularly elevated risk.

LACK OF ACCESS TO MEDICAL CARE DURING HURRICANE SANDY AND MENTAL HEALTH SYMPTOMS Kristin Bevilacqua* Julia Ruskin, Rehana Rasul, Samantha Schneider, Kristin Bevilacqua, Emanuela Taioli, Rebecca Schwartz, (Department of Occupational Medicine Epidemiology and Prevention, Northwell Health)

Background: Hurricane Sandy hit the New York area on October 29, 2012. Over 8 million residents of the New York metropolitan area lost power and infrastructure damages totaled \$19 billion Destruction caused by natural disasters compromises hospitals' abilities to administer care. Hurricane Sandy was particularly devastating, resulting in massive disruptions to the provision of medical care in the region. Objective: To determine whether a lack of access to medical care during Hurricane Sandy is significantly associated with mental health/substance use. Method: Selfreported medical access and mental health symptomatology were obtained from New York City and Long Island residents following Hurricane Sandy under the Leaders in Gathering Hope Together Project (10/23/2013-2/25/2015) and Project Restoration (6/5/2014-8/9/2016). The study sample included 1,669 participants (Project LIGHT n = 658, PR n=1,011). Multivariable logistic regressions were utilized to determine the relationship between lack of access to medical care and mental health. Results: Those without access to medical care had a significantly higher likelihood of showing symptoms of posttraumatic stress disorder (adjusted odds ratio (AOR)=2.71, CI=[1.77-4.16]), as well as depression (AOR=1.94, CI=[1.29-2.92]) and anxiety (AOR=1.61, CI=[1.08-2.39]), and lack of access to care was associated with a 2.12 point increase in perceived stress scale score (SE=0.63). A lack of medical care access was not significantly associated with alcohol misuse or smoking. Conclusions: A lack of access to medical care during Hurricane Sandy was significantly associated with PTSD and other mental health outcomes, emphasizing the need for improved emergency preparedness in mental health.

0206 S/P

RACIAL/ETHNIC DIFFERENCES IN THE AGE OF MENARCHE AND TRANSDIAGNOSTIC PSYCHIATRIC DISORDER RISK: A LATENT MODELING APPROACH Jonathan Platt* Jonathan Platt, Natalie Colich, Kate McLaughlin, Dahsan Gary, Kerry Keyes, (Columbia University)

Early or late age of pubertal maturation in girls is associated with exposure to psychosocial stress and poorer mental health. However, most investigations consider only individual disorder risk, and do not investigate differences by race/ethnicity status. The sample included all female respondents from the National Comorbidity Study Adolescent Supplement (n=5183), ages 13-17, among them non-Hispanic White (NHW)=64.7%, non-Hispanic Black (NHB)=16.5%, and Hispanic=13.9%. Confirmatory factor analysis was used to identify and fit four latent outcomes fear, distress, substance, and behavior disorders. Associations between menarche timing (early: age <=10, 11; late: age 13, 14+ vs. average: age 12) and latent disorders were estimated in a structural equation model (SEM) for each race/ethnicity group, adjusted for age, sexual activity, income, race, parent marital status, BMI, and child adversity. Measurement models showed good fit for each race/ethnicity group. Among NHW respondents, onset of menarche before age 11 was positively associated with distress (coef=0.27; p=0.008), fear (coef=0.51; p<0001), and substance disorders (coef=0.25; p=0.012). Among NHB respondents, onset before age 11 was positively associated with distress disorders (coef=0.46; p=0.001), and onset at age 13 was negatively associated with behavior disorders (coef=-0.39; p=0.025). Among Hispanic respondents, onset at age 14 was positively associated with fear disorders (coef=0.39; p=0.04). Model coefficients suggested a negative association with behavior disorders (coef=-0.39; p=0.068). Biological processes initiated at puberty are influenced by one's social context to affect emotional and social development. Those who are out of sync with their peers may face differential risks for a broad array of psychopathological consequences, however these risks may differ, based on the social norms, environments, and expectations regarding maturity that are most salient within different racial/ethnic groups.

PROPORTION OF SUBSEQUENT PSYCHOPATHOLOGY CONFERRED BY SUBTHRESHOLD PTSD IN A MILITARY COHORT David S. Fink* David S. Fink, Jaimie L. Gradus, Katherine M. Keyes, Joseph R. Calabrese, Israel Liberzon, Marijo B. Tamburrino, Gregory H. Cohen, Laura Sampson, Sandro Galea, (Columbia University, Mailman School of Public Health, Department of Epidemiology)

Background: This study identified the relative proportion of later PTSD that can be attributed to baseline subthreshold PTSD compared to baseline diagnosable PTSD. Methods We analyzed data on 3,457 US National Guard members from the state of Ohio, assessed by telephone annually from 2008 through 2014. Participants were classified into three groups at each wave based on symptoms endorsed on the PTSD Checklist: current PTSD (Criteria A, DSM-IV criteria, functional impairment), subthreshold PTSD (Criteria A, at least one symptom in each cluster), and no PTSD. We calculated the exposure rate, risk ratio (RR), and population attributable fraction (PAF) to determine the burden of subsequent PTSD attributable to baseline subthreshold PTSD compared to baseline diagnosable PTSD. Results: The annualized prevalence of subthreshold PTSD and diagnosable PTSD was respectively 11.9% and 5.0%. The RR for diagnosable PTSD at follow up among participants with current PTSD at baseline was more than twice that of those with subthreshold PTSD (7.0 vs. 3.4); however, the PAF of subsequent PTSD was considerably greater among persons exhibiting subthreshold PTSD at baseline (PAF=35%; 95% CI=26.0-42.9%) compared to persons with chronic PTSD (PAF=28.0%; 95% CI=21.8-33.8%). The results were robust to changes in subthreshold PTSD definition. Conclusions: Subthreshold PTSD accounts for a substantial proportion of eventual diagnosable PTSD. A focus on interventions that shift the whole distribution of PTSD symptoms, compared to a high-risk approach, is likely to affect the greatest reduction in the burden of PTSD within military populations.

0207 S/P

THE PREVALENCE OF TREATMENT FOR EATING DISORDERS IN A POPULATION-BASED SAMPLE Hannah Ziobrowski* Hannah Ziobrowski, Kendrin R. Sonneville, Kamryn Eddy, Ross Crosby, Nadia Micali, Nicholas J. Horton, Alison E. Field, (Department of Epidemiology, Brown University School of Public Health)

It is known that only a minority of people with mental disorders receive treatment However, little is known about treatment patterns among people with the most common types of eating disorders: binge eating disorder (BED), purging (PD) and other types of other specified feeding or eating disorder (OSFED). Data came from females in the Growing Up Today Study, a prospective cohort study that began in 1996 when participants were aged 9 to 14 years. Symptoms of eating disorders were included on all questionnaires from 1996-2013. Treatment for an eating disorder was assessed on the 2013 survey, as well as a 2004 survey to the mothers. Based on their report of symptoms, 0.8%, 2.3%, 7.4%, 6.6%, and 25.3% of participants met criteria for anorexia nervosa (AN), bulimia nervosa (BN), BED, PD, and OSFED, respectively. Among the 1,039 females classified as having an eating disorder, 12.5% reported receiving treatment. The prevalence of treatment was 20.7%, 44.1%, 11.4%, 22.8%, and 11.5% for those with AN, BN, BED, PD, and OSFED, respectively. Half of the participants who received treatment only met criteria for OSFED and did not meet criteria for AN, BN, or BED on any survey. The majority of participants with eating disorders did not receive treatment for their disorders. OSFED was the most prevalent eating disorder and the least likely to receive treatment These findings highlight the need for better recognition of OSFED by primary care providers.

TRAJECTORIES OF FAMILY POVERTY AND CHILDREN'S MENTAL

HEALTH: RESULTS FROM THE DANISH NATIONAL BIRTH COHORT. Laura Pryor* Laura Pryor, Katrine Strandberg-Larsen, Anne-Marie Nybo-Anderson, Naja Hulvej-Rod, Maria Melchior, (INSERM, Sorbonne Universite, Institut Pierre Louis d'Epidemiologie et de Sante Publique IPLESP, Department of social epidemiology, F75012 Paris, France.)

Background: Children exposed to socioeconomic adversity have elevated levels of psychological difficulties immediately and long-term. However, few studies have examined the role of long-term patterns of family socioeconomic adversity ascertained in a dynamic fashion. Methods: The Danish National Birth Cohort (DNBC) is a longitudinal, population-based study, which recruited 100 417 women in pregnancy (1996-2002). Household poverty from the year before birth until the child was 10 years of age (n=12 measures) was obtained from the National Danish Registries and modeled using Group-based modeling (Proc Traj). Child mental health symptoms were measured at 11 years using mother and child-reported Strengths and Difficulties Questionnaires (SDQ), and the child-reported Stress in Childhood (SiC) scale. Results: Four categories of family socioeconomic position were identified: 1) No poverty (83.5%); 2) Intermittent poverty (8.6%); 3) Poverty during the perinatal period (4.9%); and 4) Chronic poverty (3.0%). Controlling for several early life characteristics of the family, mother and child, significant associations were found between membership in the "Intermittent" poverty group and offspring psychological difficulties (RR= 1.18, 95% CI: 1.07; 1.30; conduct problems: RR= 1.38, 95% CI: 1.19; 1.60; hyperactivity: RR= 1.18, 95% CI: 1.01; 1.38; and stress: RR= 1.10, 95% CI 1.03; 1.17). Conclusions: Children growing up in households characterized by financial instability have elevated levels of psychosocial symptoms, especially externalizing behaviours, as well as stress in early adolescence. Policies geared towards raising disposable income among families at risk of poverty throughout childhood may prevent mental health problems and help break the vicious circle between early disadvantage and mental health
NON-INFERIORITY APPROACHES IN THE OBSERVATIONAL SETTING Hayden Smith* Hayden L Smith, William M. Pruett, Matthew W. Trump, Ryan P. Flood, (UnityPoint Health)

Introduction: Medical treatments are initially considered safe and efficacious based on randomized control trials. These studies typically include relatively healthy and homogenous subjects. Post-trial observational studies can be conducted to compare various treatments, though these studies have a risk for non-ignorability of treatment assignment. Objective: to present non-inferiority approaches available in the observational setting using a sample of parapneumonic infection patients with or without protocol adherence. Methods: A retrospective cohort study was conducted using data from three Midwestern hospitals for adults admitted with a complicated parapneumonic infection during 2014-2017. Treatment protocol included a chest tube with twice daily instillation of tPA/domase for at least three consecutive days. Protocol non-adherence was defined as a deviation from the treatment protocol and non-inferiority was defined as a length of stay (LOS) less than 110% of protocol patients' LOS. Non-inferiority approaches (e.g., bivariate, multiple regression, Bayesian model, doubly robust (DR) augmented inverse propensity weighted model, and DR stacked ensemble of machine learning algorithms) were conducted using time-fixed covariates. Results: The study included 125 unique patients with 92(74%) classified as protocol non-adherent. Median LOS was 13 (IOR: 10-20) versus 12 (IQR: 8-18) days for protocol compliant and non-adherent patients, respectively. Non-inferiority was revealed in the non-adherent group for all conducted analytic approaches. Presented will be full model descriptions along with pros and cons of each of these naïve to more complex methods. Conclusion: There are many techniques available for the examination of non-inferiority in the observational setting. Each approach has its strengths and weaknesses. Notable limitations may include model dependency/misspecification, covariate imbalances, lack of prior information, and use of p-values for decision making.

0212 S/P

AN APPLICATION OF MACHINE LEARNING FOR THE REFINEMENT OF AN EHR-DERIVED COHORT Sarah R Hoffman* Sarah R Hoffman, Emily R Pfaff, Wanda K Nicholson, (Dept of Epidemiology, UNC Gillings School of Global Public Health, Chapel Hill, NC)

Electronic health record databases (EHR) are frequently used for cohort identification in health services research studies. A primary challenge is that the EHR query (algorithm) may produce an overly broad list of patients. When this occurs, subsequent manual chart review is required to verify patient eligibility. In 2015, we used a structured algorithm to query a university-based EHR database to ïdentify women with symptomatic uterine fïbroids for recruitment into a national comparative-effectiveness registry. Manual review of a random sample of charts showed that 1 in 4 of the women identified by our final algorithm did not have symptomatic fibroids (PPV 76%). Since it is prudent to avoid placing recruitment phone calls to these women for both pragmatic and ethical reasons, we employed an open-source machine learning application (CLARK!) to explore its potential as an alternative to manual review (of all charts) for eligibility verification. CLARKI's task was to increase the PPV of our EHR-derived recruitment list by classifying patients as "symptomatic" or "non-symptomatic" based upon the contents of their charts, using the application's random forest option. Two randomly selected sets of charts from our EHR-derived cohort were submitted to CLARK!: a training set (n=397), followed by a test set (n=163). When applied at a high confidence level of 80% or more, as compared to manual review, CLARK successfully identified 97% of symptomatic cases, with a PPV of 85%. For further refinement of an EHRderived cohort of N=1,000 with a PPV of 76%, this improvement represents 110 fewer phone calls placed to ineligible patients (n=240), at a cost of 23 (of 760) truly eligible subjects, as compared to blind calling of the entire EHR-derived list. Our results show that machine learning can be used to refine the output of an existing EHR algorithm, allowing study teams to avoid the costs associated with excessive manual chart review or unnecessary recruitment phone calls.

0211 S/P

THE DEVELOPMENT AND VALIDATION OF A CLINICAL PREDICTION RULE TO PREDICT TRANSMISSION OF METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS IN NURSING HOMES Sarah S Jackson* Sarah S Jackson, Alison Lydecker, Laurence S. Magder, PhD, Mary-Claire Roghmann, (University of Maryland School of Medicine)

The prevalence of methicillin-resistant Staphylococcus aureus (MRSA) colonization among nursing home residents is high. Healthcare workers (HCW) can often serve as vector in the transmission of MRSA. The ability to identify residents who are likely to transmit MRSA to HCW hands and clothing during clinical care is important so that infection control measures such as contact precautions can be employed. We developed a clinical prediction rule with demographics and clinical characteristics as predictors of MRSA transmission to HCW gowns within a cohort of residents from a community nursing home. We externally validated this model in a cohort of Veterans Affairs (VA) nursing home residents. The prediction model, which included sex, race, HCW dependency, the presence of any device, diabetes, and chronic skin breakdown, showed good performance (c-statistic=0.70, sensitivity=74%, specificity=52%) in the development set. The decision curve analysis indicates this model has greater clinical utility than using a nares culture for MRSA colonization to determine which residents should be placed on contact precautions. The prediction rule demonstrated less utility in the validation cohort, suggesting a separate rule should be developed for the VA nursing home population.

0213 S/P

SHRINKAGE REGRESSION FOR CONFOUNDER ADJUSTMENT IN THE PRESENCE OF COLLIDER-STRATIFICATION BIAS Malcolm Barrett* Malcolm Barrett,, (University of Southern California)

It's been demonstrated that shrinkage regression methods, such as the lasso, can be effective for detecting confounding bias in settings where expert knowledge is limited or where high dimensionality prohibits sensible directed acyclic graphs (DAGs). Shrinkage techniques can both stabilize the effect of true confounders and, depending on the method, reduce or eliminate noise variables. However, it's not clear whether these methods are effective in the presence of collider-stratification bias. To assess this effect, a modified form of lasso regression that only shrinks covariates was tested against GLM methods and change-in-estimate selection to compare resulting bias in the presence of 30 confounders, 30 noise variables, and 10 colliders over 10,000 simulations. The true odds ratio between the exposure and outcome was 1.50. Five models for each approach were fit: all variables, the correct model (exposure+ confounders), a crude model with just exposure, exposure+ confounders + colliders, and exposure + confounders + noise. The modified lasso performed best for all circumstances, with the least mean bias for the correct model (estimate: 1.49 (95% CI 1.31, 1.71), bias: -0.44%), and the model with exposure+ confounders + noise (estimate: 1.45 (95% CI 1.27, 1.67), bias: -3.08%). The presence of colliders introduced instability of estimates for all approaches. The lasso had a smaller degree of bias than the GLM models and was more stable, but the confidence intervals were still wide. When including all variables, the estimate for lasso was 1.55 (95% CI 0.74, 2.94) vs 2.06 (95% CI 0.52, 5.7) for GLM, with a bias of 3.62% vs 37.64%, respectively. The lasso reduced mean bias and stabilized estimates in the presence of colliders, but confidence intervals remained considerably wide. A combined method using DAGs where possible and shrinkage methods where necessary may therefore be a more generalizable approach to addressing adjustment in observational studies.

WHICH EFFECT MEASURES MATTER MOST, AND WHEN? Gregory H Cohen* Gregory H Cohen, Laura Sampson, Shailesh Tamrakar, Sarah Lowe, Katherine Keyes, Sandro Galea, (Columbia University Mailman School of Public Health/Boston University School of Public Health)

Treatment and exposure effects are most commonly expressed with ratio measures, despite the public health importance of absolute measures. When and under what circumstances are relative compared to absolute effect measures an appropriate choice for epidemiologic analysis? We explored this question in the context of a simulation of two psychiatric interventions (treatments 2 and 3) compared to treatment as usual (treatment 1), following a natural disaster in New York City. We calculated posttraumatic stress disorder (PTSD) prevalence and treatment effects over 2 years. We compared patterns of relative effect measures (risk ratios; RRs) to patterns of absolute effect measures (risk differences; RDs). In the course of the simulation, PTSD prevalence declined from a baseline of 5.47% to 1.11% under treatment 1, 0.54% under treatment 2, and 0.15% under treatment 3. Compared to treatment 1, effects of treatment 2 emerged between 12 and 15 months (m); as RDs monotonically increased from -0.001 to -0.006, RRs monotonically increased from 0.972 to 0.489. Compared to treatment 1, effects for treatment 3 emerged between 3 and 6m, forming a U-shaped curve on the absolute scale and a downward curve on the relative scale; as RRs continued to increase in the final half of the simulation, RDs trend towards the null. For treatment 3 effects, between 12 and 24m, as RDs monotonically decreased from -0.025 to -0.01, RRs monotonically increased from 0.41 to 0.131. Comparing across treatments, for treatment 3 at 9m, an RR of 0.552 corresponds to an RD of -0.021, while for treatment 2 at 24m, a larger RR of 0.489 corresponds to an RD of only -0.006. As case prevalence declines over time, impressive and increasing RRs can mask virtually meaningless and declining RDs. The results of this simulation suggest that the calculation of both absolute and relative effect measures is important in the analysis of epidemiologic data, including comparative effectiveness trials.

0216 S/P

VALIDATION OF SELF-REPORTED PHYSICAL ACTIVITY IN THE MEN'S LIFESTYLE VALIDATION STUDY Claire H. Pernar* Claire H. Pernar, Andrea K. Chomistek, Junaidah B. Barnett, Kerry Ivey, Susan B. Roberts, Jennifer Rood, Jason Block, Walter C. Willett, Giovanni Parmigiani, Edward L. Giovannucci, Lorelei A. Mucci, Eric B. Rimm, (Department of Epidemiology, Harvard T. H. Chan School of Public Health, Boston, MA)

Background: Physical activity assessments that are scalable to large population-based studies are required to study the associations between physical activity and chronic disease risk. Our study examined the validity of a physical activity questionnaire (PAQ) by comparison with energy expenditure, accelerometer measures, and webbased 24-hour recalls. Methods: Over one year, 618 men completed two PAOs, up to four 24-hour activity recalls (ACT24), doubly-labeled water (DLW) assessments of total daily energy expenditure, and accelerometer-measured activity. A subset of men completed a repeat DLW assessment (n=101). Physical activity energy expenditure (PAEE) was estimated by subtracting resting metabolic rate and the thermic effect of food from total daily energy expenditure. Spearman correlation coefficients were calculated adjusting for age and within-person variation in the comparison method. Results: Compared to DLW-determined age-ad justed PAEE, correlations with the second PAQ were 0.40 for total activity, 0.43 for moderate- to vigorous-intensity physical activity, and -0.14 for sedentary time. Compared to DLW and accelerometer, PAQ had similar validity to ACT24 for active behavior and lower validity for sedentary behavior. Of the four comparison methods assessed, the PAQ had highest validity when compared to the ACT24. Conclusions: Our study shows moderate validity of PAQ-measured physical activity compared with DLW, accelerometer, and ACT24. Given its low cost and acceptability, the PAQ adequately captures physical activity, especially when moderate or vigorous, for use in large long-term prospective studies of chronic disease risk.

0215

CASE STUDY IN MAJOR QUOTATION ERRORS: THE MARVELOUS CITATION AND QUOTATION CAREER OF A COMMENTARY ON THE NEWCASTLE-OTTAWA SCALE Andreas Stang* Andreas Stang, Stephan Jonas, Charles Poole, ((1) Center of Clinical Epidemiology, Institute of Medical Informatics, Biometry and Epidemiology; University Hospital of Essen, Hufelandstr. 55, 45147 Essen, Germany)

The Newcastle-Ottawa scale (NOS) is one of many scales used to judge the quality of observational studies in systematic reviews. It was criticized for its arbitrary definitions of quality items in a commentary in 2010. That commentary was cited 1.250 times through December 2016. We examined the citation history of this commentary in a random sample of 100 full papers citing it, according to the Web of Science. Of these, 96 were systematic reviews, none of which quoted the commentary directly. All but 2 the 96 indirect quotations (98%) portrayed the commentary as supporting use of the NOS in systematic reviews when, in fact, the opposite was the case. It appears that the vast majority of systematic review authors who cited this commentary did not read it. Journal reviewers and editors did not recognize and correct these major quotation errors. Authors should read each source they cite to make sure their direct and indirect quotations are accurate. Reviewers and editors should do a better job of checking citations and quotations for accuracy. It might help somewhat for commentaries to include abstracts, so that the basic content can be conveyed by PubMed and other bibliographic resources.

0217 S/P

INTEGRATING DISEASE FORECASTING MODELS AND CAUSAL INFERENCE: DENGUE PREVENTION IN THAILAND Stephen A Lauer* Stephen A Lauer, Nicholas G Reich, Evan L Ray, Sopon Iamsirithaworn, Justin Lessler, Laura B Balzer, (University of Massachusetts, Amherst)

Background: Prior to and during an epidemic, forecasting models aid public health officials in identifying high-risk areas. These areas may then be targeted for interventions. In emerging outbreak settings, assessing intervention impact is complicated by lack of randomization. We sought to integrate disease forecasting models with causal inference methods to estimate the effect of an intervention to reduce Zika transmission on the incidence of dengue hemorrhagic fever in Thailand. Methods: In a simulation study, we resampled and perturbed data from 1999-2015 from 76 provinces in Thailand. The intervention was preferentially assigned to provinces with high preseason incidence, high temperatures, low rainfall, and large populations. The outcome of 2016 dengue incidence was generated using draws from the predictive distribution of an ensemble of forecasting models weighted by their error on out-of-sample predictions. For effect estimation we compared the unadjusted estimator (ratio of average incidence in treated vs. control provinces), parametric G-computation, inverse probability weighting, and targeted maximum likelihood estimation (TMLE) with Super Learning. We varied the strength of the intervention and the extent of unmeasured confounding. Results The unadjusted estimator had the highest bias and lowest power. As singly robust methods, the performance of G-computation and inverse weighting depended on the extent of model misspecification. TMLE with Super Learning was able to adapt to underlying data generating process and consistently yielded the most power with the lowest bias. Conclusion & next steps: Our work suggests that forecast modeling together with causal inference methods can improve our understanding of the effectiveness of interventions. To estimate the impact of the Zika intervention, we will apply to TMLE to the Thailand data, while integrating the forecasting models as candidate estimators in Super Learner.

SELECTION BY MILESTONES DESIGN (SMILE): BIAS VERSUS EFFICIENCY Ian Shrier* Ian Shrier, Russell Steele, Clara Bolster-Foucault, Stephanie Long, Tibor Schuster, (Lady Davis Institute, McGill University)

In a longitudinal study, investigators must limit the number of follow-up visits due to feasibility and budget constraints. Generally, these visits occur at fixed times (e.g. study entry, 14 and 28 days). We introduce an alternative approach: selecting visits based on milestones (e.g. study entry, improved, healed). This may be advantageous in cases when healing rates vary greatly or are unknown. If the research question concerns an average causal effect (ACE) that varies over time, sampling based on milestones likely produces a biased result. However, when the causal effect is timeindependent, the bias for ACE is unknown. The purpose of this study is to evaluate the bias in a longitudinal study designed to assess a hypothesized causal relationship between changes in visual function and changes in symptoms in a prospective cohort of patients diagnosed with concussion and followed until asymptomatic or for a maximum of three months. We simulated separate healing rates for visual function for 10000 patients based on an exponential function (gamma distribution for lambda). Individual symptom healing rates were a function of individual visual function healing rates. To establish the truth, we sampled data every day from baseline. We compared the truth to sampling based on the SMILE design due to changes in 1) symptoms and 2) function (study entry, improved, healed), and two time-fixed strategies (study entry and follow-up at 7&28 days or 7&90 days). The bias for the slope was 2% for SMILE, 1% for function, 1.6% for 7&28 days and 0% for 7&90. For the intercept, bias was 1.6% for SMILE, 1.1% for function, 1.2% for 7&28 days and 0.5% for 7&90 days. The mean squared error between simulated sampling strategies and the true underlying data was 0.003 for SMILE, 0.0001 for both functions and 7&28, and 0.00004 for 7&90. In conclusion, the SMILE design only had slightly increased bias in our simulations. Further work will explore biases under other simulation parameters

0220

SOFTWARE TO ASSESS THE EFFECTS OF DATA-GENERATING ASSUMPTIONS ON ESTIMATOR PERFORMANCE Scott Zimmerman* Scott Zimmerman, Ellicott C. Matthay, Kara Rudolph, Dana Goin, Jennifer Ahern, (UC Berkeley)

Simulation studies are empirical experiments in which the experimenter defines a data-generating system (DGS) and observes its behavior by repeatedly generating and analyzing data sets. Simulation studies are frequently used in epidemiology to compare the performance of two or more estimators in terms of key performance metrics such as percent bias, CI coverage, and mean-squared error (MSE). Defining the DGS for a simulation study involves making three types of assumptions: the structural relationships between variables, the functional forms of the DGS's equations, and the values of the parameters in the equations. Each simulation study can provide insight into the performance of an estimator under the specific assumptions that define the DGS. However, predicting behavior of an estimator for a new DGS, such as the unobserved DGS of an applied analysis, requires extrapolation. Patterns in estimator performance can be observed by studying a set of DGSs that vary in terms of their characteristics. For example, simulations over multiple DGSs may be used to create general guidelines for choosing an estimator based on DGS features such as effect size, treatment propensities, strength of interaction, and confounder strength. We have developed new software that researchers can use to empirically study the behavior of data-generating systems over a wide variety of possible true scenarios that reflect uncertainty in the DGS assumptions. A key feature of the software is functionality to choose the bestperforming estimator for an applied analysis based on features of the DGS. The software considers the user's unique problem to provide a tailored recommendation based on simulations from a wide variety of possible true scenarios. We illustrate the software on the problem of choosing the estimator with the lowest MSE for estimating the effect of California's Mental Health Services Act of 2004 on the suicide rate.

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ADJUSTED RESTRICTED MEAN SURVIVAL TIMES IN OBSERVATIONAL STUDIES Ludovic Trinquart* Ludovic, Sarah C. Conner, Lisa Sullivan, Emelia J. Benjamin, Sandro Galea, (Boston University School of Public Health)

In observational studies with censored data, exposure-outcome associations are commonly measured with an adjusted hazard ratio (HR) from multivariable Cox proportional hazards models. The difference in restricted mean survival times (RMST) to a pre-specified time point is an alternative measure that offers a clinically meaningful interpretation. Several regression-based methods exist to estimate an adjusted difference in RMST, but they digress from the model-free method of taking the area under the survival function. We derive the adjusted RMST by integrating an adjusted Kaplan-Meier estimator with inverse probability weighting. In a Monte Carlo-type simulation study, we demonstrate that the proposed estimator performs as well as two regression-based approaches. We illustrate the methods by re-examining the association between total cholesterol and the 10-year risk of coronary heart disease in the Framingham Heart Study. We discuss the implications for the reporting and interpretation of observational with censored data.

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INFERENCE OF DIRECT EFFECTS OF METABOLITES ON FUTURE DISEASE RISK IN METABOLIC PROFILING STUDIES - A GRAPHICAL APPROACH Clemens Wittenbecher* Clemens Wittenbecher, Jan Krumsiek, Matthias B Schulze, (Department of Molecular Epidemiology, German Institute of Human Nutrition Potsdam-Rehbruecke (DIfE), Potsdam, Germany)

Human metabolic profiles are complex high-dimensional datasets. Biological processes determine conditional dependencies among metabolites and can be intuitively encoded in metabolic networks (MN). We aimed to evaluate possible direct effects of metabolites on survival time accounting for potential indirect and confounding influences from the MN. We designed the NETcoupler-algorithm: 1) The MN is defined as skeleton of the data-generating acyclic graph, which is estimated from the metabolomics data 2) For each metabolite Mi, the Markov parents, which are sufficient to block confounding and indirect effects from the MN (d-separation), are necessarily a subset of the direct MN-neighbors. The actual sufficient adjustment set(s) are unknown due to missing directionalities within the MN. 3) In a multi-model procedure, the relation of each metabolite with disease risk is adjusted for every subset of direct neighbors, generating a set of possible estimates that necessarily contains the direct effect. 4) Metabolites are classified as direct effects if and only if all estimates in this set are consistent and significant. Simulations showed that the NETcoupler-algorithm efficiently retrieved datagenerating MNs from simulated multivariate distributions. In the NETcoupler framework, any link function can be used to identify direct influences of metabolites. In our longitudinal applications, we used Cox models, with Mi as exposure, subsets of its MN-neighbors as covariables, and survival time as outcome to reevaluate targeted metabolomics data in relation to time-to-type 2 diabetes (T2D) incidence in a real prospective cohort. Among 126 metabolites, 21 biologically compelling links with T2D were newly discovered. The causal inferencefounded NETcoupler-algorithm intrinsically accounts for conditional dependencies in relating metabolic profiles to disease risk. Simulations and real data applications encourage MN-based adjustment strategies for metabolic profiling studies.

USING FDA WEBSITE AND CLINICALTRIALS.GOV TO IDENTIFY TRIALS FOR NETWORK META-ANALYSIS: A CASE STUDY ON FIRST-LINE MEDICATIONS FOR GLAUCOMA Lin Wang* Lin Wang, Yong Chen, Christopher Schmid, Tianjing Li, (Johns Hopkins School of Public Health)

Background: Network meta-analysis (NMA) can address a broader research question than pairwise meta-analysis by comparing all interventions for a given condition in a single analysis. Bibliographic databases such as PubMed, Embase and Cochrane CENTRAL are almost always searched to identify published trial reports. For regulated products, the approval packages available from the US Food and Drug Administration (FDA) website and ClinicalTrials.gov may contain valuable information about trials. Objective: To compare the use of bibliographic databases, the FDA website and ClinialTrials.gov to identify trials for NMAs of drug interventions in a specific case study, and to assess how inferences might be affected by using different information sources. Method: Building upon a recent NMA, we searched the FDA website and ClinicalTrials.gov for randomized controlled trials on first-line medications for open angle glaucoma. When a trial was identified in multiple sources, we compared information presented. We fitted random effects NMA models and analyzed five networks of trials for the outcome of intraocular pressure (IOP) at 3 months: all unique trials; published trials only; FDA trials; ClinicalTrials.gov trials; published trials not on the FDA website and ClinicalTrials.gov. Results: We identified 115 published trials, 28 FDA trials (14 published and 14 unpublished), and 27 ClincalTrials gov trials (16 published and 11 unpublished). Published trial reports provided most information about participants, trial design, statistical methods, and results, while ClinicalTrials gov records provided the least. Information about trial characteristics and risk of bias sometimes differed across sources. The effect estimates generally agreed when different sources of data were used for NMA, although the precisions varied. Conclusions: The FDA website is useful for identifying trials for NMA for regulated products. In our case example, NMA based on FDA trials alone provided reasonably precise effect estimates.

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A SYSTEMATIC REVIEW OF QUANTITATIVE BIAS ANALYSIS IN THE EPIDEMIOLOGIC LITERATURE Julie M Petersen* Julie M Petersen, Lynsie Ranker, Matthew P Fox, (Boston University School of Public Health, Department of Epidemiology)

Introduction: Quantitative bias analysis (QBA) assesses the impact of bias on direction, magnitude, and uncertainty of study results. The ways it is used have yet to be well described. The objective of this systematic review was to evaluate QBA in epidemiologic literature over the last decade to understand how it is most commonly applied. Methods: We searched PubMed and selected methodological references for English peer-reviewed publications from Jan 1, 2006 to Sept 30, 2016. We included studies that detailed an applied bias analysis of an exposure-outcome relationship using real-world data. For each study, we extracted design, results prior to biasadjustment, the QBA rationale and methodology, bias-adjusted results and interpretation, and the location of this information in the article. Results: Most of the 124 studies included were cohort (54%) or case-control (31%). 70% were in the primary manuscript, while 8% were in secondary papers; 22% were methods paper examples. Most (67%) were published 2012-2016. The most common bias modeled was misclassification (60%), followed by unmeasured confounders (46%), and selection bias (14%)(non-exclusive). Overall the most common QBA approach was probabilistic, representing 60% of analyses modeling misclassification, 53% modeling selection bias, and 47% modeling unmeasured confounders. Among the 19% that modeled more than one bias, less than half (46%) incorporated them into a single adjusted estimate. The level of detail varied by objective (e.g., to correct for bias (51%), nullification analysis (27%)). 69% included sufficient details to reproduce the analysis had the data been available. Conclusions: The frequency of QBA has increased in recent years but remains fairly rare. Level of detail seems closely related to the rationale. We encourage researchers to consider suspected biases and incorporate quantitative methods to evaluate their influence on study results, as it is more informative than qualitative speculation.

REGRESSION APPROACHES FOR ANALYZING U.S. NATIONAL PERIOD LINKED BIRTH-INFANT DEATH DATA Lauren M. Rossen* Lauren M. Rossen, Marie Thoma, Katherine Ahrens, Dane De Silva, Ashley Hirai, (National Center for Health Statistics)

Background: Timely national vital statistics data are critical for research on infant mortality. In the US, birth-infant death data are released in two formats: period data (infant deaths linked with births in the current or prior year and a denominator file of births in the current year) and cohort data (births in a given year linked with subsequent infant deaths). The period files are timelier and are used for reporting annual infant mortality rates, but multivariable modeling with these data has been underutilized due to the separate numerator and denominator files. Our objectives were to describe the application of aggregate regression options for multivariable models of period data and to contrast these with cohort data results using associations between interpregnancy interval (IPI) and infant mortality as a motivating example. Methods: Using period data from 2011-2015, we aggregated the data in two ways and applied different distributional models for each: 1) grouped data (deaths/births) for each unique covariate combination with a Poisson model and 2) frequency-weighted data for each unique covariate-outcome combination with a log-binomial model. We then created a multiyear cohort file from the period files, using restricted-use identifiers to link births in a given year to subsequent infant deaths (2011-2015). Rate ratios from log-binomial and Poisson models were estimated using the multiyear cohort file. Results: Rate ratios for short IPI (<6 versus 18-23 months) based on grouped Poisson and frequency-weighted logbinomial models using the period data were 1.59 (95%CI: 1.52, 1.66) and 1.60 (95%CI: 1.53, 1.67), respectively, and similar to cohort data estimates from comparable models (RRs=1.58, 95%CI: 1.49, 1.67). Conclusion: Period linked birthinfant death data can be successfully used for multivariable modeling. Results were comparable to cohort data, though further comparisons may be needed to evaluate consistency across various outcomes and exposures.

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COMPARISON OF APPROACHES TO ESTIMATE THE ASSOCIATION BETWEEN SLOPE OF ESTIMATED GLOMERULAR FILTRATION RATE (EGFR) AND SUBSEQUENT END-STAGE RENAL DISEASE (ESRD) RISK Yingying Sang* Yingying Sang, Morgan E Grams, Alex R. Chang, Shoshana Ballew, Kunihiro Matsushita, Tom Greene, Josef Coresh, (Johns Hopkins Bloomberg School of Public Health)

Background: Longitudinal slope of eGFR has been proposed as an alternative endpoint to ESRD in clinical trials. However, empirical estimates of eGFR slope are imprecise, which may weaken their associations with ESRD. We compare methods for reducing this imprecision and the results on ESRD risk estimation. Methods: We estimated individuals' eGFR slope empirically by linear regression and by best linear unbiased prediction (BLUP) from linear mixed models with random intercept and slope. We then related estimates to subsequent ESRD using adjusted Weibull regression survival-time models. In a shared parameter model (SPM), we estimated eGFR slope and risk of ESRD simultaneously in an adjusted joint longitudinalsurvival model, using linear mixed model in the longitudinal submodel and Weibull regression in the survival submodel to further account for informative censoring. Results: In 1093 patients with diagnosed diabetes and urine albumin-creatinine ratio ≥300 mg/g in the Geisinger Health System, eGFR was measured a median of 6 times (IQR 4-9) in a 2-year time period with 91 ESRD events during subsequent follow-up (median 4.6 years, IQR 2.1-7.3). In 743 patients with first eGFR ≥60 ml/min/1.73m2, mean (SD) slope of eGFR was similar in three methods (-5.85 (8.58) ml/year by linear regression, -5.84 (6.25) by BLUP, and -5.82 (6.24) by SPM), but hazard ratios of ESRD per 5ml/year decline in eGFR differed considerably (1.55, 2.30 or 2.85, respectively). Results were similar in 350 patients with first eGFR <60 ml (mean (SD) slope was -3.24 (5.45), -3.23 (4.20) or -3.24 (4.20) ml/year and hazard ratio per 5ml/year decline was 1.86, 2.91 or 4.01, respectively). Conclusion: Compared to BLUPs or SPM, eGFR slopes estimated by linear regression underestimated hazard ratios of ESRD. Models that address error in slope estimation enable fuller appreciation of the value of eGFR slopes as early potential surrogates for ESRD risk.

ESTIMATING TREATMENT EFFECTS AFTER MULTIPLE IMPUTATION OF MISSING BASELINE COVARIATE DATA Hongseok Kim* Hongseok Kim, Issa Dahabreh, (Brown University)

When estimating treatment effects, the best way to use multiple imputation for handling missingness in baseline covariates is unclear. We conducted a simulation study to compare multiple imputation approaches for missing baseline covariate data when estimating the effect of a binary treatment on a continuous outcome. We simulated data missing at random, with different missing data patterns (only in the control group or both treatment groups) and treatment assignment mechanisms (treatment depended on a covariate without missing data, a covariate with missing data, or both). After multiple imputation, we estimated the average treatment effect on the treated (ATT) and on the population (ATE) by inverse probability weighting (IPW); matching (1:1 nearest neighbor propensity score matching without replacement); standardization; and doubly robust (DR) methods. We compared "within" (average effect estimates from each imputed dataset) and "across" (average propensity score estimates across imputations and estimate the effect once) approaches for IPW, matching, and DR estimators (the approaches are equivalent for standardization), using imputation models that included or omitted the outcome. We assessed bias and variance over 1000 runs for each scenario. The within approach had lower bias than the across approach for all estimators except matching, where the across approach was slightly better. Omitting the outcome from the imputation model led to bias in all estimators, particularly when treatment assignment depended on the covariate with missing data. When using the outcome in the imputation model, standardization had the smallest variance; DR estimators had much smaller variance than IPW or matching, but higher variance than standardization. ATT and ATE results were similar. When using multiple imputation to address missing baseline covariate data, the imputation model should include the outcome. For IPW or DR estimators, the within approach is preferred.

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MISSING DATA WITH AN ERROR-PRONE BINARY VARIABLE: A SIMULATION STUDY Rosie Cornish* Rosie Cornish, John Macleod, Kate Tilling, (University of Bristol)

With a binary outcome, a complete case logistic regression will be unbiased providing there is no multiplicative interaction between exposure and outcome with respect to the probability of missingness. However, in practice there might be an underlying continuous measure that actually predicts missingness. For example, the binary outcome may be presence/absence of depression, but missingness could be associated with depression severity. We used simulations - based on data from a UK cohort - to examine bias with a binary outcome and a continuous underlying trait that caused missingness. We varied the percentage of missing data, the association between the continuous measure and missingness, and the sensitivity and specificity of a proxy measure of the binary outcome. For each scenario we simulated 1000 datasets of 10,000 observations. We compared bias of the log odds ratio from complete case analysis to multiple imputation (MI) including the proxy as an auxiliary variable. Complete case estimates of the log odds ratio were generally biased unless the association between the outcome and missingness was weak (RR for being observed=0.9 for each SD increase in underlying continuous measure). When this relationship was strong (RR=0.5) the bias was not always inconsequential - for example, underestimating the log odds ratio by 28% in one scenario. Further, we found that use of a proxy for the binary outcome as an auxiliary variable in MI sometimes increased bias. A complete case logistic regression will produce unbiased estimates of the exposure odds ratio for a wide range of missing data mechanisms. However, this may not be the case if missingness in the (binary) outcome is actually related to an underlying continuous measure. Researchers should consider carefully the plausibility of the assumption that missingness is related directly to the binary outcome before carrying out their analysis. Imputation with a proxy as an auxiliary variable may not necessarily be beneficial.

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A GENERALIZED METHOD FOR OBTAINING BIAS PARAMETERS FOR ANALYSIS OF UNCONTROLLED CONFOUNDING Onyebuchi A Arah* Onyebuchi A Arah, , (UCLA Fielding School of Public Health, Los Angeles, CA)

Interest in causal inference and related bias analysis is increasing. Several methods have been developed to aid bias analysis for possible uncontrolled confounding. Common methods have involved the use of bias formulas which require externally obtained bias parameters. The bias parameters for each bias formula typically involve (i) a measure of the adjusted association between the unmeasured confounders and the outcome given the exposure and the measured confounders, and (ii) expectation of the unmeasured confounders at comparative levels of the exposure conditional on or adjusted for measured confounders. In the absence of validation studies, specifying the latter bias parameters can be counterintuitive especially for applications involving multiple measured and unmeasured confounders. This study develops a generalizable algorithm that uses causal diagrams and simulations to generate bias parameters that relate one or more unmeasured confounders to the exposure and the outcome adjusted for measured confounders. The algorithm uses the assumed data generating process depicted in a causal diagram to guide the specification of how the unmeasured confounders might relate to the exposure in the presence of other covariates including measured confounders and to the outcome given the exposure and the measured confounders. The algorithm then yields the bias factor(s) given the input relations and the assumed edges in the causal diagram. The resulting bias factors can then be used to ad just for unmeasured confounders in the analysis of the observed data. By using the observed data and the working causal diagram, this new method is intuitive, visual and easy to implement in routine software and record-level data analysis. Simulation, empirical and graphical illustrations are provided.

MEASURED MATERNAL ANTHROPOMETRY PRIOR TO PREGNANCY AND NEWBORN DNA METHYLATION Edwina Yeung* Edwina Yeung,

Weihua Guan, Sunni L. Mumford, Robert Silver, Cuilin Zhang, Michael Y. Tsai, Enrique F. Schisterman, (Epidemiology Branch, DIPHR, NICHD)

Background: Maternal obesity increases risk of pregnancy complications and has long-term implications for children's health. Epigenetic changes are proposed as a mechanism through which maternal obesity has intergenerational effects. Methods: We conducted an epigenome wide association study to examine DNA methylation in cord blood and maternal anthropometry among 391 singletons in the EAGeR Trial (2007-2011). The trial randomized women with previous pregnancy loss to low dose aspirin or placebo prior to conception. Mothers had clinically measured weight and height prior to pregnancy along with waist and hip circumferences and skinfold measures at the subscapular, suprailiac and triceps. DNA methylation was measured on >850,000 CpGs using the Infinium MethylationEPIC BeadChip. Linear mixed models were used to test the associations between maternal anthropometry measures (continuous) and methylation β-values at each CpG site with adjustment for estimated cell count (using a cord blood reference), maternal age, infant sex, and batch effects (random effects). Results: Mothers averaged 28 years of age and BMI of 25.2 kg/m2, with 24% overweight (30>BMI≥25) and 18% obese (BMI≥30). Only one single CpG site (cg05072085) was associated with waist circumference at Bonferroni corrected genome wide significant levels (p<6x10-8). All others were not. Suggestive associations (p<10-6) were observed at STOX1 (beta=-0.002), SFRS8 (beta=0.001), and FLJ41941 (beta=-0.003) per unit increase in BMI. However, CpGs of different genes were associated with waist to hip ratio (cg19466037) and sum of skinfolds (NCAPG2, LOC72832, CXADRP3). Conclusion: Maternal pre-pregnancy anthropometry was not consistently associated with newborn methylation levels in the same regions. However, the waist circumference identified CpG (cg05072085) is near (~4.5kb) the Wnt1-inducible signaling pathway protein 1 (WISPI) gene found to be associated with adipose tissue inflammation and differentiation.

AGE-PERIOD-COHORT MODELING OF MULTIPLE SCLEROSIS INCIDENCE RATES IN KUWAIT: 1980-2014 Saeed Akhtar* Saeed Akhtar, Jarrah Al-Abkal, Jasem Al-Hashel, Raed Alroughani, (Department of Community Medicine and Behavioral Sciences, Faculty of Medicine, Kuwait University, Kuwait)

Background: Multiple sclerosis (MS) is a complex immune-mediated disorder of central nervous system with undefined etiology. Genetic predisposition and environmental factors play imperative role in MS causation and its sustained increasing burden worldwide. This study examined the age, period and cohort effects on MS incidence rates in Kuwait. Methods: In this retrospective cohort study, data on MS cases diagnosed between January 1,1980 through December 31, 2014 and registered in National MS Registry and reference population were obtained. Age-period-cohort (APC) analysis was conducted using a loglinear Poisson regression model to supplement the descriptive and graphical presentation. Descriptive statistics were complemented with APC parameters' estimates including net drift, local drift, age at onset curve and longitudinal age trend. Age effect was presented as incidence rates (per 105 person-years), whereas, period and cohort effects as adjusted relative rates. Results: A total of 1131 cases were diagnosed in 1385923 person-years. Overall age-standardized MS incidence rate was 64.5 (95% CI: 52.4, 79.8). An estimated annual percentage change revealed 7.4% annual increase in MS incidence rate during the study period (Net drift= 7.4%; 95% CI: 4.1% - 10.8%). APC 'fitted' age-at-onset curve showed a bimodal pattern with peaked incidence rates at 20-24 years and 45-49 years of age. Compared with referent period (1980-1984), and cohort (1970-74), MS incidence rates progressively and significantly (p < 0.001) increased during subsequent time periods and in successive cohorts. Results of APC analysis are descriptive in nature and specific etiological hypotheses were not evaluated. However, the findings of this study substantiated the notion of multiplicity of genetic and/or environmental risk factors' contributions. Conclusion: A substantial increase in MS incidence rates was recorded, which significantly varied in all three temporal dimensions during the study period. Future studies may cont

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FACTORS ASSOCIATED WITH POOR REINTEGRATION TO NORMAL LIVING ONE YEAR AFTER STROKE: EVIDENCE FROM THE DESERVE TRIAL kennedy okhawere* Kennedy Okhawere, Emily Goldmann, Noa Appleton, Nina S. Parikh, Bernadette Boden-Albala, (College of Global Public Health, New York University)

Common sequalae of stroke include functional impairment and challenges to reintegrating back into pre-stroke activities and functioning. This study aimed to identify sociodemographic and clinical correlates of poor reintegration to normal living one year post-stroke. Data came from the Discharge Educational Strategies for Reduction of Vascular Events (DESERVE) study, a randomized controlled trial of a skills-based intervention to reduce vascular risk among mild stroke/transient ischemic attack patients. Reintegration to normal living was assessed one year poststroke using the Reintegration to Normal Living Index (RNLI), which measures physical, social and psychological functioning. RNLI score ranges from 0-100, with 60-100 indicating no/mild/moderate restriction and <60 indicating severe restriction to reintegration. The association between severe restriction to reintegration and sociodemographic and clinical factors was examined using Chi-square and Fisher Exact tests and logistic regression. Of the 324 participants, 23.8% were severely restricted in reintegration to normal living at one year. Female sex (64.0% vs. males, 36.0%; p=0.019), those with diabetes history (45.3% vs. no diabetes, 54.7%; p=0.001), and those who had lived in the community for 20-40 years (52.0% vs. 40 years, 26.7%; p=0.037) had a higher prevalence of severe restriction. In the multivariable regression model including diabetes history, sex, age, race/ethnicity, education, years lived in the community, and marital status, diabetes history (OR=2.03, 95% CI: 1.16, 3.55) remained significantly associated with severe restriction to reintegration while the association with female sex (OR=1.72, 95% CI: 0.96, 3.09) and Hispanic ethnicity (vs. non-Hispanic white, OR=1.96, 95% CI: 0.90, 4.26) was marginally significant. Targeted intervention to address various aspects of functioning following stroke among women, Hispanic patients, and those with diabetes may be warranted.

0251 S/P

THYROID STIMULATING HORMONE AND ALZHEIMER DISEASE: A MENDELIAN RANDOMIZATION STUDY Matthew L. Romo* Matthew L. Romo, Jian V. Huang, C. Mary Schooling, (CUNY Graduate School of Public Health and Health Policy, City University of New York)

Introduction. The observational evidence regarding the association between thyroid stimulating hormone (TSH) and Alzheimer Disease (AD) is conflicting. Specifically, both low and high TSH levels have been associated with AD and differences in the association by sex have been reported. We used 2-sample Mendelian randomization to estimate the causal effect of TSH on AD. Methods. Twenty-two single nucleotide polymorphisms (SNPs) solely and independently predicting TSH at genome-wide significance (p < 5*10-8) were applied to a very large genotyped case-control study of AD, International Genomics of Alzheimer's Project (IGAP) (N=17,008 AD cases, N=37,154 controls). We obtained overall estimates of the effect of TSH on AD using inverse variance weighting with random effects, a weighted median, and MR-Egger to combine SNP-specific Wald estimates. Results. All methods gave no significant association of TSH with AD; for example, OR 0.97, 95% CI 0.89 to 1.05, p=.381 with inverse variance weighting. The MR-Egger intercept gave little indication of pleiotropy (intercept OR 0.99, 95% CI 0.98 to 1.01, p=.499). Conclusions. Overall, these results do not support a causal effect of TSH on AD. Other explanations need to be sought to generate effective interventions for AD.

ASSOCIATION OF FRIED FOOD CONSUMPTION WITH ALL-CAUSE AND CAUSE-SPECIFIC MORTALITY: RESULTS FROM THE WOMEN'S HEALTH INITIATIVE Yangbo Sun* YANGBO SUN, Buyun Liu, Linda G. Snetselaar, Jennifer G. Robinson, Robert B. Wallace, Lindsay Peterson, Wei Bao, (UNIVERSITY OF IOWA)

Background: The association of fried food consumption (FFC) and mortality is unknown but may represent an important health message. Methods: We examined total and specific FFC (from food frequency questionnaires) in relation to all-cause and cause-specific mortality among 106,966 postmenopausal women in the Women's Health Initiative (WHI). Multivariable Cox proportional hazards models were utilized to calculate adjusted hazard ratios (HRs) of all-cause, cardiovascular disease (CVD) and cancer mortality in relation to total and specific (chicken, fish, potatoes, and others) FFC. Results: During the 17.9 years of follow up, 31,558 deaths occurred. Compared with total FFC of ≤1 serving/week, multivariablead justed HRs (95% CI) of \geq 1-3 servings/week, \geq 3-5 servings/week and \geq 5 servings/week were 1.03(1.01, 1.06), 1.04(1.01, 1.09) and 1.06(1.01, 1.10), respectively, for all-cause mortality; 1.04(0.99, 1.09), 1.05(0.97, 1.13) and 1.04(0.96, 1.13), respectively, for CVD mortality. Compared with zero consumption, HRs (95% CI) for fried chicken consumption of ≤1 serving/month, \leq 3 servings/month and \geq 1 serving/week were 1.06(1.03, 1.10), 1.11(1.07, 1.15) and 1.14(1.09, 1.20), respectively, for all-cause mortality; 1.08(1.02, 1.15), 1.15(1.07, 1.23) and 1.14(1.05, 1.24), respectively, for CVD mortality. Compared with zero consumption, HRs (95% CI) for fried fish consumption of ≥1 serving/week were 1.05(1.01, 1.09) for all-cause mortality and 1.09(1.01, 1.17) for CVD mortality, while fried potatoes or other fired foods were not associated with all-cause or CVD mortality. Neither total nor specific FFC were associated with cancer mortality, except that compared with zero consumption, HRs (95% CI) for fried fish consumption of ≤ 1 serving/month was 0.90(0.85, 0.96). These associations persisted after adjusting for body mass index. Conclusion: Regular consumption of fried foods, especially fried chicken, was associated with higher risk of all-cause and CVD mortality in WHI.

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RELATIONSHIP BETWEEN RACE/ETHNICITY, GENDER, CHANGE IN NEIGHBORHOOD SEGREGATION AND CARDIOVASCULAR HEALTH AMONG MINORITY YOUTH ATTENDING A PARK-BASED AFTERSCHOOL PROGRAM Emily M. D'Agostino* Emily M. D'Agostino, Hersila H. Patel, Zafar Ahmed, Eric Hansen, M. Sunil Mathew, Maria Nardi, Sarah E. Messiah, (Miami-Dade County Department of Parks, Recreation and Open Spaces)

Identifying how racial/ethnic residential segregation may impact health can guide innovative strategies for reducing disparities. We examined the association between gender, race/ethnicity, change in neighborhood segregation, and cardiovascular health outcomes for youth (n=2,250, mean age 9.1 years, 54% male; 51% Hispanic, 49% non-Hispanic Black (NHB); 49% high area poverty) attending a multisite parkbased afterschool physical activity program in Miami, Florida. Two-level longitudinal generalized linear mixed models with random intercepts for park effects were fit to test the association of change in segregation between home and program site and cardiovascular health outcomes over two school years. After covariate adjustment (individual-level sex, race/ethnicity, age, time, and park-area poverty) and including interaction terms, greater improvements in cardiovascular health including body mass index percentile, sum of skinfold thicknesses, systolic/diastolic blood pressure percentiles, and 400 meter run time were found for youth who attended the program in a less segregated area compared to their home area (p <0.05 for all outcomes). NHB and Hispanic girls showed the greatest cardiovascular health improvements. Specifically, compared to the reference group (no difference between home and program-area segregation), skinfold thicknesses decreased 18% (IRR 95% CI -0.239, -0.158) and 14% (IRR 95% CI -0.196, -0.099), vs. no significant change (IRR 95% CI - 014, 0.050) and decreased 6% (IRR 95% CI -0.092, -0.035) for NHB and Hispanic girls, respectively, who attended the program in less vs. more segregated areas. These findings have implications for community-based programs targeting cardiovascular health disparities reduction, particularly in light of a continually expanding youth obesity epidemic. The national effort to reduce health inequalities may be supported through Parks and Recreation Departments given potential to expand geographic mobility for minorities.

0261

TRENDS AND PATTERNS OF CHILD STUNTING AND THE DOUBLE BURDEN OF CHILD UNDER-NUTRITION IN MALAWI: A MULTILEVEL LOGISTIC REGRESSION ANALYSIS OF THE 2000 AND 2015 MALAWI DEMOGRAPHIC AND HEALTH SURVEYS DATA Lana Clara Chikhungu* Lana Clara Chikhungu, (University of Portsmouth)

Child under-nutrition is a major global health challenge that is implicated in child deaths in developing countries every year and contributes to poor cognitive development. Recent estimates reveal that in Malawi 37% children are stunted, 12% are underweight and 3% are wasted. This paper used the 2000 and 2015 Malawi Demographic and Health Survey data to examine the co-existence of stunting and underweight within a child, identify children that suffer from stunting only, and performed multilevel logistic regression on the determinants of child nutritional status in Malawi. The percentage of children that are stunted reduced from 54.1% to 37.2% in 2000 and from 37% to 26.8% in 2015. The double burden of child undernutrition was estimated at 14.5% in 2000 and 8.8% in 2015. Less than 1% (0.7% in 2000 and 0.4% in 2015) of children were found to be underweight and without other kinds of under-nutrition questioning the importance of using the underweight measure for assessing child under-nutrition in Malawi. The following factors were significantly associated with stunting and the double burden of child under-nutrition; child's age, child's sex, preceding birth interval, household wealth status, residence (rural/urban), mother height and mother weight. Child stunting and the double burden of child undernutrition declined between the two time-periods but remain high. Focusing on children affected by the double burden of under-nutrition measure may lead to more effective policy interventions to tackle child undernutrition in Malawi and other countries affected by the problem.

0263 S/P

USING SOCIODEMOGRAPHIC CHARACTERISTICS TO PREDICT EARLY CHILDHOOD OBESITY AMONG LOW-INCOME CHILDREN IN LOS ANGELES COUNTY: AN APPLICATION OF MACHINE LEARNING TECHNIQUES Shelley Jung* Shelley Jung, , (University of California, Los Angeles)

Monitoring regional public health statistics, such as regional disease prevalence, is costly, time-consuming, and often relies on population surveys, which have their own limitations. Given these barriers, up-to-date health statistics needed for public health programming and planning are often unavailable when they are needed. Leveraging on new machine learning techniques to build high quality predictive models, we will use sociodemographic data to infer neighborhood- and city-level prevalence of early childhood obesity among low-income children 2 to <5 years in Los Angeles County. An advantage of using sociodemographic data to predict early childhood obesity is that this data is widely available and updated in a timely manner through national censuses and community surveys. Using data for census tracts in Los Angeles County from 2002 to 2016, we constructed a machine learning model to predict the prevalence of early childhood obesity based on population sociodemographic characteristics from the American Community Survey. We found that neighborhood- and city-level prevalence estimates of early childhood obesity in Los Angeles County can be reasonably predicted. This highlights the utility of this sophisticated approach to model early childhood obesity development, as well as the vital importance of sociodemographic characteristics ubiquitously available to researchers that can serve as both indicators and determinants of early childhood obesity.

DIFFERENT SOURCES OF HEALTHY EATING NORMS AND THEIR ASSOCIATION WITH CHILDREN'S CHANGES IN HEALTHY EATING Hsin-Jen Chen* Hsin-Jen Chen, Carol Strong, Hsing-Yu Yang, (National Yang-Ming University)

This study examined whether children's dietary habit changes were associated with social norms in family and school, based on the longitudinal observation of a schoolclustered randomized trial of a healthy eating and active lifestyle intervention. The 3rd and 4th graders in 8 schools in rural Northern Taiwan were invited. Baseline took place before the intervention started, at the beginning of the fall semester of the academic year 2016. Children were followed up at the mid-term and at the end of the semester. At baseline and the 2 follow-ups, children reported their own dietary habits (using a 7-day recall food questionnaire: drinking water in school, drinking sugar-sweetened beverage [SSB], five-a-day). Children reported the dietary habits of adults at home, and their perceived teachers' and familial expectations of healthy eating. The average healthy eating score of a school was used to represent the peers' healthy eating norm. Logistic mixed-effect models estimated the association between the dietary habits and different sources of healthy eating norms, adjusted for sex, baseline age, family environment for physical activity and healthy food, and within-school within-subject correlations. At baseline, observed adults' better dietary score at home was associated with children's higher odds of notdrinking SSB (OR=1.7, 95%CI [1.1-2.6]). Baseline adults' better dietary score at home was associated with a faster improvement in children's drinking water in school (p=0.047). The 1-point increment in the average healthy eating score of peers was associated with children's future healthy eating behaviors 5-a-day (OR=5.4 [1.6-18.1]), not drinking SSB (OR=9.9 [3.7-26.8]), drinking water in school (OR=3.1 [1.2-7.9]). This study teased out the influences of different sources of social norms in schoolchildren's dietary habits improvements.

0266

A DIETARY MICRONUTRIENT STATUS SCORE PREDICTS BODY COMPOSITION IN YOUNG ADULT WOMEN Sofija Zagarins* Sofija Zagarins, Alayne Ronnenberg, Elizabeth Bertone-Johnson, (Springfield College)

While weight maintenance can be described as the balance between caloric intake and energy expenditure, there is growing recognition that achieving this balance is more complicated than previously recognized. Successful weight maintenance depends on a range of physiologic, psychologic, and environmental factors, and the role of diet itself has been shown to extend beyond caloric intake. Research on diet and body composition has focused primarily on macronutrient intake as well as specific micronutrients including calcium and vitamin D. However, nutrients work synergistically in the body, and adequate intake of a range of micronutrients may be necessary to successfully regulate body composition. To examine this idea, we developed a micronutrient status score based on whether individuals met the Recommended Dietary Allowance (RDA) or Adequate Intake (AI) for 18 vitamins and minerals, such that scores range from 0 (does not meet any RDA/AI) to 18 (meets all RDAs/AIs). We examined the association between micronutrient status score and body composition in a cross-sectional study of 288 women aged 18-30 for whom diet was assessed using a version of the Harvard food frequency questionnaire. Body mass index (BMI) was calculated from height and weight, and body fat percentage (BF%) was measured by dual-energy x-ray absorptiometry. One version of the micronutrient status score included micronutrients from foods and supplements (mean score=14.2, SD=3.5); a second version included only food sources (mean score=13.0, SD=3.9). While the food+supplement score was not associated with BF% or BMI, food-only score was inversely associated with BF% and BMI after adjustment for caloric intake, physical activity, and age at menarche $(BF\%: \beta(SE) = -0.45 (0.20), P=0.03; BMI: -0.16 (0.08), P=0.05). BF\%$ in the highest vs. lowest quartiles of food-only score were 30.9% vs. 33.1%; P=0.04. These findings suggest that further evaluations of micronutrient status and body composition are warranted.

0265 S/P

ESTIMATING DIETARY PHOSPHORUS INTAKE FROM URINARY PHOSPHORUS EXCRETION: RESULTS FROM THE DASH TRIAL Scott T McClure* Scott T McClure, Casey M Rebholz, Catherine Champagne, Katherine Phillips, Elizabeth Selvin, Lawrence J Appel, (Johns Hopkins School of Public Health)

Introduction Urinary excretion of phosphorus might be useful measure of intake. This study examines the association of dietary intake with urinary excretion of phosphorus in the Dietary Approaches to Stop Hypertension (DASH) trial. Methods DASH is a completed, feeding study of 459 pre-hypertensive and stage one hypertensive adults After a three-week run-in where participants ate a typical American (control) diet, they were randomized to one of three diets for the eightweek intervention period: control diet; diet high in fruits and vegetables (FV diet); or diet high in fruits, vegetables, and low-fat dairy (DASH diet). Investigators provided all food and adjusted the calorie intake to maintain participants' weights. The phosphorus content of 2100 kcal/day diets were 940 mg/din control, 1007 mg/din FV, and 1481 mg/din DASH. We calculated change between run-in and intervention in mean intake and urinary excretion of phosphorus, as well as the percent excreted. Results In the control diet, mean phosphorus intake did not significantly change (95%CI -0.5-23 mg/d, p = 0.21) and excretion increased by 67 mg/d (95%CI 22-112 mg/d, p = 0.005). At the end of the intervention period, percent phosphorus excretion was 65.1 % (95%CI 61.8-68.4%). In the FV diet, mean phosphorus intake increased by 74 mg/d (95%CI 59-89 mg/d, p < 0.001). Phosphorus excretion did not change (95%CI -95-3 mg/d, p = 0.09). Compared to the control diet, percent phosphorus excretion was significantly lower [60.7% (95%CI 57.4-64.0%), p = 0.001]. In the DASH diet, mean phosphorus intake increased by 611 mg/d (95%CI 591-631 mg/d, p < 0.001). Phosphorus excretion increased by 119 mg/d (95%CI 72-166 mg/d, p < 0.001). Compared to the control diet, percent phosphorus excretion was significantly lower [50.1% (95%CI 46.9-53.3%), p < 0.001]. Conclusions Urinary phosphorus excretion is influenced by both intake and other aspects of diet. Additional research is needed to identify those factors that impact excretion.

0267 S/P

APPLYING THE E-VALUE TO ASSESS THE ROBUSTNESS OF EPIDEMIOLOGIC FIELDS OF INQUIRY Adrienne Erlinger* Adrienne, Ludovic Trinquart, Sandro Galea, (Boston University School of Public Health)

The E-value is a novel measure that quantifies how much unmeasured confounding is required to explain away an observed association. We explored the use of Evalues to gauge the robustness of a specific epidemiological field of inquiry, reasoning that main findings in a field should be largely robust to unmeasured confounding. We surveyed nutritional epidemiology by systematically selecting observational studies that found significant associations between foods, beverages, or nutrients and incident health outcomes. We searched MEDLINE on October 31st, 2017 and selected the first 100 most recent eligible studies. For each study, we extracted the adjusted relative effect estimate and associated confidence interval (95% CI). For consistency, we inverted effect estimates where necessary so that relative effects were greater than 1. For each study, we calculated two E-values for both the effect estimate and for the lower limit of 95% CI. The 100 studies examined 38 different outcomes (most frequently all-cause death), and 46 foods and beverages (most frequently mat and coffee). Studies enrolled a median of 42,400 participants (25%-75% percentiles, 10,786-97,334). The median relative effect estimate was 1.33 (1.21-1.50) and the median E-value was 1.92 (1.52-2.30). The median lower limit of 95% CI was 1.08 (1.04-1.15) and, correspondingly, the median E-value was 1.32 (1.16-1.49). In recent nutritional epidemiologic studies, the central observed associations could be nullified by an unmeasured confounder associated with both the exposure and outcome by an effect size of about 2-fold each, conditional on the measured confounders. A full understanding of the implications of this for the robustness of nutritional epidemiology shall require comparison with robustness in other epidemiologic fields. This presentation shall discuss the application of the E-value and potential utility of its application to the study of epidemiologic fields of inquiry.

EVALUATING THE VALIDITY OF 24-HOUR DIETARY RECALLS FOR ASSESSING SODIUM INTAKE AMONG U.S. ADULTS—NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY 2014 Puthiery Va* Puthiery Va, Kevin W. Dodd, Lixia Zhao, Angela M. Thompson-Paul, Carla I. Mercado, Ana L. Terry, Sandra L. Jackson, Chia-Yih Wang, Catherine M. Loria, Alanna J. Moshfegh, Donna G. Rhodes, Mary E. Cogswell, (Centers for Disease Control and Prevention/National Center for Chronic Disease Prevention and Health Promotion)

Accurate assessment of sodium intake is essential for population surveillance and research evaluating the health impacts of sodium reduction. The present study aimed to evaluate the validity of sodium intake derived from 24-hour dietary recalls (24HDR), a commonly used self-report measure, compared with a reference measure derived from 24-hour urinary excretions (24HUE). We analyzed data from 779 adults aged 20-69 years who completed up to two 24HUE and 24HDR in the 2014 National Health and Nutrition Examination Survey, a nationally-representative survey of the US noninstitutionalized population. We estimated group-level reporting bias (RB%) for sodium intake assessed with 24HDR, the correlation between person-level 24HUE and 24HDR (adjusted for within-person error in both measures), and the attenuation factor (λ). The attenuation factor reflects the degree to which the true association between long-term intake (estimated by adjusting 24HUE for within-person random error) and a hypothetical health outcome would be approximated using a single 24HDR: λ values near 1 indicate close approximation, values near 0 indicate bias toward null. RB% was estimated as the mean difference between log 24HDR and 24HUE, re-expressed as relative bias by exponentiation. Correlations and attenuation factors were estimated using mixed linear models. For men, mean sodium intake measured with 24HDR was 3622mg and 24HUE was 3730 mg, with RB% of -3% (95% CI: -11%, 6%). The attenuation factor was 0.12 (0.06, 0.18), and correlation was 0.20 (0.11, 0.30). For women, mean sodium intake measured with 24HDR was 2672 mg and 24HUE was 2768 mg, with RB% of -3% (-9%, 2%). The attenuation factor was 0.13 (0.06, 0.20), and correlation was 0.27 (0.13, 0.41). Group mean 24HDR and 24HUE for sodium are similar. The low attenuation factors and correlations suggest associations of health outcomes with 24HDR sodium may be strongly biased toward the null due to systematic and random measurement error.

NUTRITION/OBESITY

0268 S/P

MATERNAL PRE-PREGNANCY WEIGHT, WEIGHT GAIN IN PREGNANCY AND THE INFANT GUT MICROBIOME Sirtaj B Singh* Sirtaj B. Singh, Noel T. Mueller, Modupe Coker, Anne G. Hoen, Juliette Madan, Margaret R. Karagas, (Johns Hopkins Bloomberg School of Public Health)

Background The intergenerational cycle of obesity, perpetuated by the continued rise of maternal obesity in the US, may be partly explained by mother-to-infant sharing of microbiota. Prospective data to test this hypothesis are sparse. Aim To prospectively analyze maternal pre-pregnancy BMI and gestational weight gain in relation to the infant gut microbiome at 6 weeks in the New Hampshire Birth Cohort. Methods We ascertained exposure data from questionnaires and medical records. We generated infant gut microbiome data from infant stool, collected at 6 weeks, using Illumina 16S rRNA gene sequencing (V4-V5 region). We used linear regression for microbial alpha-diversity models and negative-binomial regression, with log-transformed sequence variants, for microbial-abundance models. We included maternal age, education, and parity in Model 1, plus Mediterranean diet score in Model 2. Based on prior literature, we stratified analyses by delivery mode. Results Among 335 mother-infant pairs, 56% had normal pre-pregnancy BMI (referent), 27% were overweight, 14% obese, and 3% morbidly obese. Among 318 pairs with weight gain data, 10% had inadequate weight gain, 30% adequate (referent), and 60% excess. In the vaginal strata, maternal obesity was associated with higher alpha diversity (measured by number of observed species, Shannon Diversity Index, and Chaol). In the vaginal group, 16 OTUs were differentially abundant in Models 1 and 2 (FDR adjusted p-value < 0.1); there was overrepresentation of Streptococcus (genus), E.coli, B. fragilis, and V. dispar among infants born to overweight mothers, Bifidobacterium (genus) in infants born to obese mothers, and Streptococcus (genus) in infants born to mothers who gained excess gestational weight. There were no significant results among C-Section infants. Conclusion Maternal pre-pregnancy BMI and gestational weight gain may be associated with the infant gut microbiome diversity and composition at 6 weeks in vaginally delivered infants.

EFFORT-REWARD IMBALANCE IN POLICE WORK: ASSOCIATIONS WITH AN ATYPICAL CORTISOL STRESS RESPONSE John Violanti* John M. Violanti, Desta Fekedulegn, Ja K Gu, Penelope Allison, Anna Manatsakanova, Michael E. Andrew, (SUNY Buffalo)

Background: The effort-reward imbalance (ERI) model proposes that less stress at work depends on an equitable balance of demand and reward. ERI has been associated with job stress. Stress triggers cortisol secretion via the Hypothalamic-Pituitary-Adrenal (HPA) axis, and any significant deviation from a typical cortisol pattern can indicate HPA axis dysfunction. Studies of ERI in police work have demonstrated a lack of adequate reward structure. In the present study we examined association of ERI with magnitude and pattern of wakening cortisol response. Methods: The sample was 176 police officers enrolled in the Buffalo Cardio-Metabolic Occupational Police Stress (BCOPS) Study. ERI was the exposure variable. Outcome variables were saliva-based peak and mean cortisol values, total area under the curve in reference to ground (AUCG) and baseline (AUCI), and slope of linear regression line fitted to the log transformed cortisol data. Regression analyses were used to examine linear trend between ERI and the cortisol parameters. Repeated measures analysis was performed to examine whether the pattern of cortisol over time differed between low ERI (<median) and high ERI (2median). Results: Mean age was 46 years (SD=6.6). After adjustment for potential confounders, there was a significant inverse association between ERI and peak cortisol ($\beta = -0.20$, p = 0.009), average cortisol ($\beta = -0.23$, p= 0.003), and total area under the curve ($\beta = -0.21$, p = 0.009). ERI was not significantly associated with AUCI (β = -0.11, p = 0.214); slope of the regression line fitted to the cortisol profile $(\beta = -0.009, p = 0.908)$. Results from repeated measures analyses showed that the cortisol profile did not vary significantly between officers with high and low ERI (interaction p-value = 0.790). Conclusion: ERI was inversely associated with the magnitude of awakening cortisol but not with pattern over time. The results are consistent with previous research in other occupational groups.

ASSOCIATIONS OF VITAMIN D3 WITH OBJECTIVE SLEEP DURATION IN POLICE OFFICERS Anna Mnatsakanova* Anna Mnatsakanova, Luenda E. Charles, Desta Fekedulegn, Cathy Tinney-Zara, Ja K. Gu, Michael E. Andrew, John M. Violanti, (National Institute for Occupational Safety and Health)

Rationale: Individuals with deficient levels of 25-hydroxy vitamin D3 (vitamin D3) may be at increased risk of developing adverse health outcomes including cardiovascular disease (CVD) and cancer. Police officers may experience sleep deprivation due to shiftwork, long-work hours, and other occupational stressors and have a higher prevalence of CVD than the general population. We examined associations of vitamin D3 with objectively measured sleep duration among 261 police officers (71% men). Methods: Participants were from the Buffalo Cardio-Metabolic Occupational Police Stress Study. They wore a wrist actigraph for 15 consecutive 24-hour periods and sleep parameters were derived using the Action-W software. Vitamin D3 was measured by a liquid-phase radioimmunoassay technique. ANOVA/ANCOVA were used to compare mean hours of sleep across vitamin D3 categories: deficient: <12 ng/mL, inadequate (12-<20 ng/mL), and adequate/high (≥ 20 ng/mL) according to NIH guidelines Models were adjusted for age, race/ethnicity, BMI, waist circumference, depression score, C-reactive protein, and multivitamin intake. Effect modification was assessed for sex. Results: Officers (mean age=48.3years) slept on average 6.8 hours/day. Vitamin D3 levels ranged from 4.5 to 83.4 ng/mL. Among all officers, vitamin D3 was positively and significantly associated with sleep duration after adjustment for age but not after further adjustment. Sex significantly modified the association (interaction p=0.056). Among female officers, those who were deficient in vitamin D3 had significantly fewer hours of sleep (5.39±0.57 hrs) compared to those who had inadequate levels (6.74±0.33 hrs; p=0.028) and those who had adequate/high levels of vitamin D3 $(7.17\pm0.15; p=0.005)$. Conclusion: Our results show that vitamin D3 deficiency is associated with shorter sleep duration but only among female officers. Reasons for the differences by sex are not entirely known. Our results support those of previous studies.

0272 S/P

NASAL AND SINUS SYMPTOMS: CHRONIC RHINOSINUSITIS AND OTHER RISK FACTORS FOR WORK ABSENTEEISM AND

PRESENTEEISM Jordan R. Kuiper* Jordan R. Kuiper, Annemarie G. Hirsch, Karen Bandeen-Roche, Agnes S. Sundaresan, Bruce K. Tan, Robert P. Schleimer, Robert C. Kern, Walter F. Stewart, Brian S. Schwartz, (Department of Environmental Health and Engineering, Johns Hopkins University Bloomberg School of Public Health, Baltimore, MA, USA)

Chronic rhinosinusitis (CRS) affects nearly 31 million people in the United States; yet, few studies have assessed the impacts of CRS and related morbidities on work productivity. The goal of this study was to identify and estimate the effects of CRS and other risk factors on work absenteeism and presenteeism in a population-based sample. Five questionnaires were mailed to a stratified random sample of Geisinger patients over the course of 16 months and used to classify subjects into three CRS groups (current, past, and never CRS) based on reported nasal and sinus symptoms (NSS). We assessed days of work missed due to illness (absenteeism) or present while ill (presenteeism) in the prior two weeks using questions from the Work and Health Interview. Individuals who reported work impacts were asked to report the number of days affected by NSS. We used negative binomial regression to estimate associations of CRS with work productivity. Of 2,393 subjects currently working, we categorized 1029, 911, and 453 as never, past, or current CRS at the time of the questionnaire. In unadjusted analysis, we found a 1.44-fold (95% CI: 1.04, 2.00) and 2.67-fold (95% CI: 1.90, 3.75) increase in overall days of absenteeism for the past and current CRS groups (vs. never), respectively, and a 1.66-fold (95% CI: 1.12, 2.45) increase in NSS-specific absenteeism in the current CRS group. Presenteeism days were 2.03-fold (95% CI: 1.75, 2.36) and 4.60-fold (95% CI: 3.95, 5.35) greater in the past and current CRS groups (vs. never), respectively. Presenteeism days affected by NSS were 1.30-fold (95% CI: 1.12, 1.51) and 2.24-fold (95% CI: 1.93, 2.60) greater in the past and current CRS groups, respectively. These findings suggest that NSS and CRS can have significant impacts on workplace absence and decreased productivity while at work.

META-ANALYSIS COMPARING INFECTION RISK FOR FEMORAL AND NON-FEMORAL CENTRAL LINE INSERTION SITES Audrey Herring* Audrey Herring, Liana Merz, (BJC HealthCare)

Purpose: Guidelines for prevention of catheter-related infections recommend nonfemoral sites for catheter insertion among adult patients. However, studies published after these guidelines suggest the evidence may be less clear for some populations, like intensive care unit (ICU) patients. The aim of this project is to determine if the femoral site has greater infection risk compared to other non-femoral sites among adult ICU patients. Methods: A systematic search for relevant literature was conducted using electronic databases Medline (via PubMed), Cochrane Collaborative, Cumulative Index to Nursing and Allied Health Literature, EMBASE, and Google. The quality of included studies was assessed using standardized instruments. Meta-analysis was conducted using Review Manager 5.3 to assess risk of catheter-related bloodstream infection (CRBSI) between femoral, jugular or subclavian sites. Sensitivity analysis was conducted by excluding studies that did not control for baseline characteristics or other confounders. Results: Combined results of 12 studies showed insertion at the jugular site had a slight decreased risk of CRBSI compared to the femoral site (RR 0.58, 95% CI 0.36-0.94), while risk of CRBSI was significantly lower for the subclavian site compared to femoral (RR 0.44, 95% CI 0.22-0.88). However, heterogeneity among studies in both comparisons was substantial (12=54%, and 60%, respectively), with significant differences in pooled results between study designs. Moreover, results of sensitivity analysis did not show any significant differences in CRBSI risk between sites. Conclusions: Combined results of included studies indicate central line insertion at the jugular and subclavian site may provide less risk of infection compared to the femoral site for ICU patients, but with consideration of subgroup differences and sensitivity analysis, results are less clear.

0282 S/P

INCREASED RISK OF DELAYED GRAFT FUNCTION AND ACUTE REJECTION FOLLOWING HLA-INCOMPATIBLE LIVE DONATION Jennifer D. Motter* Jennifer D. Motter, Allan B. Massie, Jacqueline M. Garonzik-Wang, Babak J. Orandi, Kyle R. Jackson, Xun Luo, Abimereki D. Muzaale, Dorry L. Segev, (Johns Hopkins University)

Over 30% of kidney transplant candidates are "sensitized", meaning that they produce antibodies to foreign HLA found in donor tissue. These candidates face decreased access to compatible kidney transplantation, poorer quality of life, and high risk of mortality in absence of transplantation. Desensitization treatment followed by incompatible live donor kidney transplantation (ILDKT) has been transformative for many patients who have a willing, but incompatible live donor. However, due to circulating anti-HLA antibodies, ILDKT recipients may face increased risk of delayed graft function (DGF) and acute rejection (AR), postoperative complications that increase risk of subsequent graft loss and death. Using a novel linkage of national registry data with patient medical records in 22 US transplant centers, we studied 10259 adult live donor kidney transplantation recipients 1997-2011, of whom 1025 received ILDKT. ILDKT recipients were categorized by increasing antibody strength (positive-Luminex/negative-flow.PLNF; positive-flow/negative-cytotoxic crossmatch,PFNC; positive-cytotoxic crossmatch,PCC) measured prior to desensitization. Multivariable logistic regression was used, adjusting for donor and recipient confounders identified a priori. Among compatible, PLNF, PFNC, and PCC recipients, we observed DGF in 3.3%, 2.7%, 6.2% and 8.6%, respectively. In adjusted models, there was no evidence of increased odds of DOF in PLNF recipients (OR vs. compatible recipients=0.71(0.29-1.76),p=0.5). However, the odds of DGF were 72% higher among PFNC (OR=1.72(1.17-2.54),p<0.01) and 130% greater for PCC (OR=2.30(1.47-3.58),p<0.001). Likewise, PFNC (OR=2.9(1.3-6.7),p=0.01) and PCC (OR=16.6(7.9-34.5),p<0.001) recipients were associated with increased AR. Kidney transplant recipients who undergo ILDKT are at higher risk of DGF and AR, particularly at higher levels of antibody strength.Optimizing long-term outcomes for ILDKT recipients depends on a better understanding of DGF and AR in this vulnerable population.

0281 S/P

POSTDOCTORAL FELLOWSHIP LENGTH AND FUTURE RESEARCH PRODUCTIVITY Tiffany Holland* Tiffany Holland, Keewan Kim, Carrie Nobles, Ya-Ling Lu, Indulaxmi Seeni, Stephen Gilman, Enrique Schisterman, (NICHD, NIH)

Introduction: The length of postdoctoral fellowships, number of doctorates pursuing them, and academic job market have seen dramatic changes in recent years. However, there is limited research on attributes of fellowships most relevant to future scientific achievement. We analyzed the association of a modifiable aspect of postdoctoral training, fellowship length, with future productivity and whether this association varied by research discipline at the Division of Intramural Population Health Research (DIPHR) of the Eunice Kennedy Shriver National Institute of Child Health and Human Development. Methods: Demographics of 87 DIPHR postdocs from 2000-2015 were collected by internal documentation and coordinated web search. Productivity metrics, including total publication count, publications since end of postdoc and H-index through 2016, were collected via PubMed and Scopus. Linear regression models adjusted for fellowship start year, number of publications at entry, DIPHR branch and mentor seniority. Results were stratified by DIPHR branch: Biostatistics and Bioinformatics, Epidemiology, and Health Behavior. Results: Overall, each additional year of training was associated with an increase in H-index, though this result was attenuated after adjustment (B 0.8, 95% confidence interval [CI] -0.2, 1.9). In the Epidemiology branch, each additional year was associated with a 1.6 point increase in H-index (95% CI 0.1, 3.0) and 8.2 additional lifetime publications (95% CI 1.1, 15.4). No clear associations were found in the other DIPHR branches. Conclusion: Longer postdoctoral training had a small positive effect on future research productivity of Epidemiology postdocs. This association was less clear for other research disciplines. Additional research on the effect of a broader range of fellowship characteristics on research productivity outcomes, including differences across disciplines, could help tailor postdoctoral training programs to maximize the success of trainees.

0283

POST-TRANSPLANT GRAFT LOSS UNDER RECENT POLICY CHANGE IN KIDNEY TRANSPLANTATION IN PEDIATRIC PATIENTS Sheng Zhou* Sheng Zhou, Allan Massie, Jessica Ruck, Kyle Jackson, Dorry Segev, (Johns Hopkins University)

Deceased donor kidney transplantation (DDKT) improves survival and quality of life for children with end-stage renal disease. A recent policy change - the Kidney Allocation System (KAS) - reduced priority for pediatric candidates compared to some adult candidates and increased the time to DDKT for children. Early analyses of pediatric KT recipients have reported increased delayed graft function post-KAS, possibly suggesting post-transplant graft survival in this population. Using national registry data, we studied 906 pediatric patients (age <18y) who received kidney-only DDKT 12/4/2013-12/3/2014 ("pre-KAS", N=463) or 12/4/2014-12/3/2015 ("post-KAS", N=443). Participants were followed until graft loss or administrative censorship on May 1, 2016. We tested the association between transplant era (pre-KAS vs post-KAS) and risk of graft loss using Cox regression. Since differences in donor quality and recipient casemix may be caused by the policy change, we considered these to be mediators, rather than confounders; as such, we did not adjust for these covariates. Patient casemix post-KAS was comparable to the pre-KAS population (e.g. 39.1% female pre-KAS vs 40.1% female post-KAS, Fisher exact p=0.8; 26.4% black pre-KAS vs 22.6% black post-KAS, p=0.3; median (IQR) age 13 (7-16) pre-KAS vs 12 (7-16) post-KAS, log rank p=0.3). The cumulative incidence of graft loss at one year was 4.1% pre-KAS and 2.2% post-KAS. The post-KAS era was associated with a 42.3% decrease in hazard of graft loss; however, the change was not significant (HR=0.58, 95% CI: 0.27-1.23, p=0.2). While longer-term graft survival should be monitored as data become available, there is no current evidence that pediatric post-KT graft survival has worsened in the KAS era.

ALL-CAUSE MORTALITY, UNNATURAL DEATH AND FATAL OVERDOSE AMONG INDIVIDUALS INITIATING LONG-TERM OPIOID THERAPY. Kirsha Gordon* Kirsha Gordon, Jan Tate, Ajay Manhapra, E. Jennifer Edelman, Stephen Crystal, David Fiellin, Robert Kerns, Amy C. Justice, William Becker, (Yale School of Medicine, VACT Healthcare Sys.)

Background While the link between long-term opioid therapy (LTOT) dose and fatal overdose is well-accepted, the association with other important harms is not wellunderstood. Among recipients of LTOT, we examined the association between opioid dose and all-cause mortality, unnatural death and fatal overdose. Methods Among HIV-infected (HIV+) and matched uninfected (HIV-) patients, we defined LTOT as 90 consecutive days of opioid therapy. We converted all outpatient fills of oral and transdermal opioids into mg morphine equivalent daily dose (MEDD). Using time-updated Cox regression, we examined the association between MEDD categorized as 0-20 (reference), 21-50, 51-90, and \geq 91mg and the 3 outcomes. Models were adjusted for demographics, HIV status, hepatitis C (HCV), medical morbidities, substance use disorders, mental illness, benzodiazepine therapy (defined as lorazepam equivalent daily dose), and average monthly pain score. Results Among 21004 LTOT initiates, 4441 (21%) died from any cause, 502 (2%) unnatural, and 259 (1%) from overdose. The common medical morbidities were chronic pain (79%), smoking (61%), hypertension (46%), and diabetes (35%). In ad justed Cox models, those on ≥91mg MEDD were more likely to die (All-cause: hazard ratio [HR] 1.37, 95% CI 1.30-1.54, unnatural: HR 1.26, 95% CI 0.97-1.62, overdose: HR 1.58, 95% CI 1.13-2.22). This remained true when overdose was excluded form all-cause and unnatural death. The other MEDD groups were not significant, except for 51-90mg MEDD (HR 1.67, 95% CI 1.15, 2.43) with overdose. The factors most strongly associated with all-cause mortality were HCV, smoking, age, benzodiazepine use, and substance use disorder. An interaction term between opioid and benzodiazepine use was not significant. Conclusions Among individuals with LTOT, higher daily dose of LTOT was associated not only with fatal overdose but also with all-cause mortality and unnatural death. Benzodiazepine use impact among LTOT warrants careful attention.

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(Johns Hopkins University)

TRENDS IN USE OF GABAPENTIN IN CKD AND ASSOCIATED ADVERSE OUTCOMES Aditya Surapaneni* Aditya Surapaneni, Alex R. Chang, Shoshana H. Ballew, Tessa Novick, Yingying Sang, Joe Coresh, Morgan Grams,

Background: Gabapentin is eliminated by the kidneys and often used in patients with chronic kidney disease (CKD), but it is unknown whether this use is associated with adverse clinical outcomes. Methods: We examined trends in use of gabapentin among adult patients without a history of malignancy from Geisinger, an integrated health system in rural Pennsylvania. To compare patients using gabapentin to nonusers who were otherwise similar, we developed propensity scores using logistic regression on demographic and clinical variables and matched users of gabapentin 1:1 to non-users, evaluating risk of altered mental status, hospitalization, and death. We modeled eGFR continuously using linear splines with knots at 45, 60, and 90 mL/min/1.73 m2 and an interaction term between gabapentin use and eGFR. We used Cox proportional hazard models to evaluate the risk of altered mental status, first hospitalization, and death. Results: Use of gabapentin increased from 2013 to 2016 (p for trend <0.001), particularly among patients with CKD, with nearly 14.2% of patients in eGFR < 30 mL/min/1.73 m2 using gabapentin in 2016. In the propensity matched cohort of 14,768 patients, users of gabapentin had a significantly higher risk of altered mental status (HR 1.61, 95% CI: 1.31 -1.97) and hospitalizations (HR 1.21, 95% CI: 1.13 -1.30) compared to non-users, but there were no significant differences in risk of death (HR 1.16, 95% CI: 0.98 -1.36). Risks were consistent across levels of eGFR. Conclusion: Gabapentin use was common, particularly in CKD, and associated with higher risk for different adverse clinical outcomes.

0322

TREND-IN-TREND METHOD TO ANALYZE ABUSE OF INFREQUENTLY PRESCRIBED DRUGS IN THE COMMUNITY SETTING Nabarun Dasgupta* Nabarun Dasgupta, John Schwarz, Richard C. Dart, (Univ. of North Carolina & RADARS System)

Public health officials are interested in assessing whether new opioid analgesics with abuse deterrent properties have lower abuse in the community setting. However, the years immediately after launch are characterized by idiosyncratic geographic uptake of expensive medicines, with low market sales and population penetration. National prescribing-ad justed estimates from Poisson regression are unduly influenced by the few locations where a new product is popular; concurrent interventions obscure interrupted time series findings. Developed for individual-level pharmacoepidemiology, trend-in-trend analysis simultaneously accommodates variations in prescribing level as well as calendar time effects. We extended it to aggregate data to account for community-level prescribing variation. Individually, 10 low volume opioid analgesics were analyzed by US 3-digit ZIP code and calendar quarter (2009q3-2016q4) (N=25,401), within a logistic framework. Exposure: outpatient units dispensed with exposure status determined using threshold regression. Outcome: Any product-specific intentional abuse or misuse case from 50 US poison centers or past-month endorsement by enrollees from 433 drug treatment centers, covering 551 3DZs total. Results: An exemplary drug had 429 abuse cases, crude OR: 2.43 (95% CI: 2.00, 2.97), Mantel-Haenszel OR across quartiles of dispensed units: 196 (1.60, 2.40), calendar time instrumental variable: 2.32 (2.11, 2.56), trend-in-trend: 2.03 (1.66, 2.49). During the study period, manufacturing disruptions and other forces altered dispensing volume among drugs; blinded results will be presented for the other drugs, with varying uptake patterns. Modifications to the R package will be described, including initial parameter estimates to avoid local maxima, algorithm selection and convergence, and bootstrapped confidence intervals. Sensitivity analyses will be presented. Conclusion: T-in-T analysis holds promise for analyzing new low volume drugs, but needs further characterization.

0324 S/P

ANTIPSYCHOTIC INITIATION AMONG A COHORT OF YOUTH IN FOSTER CARE PRESCRIBED ANTIDEPRESSANTS O'Mareen Spence* O'Mareen Spence, Laura Bozzi, Susan dosReis, (University of Maryland Baltimore, School of Pharmacy)

Background: Lack of efficacy of antidepressants may contribute to the observed increased antipsychotic prevalence in youth. However, few studies have examined antipsychotic initiation among youth prescribed antidepressants. This study examines the prevalence and correlates of antipsychotic initiation among youth in foster care who newly initiated an antidepressant. Methods: Using linked child welfare and administrative claims data, we identified youth in foster care in one US State who were ≤21 years-old and initiated an antidepressant anytime from 2010-2015. We excluded youth with antidepressant or antipsychotic use during the one-year period before the index antidepressant prescription. Youth were followed for 6 months to identify antidepressant regimen changes and antipsychotic initiation. Multivariable logistic regression models assessed associations between baseline covariates (i.e. demographic characteristics, other psychotropic use, psychiatric diagnoses, and mental health services) and the odds of a regimen change and antipsychotic initiation. Results: The 657 youth initiating an antidepressant were on average age 16 (SD=4), female (393; 60%), and black (492; 75%). 267 (41%) youth had an antidepressant regimen change during follow-up, of which 92 (34%) was an antipsychotic initiation. An antidepressant regimen change was less likely in older youth (OR=0.93; 95% CI=0.89-0.98), and more likely in youth receiving psychotropic polypharmacy at initiation (OR=1.65; 95% CI=1.10-2.45) or youth with prior psychotropic use (OR=4.91; 95% CI=3.32-7.26). Among youth with a regimen change, the odds of antipsychotic initiation was higher in youth with a prior hospitalization (OR=3.04; 95% CI=1.35-6.82) and psychotropic polypharmacy (OR=1.89; 95% CI=1.04-3.39). Conclusion: Overall, 15% of new antidepressant users initiated an antipsychotic within 6 months. Future research is needed to determine whether antipsychotic initiation is due to treatment resistant depression.

REPRODUCTIVE HISTORY, 170HP USE, AND TIME TO SPONTANEOUS RECURRENT PRETERM BIRTH Valery A Danilack* Valery A Danilack, Desmond M Sutton, Mara J Bensson, Linda A Nelson, Erika F Werner, (Brown University, Women & Infants Hospital)

To determine the influence of maternal history and 17-alpha-hydroxyprogesterone (170HP) on time to spontaneous recurrent preterm delivery, we conducted a retrospective chart abstraction study of pregnant women who received at least one dose of 17OHP for the prevention of recurrent preterm birth through our hospital's pharmacy. We included women who delivered between January 1, 2006 and December 31, 2016 at ≥ 20 completed weeks gestation and excluded multifetal gestations and severe fetal anomalies. Information collected from pharmacy and medical records included gestational age at delivery of current pregnancy, dates of 17OHP doses received, maternal demographics, parity, maternal medical conditions, pregnancy conditions in prior pregnancies, and cause of prior preterm deliveries. We used time to event analyses to study our main outcome of interest, spontaneous preterm delivery (<37 weeks gestation). Observations were censored at the time of delivery for iatrogenic preterm deliveries, or at 37 completed weeks gestation for all term deliveries. Out of 286 women, 53 (19%) had a recurrent spontaneous preterm delivery. Time to spontaneous preterm delivery was significantly related to gestational age at earliest prior preterm delivery (hazard ratio (HR)=0.94, p=0.003), number of prior preterm births (HR=1.87, p=0.001), number of prior term births (HR=0.54, p=0.002), history of previable rupture of membranes (HR=2.42, p=0.030), and undetermined reason for a prior preterm birth (HR=2.32, p=0.013). Time to spontaneous preterm delivery was not related to maternal age, race, or weight; history of chronic infectious disease; gestational diabetes, fetal growth restriction, placental abruption, chorioamnionitis, or intrauterine fetal demise in a prior pregnancy; or the amount of 17OHP received in this pregnancy. Reproductive history is an important determinant of risk of recurrent spontaneous preterm delivery and can assist clinicians in estimating recurrent preterm birth risk.

0291 S/P

SOCIODEMOGRAPHIC PREDICTORS OF EARLY POSTNATAL GROWTH Ann Von Holle* Ann Von Holle, Kari E. North, Sheila Gahagan, Estela Blanco, Anne Justice, Misa Graff, Betsy Lozoff, Raquel Burrows, Annie Green Howard, Saroja Voruganti, (University of North Carolina, Chapel Hill)

Background: Infant growth varies across socioeconomic factors including maternal education and income, serving as an indicator of environmental influence in early life with long term health consequences. Previous research has identified sociodemographic gradients in growth with a focus on the first year and beyond, but estimates are sparse for growth before 6 months. Methods: Participants (n=1,412) were from a randomized iron deficiency anemia prevention trial in healthy infants from low- to middle-income neighborhoods in Santiago, Chile (1991-1996). Anthropometric measures included monthly weight (kg), length (cm) and weight-forlength (WFL) values from 0to 5 months. For each measure, we estimated 3 individual-level growth parameters (size, timing and velocity) as outcomes from SuperImposition by Translation and Rotation (SITAR) models. Subsequently, we used lasso regression with post-selection inference methods to estimate the linear association between each of the growth parameter outcomes and covariates including gestational age, maternal age, education, and socioeconomic position (SEP). We used a false discovery rate=0.05 to correct for multiple comparisons. Results: Lower SEP was associated with higher length velocity growth parameters for both males (0.21, 95% CI=0.14,0.37), females (0.17, 95% CI=0.05,0.31), and the pooled sample (0.22, 95% C1=0.13, 0.31) -- outcome units are percent increase in velocity above the average growth curve. Lower SEP was also associated with slower growth timing for females (0.25, 95% CI=0.05,0.42) -- outcome units are shifts in days from the average growth curve. Conclusion: Previous research on growth in older infants and children shows positive associations between income and/or maternal education with length velocity. We found evidence supporting an opposite direction of association at an earlier age, which may inform age-specific prevention efforts aimed at infant growth.

0292

PRENATAL LEVELS OF POLYUNSATURATED FATTY ACIDS IN ASSOCIATION WITH AUTISM SPECTRUM DISORDER Kristen Lyall* Kristen Lyall, Gayle Windham, Nathaniel Snyder, Jamine Carver, Craig Newschaffer, (Drexel University)

Polyunsaturated fatty acids (PUFAs) are critical to fetal neurodevelopment, but limited information exists regarding their potential role in autism spectrum disorder (ASD). To address this question, we analyzed data from 481 cases of ASD (identified from the California Department of Developmental Services, (DDS)), and 476 frequency matched general population controls (randomly selected within strata of matching factors (sex, month, and year of birth) from 2011-2012 California birth certificate files after excluding DDS clients). Levels of specific PUFAs were measured from archived prenatal serum samples using liquid chromatography/high resolution mass spectrometry (LC-MS/HRMS). Logistic regression was used to examine the association between PUFAs (as classes and individual fatty acids) and ASD. Mean levels of PUFAs did not significantly differ between cases and controls. In adjusted analyses, non-significant reductions in odds of ASD for those in the highest 5th percentile of total PUFAs and total n6 were suggested (adjusted ORs and 95% CI 0.74 (0.39,1.42) and 0.81 (0.43, 1.53) respectively), relative to those with mid-distribution levels. Increased odds of ASD were observed for individuals in the lowest 5th percentile of linoleic acid levels (OR=1.57, 95% CI 0.90-2.76) and the highest 5th percentile of total n3 levels (OR=1.70, 95% CI 0.97, 2.98). Stronger associations were suggested in analyses of ASD with comorbid intellectual disability, though confidence intervals were wide in this smaller subgroup (n=64; ad justed OR for the lowest 5th percentile of linoleic acid =2.72, 95% CI 1.07, 6.95). Secondary analyses investigating potential non-linear relationships using cubic splines, and using PUFAs measured in neonatal bloodspots will also be presented. Further analyses of prenatal PUFAS and ASD, particularly considering comorbid intellectual disability, may be warranted given the potential magnitude of the effect of altered levels of these fats.

0293 S/P

INFLUENCE OF MATERNAL AND OFFSPRING GENETIC SUSCEPTIBILITY TO OBESITY ON BIRTHWEIGHT IN AFRICAN ANCESTRY POPULATIONS: INTRA-UTERINE VS SHARED GENETIC INFLUENCE? Deepika Shrestha* Deepika Shrestha, Mohammad Rahman, Tsegaselassie Workalemahu, Chunming Zhu, Fasil Tekola-Ayele, (Epidemiology Branch, Division of Intramural Population Health Research, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health)

Genetic susceptibility to adulthood obesity can influence birthweight through mechanisms involving the fetus (through shared genetic effect) and/or the mother (by modulating the intra-uterine environment). We investigated the effects of fetus and maternal genetic risk of obesity on birthweight and evaluated whether these genetic influences modify the well-known association between maternal prepregnancy BMI (ppBMI) and birthweight. Genotypic and phenotypic data of 950 mother-baby pairs of African ancestry were obtained from the Hyperglycemia Adverse Pregnancy Outcome study (dbGAP study accession phs000096.v4.pl). A genetic risk score for obesity was generated for mothers (mGRS) and babies (bGRS) as the weighted sum of 97 BMI-increasing alleles. The median GRS was used to categorize samples as having high-low genetic risk for obesity. Linear regression analysis was performed to calculate the association adjusting for birth weight covariates and proportion of African ancestry. A one allele increase in bGRS was significantly associated with a 13.0 glower birthweight [95% C1=-24.7, -1.4]. High bGRS was significantly associated with 70.9 glower birthweight (95% C1=-130.5, -15.2) compared to low bGRS. However, mGRS was associated with a modestly higher birthweight but did not reach statistical significance. The significant birthweight-increasing effect of maternal ppBMI (β=6.5,95% CI=1.2,11.9) was modified by mGRS (P for interaction =0.03); ppBMI had a stronger and significant association with birthweight among low mGRS pregnancies (B=8.7,95% CI =1.1,16.2) but not among high mGRS pregnancies (β=4.5,95% C1=-2.9,12.0). Fetal genetic risk to obesity in later life had strong birthweight-lowering effect as opposed to the weak birthweight-increasing effect of maternal genetic risk to obesity. Findings suggest that obesity genetic risk loci are important components of the life course associations between birthweight and obesity in later life.

NEONATAL VS. FETAL GROWTH STANDARDS TO IDENTIFY SMALL FOR GESTATIONAL AGE INFANTS AT RISK OF ADVERSE

OUTCOMES Nansi Boghossian* Nansi Boghossian, Marco Geraci, Erika Edwards, Jeffrey Horbar, (University of South Carolina)

It is unclear whether small for gestational age (SGA) defined by a neonatal or by a fetal growth standard is a better predictor of adverse newborn outcomes. We aimed to evaluate and compare the predictive power of SGA for adverse neonatal outcomes using three fetal growth charts [National Institute of Child Health and Human Development (NICHD), World Health Organization (WHO), Intergrowth-21st)] and one neonatal sex-specific birth weight standard. SGA was defined as <10th centile of birth weight for gestational age. Outcomes included mortality, necrotizing enterocolitis (NEC), severe intraventricular hemorrhage (sIVH), severe retinopathy of prematurity (sROP), and chronic lung disease (CLD). Inborn singleton infants from 2006-2014 with gestational age between 22 and 29 weeks and enrolled at one of the 852 U.S. centers participating in Vermont Oxford Network were studied. Receiver operating characteristic (ROC) curve analysis was used to compare the four methods of calculating birth weight centiles in relation to the outcomes. The percentage of SGA newborns ranged between 25.9% and 29.7% when using the fetal growth charts. In contrast, the percentage was 10% when using the neonatal charts The areas under the ROC curves (AUCs) for different outcomes were similar across charts: mortality (0.82), NEC (0.64), sIVH (0.75), sROP (0.84), and CLD (0.77). After adjusting for maternal race/ethnicity, antenatal corticosteroids, postnatal life support, and newborn sex, the AUCs increased but did

corticosteroids, postnatal life support, and newborn sex, the AUCs increased but did so similarly regardless of the chart used to classify SGA newborns. In conclusion, the predictive power of SGA for adverse outcomes is comparable across neonatal and fetal growth charts

INFANT VACCINATION EDUCATION PREFERENCES AMONG LOW-INCOME PREGNANT WOMEN Erika Fuchs* Erika Fuchs, Jacqueline Hirth, Fangjian Guo, Veronica Brown, Leslie Cofie, Abbey Berenson, (University of Texas Medical Branch)

Background: Women who receive prenatal vaccinations are more likely to have children who are up to date on childhood vaccinations. Prenatal appointments may be an opportunity for targeted interventions. The aim of this study was to examine the infant vaccination education preferences of pregnant women by prenatal vaccination status. Methods: An in-person health and behavior questionnaire, available in English or Spanish, was conducted from June 14-July 21, 2017, in reproductive health clinics serving low income women in southeast Texas. Eligible participants (N = 335) were pregnant women \leq 50 years old attending a participating clinic. Participants were asked about prenatal vaccination behaviors and preferences about infant vaccination education. Differences between participants who did and did not receive prenatal tetanus, diphtheria, and acellular pertussis (Tdap) vaccination were examined using chi-squared tests in Stata SE Version 14.2 with α=0.05. Results: The mean age was 26.4 years (range: 14-44 years). The majority of participants were Hispanic (78.2%), born outside of the United States (58.7%), and married or living with a partner (66.0%). One quarter (24.0%) of participants had less than a high school education. Half (52.2%) of participants reported having received the Tdap vaccine during their current pregnancy. The majority (90.2%) of participants were willing to discuss infant vaccination prenatally, close to half (48.9%) considered pregnancy the best time to get information about infant vaccination, and many (40.6%) were open to receiving infant vaccination information from nurses who give prenatal vaccinations. There were no significant differences by prenatal Tdap vaccination status on any infant vaccination education preferences. Conclusion: These data indicate that prenatal programs that aim to improve infant vaccination would be well accepted among low-income women.

0296

ASSOCIATION OF SOCIAL SUPPORT AND ANTEPARTUM DEPRESSION AMONG PREGNANT WOMEN Lauren E. Friedman* Lauren E. Friedman, Bizu Gelaye, Sixto Sanchez, Michelle A. Williams, (Harvard T.H.

E Friedman, Bizu Gelaye, Sixto Sanchez, Michelle A. Williams, (Harvard T.H. Chan School of Public Health)

Background: The absence of social support has been associated with health outcomes including poor mental health, increased chronic disease burden, and increased mortality. However, few investigators have evaluated the association between social support and antepartum depression. Objective: To examine the extent to which early pregnancy social support and sources of social support are associated with antepartum depression among women in Peru. Methods: A total of 2,062 pregnant women participated in structured interviews. Social support during early pregnancy was measured using the Social Support Questionnaire Short Form (SSQ-6). We evaluated the number of individuals that participants could turn to in different situations (Social Support Number Score; SSQN) and participants' satisfaction with social support they received (Social Support Satisfaction Score; SSQS). Consistent with previous studies, median SSQN and SSQS scores were used to characterize participants according to high and low levels of social support. SSQN scores were also evaluated for family and non-family support sources. Antepartum depression was assessed using the Patient Health Questionnaire-9 (PHQ-9). Multivariable logistic regression procedures were used to estimate adjusted ORs and 95% CIs. Results: Approximately 25% of women had antepartum depression. Among those with antepartum depression, 65.5% reported low SSQN, while 65.7% reported low SSQS. Women with low non-family SSQN were more likely to have depression; the association was not significant among women with low family SSQN. Women with high SSQN were 22% less likely to have antepartum depression (AOR: 0.78; 95%CI: 0.63-0.97). Similarly, pregnant women with high SSQS score were 45% less likely to have antepartum depression (AOR: 0.55; 95%CI: 0.45-0.68). Conclusion: Social support during early pregnancy is associated with a reduced risk of antepartum depression. Increased social support may improve maternal mental health during pregnancy.

0297

THE EFFECTS OF MODERATE TO VIGOROUS INTENSITY SPORTS AND EXERCISE ACTIVITY DURING PREGNANCY ON INFANT SIZE AT BIRTH Samantha Ehrlich* Samantha Ehrlich, Romain Neugebauer, Monique M Hedderson, Assiamira Ferrara, (University of Tennessee Knoxville)

Studies of the association of physical activity during pregnancy with infant size at birth have yielded inconsistent results. This study estimated the causal effects of moderate to vigorous intensity sports and exercise activity during pregnancy on delivering large and small for gestational age infants (LGA and SGA, respectively). Data come from PETALS, a diverse pregnancy cohort (n= 1,691) of women delivering at Kaiser Permanente Northern California (KPNC) from February 2014 to October 2016. Participants completed a study survey at 12.7 weeks gestation (SD 2.3) which included a pregnancy physical activity questionnaire; active pregnancy was defined by the upper quartile for moderate to vigorous intensity sports and exercise activity. Infant data were obtained from the electronic health records, and LGA and SGA designations (>90th and <10th percentiles, respectively) based on KPNC's race-ethnicity and gestational age-specific birthweight distributions. The causal risk differences for LGA and SGA if all pregnancies had been active versus non-active were estimated by Inverse Probability Weighting using linear marginal structural models for a single time-point intervention. Propensity scores were estimated by logistic regression using pre-exposure covariates only (e.g., prepregnancy BMI, diet, education). The causal risk difference for all women having had active pregnancies versus non-active pregnancies was -0.032 (95% CI -0.058, -0.0062; P= .01) for LGA and 0.036 (95% CI -0.0023, 0.075; P= .07) for SGA. These results suggest that, at the population level, active pregnancy for all would modestly shift the distribution of infant size to the left and that the clinical impact would be negligible. As such, this study provides additional assurance to providers and women of the safety of moderate to vigorous intensity sports and exercise during pregnancy.

PRECONCEPTION BLOOD PRESSURE LEVELS AND VASCULAR-RELATED PREGNANCY COMPLICATIONS Carrie Nobles* Carrie Nobles, Pauline Mendola, Sunni Mumford, Robert Silver, Keewan Kim, Matthew Connell, Lindsey Sjaarda, Neil Perkins, Enrique Schisterman, (Eunice Kennedy Shriver National Institute of Child Health and Human Development)

Introduction: Although vascular-related pregnancy complications are associated with long-term maternal cardiovascular risk, whether subclinical risk factors prior to pregnancy are important predictors of these complications is not well studied. We investigated preconception blood pressure and blood pressure trajectories in relation to preeclampsia, gestational age (GA) at birth and birthweight in the EAGeR trial which randomized women to low dose aspirin prior to pregnancy. Methods: Of 1228 women enrolled, analyses included 595 with a live birth >23 weeks' gestation. Mean arterial pressure (MAP) was derived from systolic and diastolic blood pressure measured preconception at enrollment and at regular prenatal care visits. Pregnancy outcomes were abstracted from medical records and modeled with robust Poisson or linear regression. Blood pressure trajectories from preconception through pregnancy were identified with finite mixture models. Models were weighted for probability of live birth and adjusted for treatment arm, age, body mass index, race/ethnicity, marital status, smoking and parity. Results: Sixty-one (10.3%) participants had preeclampsia, mean GA at delivery was 38.8 (standard deviation [SD] 1.6) weeks and mean birthweight 3336 (SD 500) grams. Preconception MAP was associated with a 75% greater risk of preeclampsia (95% confidence interval [CI] 1.33, 2.17), 1.3 day shorter gestation (95% CI -2.3, -0.1) and 50.0 gram lower birthweight (95% CI -100.0, 0.1) for each 10mmHg. Consistently high versus consistently moderate MAP from preconception through 20 weeks' gestation was associated with 2.9 times the risk of preeclampsia (95% CI 1.63, 5.17), a 3.8 day shorter gestation (95% CI -6.5, -1.0) and a 119.3 gram lower birthweight (95% CI -237.9, -0.7). Conclusion: Subclinical preconception blood pressure is associated with vascular-related pregnancy complications, and warrants further investigation as a potential intervention point to improve pregnancy outcomes.

0300

EFFECT OF MATERNAL SMOKING DURING PREGNANCY ON TRAJECTORIES OF MATERNAL GESTATIONAL BLOOD PRESSURE Kohta Suzuki* Kohta Suzuki, Rei Tsukahara, Zentaro Yamagata, (Aichi Medical University School of Medicine)

Although it was suggested that maternal smoking during pregnancy might be a preventive factor of pregnancy induced hypertension in the US, this association is still controversial in Japan. In every prenatal check-up, maternal blood pressure is measured to detect pregnancy induced hypertension in Japan Therefore, this study aimed to describe trajectories of maternal blood pressure during pregnancy by maternal smoking status using multilevel analysis. We obtained 10525 prenatal check-up data including systolic blood pressure (SBP) and diastolic blood pressure (DBP)from 1021 women from three hospitals in Yamanashi prefecture. Of these, 494 (48.4%) were primipara. Mean maternal age at delivery was 31.1 years. SBP and DBP from the first prenatal check-up were used as primary outcomes. Mean change of SBP and DBP during pregnancy was 3.8 mmHg and 3.5 mmHg, respectively. Multilevel analysis (random intercepts and slopes model) was conducted to determine the estimates of slopes of outcomes in each gestational period by maternal smoking status during pregnancy. In addition, same analyses were conducted grouped by maternal pregestational weight status (underweight, normal weight and overweight). Among all pregnant women, there was no significant effect of maternal smoking during pregnancy on SBP and DBP. Moreover, no significant effects of interaction on SBP and DBP were seen between gestational duration and maternal smoking during pregnancy. However, there was weak evidence that maternal smoking during pregnancy was likely to increase SBP during pregnancy in the model among overweight women (p=0.08) although there was no significant effect of maternal smoking during pregnancy on trajectories of SBP and DBP in other models. In conclusion, although there was a limitation of small sample size in these analyses, there was no significant effect of maternal smoking during pregnancy on decreasing gestational blood pressure and there might be racial difference of this association.

0299 S/P

AN APPLICATION OF STATISTICAL METHODS TO EVALUATE THE RELATIONSHIP BETWEEN GESTATIONAL WEIGHT GAIN AND PRETERM BIRTH Lucia C. Petito* Lucia C. Petito, Stephanie Leonard, Kari Johansson, Nicholas Jewell, Olof Stephansson, Barbara Abrams, (Harvard T.H. Chan School of Public Health)

Studying the link between gestational weight gain (GWG) and preterm birth is difficult due to their inherent dependence. Serial GWG measurements provide ideal data, but are rarely available in population health datasets. To address this challenge, Hutcheon et al. (2013) developed GWG-for-gestational age z-scores, a new way of incorporating pregnancy weight data as an exposure in regression models to model preterm birth that would reduce bias induced by not properly accounting for gestational age. However, Mitchell et al. (2016) challenged this approach, claiming that repeated measures of weight gain through pregnancy should be the gold standard for predicting gestational outcomes. They proposed using a proportional hazards (Cox) model with GWG as a time-varying covariate to assess the relationship between GWG and overall gestational duration. Here, we apply both methods to electronic medical record data that contain serial weight measurements from 59,595 pregnant women in Sweden. We test for differences in the association between GWG and preterm birth by prepregnancy BMI, and for non-linear associations. We further use a linear random-effects model with restricted cubic splines to identify whether the pattern of weight gain in pregnancy between women who gave birth preterm versus at term meaningfully differs at any point before 37 weeks.

0301

VALIDATION OF SPONTANEOUS ABORTION FOLLOWING INADVERTENT QUADRIVALENT HUMAN PAPILLOMA VIRUS VACCINATION DURING PREGNANCY IN THE VACCINE SAFETY DATALINK Gabriela Vazquez Benitez* Gabriela Vazquez Benitez, Elyse O. Kharbanda, Heather S. Lipkind, Sangini Sheth, Jingyi Zhu, Allison Naleway, Nicola P Klein, Rulin C Hechter, Matthew F. Daley, James G Donahue, Michael L Jackson, Sophia R Newcomer, James D. Nordin, (HealthPartners Institute)

The Vaccine Safety Datalink maintains a pregnancy episode table to evaluate the safety of maternal vaccination. It uses a pregnancy episode algorithm (PEA) to retrospectively identify pregnancies from electronic health and birth data. Spontaneous abortions (SABs) are identified through diagnosis and procedure codes and assigned a default gestational age (GA) of 10 weeks. Since outcome misclassification could cause bias, our objective was to validate SAB, fetal demise dating and GA within a cohort study of inadvertent human papillomavirus vaccine (4vHPV) administration during pregnancy. The cohort was comprised of women 12-27 years potentially exposed to 4vHPV during three exposure windows, distal (16-22 weeks prior to last menstrual period (LMP)), peri-pregnancy (the 42 days prior to LMP) and during pregnancy (up to 19 completed weeks gestation). Seven sites conducted structured chart reviews for SAB, identified exclusions, and initial LMP dating. Case adjudication was performed by two obstetricians for eligible pregnancies. Adjudicators recorded the range of fetal demise dates and GA at which fetal demise could have occurred. From a cohort of 3,695 pregnancies, 843 (23%) potential SABs were identified. 308 (37%) of SABs were adjudicated. In total, 66% of episodes were confirmed as a SAB occurring at ≥6 weeks gestation, 7% did not have records to confirm the pregnancy outcome, and 21% had other etiologies such as ectopic or molar pregnancy, pregnancy loss before 6 weeks, or other study exclusions; 29% were not exposed to 4vHPV based on LMP dating; mean GA in weeks was 9 (standard deviation (SD) 3). Among those adjudicated, mean recorded range of GA was 2.6 (SD 2.2) weeks. Fetal death dating departed from PEA-SAB dating by an average of 0.7 (SD 1.1) weeks, with a mean recorded range of 1.3 (SD 2.1) weeks. In order to study vaccine SAB associations, chart abstraction and ad judication are needed to refine estimates.

25-HYDROXYVITAMIN D (250HD) AND FIRST TRIMESTER CROWN-RUMP LENGTH (CRL) IN A PROSPECTIVE COHORT STUDY Anne Marie Jukic* Anne Marie Z. Jukic, Allen J. Wilcox, Patrick T. Bradshaw, D. Robert McConnaughey, Donna D. Baird, Clarice R. Weinberg, Anne Z. Steiner, (Yale School of Public Health)

Lower vitamin D levels have been associated with reduced birth weight, but it is not known how early in pregnancy vitamin D might affect fetal growth. We used data from a prospective time to pregnancy study, Time to Conceive, to examine the association between 25OHD and crown-rump length (CRL) at 7-9 weeks gestation. Participants enrolled early in their pregnancy attempt and CRL was measured with vaginal ultrasound. 25OHD was measured in baseline blood spots and early pregnancy serum using liquid chromatography-tandem mass-spectrometry. Ovulation was identified with ovulation predictor kits, cervical mucus monitoring or basal body temperature. Gestational age was based on ovulation. To account for missing data on gestational age (due to missing ovulation days), we modeled the joint distribution of CRL and gestational age in a Fully Bayesian framework, with a log-normal model for CRL, and a Weibull model for gestational age (conditional on covariates). Baseline 250HD was measured in 294 pregnancies and early pregnancy 25OHD was measured in 142 pregnancies. The two measures were highly correlated (r=0.8) with moderate agreement (weighted kappa=0.6 (0.5, 0.7)). Baseline continuous 25OHD was not associated with CRL, for a 10 ng/ml increase the estimated percent change in CRL was 1% (95% Credible interval (CrI): -6, 4%). However, pregnancies with a 25OHD of 40ng/ml, percent change (CrI): -9% (-26, 4%)). Early pregnancy continuous 25OHD was not associated with CRL, for a IOng/ml increase the estimated percent change was 3% (CrI: -10, 19%). However, compared with a 25OHD of at least 30ng/ml, an early pregnancy 25OHD of <20ng/ml was associated with a 5% (CrI:-7%, 35%) shorter CRL. Neither baseline nor early pregnancy 25OHD were strongly associated with first trimester CRL. Low baseline 25OHD (<30ng/ml) and low early pregnancy 25OHD (<20ng/ml) were associated with small decrements in first-trimester CRL.

0304 S/P

POOR BIRTH OUTCOMES AMONG ABORIGINAL WESTERN AUSTRALIANS AND SMOKING, ALCOHOL AND DRUG MISUSE, AND ASSAULT Alison Gibberd* Alison Gibberd, Judy Simpson, Jocelyn Jones, Robyn Williams, Fiona Stanley, Sandra Eades, (The University of Sydney)

The average birthweight of Aboriginal infants in Western Australia (WA) is 200g less than non-Aboriginal infants and they are 2-3 times more likely to be preterm, stillborn, or die neonatally. They are also much more likely to be exposed in utero to maternal smoking, alcohol misuse, drug misuse, and assault against their mother, due to factors such as intergenerational trauma, poverty, and marginalisation. Given the high prevalence of these risks, we aimed to estimate the proportion of small for gestational age (SGA) births, preterm births, and perinatal deaths of Western Australian Aboriginal infants that were attributable to these risk factors from 1998-2010. We used linked birth, hospital, mental health, and death records of all Aboriginal singletons and their parents. Using logistic regression with a generalized estimating equation approach to account for clustering by mother, associations between birth outcomes and the four risk factors of interest were estimated after adjusting for maternal age, height and health. Using coefficients from these models, we estimated adjusted population attributable fractions (PAFs). Of 28,119 births, 16% of infants were SGA, 13% were preterm and 2% died perinatally. 51% of infants were exposed to maternal smoking, alcohol misuse, drug misuse, and/or assault, and 37% [95% CI: 35%, 40%] of SGA births, 16% [95% CI: 14%, 19%] of preterm births and 20% [95% CI: 12%, 28%] of perinatal deaths were attributable to these factors, predominantly smoking. The PAFs for alcohol misuse (for example, for SGA, 3% [95% CI: 2%, 3%]) are likely to be underestimates as it is difficult to identify alcohol misuse using administrative data. While smoking rates have dropped considerably, reduction measures have been less successful among Aboriginal women than non-Aboriginal women. Significant improvements in perinatal health are possible with identification and support of effective risk reduction approaches for Aboriginal women, as well as their communities and families

RISK OF PRETERM BIRTH AMONG WOMEN LIVING IN DEPRIVED NEIGHBOURHOODS DIFFERS BY WOMEN'S DEPRESSION AND ANXIETY STATUS Kamala Adhikari Dahal* Kamala Adhikari Dahal, Scott Patten, Tyler Williamson, Alka Patel, Shahirose Premji, Suzanne Tough, Nicole Letourneau, Gerald Giesbrecht, Amy Metcalfe, (University of Calgary)

Objective This study examined whether anxiety, depression, or comorbid anxiety and depression during pregnancy modifies the relationship between neighborhood SES and PTB. Methods Individual-level data from two prospective cohort studies in Alberta Canada (All Our Families and Alberta Pregnancy Outcome and Nutrition (n=5,538)) were linked to neighborhood SES data measured by the Pampalon deprivation index. Depression was defined as an Edinburgh Postnatal Depression Scale (EPDS) score of ≥10, anxiety was defined as an EPDS anxiety-subscale score of ≥ 6 , and comorbid anxiety and depression was defined as meeting both anxiety and depression definitions. Multilevel logistic regression models were developed including confounding variables (parity and ethnicity) and the interaction-term of neighborhood-deprivation with anxiety and/or depression. Results The rates of PTB in the least and most deprived-neighborhoods were 7.5% and 10.6%, respectively. However, the PTB rate in the most deprived-neighbourhoods differed by anxiety and depression status: the rate was 9.5% (95% CI: 6.8, 13.3) for women without depression or anxiety, 14.7% (95% CI: 6.0, 31.9) for anxious women, 16.2% (95% CI: 10.0, 24.9) for depressed women, and 6.9% (95% CI: 3.1, 14.7) for women with comorbid anxiety and depression. The presence of anxiety, depression, and comorbid anxiety and depression increased the risk of PTB by 1.4, 2.4, and 1.9 times, respectively (p-value for interaction: 0.07, 0.03, and 0.04, respectively) for women living in the most deprived-neighborhoods. Conclusions Study findings suggest that anxiety and depression associated with the challenges of deprivation may extend stress-response activation, resulting in increased risk of PTB. This understanding may guide identification of high-risk women for PTB and allocation of resources to develop interventions for early identification and management of anxiety and depression, and ultimately the reduction of PTB, in vulnerable populations.

0305 S/P

ASSOCIATION BETWEEN MATERNAL PSYCHOSOCIAL STRESS DURING PREGNANCY AND GESTATIONAL AGE IN PUERTO RICO Stephanie Eick* Stephanie Eick, Rafael Rios-McConnell, Zaira Rosario Pabon, Carmen Vélez Vega, John D. Meeker, Akram N. Alshawabkeh, Kelly K. Ferguson, (University of Georgia, College of Public Health)

Preterm birth (PTB), the leading cause of infant morbidity and mortality worldwide, disproportionally impacts infants in Puerto Rico (PR). Psychosocial stress may be an important risk factor for PTB and hasn't been examined in PR. We examined associations between stress and gestational age continuously and PTB (<37 weeks gestation) using multiple dimensions of stress in order to optimally define exposure. Stress was measured using the Perceived Stress Scale, Life Experiences Survey, Center for Epidemiologic Studies-Depression, and ENRICHD Social Support Instrument. We included 922 mother-infant pairs of the Puerto Rico Testsite for Exploring Contamination Threats (PROTECT) Cohort, which examines environmental risk factors for PTB in the Northern Karst region of PR. Data on stress measures was collected during the 3rd trimester visit, except for Life Experiences Survey, which was collected at the 2nd trimester. Responses on each scale were scored to create a continuous measure. Higher scores on each scale, except social support, were indicative of increased stress. There were 93 PTBs in this analysis. Lower maternal education, unemployment, and public insurance were more common among women who delivered preterm and were associated with higher scores on all stress measures. Higher scores on the perceived stress (B: 0.00; 95% CI: -0.02, 0.01), negative life experiences (8: 0.01; 95% CI: -0.02, 0.04), social support (B: 0.01; 95% CI: -0.02, 0.04), and depression scales (B: -0.01; 95% CI: -0.02, 0.01) were not associated with gestational age or PTB. Although our findings show that stress is not associated PTB, there are other facets of stress, such as anxiety and neighborhood perceptions, that were not captured in our scales but may be important. Our study indicates that stress in pregnancy is not a major risk factor for PTB in our population. Other environmental exposures, such as chemical exposures in pregnancy, will be investigated in this population in the future.

CONFLICT-INDUCED MATERNAL STRESS AND BIRTH OUTCOMES: A NATURAL EXPERIMENT Eva Laura Siegel* Eva Laura Siegel, Pam Factor-Litvak, Dror Mandel, Ronit Lubetzky, Amalia Levy, Elkana Kohn, Rimona Keidar, Revital Sheinberg, Josef Tovbin, Matitiahu Berkovitch, (Mailman School of Public Health)

Background: Stressful events during pregnancy may have negative effects on birth outcomes. War broke out in 2014 in northern Israel during birth cohort enrollment, creating a natural experiment to study this phenomenon. Methods: Women enrolled in a hospital-based birth cohort (n=174) in northern Israel were divided into three groups: no exposure to conflict-induced stress during pregnancy, exposure during 1st half of pregnancy, and exposure during 2nd half. Conflict-induced stress and birth outcomes were looked at using adjusted regression models. Results Babies exposed to conflict-induced prenatal stress had lower birth weights and shorter gestation times. Mothers who were pregnant during the conflict were more likely to be diagnosed with gestational diabetes and to give birth by caesarean. Those exposed during 2nd half of pregnancy had lower birthweights (2930.3 g ±397.8) compared to those unexposed (3190.6 g \pm 464.0) and those exposed during the 1st half of pregnancy (3185.4 g ±486.4); those exposed during 1st half of pregnancy had shorter gestation (38.8 weeks ± 1.5) compared to those unexposed (39.3 weeks ± 1.3) and those exposed during 2nd half of pregnancy (39.1 weeks±1.5). Conclusions: These findings support prior evidence that exposures late in pregnancy negatively affect birth weight and exposures earlier in pregnancy affect length of gestation. On the other hand, sex-specific birth outcomes observed in other birth cohorts experiencing conflict-induced stress were not replicated in the current study.

0307 S/P

PRETERM BIRTH, FIREARM VIOLENCE, AND INFECTION: A STUDY OF MEDIATION IN CALIFORNIA Dana Goin* Dana Goin, Jennifer Ahern, (UC Berkeley)

Preterm birth contributes to infant morbidity and mortality in the United States, and stark disparities exist by maternal race/ethnicity. Living in a neighborhood with high levels of firearm violence may increase risk of preterm birth. Maternal infection may mediate this relationship, through behavioral or immune dysregulation mechanisms. This study assesses whether infection during pregnancy mediates the association between high firearm violence and preterm birth among mothers in California. We used data from the California Vital Statistics and Office of Statewide Health Planning and Statistics (OSHPD) to measure of firearm violence, infection, and preterm birth for all singleton births in California from 2007-2011. We used inverse odds ratio weighting to estimate the total and natural direct and indirect effects of firearm violence on risk of preterm birth. We examined whether the association differed by spontaneous versus indicated preterm birth, and assessed whether the association differed by race/ethnicity. We found a total effect (Risk Difference (RD) = 0.015) on the risk of preterm birth (0.112 versus 0.097) comparing if all women lived in a neighborhood with high firearm violence versus if none did. The direct effect (DE) of living in a neighborhood with high firearm violence was 0.013 and the indirect effect (IDE) was 0.0002. The total effects were of comparable size for spontaneous versus indicated preterm birth (RD = 0.0075 and RD=0.0068, respectively), but the indirect effect was seen exclusively in the spontaneous group (0.0016 versus -0.0003). The total effects on spontaneous preterm birth were strongest for black (RD=0.013), Hawaiian/Pacific Islander (RD = 0.013), and other or multi-race women (RD= 0.011). These results suggest firearm violence may be an important contributor to risk of preterm birth and the effects among women with spontaneous preterm birth may be partially mediated by risk of infection during pregnancy.

0308 S/P

CARDIOVASCULAR-RELATED MORBIDITY AND MORTALITY IN WOMEN WITH A HISTORY OF PREGNANCY COMPLICATIONS: A SYSTEMATIC REVIEW Sonia M Grandi* Sonia M Grandi, Kristian B Filion, Sarah Yoon, Henok Ayele, Carla Doyle, Jennifer A Hutcheon, Graeme Smith, Joel Ray, Robert W Platt, (sonia.grandi@mail.mcgill.ca)

Introduction: Studies have found that women with a history of pregnancy complications are identified, at or shortly after delivery, with risk factors for cardiovascular disease (CVD) and that these effects may persist long-term. However, clinical guidelines recommend post-partum follow-up only in women with a history of preeclampsia or preterm birth. We therefore performed a systematic review of observational studies to examine the association between pregnancy complications and the risk of subsequent CVD. Methods: We systematically searched PubMed, MEDLINE (via Ovid), EMBASE (via Ovid), CINAHL, and the Cochrane Library for studies investigating the association between pregnancy complications, including hypertensive disorders in pregnancy, gestational diabetes, low birth weight, placental abruption, preterm birth, small-for-gestational-age at birth, stillbirth, and pregnancy loss, and subsequent CVD. Studies were grouped by pregnancy complication and design to facilitate between study comparisons. Quality assessment was performed using the ROBINS-I tool. Results: Our literature search identified 13,969 publications, of which 84 were included in our review. Follow-up ranged from 0 to 55 years, and the sample sizes varied from 250 to 2,000,000 women. The overall evidence suggests that all pregnancy complications except pregnancy loss are associated with an increased risk of subsequent CVD in women (range: HR 1.1 to 14.5). The findings for pregnancy loss were heterogeneous across studies with a suggestion of no increased risk of CVD. The studies included in the review were found to be of varying quality largely due to insufficient adjustment for known confounders. Conclusions: Women with a history of the included pregnancy complications are at increased risk of subsequent CVD. The findings support the importance of continuous follow-up and risk-factor management in these women beyond the post-partum period.

0309 S/P

THE EFFECT OF SKIN-TO-SKIN CARE ON POSTPARTUM DEPRESSION AMONG MOTHERS OF PRETERM OR LOW BIRTH WEIGHT INFANTS: A SYSTEMATIC REVIEW Natalie V. Scime* Natalie V. Scime, Adam G. Gavarkovs, Kathleen H. Chaput, (Department of Community Health Sciences, University of Calgary)

Background: Mothers of preterm or low birth weight (LBW) infants are at 2-3 times greater risk of postpartum depression (PPD) than mothers in the general population, which may be partially due to separation of the mother-infant dyad at birth and during hospitalization. Regular skin-to-skin (S2S) care between mothers and infants could potentially prevent PPD in this vulnerable population. Objective: To examine the effect of S2S on PPD among mothers of preterm or LBW infants through a systematic review. Method: We systematically searched 6 peer-reviewed databases for prospective studies of S2S interventions that took place in neonatal intensive care units, and included PPD as an outcome, published in English between 1979 and 2017. Multiple hand searching strategies were also used. Two reviewers independently performed data extraction and critical appraisal. Results: Forty-four articles were located through searching, and 8 studies detailing 7 interventions met inclusion criteria. Substantial heterogeneity was observed across studies. Intervention duration ranged from 1 week to >2 months, S2S sessions ranged from 15 minutes to 1 hour (or as per maternal preference), and S2S frequency ranged from thrice daily to thrice weekly. The latency period between birth and S2S initiation was largely unreported. Five different tools were used to measure PPD (mainly the Edinburgh Postnatal Depression Scale) and few studies reported followup beyond infant discharge; tools were frequently used as continuous measures rather than dichotomous measures with a validated cut-off score. Of the 4 moderatequality studies, 3 reported a significant reduction in depressive symptoms among mothers in the S2S group compared to controls. Conclusion: Despite positive findings, studies differed markedly in terms of S2S dose, outcome measurement, and overall quality. Further well-designed, randomized studies are warranted to conclusively test the effectiveness of S2S on PPD prevention.

PREVALENCE OF SMALL FOR GESTATIONAL AGE AMONG LIVE BIRTHS WITH CONFIRMED AND POSSIBLE PRENATAL EXPOSURE TO ZIKA VIRUS INFECTION, UNITED STATES ZIKA PREGNANCY AND INFANT REGISTRY, 2015-2017 Regina M. Simeone* Regina M. Simeone, Abbey M. Jones, Sascha Ellington, Megan R. Reynolds, Carrie K. Shapiro-Mendoza, Ellen Lee, Hannah Cooper, Kristine Aviles, Juliana Prieto, Esther M. Ellis, Julie E. Dunn, Aja Griffin, Amelie Mafotsing Fopoussi, Nina Ahmad, Viola Glaze, Lisa D'Amico, Cristina Suarez, Shea Browne, Jonathan Popovitch, Dana Perella, Margaret A. Honein, US Zika Pregnancy and Infant Working Group, (Centers for Disease Control and Prevention)

The United States Zika Pregnancy and Infant Registry (USZPIR) monitors infant outcomes from pregnancies with confirmed and possible Zika virus (ZIKV) infection. A higher prevalence of ZIKV-associated birth defects (birth defects) among nucleic acid test (NAT) confirmed ZIKV infection compared to possible ZIKV infection has been reported. We examined associations between NAT confirmed ZIKV infection during pregnancy and small for gestational age (SGA; birthweight <10th percentile for gestational age and sex) among live births stratified by birth defects. NAT-confirmed ZIKV infection was defined as a positive nucleic acid test in maternal, infant, or placental specimens; possible ZIKV infections were those with serologic evidence and were the comparison group. From December 2015-December 2017, 5579 singletons were reported to the USZPIR; 36% from the US States and 64% from US Territories. Among 1567 State and 3170 Territory live births with gestational age and weight at delivery, 12% and 10% were SGA and 6% and 4% had birth defects, respectively. In the States, among live births with birth defects, the prevalence of SGA was higher among pregnancies with NAT-confirmed ZIKV (68%) compared to possible infection (34%) (prevalence ratio (PR): 2.0 (95% confidence interval: 1.1, 3.6)). The association between NAT-confirmed infection and SGA among those without birth defects was not significant (PR: 1.3 (0.8, 1.9)). In the Territories, among those with birth defects, the prevalence of SGA was similar for NAT-confirmed (45%) and possible ZIKV infection (43%) (PR: 1.0 (0.6, 1.8); a similar association was observed among those without birth defects (PR: 0.8 (0.6, 1.0)). The prevalence of SGA might be higher among pregnancies with NAT-confirmed ZIKV infection compared to possible infection. This finding was observed only in pregnancies with birth defects in the States. Results are limited by differences in completeness of data collection, testing, and reporting within USZPIR.

0312

ASTHMA RISK PREDICTION USING CHILDHOOD WHEEZE

TRAJECTORIES Arthur H. Owora* Arthur H. Owora, Allan B. Becker, Moira Chan-Yeung, Edmond S. Chan, Rishma Chooniedass, Clare Ramsey, Wade TA Watson, Meghan B. Azad, (Falk College, Syracuse University)

Rationale: Developmental trajectories of wheezing as a predictor of asthma risk are of considerable public health interest, especially with respect to prevention and early diagnosis. Objective: To identify developmental trajectories of wheezing using datadriven methodology and examine associations with asthma diagnoses. Methods: Secondary analysis of the Canadian Asthma Primary Prevention Study, a multifaceted prenatal intervention among children at high risk for asthma, followed from birth to 15 years. Wheezing trajectories were identified by latent class growth analysis. Predictors, intervention effects, and asthma diagnoses were examined between and within trajectory groups. Results: Among 525 children, three wheeze trajectory groups were identified: Low-Progressive (365, 69%), Early-Transient (52, 10%), and Early-Persistent (108, 21%). The study intervention was associated with lower odds of Early-Transient and Early-Persistent wheezing (p<.01). Other predictors of wheeze trajectories included sex, maternal asthma, maternal education, city of residence, breastfeeding, household pets, and atopy at 12 months. The odds of an asthma diagnosis were three to six-fold higher in the Early-Persistent versus Low-Progressive group at all follow-up assessments (p<.05), whereas Early-Transient wheezing (first year) was not associated with asthma. In the Early-Persistent group, the odds of wheezing were lower among intervention than control children (adjusted odds ratio 0.67; 95%CI: 0.48; 0.93) at 7 years. Conclusion: Using data-driven methodology, children can be classified into clinically meaningful wheeze trajectory groups that appear to be programmed by modifiable and nonmodifiable factors, and are useful for predicting asthma risk. Interventions early in life can alter wheeze trajectories in infancy and reduce wheezing prevalence in midchildhood.

0311

E XPOSIRE TO MALTREATMENT IN CHILDHOOD AND EXCESS WEIGHT GAIN IN PREGNANCY: RESULTS FROM A PILOT STUDY Susan Mason* Susan Mason, Lisa Bodnar, Suzanne Canney, Rich MacLehose, Dianne Neumark-Sztainer, (University of Minnesota School of Public Health)

Background: Childhood exposure to maltreatment (abuse and/or neglect) is associated with obesity in adulthood. However, few studies have examined whether maltreatment is related to pregnancy weight, such as excess gestational weight gain (EGWG), and whether this depends on pre-pregnancy weight status. Links between childhood maltreatment and EGWG might indicate a need for targeting EGWG interventions to women with maltreatment histories. Methods: A pilot survey assessing self-reported pre-pregnancy weight and pregnancy weight gain was sent to 162 parous women aged 27-33 participating in Project EAT (Eating and Activity in Teens), a 15-year longitudinal study of weight-related health in which exposure to childhood maltreatment (neglect and physical, sexual, and emotional abuse) had been previously assessed. EGWG was defined using body mass index-specific Institute of Medicine guidelines. Modified Poisson regression was used to model first-pregnancy EGWG as a function of the number of maltreatment types experienced (0, 1, or 2+), adjusted for maternal age and race. Results: The response rate to the survey was 79% (n=129). Over half of participants had EGWG and 33% reported maltreatment. All maltreatment types were associated with increased EGWG risk. Adjusted RRs for EGWG in those with 1 and 2+ maltreatment types were 1.34 (95% CI: 0.92, 1.93) and 1.55 (95% CI: 1.08, 2.22) respectively, relative to no maltreatment. In women who were non-overweight prior to pregnancy, RRs for 1 and 2+ types of maltreatment were 1.55 (95% CI: 0.86, 2.80) and 1.90 (95% CI: 1.10, 3.28) respectively. In overweight women, RRs were close to the null. Conclusion: In this small pilot study, maltreatment history was associated with elevated risks of EGWG in non-overweight women who might otherwise be considered low risk. Women with maltreatment may be an unrecognized high-risk group for EGWG.

EXPOSURE TO TETRACHLOROETHYLENE-CONTAMINATED DRINKING WATER AND THE RISK OF STILLBIRTH Ann Aschengrau* Ann Aschengrau, Lisa G. Gallagher, Michael R. Winter, Lindsey J. Butler, M. Patricia Fabian, Veronica M. Vieira, (Boston University)

Background: Residents in Massachusetts and Rhode Island were exposed to tetrachloroethylene (PCE)-contaminated drinking water from 1968 through the early 1990s when the solvent was used to apply a vinyl liner to the interior of drinking water pipes to solve taste and odor problems. While PCE is a common drinking water contaminant, its effects on the developing fetus are not well-understood. The present case-control study was undertaken to determine if the risk of stillbirth is increased among pregnant women exposed to PCE-contaminated drinking water. Methods: Cases were comprised of stillborn infants delivered between 1968 and 1995 to mothers who resided in 28 cities and towns with affected water pipes (N=296). Cases whose cause of death was placental abruption and/or placental insufficiency were included. Controls were randomly selected live-born infants who were delivered in the same time period and geographic area as cases (N=783). Prenatal PCE exposure was estimated using US EPA water distribution system modeling software that incorporated a leaching and transport algorithm for PCE. Results: Mothers with any PCE exposure had a 1.7-fold increase in the adjusted odds of stillbirth (95% CI: 1.2-2.4). The adjusted OR increased as a woman's exposure level increased: 1.5 (95% CI: 1.0-2.3) for low exposure (>0-median), 1.7 (95% CI: 1.1-2.5) for moderate exposure (>median-90th percentile) and 1.9 (95% CI: 1.1-3.2) for high exposure (>90th percentile). Increasing odds with exposure level increases were observed both for stillbirths due to placental abruption and placental insufficiency. Conclusions: We observed a dose-dependent increase in the odds of stillbirth due to placental abruption and placental insufficiency with prenatal exposure to PCE-contaminated drinking water. These findings highlight the importance of considering pregnant women and their developing fetuses when monitoring, regulating and remediating drinking water contaminants.

0332

PHYSICALACTIVITY AND PREGNANCY OUTCOMES IN WOMEN WITH PRIOR PREGNANCY LOSS Lindsey M. Russo* Lindsey M. Russo,

Brian W. Whitcomb, Joshua R. Freeman, Sunni L. Mumford, Lindsey A. Sjaarda, Robert M. Silver, Jagteshwar Grewal, Karen C. Schliep, Neil J. Perkins, Enrique F. Schisterman, (Department of Biostatistics & Epidemiology, University of Massachusetts Amherst, Amherst, MA)

Data regarding the relationship between physical activity (PA) and pregnancy loss are conflicting. Some studies have observed no relationship while others suggest an increased risk of very early losses with high physical strain, potentially through mechanisms such as elevated body temperature and energy availability. We examined the relation of PA with pregnancy outcomes among women ages 18-40 with a human chorionic gonadotropin (hCG)-detected pregnancy in the Effects of Aspirin in Gestation and Reproduction (EAGeR) trial, which included women with 1 or 2 prior losses. The International Physical Activity Questionnaire (IPAQ) short form assessed baseline hours/week of activity (vigorous, moderate, and walking); intensity scores and reported duration were used to determine Metabolic Task Equivalent (MET)-hours/week. Systematic urine hCG tests and ultrasound identified chemical losses, clinical losses, and live births. Risk ratios (RR) and 95% confidence intervals (CI) were estimated using log-binomial regression, adjusting for age and waist-hip ratio. Among 785 women with hCG-detected pregnancies, there were 55 chemical losses and 133 clinical losses. The overall median level of physical activity was 27.9 MET-hours/week. Compared to the first tertile of baseline PA (median= 7.7 MET-hours/week), the RR for chemical losses was 2.06 (95% CI: 1.03, 4.14) in the second tertile (median= 27.8 MET-hours/week) and was 1.92 (95% CI: 0.94, 3.90) in the third (median= 95.7 MET-hours/week). No associations were observed between MET-hours/week and clinical loss or live birth. Models adjusting for BMI instead of waist-hip ratio yielded similar results, as did models using inverse probability of pregnancy weighting to address potential selection bias. These results suggest a relationship between PA and very early pregnancy loss/implantation failure in women with a history of prior losses, though caution is warranted due to potential limitations such as unmeasured confounding.

REPRODUCTIVE

EFFECT OF A HOME PREGNANCY TEST INTERVENTION ON COHORT RETENTION AND DETECTION OF PREGNANCY LOSS Lauren A. Wise* Lauren A. Wise, Kenneth J. Rothman, Amelia K. wesselink, Ellen M. Mikkelsen, Sydney I. Willis, Elizabeth E. Hatch, (Department of Epidemiology, Boston University School of Public Health)

Objective: We conducted a pilot study to assess the extent to which randomization of cohort study participants to receive home pregnancy tests (HPT) improves retention, increases detection of spontaneous abortion (SAB), and advances the timing of SAB detection. Methods The study population comprised female participants from Pregnancy Study Online (PRESTO), a North American web-based preconception cohort study. Eligible women were aged 21-45 years, trying to conceive, and not using fertility treatments. Women completed a baseline questionnaire and follow-up questionnaires every 2 months for up to 12 months or until pregnancy, whichever came first. After enrollment, 401 U.S. participants with ≤6 cycles of attempt time at entry were randomized to receive either 12 Clearblue visual HPTs with guidance to test the day after a missed menses (N=198) or the standard protocol (N=203). On follow-up questionnaires, women reported their pregnancy status, if they had experienced a SAB since their last questionnaire and, if so, their gestational weeks at SAB. We performed an intent-to-treat analysis to compare randomized groups. We defined cohort retention as completion of ≥ 1 follow-ups. Results: After a median of 29 weeks of follow-up, cohort retention was higher among women randomized to receive HPTs (N=165; 83.3%) relative to the standard protocol (N=137; 67.5%) (mean difference=15.8%, 95%CI=7.5%-24.2%). Conception was reported by 60.6% in the HPT arm and 48.9% in the standard protocol arm. Among women who conceived, SAB was reported by 19 (19.2%) in the HPT arm (gestational weeks at SAB: median=5.0, range: 4-10) and 11 (16.7%) in the standard protocol arm (gestational weeks at SAB: median=5.0, range=4-9). SAB <8 weeks' gestation was slightly more common in the HPT arm (N=16; 84.2%) than in the standard protocol arm (N=9; 81.8%). Conclusions: Randomization of HPTs to participants in a web-based preconception cohort study may increase cohort retention and SAB detection.

0333 S/P

HEAT EXPOSURES AND MALE FECUNDABILITY: A PRECONCEPTION COHORT STUDY. Craig J McKinnon* Craig J McKinnon, Elizabeth E Hatch, Kenneth J Rothman, Michael L Eisenberg, Lauren A Wise, (Boston University School of Public Health)

Objective: We examined the association between selected heat exposures and male fecundability in Pregnancy Online Study (PRESTO), a North American preconception cohort study (2013-2017). Methods Men aged ≥21 years completed a baseline questionnaire about recent exposure to heat, including use of saunas or hot baths, type of underwear worn, time spent sitting, laptop use on one's lap, fever, and seat heater use. Couples were followed via bimonthly follow-up questionnaires completed by the female partner for up to 12 months or until pregnancy, whichever came first. Analyses were restricted to 1,242 couples attempting conception for ≤6 cycles at entry. We used proportional probabilities regression to estimate fecundability ratios (FR) and 95% CIs, adjusting for demographic and lifestyle factors, reproductive and medical history, and all other heat factors Results: Sauna use was not appreciably associated with fecundability (≥3 saunas/month vs. no sauna use: FR=1.09, 95% CI=0.67-1.75). The FR for ≥3 baths/month relative to no hot baths was 0.77 (95% C1=0.57-1.03). FRs were 1.09 (95% CI=0.95-1.27) for slim-fit boxers and 0.87 (95% C1=0.69-1.10) for alternating slim-fit/loose boxers, as compared with loose boxers/no underwear. The FR comparing sitting of ≥10 hours/day vs. <5 hours/day was 0.91 (95% CI=0.73-1.13). The FR for \geq 5 hours/day vs. <1 hour/day of laptop use on one's lap was 0.85 (95% C1=0.63-1.14). The FR for a fever episode in the prior 3 months was 0.95 (95% CI=0.72-1.25). The FR for use of seat heaters during winter for ≥3 hours/day compared with no seat heater use was 0.87 (95% C1=0.68-1.11); after restricting follow-up to the etiologically-relevant months of Feb-May, the respective FR was 0.70 (95% C1=0.46-1.08). Conclusion: Modestly reduced male fecundability was observed for high exposure to selected heat variables, particularly use of hot baths, laptops, and seat heaters.

ASSOCIATIONS BETWEEN URINARY PHYTOESTROGENS AND PREGNANCY LOSS AND LIVE BIRTH Keewan Kim* Keewan Kim, Germaine M. Buck Louis, Rajeshwari Sundaram, Enrique F. Schisterman, Matthew T. Connell, Carrie J. Nobles, Lindsay D. Levine, Elizabeth DeVilbiss, Tiffany L. Holland, Sunni L. Mumford, (NICHD/NIH)

Background: Phytoestrogens, which are abundant in soy products and oilseeds, have estrogenic and antioxidant effects and possible associations with reproductive health outcomes have been observed. However, their role in influencing pregnancy outcomes, such as loss and live birth, is unknown. Thus, our aim was to evaluate the association between urinary phytoestrogen levels and prospectively assessed pregnancy loss and live birth among couples attempting pregnancy. Methods: We used data collected in a prospective preconception cohort, the Longitudinal Investigation of Fertility and the Environment (LIFE) Study, which enrolled and followed 501 couples for 12 months or until pregnancy. We measured urinary genistein, daidzein, O-desmethylangolensin, equol, enterodiol, and enterolactone at baseline and assessed by quartile. Using log-binomial regressions, we estimated relative risks (RR) and 95% confidence intervals (CI) for couples' level of phytoestrogens separately and jointly. Models were adjusted for both partners' age, BMI, race, urinary creatinine, supplement use, physical activity, and study site. For pregnancy loss, inverse probability weights were used to account for potential selection bias by restricting to pregnant women. Results: Higher female genistein levels were associated with higher probability of live birth (4th quartile RR 1.36, 95% CI 0.99, 1.88), compared to the lowest quartile. The results were consistent in the couple-based joint models. No associations were observed for pregnancy loss. We did not find associations between male phytoestrogen levels and loss or live birth. Conclusions: Preconception female urinary genistein levels were positively associated with live birth, though no associations were observed for male levels or with pregnancy loss. This is the first study highlighting the importance of dietary influences of phytoestrogens on a continuum of reproductive endpoints, including a couple's ability to ultimately achieve a live birth.

REPRODUCTIVE

0335 S/P

GESTATIONAL ARSENIC EXPOSURE, FETAL LOSS, AND NEONATAL DEATH Sharia M Ahmed* Sharia M Ahmed, Mostofa Golam, Mahmudar Rahman, Quazi Quamruzzaman, Mohammad Rahman, Karen Levy, David Christiani, Molly Kile, (Oregon State University)

Arsenic crosses the placenta, resulting in fetal exposure. Previous studies examined the association between arsenic exposure and birth outcomes, and infant morbidity and mortality. Yet few prospective studies have examined the contribution of arsenic to pregnancy loss. This study evaluated the association between gestational arsenic exposure, fetal loss, and neonatal death. We used data from an extant cohort of pregnant women and their children in Bangladesh (n=1,557), where chronic arsenic exposure is common from contaminated drinking water. Maternal drinking water at ≤16 weeks gestational age was used to assess exposure to arsenic in utero. Extended Cox regression was used to estimate the time-varying association between gestational arsenic exposure and fetal and neonatal death, which included all mortality between conception and one month after birth. Both step functions and time-dependent coefficients were used to explore the effect of arsenic exposure at different stages of pregnancy. A sensitivity analysis was conducted whereby gestational arsenic exposure was assessed using maternal toenail samples at birth. Missing toenail arsenic data were imputed using other data. We observed 197 fetal losses and 20 neonatal deaths. There was a persistent non-linear relationship between gestational arsenic exposure and hazard of death across time using the different methods and exposure measurements. Increased gestational arsenic exposure appeared to increase the rate of mortality in the second trimester, but decreased mortality (was protective) in the third trimester. In the step function model, the hazard ratios (HR) for each unit increase in natural log drinking water arsenic ranged from HR=1.7 (p<0.001) in weeks 24-28, to HR=0.91 in weeks 32-36 (p=0.577). Arsenic may be exerting survival pressure on developing fetuses, possibly leading to survival bias in studies of infants. Levels of arsenic exposure considered safe for adults may be detrimental to fetuses.

TEST PERFORMANCE CHARACTERISTICS OF THE AIR, GAD-7 AND HADS-ANXIETY SCREENING QUESTIONNAIRES FOR ANXIETY IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE Janet T. Holbrook* Janet T. Holbrook, Nicola A, Hanania, Abebaw M. Yohannes, Robert Henderson, Elizabeth A. Sugar, Michelle N. Eakin, Anna M. Baker, Robert A. Wise, (Johns Hopkins Bloomberg School of Public Health)

Rationale: Anxiety is a common co-morbidity of Chronic Obstructive Pulmonary Disease (COPD) that is associated with higher morbidity and mortality. We evaluated three anxiety screening questionnaires, the Generalized Anxiety Disorder (GAD-7) questionnaire, the Hospital Anxiety and Depression Scale (HADS), and the Anxiety Inventory for Respiratory Disease (AIR). Objectives: Evaluate and compare thet test performance characteristics of 3 anxiety screening questionnaires using the Mini International Neuropsychiatric Interview (MINI) version 7.0 as the gold standard. Methods: Individuals with COPD were recruited at 16 centers. The MINI interview and questionnaires were administered by trained coordinators at an in-person visit and re-administered by telephone 2 to 4 weeks later. A composite score for the presence of any anxiety disorder was computed based on a participant screening positive on at least one of the anxiety scales and used as the gold standard comparator for these analyses Results: 220 eligible individuals were enrolled; 219 completed the study. 11% were identified as having a DSM-5 anxiety disorder based upon the MINI. Elevated anxiety symptoms based on questionnaires were 38% for the AIR, 30% for the GAD-7, and 20% for the HADS-A. Area under the receiver operating curve (AUC) was highest for the GAD-7, followed by the HADS-A and the AIR. AUC for the GAD-7 was significantly greater than for the AIR (P=0.014). Sensitivity was not statistically different among the questionnaires: 77% for the GAD-7; 63% for the HADS-A; and 66% for the AIR. The HADS-A had the highest specificity, 85%, which was significantly higher than the GAD-7 (77%, P<0.001) and the AIR (65%, P<0.001); the GAD-7 specificity was higher than the AIR (P<0.001). Conclusion: The GAD-7, the HADS and the AIR questionnaires had acceptable diagnostic properties as screening tools for anxiety in individuals with COPD. Symptoms of anxiety among COPD patients as identified by screening questionnaires were common a

PREVALENCE OF PREVENTIVE HEALTH SERVICES USE AMONG US ADULTS: COMPARISONS BETWEEN TWO NATIONAL HEALTH SURVEY FINDINGS, 2016 Guixiang Zhao* Guixiang Zhao, Jason Hsia, Catherine A. Okoro, Jun Li, Machell Town, (Centers for Disease Control and Prevention)

Purpose: To compare the prevalence estimates for selected preventive health services use among US adults using data from two national health surveys. Methods: In 2016, both the Behavioral Risk Factor Surveillance System (BRFSS) and the National Health Interview Survey (NHIS) collected data on the following preventive health services received by US adults at varying ages mammogram, Pap test, colorectal cancer (CRC) screening, HIV test, influenza and pneumococcal vaccinations. Absolute differences in the prevalence estimates between the 2 surveys were calculated overall and by demographic characteristics. Adjusted prevalences were estimated by conducting log-linear regression analyses while adjusting for demographic characteristics, general health, and health insurance status. Results: The prevalence estimates for mammogram and CRC screening were similar between BRFSS and NHIS (absolute difference: -0.4% for mammogram and -0.9% for CRC screening). The prevalence estimates for Pap test, HIV test, and influenza vaccination were lower from BRFSS than from NHIS (absolute difference: -6.6%, -2.0%, and -3.9%, respectively), whereas the prevalence of receiving pneumococcal vaccination was higher from BRFSS than from NHIS (absolute difference: 5.4%). These patterns persisted after adjustment for demographic characteristics or further ad justment for general health and health insurance status. Compared with NHIS, the adjusted prevalences for receiving Pap test, HIV test, and influenza vaccination were 5-11% lower (P<0.001) and the adjusted prevalence of receiving pneumococcal vaccination was 7% higher (P<0.001) from BRFSS. Conclusions: Some degree of discrepancy in the prevalences of preventive health services use existed between the 2 surveys Nonetheless, both surveys provide useful information on health care utilizations at national level as well as at state or local level by BRFSS.

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BREAST AND CERVICAL CANCER SCREENING PARTICIPATION OF WOMEN WITH CHRONIC DISEASES IN KOREA: ANALYSIS OF THE 2012 KOREAN NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY Laurence Twizeyimana* Laurence Twizeyimana, Yeol Kim, Lim Jun tae, (National Cancer Center Graduate School of Cancer Science and Policy, Korea)

Background: Chronic disease morbidity is a concern for cancer research. Contradictory results have been reported concerning adherence to screening programs among patients with chronic diseases. Study Objective: To assess the adherence to breast and cervical cancer screening of women with chronic diseases. Methods: Using data from Korean National Health and Nutrition Examination Survey in 2012, participation in cervical and breast cancer screening were analyzed among women who had nine chronic diseases (hypertension, diabetes, cancer, dyslipidemia, stroke, obesity, depression, osteoarthritis and asthma) adjusting for screening determinants. Pearson's chi-squared test and multiple logistic regression analysis were performed using STATA version 14. Results: A total 2,404 women aged 40 years or older were included, 74.61 % and 69.91 % had taken breast and cervical cancer screening, respectively. In logistic regression model, women with asthma had 66% lower chance of participating in breast cancer screening (OR, 0.34; 95% CI, 0.18 - 0.64). Likewise, the OR of those with diabetes mellitus is 0.48 (95% CI, 0.33 - 0.69). Women with hypertension had 14% lower chance of participating in cervical screening compared to non-hypertensive (OR, 0.86; 95% CI, 0.67 -0.93); osteoarthritis (OR, 0.74; 95% CI, 0.58 - 0.95) and diabetes mellitus (OR, 0.65; 95% CI, 0.44 - 0.95). The ORs of participation of those women with dyslipidemia are 1.56 (95% CI, 1.10 - 2.22) and 1.60 (95% CI, 1.16 - 2.19) in breast and cervical cancer screening, respectively. Conclusion: In most chronic diseases, those with the illnesses had the lower chance of participating in either breast or cervical screening. The results from this study may provide an important contribution for helping to increase participation in cancer screening among patients with some chronic diseases.

ESTIMATING A DYNAMIC EFFECT OF SUPPORTIVE HOUSING PLACEMENT ON EMERGENCY DEPARTMENT VISITS IN NEW YORK CITY Sungwoo Lim* Sungwoo Lim, Tejinder Singh, Sarah Walters, Sara Miller-Archie, L. Hannah Gould, (New York City Department of Health and Mental Hygiene)

Supportive housing has a positive impact on health among chronically homeless people. Yet, little is known about how this impact differs by when persons are placed in the program and how long they remain housed. In this evaluation, we tested the hypothesis that chronically homeless persons with immediate and continuous placement are less likely to have emergency department (ED) visits. We used matched administrative data for 7612 adults who were eligible for a New York City supportive housing program and had 80% Medicaid coverage during a 2-year follow-up period. Treatment was defined as being placed in the housing program for >7 days after the first eligibility date; the outcome was defined as having an ED visit. Time-varying covariates included incarceration, homelessness, hospitalization, and other supportive housing placement events, while time-invariant covariates included demographics and clinical and behavioral characteristics at eligibility. Data on treatment, outcome, and time-varying variables were collected in 6-month intervals. A dynamic effect was estimated by comparing various treatment patterns with continuous non-placement via targeted maximum likelihood estimation using R package ltmle. During the 18-month follow-up, 35% were placed in the program; most (71%) were continuously placed immediately after eligibility, followed by continuous placement after 7-12 months delay (14%) or 13-18 months delay (7%). Continuous placement was associated with smaller number of ED visits (Additive effect= -0.22, 95% CI=-0.37, -.07) during months 19-24 post-eligibility, compared with continuous non-placement. Delayed placement for > 6 months or early moveout was not associated with ED visits. These findings highlight the importance of immediate and continuous placement in supportive housing to reduce the risk of ED visits among chronically homeless people.

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WILL THE RISE OF FOR-PROFIT COLLEGES ERODE THE POPULATION HEALTH ADVANTAGES ASSOCIATED WITH HIGHER EDUCATION? Theresa L. Osypuk* Theresa L. Osypuk, Nicole M. Schmidt, Naomi H. Thyden, Aaron Berger, John Robert Warren, M. Maria Glymour, (University of Minnesota School of Public Health, Division of Epidemiology & Community Health)

In the past 2 decades, for-profit colleges have proliferated. However, evidence suggests that education quality at for-profit colleges may be inferior to public or nonprofit colleges. There is no prior evidence on whether for-profit colleges influence health. Using National Longitudinal Survey of Youth, a nationallyrepresentative cohort, we tested whether attending any college, and the sector of the college (for profit, nonprofit, public, vs. no college), was associated with obesity (BMI>=30) in young adulthood (mean age=31, N=7095). We also evaluated mediation; specifically: the direct effects of for-profit (and other sector) college attendance for individuals who did or did not receive a Bachelor's degree. Logistic regression models were adjusted for prospectively-reported demographics, geography, parental SES, and childhood health. The sector of higher education that one attended strongly influenced obesity odds (p<.001). Attending a for-profit college was associated with higher odds of obesity, compared to no college (OR=1.17, 95%: 0.99-1.38). Compared to those with no college, obesity was less common for those who earned a Bachelor's degree at a public (OR=.80, 0.66-0.95) or non-profit (OR = 0.68, 0.53-0.82) college, but not for those with a Bachelor's from a for-profit college (OR=1.01, 0.64-1.37). Regardless of sector, individuals who started college but never earned a Bachelor's had higher odds of obesity than those who did not begin college. In sum, attending for-profit colleges was not associated with better health, even for students who earned a Bachelor's, unlike more traditional higher-education institutions. Unpacking why education improves health will help us understand how this fundamental cause of health inequity can be modified to improve population health. Numerous social policies influence whether students attend for-profit colleges. We urgently need rigorous evidence on the health effects of these increasingly common educational experiences.

DO ALCOHOL OUTLETS MEDIATE THE EFFECTS OF THE MOVING TO OPPORTUNITY HOUSING VOUCHER EXPERIMENT ON ADOLESCENT EXCESSIVE DRINKING? Spruha Joshi* Spruha Joshi, Nicole M. Schmidt, Theresa L Osypuk, David Haynes II, M. Maria Glymour, Toben F. Nelson, (University of Minnesota)

Adolescent excessive alcohol use is associated with negative social and health outcomes. Neighborhood's built environment may impact alcohol use, but most prior research has been observational. The Moving to Opportunity (MTO) study randomly assigned housing vouchers allowing low-income families to move from public housing to private apartments in lower poverty neighborhoods. The policy decreased binge drinking and alcohol use among girls, but increased risk among boys. No studies have tested mediators of these effects. We examined whether the effect of MTO housing voucher receipt (vs public housing control) on youth (N=2970 aged 12-19 in 2001-02) drinking (past 30-day number of drinks per day on days drank), reported in 2001-02 was mediated by objective measures of density (per square mile) of on- and off-premise alcohol outlets (M=18.9, SD=31.1) at the census tract where the family lived in the first post-randomization follow-up (1997). We estimated gender-stratified Poisson mediation models to estimate controlled direct effects (CDE). In 1997, MTO children randomized to receive vouchers lived in census tracts with lower density of off-premise outlets but higher density of onpremise outlets vs. controls. MTO treatment (vs. control) resulted in lower drinking for girls via alcohol outlet density, but only at higher levels of the mediator. The RR of treatment on drinking when mediator=15 off-premise outlets per sq mile: RR=0.60, 95%CI (0.39, 0.93); when mediator=50, RR=0.35 (0.18, 0.70). MTO treatment generated harmful effects on boys' drinking at lower levels of off-premise outlet density, but results were mixed for boys' on-premise outlet density. The boys' treatment effect on drinking when mediator=5 off-premise outlets per sq mile was RR=2.14 (1.30, 3.52); for mediator= 15, the RR=2.17 (1.30, 3.61). Policies that include ongoing services may be important to help boys navigate changes in housing and the surrounding alcohol environment, to prevent alcohol use.

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EVICTION IN THE UNITED STATES: AFFECTED POPULATIONS, HOUSING AND NEIGHBORHOOD-LEVEL CONSEQUENCES, AND IMPLICATIONS FOR HEALTH Kathryn Leifheit* Kathryn Leifheit, Craig E. Pollack, Maureen M. Black, Jacky M. Jennings, (Johns Hopkins University Bloomberg School of Public Health)

Background: Owing to rising housing costs and stagnant incomes, eviction is increasingly common in the U.S. Early evidence links eviction to the development of poor mental and physical health in adults. Given these negative associations, our analysis aims to 1) identify factors associated with eviction and 2) describe associations between eviction and housing and neighborhood factors that cause poor health. Methods: Using 2013 American Housing Survey data, we compared families with low vs. high eviction risk (i.e. received an eviction notice or likely to be evicted in the future) on the basis of household-level variables (e.g. poverty, housing burden, household composition). Among respondents who reported moving recently, we conducted regression models to test for associations between having been previously evicted and indicators of current housing and neighborhood quality. Results: Overall, 8.9% of US renters (909/11,909) reported a high risk of eviction. Households with high risk were more likely to pay ≥30% of their income on rent (47.3% vs. 40.7%, p=0.001) and more likely to live below the federal poverty level (33.2% vs. 26.3%, p<0.001). Single parents with children were more likely to report high eviction risk than all other household structures (12.0% vs. 8.8%, p<0.001). Among recent movers (4,898), past eviction was associated with worse housing quality following a move (OR=2.1, 95% CI: 1.0, 4.2) and increased rates of healthrelated housing deficits, including peeling paint and water leaks. Eviction was also associated with worse neighborhood quality (OR=2.3, 95% CI: 1.1, 4.8) and lower neighborhood social capital (coefficient= -0.3 on a 0-5 scale, 95% CI -0.8, 0.1). Conclusion: Eviction is most prevalent among impoverished households with single parents and children and may lead to poor quality housing and neighborhood environments linked to decrements in health.

FEELINGS VERSUS FACTS: USING NEIGHBORHOOD DATA AND PERCEPTIONS OF NEIGHBORHOODS TO STUDY HOW PLACE AFFECTS SELF-REPORTED HEALTH OF URBAN BLACK MEN Aimee J. Palumbo* Aimee Palumbo, Douglas J. Wiebe, Nancy Kassam-Adams, Therese S. Richmond, (University of Pennsylvania)

Background. To understand neighborhood influences on health, we must measure neighborhood environments appropriately. We explored whether the physical and mental health of urban black men is related to neighborhood characteristics as measured through objective data or through men's perceptions of their neighborhoods. Methods. We used data from 486 black men age ≥ 18 years living in Philadelphia admitted to a trauma center with an injury between January 2013 and February 2017. Neighborhood-level measures of the social, economic, and built environment were obtained from multiple sources. At study entry, participants answered questions of perceived neighborhood environment and self-reported poor physical and mental health 30 days before injury. We conducted factor analysis of neighborhood variables to identify neighborhood factors and compute factor scores, then used logistic regression to estimate the odds of poor physical or mental health, accounting for spatial correlation of participants. Results. Poor physical and mental health was reported by 12% and 22% of subjects, respectively. In participants' neighborhoods, median household income was \$29,000 and 29% of adults lived in poverty. Individually, 73% of men reported abandoned buildings and 31% reported not feeling safe walking around their neighborhood. Physical health varied based on neighborhood poverty (deprivation, vacancy, and victimization) and neighborhood disconnectedness factors. Mental health varied based on neighborhood economics (spending, income, and education) and two individual perception factors (social disorder, safety concerns). Conclusions. We identified neighborhood components of importance to this vulnerable population. Both neighborhood-level and individuallevel measures of neighborhood influence health, but may operate through different mechanisms.

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DOES BANKRUPTCY RISK PREDICT NEW HIV CASES? A SPATIO-TEMPORAL ANALYSIS OF THE LOCAL CREDIT ECONOMY AND HIV IN PHILADELPHIA, PA Lorraine T Dean* Lorraine Dean, Hui (Henry) Luan, Kathleen A. Brady, Yusuf Ransome, (Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA)

Introduction: Previous studies have evaluated local credit economy indicators to predict infectious diseases such as flu, but have not applied this to HIV. We assessed whether local credit economy indicators operate independently of other social and economic factors (race, income, poverty) that have been previously associated with new HIV cases. Methods: This longitudinal spatiotemporal analysis examined new HIV cases in 2011-2015 reported by the Philadelphia Health Department for 45 Philadelphia zip codes. Prior year local credit economy was measured by: (1) Equifax's Bankruptcy Navigator Index 4.0 (BNI), rating the likelihood of bankruptcy within the next 24 months on a scale of 1-600, with lower values indicating higher bankruptcy risk, and; (2) the sum of derogatory credit accounts (i.e., bankruptcy, foreclosure, and collections). Population demographics were from American Community Survey 2011 5-year estimates. Hierarchical Bayesian Poisson models with spatial, temporal, and space-time interaction random effects were fitted for new HIV cases. All models adjusted for population size, median income, and percent: age 18-24, male, Black, and below 200% poverty. Zip codes with a high probability (>0.9) of relative risk exceeding 1 were considered HIV hotspots. Results: Across the 5-year period, BNI scores ranged from 273 to 295. HIV cases ranged from 6 to 62 in the zip codes. Three HIV clusters were identified in central and southern Philadelphia. New HIV cases decreased from 2011-15. Each unit increase in BNI and derogatory account in the previous year predicted 48% (95% credible interval: 0.17,0.87) and -15% (95% CI: -0.01, -0.29) change in HIV risk, respectively. Conclusion: Philadelphia zip codes with more favorable credit economies had higher HIV risk than those with less favorable credit economies. While new HIV cases decreased, local credit economy indicators may further refine which hotspots should be targeted for prevention efforts.

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PERCEIVED RACISM IN RELATION TO TELOMERE LENGTH Yvette C Cozier* Yvette C Cozier, Darlene Lu, Lynn Rosenberg, Julie R Palmer, (Slone Epidemiology Center at Boston University)

Telomere length is considered a biomarker of human aging and premature morbidity and mortality. Chronic stress is associated with shorter telomere length. Perceived racism is a chronic psychosocial stressor in the lives of black women. We assessed the relationship between perceived racism and telomere length in the Black Women's Health Study (BWHS) a follow-up of US black women begun in 1995. The 1997 and 2009 biennial questionnaires asked about the frequency of "daily racism" (e.g., "you receive poorer service than other people in restaurants or stores") and about "lifetime racism" (e.g., "treated unfairly due to your race"). Relative telomere length (RTL) was determined for 992 women using the exponentiated ratio of telomere repeat copy number to a single gene copy number (T/S) from quantitative real-time PCR telomere assay, log-transformed to improve normality (log-RTL). Multivariable linear regression was used to estimate the relationship between log-RTL and racism adjusting for age at blood draw and demographic and behavioral factors. Mean age of the women assessed was 55.6 (range: 40-70) years, and the mean telomere length was 0.77(range: 0.21-1.38). Overall, log-RTL was not associated with measures of perceived racism. However, in analyses stratified on responses (yes/no) to whether one discusses experiences of racism with others, there was an inverse association between daily racism and log-RTL among women who did not discuss racism with others (b= -0.0598, SE=0.03, p=0.03). Women who kept racism to themselves and reported higher measures of daily racism had shorter RTL. These findings suggest that experiences of racism plus style of coping may together have an effect on the health of black women.

PAST YEAR ARRESTS AMONG PRESCRIPTION PAIN RELIEVER MISUSERS IN THE UNITED STATES, 2002-2014 Abby Hagemeyer* Abby Hagemeyer, Alejandro Azofeifa, Margaret Mattson, (CSTE Applied Epidemiology Fellow)

Background: Prescription pain reliever misuse is a driving factor in the U.S. opioid crisis which has had adverse consequences to health, economic, and social welfare. Little is known about the impact on the criminal justice system. The goals of this study are to estimate, characterize, and assess the overall trend of the national prevalence of past year arrests among persons who misuse prescription pain relievers using data from the National Survey on Drug Use and Health (NSDUH) 2002-2014. Methods NSDUH data from 2002-2014 were used to estimate the national prevalence of past year arrests among prescription pain reliever misusers aged 12 years and older, overall and by sociodemographic characteristics. Prescription pain reliever misusers were defined as persons with past year use of any prescription pain reliever not prescribed or taken only for the experience or feeling it caused, and excluded heroin users. A logistic regression model was used to assess the overall trend of past year arrest prevalence among prescription pain reliever misusers from 2002-2014. Results: From 2002-2014, 10.9% of people who misused prescription pain relievers reported a past year arrest (approximately 1.2 million people each year). Overall, data show higher past year arrest prevalence among prescription pain reliever misusers who were white (67.0%), male (70.5%), 18-25 years of age (43.6%), high school graduates (30.6%), unemployed (39.6%), and have an annual household income of \$20,000-\$49,999 (38.6%). The overall trend of past year arrest prevalence among prescription pain reliever misusers significantly decreased from 2002-2014 (OR=0.986, 95% CI: 0.974-0.997). Conclusions: Every year, more than 1.2 million prescription pain reliever misusers are arrested placing burden on the criminal justice system. Identifying and understanding this population will help inform intervention efforts, drug court eligibility criteria, and substance use treatment referral programs.

EXAMINING THE ASSOCIATION BETWEEN LONG-TERM ALCOHOL RISK AWARENESS AND ALCOHOL DRINKING PATTERNS AND ALCOHOL USE DISORDERS AMONG UNIVERSITY STUDENTS Nicole Khauli* Nicole Khauli, Silvia S. Martins, Lilian A. Ghandour, Sirine Anouti, (Columbia University Mailman School of Public Health)

Background: While alcohol remains one of the leading risk factors for noncommunicable diseases and injuries worldwide, knowledge of its long-term harmful consequences among drinkers remains relatively low. Methods: A cross-sectional survey was administered in May 2016 to 1155 students, aged 18-25, from six private and public universities in Lebanon. The survey assessed respondents' patterns of alcohol use, awareness of health risks caused by alcohol consumption as well as policy-relevant variables. This study aims to investigate the association between alcohol risk awareness and alcohol drinking among youth. Four questions assessed knowledge of alcohol use as causing (a) problems in the liver, (b) cancer of the mouth, throat, esophagus, and breast, (c) damage in the heart, and (d) weakening of the immune system; the total score on all questions was categorized into belowaverage and above-average knowledge level. Multivariate regression analyses assessing the adjusted association between several past-year drinking outcomes, including DSM-5 defined alcohol-use disorders, and level of knowledge, controlling for sociodemographics (age, gender, education level) were conducted. Results: Around half of the sample (50.4%) were past-year drinkers and of those, 17.6% had a 12-month prevalence of any DSM-5 AUD. Respondents who had above- vs belowaverage awareness were 3.3 times more likely to be abstainers vs. current drinkers [OR=3.26 (1.06, 10.07)], and almost four times more likely to binge drink less than once/month vs. 3-4 times/week or more [OR=3.60 (1.61, 8.05)] adjusting for sociodemographics. Conclusion: Raising awareness of the long-term health risks caused by alcohol consumption among students could be an effective way to influence alcohol consumption.

0371

PATTERNS OF FORMER DRINKING AND THEIR RELATIONSHIP WITH HOSPITALIZATIONS, CARDIOVASCULAR DISEASE, AND DEATH IN THE ARIC (ATHEROSCLEROSIS RISK IN COMMUNITIES) STUDY Natalie R. Daya* Natalie R. Daya, Casey M. Rebholz, Lawrence J. Appel, Elizabeth Selvin, Mariana Lazo, (Johns Hopkins University)

Excessive alcohol consumption is a risk factor for poor health outcomes but moderate consumption may reduce the risk of cardiovascular disease (CVD). Few studies have examined the association of patterns of alcohol consumption prior to quitting with subsequent health outcomes. We seek to understand if patterns of prior drinking modified the risk of hospitalizations, CVD and death among former drinkers. Participants from the ARIC Study were followed from 1993 to 2015. Participants were categorized as never, moderate (≤1 and ≤2 drinks/day for women and men, respectively), and former drinkers with or without a history of heavy episodic drinking (self-report consumption of 5 or more drinks almost every day). We used Cox models adjusted for established risk factors to examine the associations with all-cause and cause-specific hospitalizations, CVD, and death. Among 12,763 participants (mean age 60 years, 56% female, 23% black), 24% were former drinkers and 15% of them reported history of heavy episodic drinking. Over a median follow-up of 20.5 years, former drinkers had a higher risk of all-cause hospitalizations, external causes of injuries and poisonings, death and heart failure compared to moderate drinkers. Furthermore, former drinkers with a history of episodic drinking had a significantly higher risk of hospitalization and death compared to former drinkers without a history of heavy episodic drinking [hospitalization: HR (95% CI), 1.36 (1.23-1.52) vs. 1.16 (1.09-1.22), p=0.003; death: 1.60 (1.40-1.83) vs 1.30 (1.20-1.41), p=0.004]. Among former drinkers, those who experienced a hospitalization or died during follow-up, drank for a longer period and reported higher consumption in the past. Former drinking is associated with poor health outcomes, whether or not there was a history of heavy drinking. Former drinkers with a history of heavy drinking had a greater risk of adverse health outcomes after cessation than those without a history of heavy drinking.

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LINKING DSM-V ALCOHOL-USE DISORDERS WITH POLICY-RELEVANT CORRELATES IN YOUNG ADULTS: IMPLICATIONS FOR AN EVIDENCE-INFORMED NATIONAL ALCOHOL HARM REDUCTION POLICY Lilian Ghandour* Lilian Ghandour, Sirine Anouti, (American University of Beirut)

A total of 1155 university students from 8 private and public universities from Lebanon participated in a survey in May 2016 aimed at understanding the association between policy-relevant factors and alcohol consumption. Among pastyear drinkers (n=582), 15% were screened with DSM-V moderate to severe alcoholrelated problems. Compared to drinkers with no AUD, they were also more likely to purchase their alcohol beverages mostly from pubs/bars [OR=2.43 (1.16, 5.08)] and to recall seeing alcohol ads worn by sports players [OR=2.8 (1.70, 4.61)]. Drinkers with moderate/severe alcohol problems (versus no AUD) also believe that earlier closing times for pubs/bars [OR=2.23 (1.48 -3.35)], banning all forms of alcohol marketing [OR=1.8 (1.00, 3.24)], pricing promotions [OR=2.21 (1.33, 3.65)], as well as enforcing a minimum BAC [OR=2.11 (1.07, 4.13)] would decrease their alcohol consumption levels, all probable points of entry for a national alcohol harm reduction policy, also supported by additional data including: (1) 40% of past-year drinkers reported drive through drinking stores that sell cheap low quality alcohol as their source of alcohol, in addition to music concerts/other events; (2) only 8% of past year drinkers (who reported drink-driving) were pulled over for a breath test; (3) 98% reported an alcohol outlet near school/home, 88% perceived alcohol as easily accessible, 92% had never been asked for ID when purchasing alcohol, and less than 1% have been refused alcohol after they have had too much to drink; (4) and lastly, students choice of alcoholic drink as well as brand most recalled matched the alcohol brands most advertised. In the absence of specialized care for people with alcohol-problems, coupled with an alcogenic environment characterized by cheap, widely available and heavily advertised alcoholic beverages, Lebanon is one of many countries that must strengthen their national response via a contextualized evidence-based alcohol harm reduction policy.

EFFECTS OF GOOD SAMARITAN LAWS ON PRESCRIPTION OPIOID AND HEROIN OVERDOSE FATALITIES Nicole Kravitz-Wirtz* Nicole Kravitz-Wirtz, Corey Davis, Bill Ponicki, Paul Gruenewald, David S. Fink, Silvia Martins, Brandon DL Marshall, Garen Wintemute, Magdalena Cerda, (University of California, Davis)

Good Samaritan laws (GSLs), which provide legal protection to anyone who seeks medical assistance in the event of a drug overdose, have been advanced as part of larger efforts to reduce opioid-related harm. The only studies to examine the impacts of these laws have done so at the state level; however, state-level studies may mask critical variation at the local level. The aim of this study was to examine the immediate and longer-term effects of GSLs on county-level incidences of fatal overdose involving prescription opioids (POs) and heroin. County-by-year mortality data were drawn from the National Vital Statistics System for 49 states and the District of Columbia for 2002-2015. We used Bayesian space-time Poisson models with cumulative lag effects estimated for the year of GSL implementation and up to three successive years. These models utilize a conditional autoregressive random effect that accounts for spatial dependence between adjacent counties, a non-spatial random effect that accounts for residual county-level variation, and a zero-centered, non-spatial random time trend to capture changes in overdose between counties. Models also include a fixed-effect linear time trend to account for changes in overdose common to all states and state dummy variables to correct for differences in the propensity for states to adopt a GSL. GSLs were increasingly associated with decreases in fatal PO overdose. By year three of operation, GSLs were linked to a 19% reduction in the relative risk of PO mortality (95% CI=0.77-0.84). Legal immunity for possession of controlled substances or drug paraphernalia was a particularly important feature of these laws. Conversely, GSLs were increasingly associated with increases in fatal heroin overdose (RR=1.29, 95% CI=1.18-1.40 by year three). These findings suggest that GSLs may reduce overdose fatalities involving POs but not heroin. Additional research is needed to determine how the effectiveness of GSLs could be further improved.

DIFFERENCES IN MARIJUANA USE DISORDER AMONG USERS OF DIFFERENT TYPE OF MARIJUANA IN CHILE SINCE 2014 TO 2016 Nicolás Rodriguez* Nicolás Rodriguez, Pedro P. Seguel, Alvaro Castillo-Carniglia, Esteban Pizarro, José D. Marin, (Pontificia Universidad Católica de Chile)

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Background: Marijuana use more than tripled between 2010 and 2016 in Chile (4.6% vs. 14.5% in past year use). A recent report showed variations in the composition of the type of marijuana that is consumed in Chile, which may affect rates of marijuana use disorders in the population. We investigated the change in marijuana use disorder between 2014 and 2016 among users of different type of marijuana. Method: We used data from the National Survey on Drug Use in Chile of 2014 and 2016. The survey has a three-stage random sample (n 2014=20,113, n 2016=19,147), and considers people between 12-65 years of age. We estimated the proportion of people who meet criteria for marijuana dependence among respondents who declared the use of marijuana in the last year, based on the tenth revision of the International Classification of Diseases. We stratified results by three different types of marijuana most frequently consumed: resin, flowers of lowmedium potency, and flowers of high-potency (skunk). We used Wald test to determine changes in marijuana dependents between 2014 and 2016, and by type marijuana. Results 15.8% met criteria for marijuana dependence in 2016 and 17.3% in 2014. The proportion of people who use high-potency marijuana went from 5.7% in 2014 to 9.7% in 2016. There was no change in the proportion of marijuana dependence among resin users between 2014 and 2016 (31.6% vs. 32.8%), as well as for those who mainly use low-medium potency marijuana (14.6% vs. 12.1%). In the group that used high-potency marijuana, however, there is a significant increase in the proportion of subjects that meet dependence criteria, passing from a 10.9% in 2014, to a 29.0% in 2016 (p=0.0059). Conclusion: There is a change in the kind of marijuana that is being used in Chile within those who meet criteria for dependence. High-potency marijuana may increase the risk for substance use disorder and should be considered in future public health interventions.

THE CRCS-WISDM PROJECT: A MULTILEVEL, SHARED DECISION MAKING INTERVENTION TO INCREASE COLORECTAL CANCER SCREENING. Resa M. Jones* Resa M. Jones, Keighly Bradbrook, Pamela J. Mink, David C. Wheeler, Diane L. Bishop, (Department of Epidemiology and Biostatistics, College of Public Health, Temple University and Fox Chase Cancer Center)

Background: Colorectal cancer screening (CRCS) prevalence is suboptimal and barriers exist at the health system-, clinician-, and patient-level. Thus, multilevel interventions hold promise to increase adherence. Methods The CRCS with Improved Shared Decision Making (CRCS-WISDM) Project aimed to increase CRCS among average-risk adults, 50-75 years, using an evidence-based intervention (N=6 communities; 2 intervention, 4 comparison). CRCS-WISDM embedded shared decision making (SDM) in community-based primary care in a large MN health system using a non-obtrusive system enhancement involving clinicians and patients. Specifically, an electronic health record (EHR) algorithm identified nonadherent patients and custom best-practice-alerts enabled CRCS orders or SDM delivery to patients by trained nurse clinicians. We obtained annual cross-sectional EHR data (2010-2014: baseline, Times 1-3) for eligible patients seen in participating clinics (N range: 12,430-15,465). Intention-to-treat logistic regression, adjusting for model-specific confounders (e.g., gender, age, insurance) and baseline screening, determined the intervention effect on overall CRCS adherence (i.e., stool test in last year, sigmoidoscopy in last 5 years, colonoscopy in last 10 years). Results: Overall, the population was 52.3% female, 34.1% ≥65 years, and 58.1% had private insurance. During baseline, adherence increased more significantly in the intervention condition compared to the comparison (33.3% vs. 28.6%, p<0.001). After adjustment, the odds of adherence were significantly higher in the intervention compared to the comparison: Time 1 adjusted odds ratio (aOR)=1.34, 95% confidence interval (C1): 1.12-1.50; Time 2 aOR=1.33, CI: 1.18-1.49; Time 3 aOR=1.27, CI: 1.11-1.44). Conclusions: A translational, multilevel intervention designed to address health system-, clinician-, and patient-level barriers to CRCS results in meaningful increases in CRCS adherence, which could ultimately decrease mortality.

WHO'S AT RISK? ADJUSTED ESTIMATES OF HYSTERECTOMY INCIDENCE AMONG WOMEN WITH BENIGN GYNECOLOGIC CONDITIONS IN NORTH CAROLINA Danielle R Gartner* Danielle R. Garter, Robert A. Hummer, Paul Delamater, Jennifer Lund, Brian W. Pence, Whitney R. Robinson, (University of North Carolina at Chapel Hill)

Background: Because hysterectomy (uterus removal) is the second most common surgical procedure among non-elderly American women, failure to exclude women with previous hysterectomy from rate denominators may underestimate incidence rates. Estimates of racial/ethnic difference may be particularly biased due to differential prevalence of hysterectomy by race/ethnicity. Purpose: We aim to estimate racial/ethnic-specific hysterectomy incidence rates after removing from the denominator women not at risk due to previous hysterectomy. Methods: We used surveillance data from the 2014 North Carolina (NC) Hospital Discharge and NC Ambulatory Surgery Visit databases to estimate racial/ethnic-specific hysterectomy counts for women aged <45 years with benign gynecologic conditions (N=7,098). Denominator data were derived from 2014 age-, race-, and sex-specific NC population estimates from the American Community Survey. We then applied NC racial/ethnic-specific hysterectomy prevalence estimates from the 2012 Behavioral Risk Factor Surveillance System to remove women with previous hysterectomy from denominators. Rates were age-adjusted to the 2000 Decennial Census. Results: After denominator correction, age-standardized hysterectomy rates varied by race/ethnicity (range: 6.1 (non-Hispanic [NH] Asian) to 76.5 (NH American Indian [AI]) per 10,000 women-years [WY]). Although least precise, the highest rate increase attributable to denominator correction was among NH AI women (corrected: 76.5 per 10,000 WY [95% CI, 13.2-139.8] vs. uncorrected: 64.5 per 10,000 WY [95% CI, 10.9-118.0]). The denominator-corrected NH White rate was 45.1 per 10,000 WY (95% CI, 38.3-51.9) (vs. uncorrected: 42.4 per 10,000 WY (95% CI, 36.0-48.7). All racial/ethnic rate differences (ref: NH White women) increased after correction. Conclusion: By not accounting for the appropriate at-risk population, hysterectomy incidence rates are likely underestimated, as are the magnitude of racial/ethnic disparities.

0392 S/P

THE RELATIONSHIP BETWEEN URINARY BISPHENOL A CONCENTRATIONS, ESTROGEN RECEPTOR GENE AND BREAST CANCER Yu-Ting Tseng* Yu-Ting Tseng, Tsu-Nai Wang, (Department of Public Health, College of Health Science, Kaohsiung Medical University)

Introductions Breast cancer is one of the most common diseases in women. Compared to other western countries, there is a younger trend in Taiwan. The gene expression of estrogen receptor plays an important role in breast cancer pathogenesis. Environmental hormones such as bisphenol A, had been suspected that they had estrogen effects. The aims of present study is to explore the relationship between the environmental hormones, gene expression of estrogen receptor and breast cancer by a case-control study. Materials and Methods Breast cancer patients were recruited from Kaohsiung Medical University Hospital and health controls were recruited from communities in Kaohsiung. Cases were diagnosed by physicians, and were confirmed by the pathological lesion examination. 224 cases and 30 health controls were included for further analysis. We categorized the cases according to the diagnosis age of 40 into two groups of early onset and non-early onset patients. Finally, we measured the bisphenol A concentrations in urine and gene expression levels of estrogen receptor (ESR2). Results The present study found that early onset patients have the highest concentrations of bisphenol A in urine. Although the statistical analysis didn't show a significant difference, the results showed the significant trend effect. Gene expression level of ESR2 is significantly different between early onset and non-early onset groups, and the health controls have the highest ESR2 levels among three groups. We found that the odds ratio is 8.1 in upper tertile concentration of BPA for breast cancer. The BPA concentrations of early onset breast cancer are higher than non-early onset breast cancer. Conclusions The present study found that bisphenol A exposure may increase the risk of breast cancer and even the early onset breast cancer. Bisphenol A may regulate gene expression of estrogen receptor and influence the pathogenesis of breast cancer.

0391

DIETARY LONG-CHAIN OMEGA-3 FATTY ACIDS AND RISK OF UTERINE FIBROIDS IN THE STUDY OF ENVIRONMENT, LIFESTYLE, AND FIBROIDS (SELF) Theodore M. Brasky* Theodore M. Brasky, Traci N. Bethea, Ganesa R. Wegienka, Donna D. Baird, Lauren A. Wise, (The Ohio State University-James Comprehensive Cancer Center)

Uterine fibroids are a common, often painful, benign neoplasm diagnosed in women of reproductive age and are responsible for significant medical expenditure. In the U.S., rates of fibroid diagnoses among black women are at least twice that of white women. In a recent cohort study of black women, we reported positive associations between long-chain omega (n)-3 polyunsaturated fatty acid (PUFA) intake and fibroid risk. Here, we examine these associations in a separate cohort of black women living in the Detroit area. During 2010-2012, we recruited 1,696 premenopausal women aged 23-34 years, without a history of uterine fibroids, autoimmune disease, or cancer. Based on ultrasonography at enrollment, 20, and 40 months of follow-up, 1,232 women were eligible for analysis of fibroid incidence, among whom 199 incident cases were identified. Women answered a baseline selfadministered questionnaire with questions on demographics, reproductive and medical history, and lifestyle, including a 110-item food frequency questionnaire, from which dietary intakes of α-linolenic, eicosapentaenoic (EPA), docosapentaenoic (DPA), and docosahexaenoic acids (DHA) were estimated. Fatty acid intakes were energy-adjusted and categorized into quartiles. We calculated a composite variable representing long-chain n-3 PUFA intake by summing intakes of EPA, DPA, and DHA. We used Cox models to estimate adjusted HRs and 95% CIs for associations between n-3 PUFA and fibroid risk. Overall, intakes of individual and total long-chain n-3 PUFA were not consistently or appreciably associated with fibroid risk. However, HRs for the highest versus the lowest quartiles of DHA (1.29, 95% CI: 0.85, 1.96) and total long-chain n-3 PUFA (1.17, 95% CI: 0.77, 1.78) were similar in magnitude to those previously reported. These data are suggestive of a possible relation between dietary long-chain n-3 PUFAs and fibroid risk; further follow-up in the cohort will be conducted to confirm these findings.

0393

INSIGHT INTO BLADDER HEALTH: THE RELATION BETWEEN LOWER URINARY TRACT SYMPTOMS AND INTERFERENCE IN WOMEN Siobhan Sutcliffe* Siobhan Sutcliffe, Tamara Bavendam, Charles Cain, C. Neill Epperson, Colleen Fitzgerald, Sheila Gahagan, Alayne Markland, David Shoham, Ariana Smith, Mary Townsend, Kyle Rudser, (Washington University in St. Louis)

BACKGROUND: Little research to date has focused on lower urinary tract symptoms (LUTS) prevention and bladder health promotion. To address this gap, the Prevention of Lower Urinary Tract Symptom Research Consortium developed a working bladder health definition as "A complete state of physical, mental and social well-being related to bladder function that permits daily activities [and] allows optimal well-being." We used existing data from the Boston Area Community Health (BACH) Survey to begin to quantify the distribution of this definition, drawing upon extensive LUTS data and unique LUTS-specific interference with activities data. METHODS: At baseline, participants reported their frequency of 15 LUTS and interference with 7 activities (e.g., drinking fluids before bed; adapted from the validated Epstein scale). Prevalence estimates were weighted, and prevalence ratios (PRs) were calculated by log-link generalized linear models with robust variance estimation, adjusting for known LUTS risk factors and individual LUTS. RESULTS: Of the 2,697 women with complete data, 23.0% reported no LUTS or interference, 2.7% reported at least a little interference but no LUTS, 44.8% reported rare or greater LUTS but no interference, and 29.5% reported both. LUTS independently associated with interference were weak stream, urgency incontinence, urgency, nocturia, perceived frequency, and frequency (PRs=I.3-1.5, p<0.05). CONCLUSIONS: Our findings begin to inform and quantify the spectrum of bladder health, demonstrating a sizeable group of women without LUTS or interference who might be considered to have optimal bladder health; a larger group of women with LUTS but no interference, or interference but no LUTS, who might be considered to have good/intermediate health; and another sizeable group of women with worse health i.e., those with both LUTS and interference.

YELLOW FEVER VACCINATION IN RELATION TO PREGNANCY AMONG US ACTIVE DUTY MILITARY WOMEN Zeina G Khodr* Anna T Bukowinski, Zeina G Khodr, Richard N Chang, Gia R Gumbs, Ava Marie S Conlin, Susan C Farrish, (The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc.)

Yellow fever (YF) is a zoonotic infection, endemic to parts of Africa and South America, with 50% fatality rates among symptomatic cases. US service members deployed/stationed in regions endemic to YF require vaccination against this potentially fatal infection. YF vaccination is precautionary in pregnancy, as it may lead to adverse pregnancy and birth outcomes, and inadvertent vaccination may occur among women unaware of their pregnancy status. We conducted a descriptive analysis of the occurrence of YF vaccination preconceptionally/in pregnancy among active duty military mothers. The study population included 163,596 pregnancies ending in live deliveries to military mothers from 2003-2014. Pregnancies were captured by the Department of Defense Birth and Infant Health Research program and linked to vaccine records. Descriptive analyses compared women who received YF vaccine 28 days prior to their last menstrual period (LMP)-since this vaccine is live attenuated-through date of delivery with those who did not receive the vaccine preconceptionally/in pregnancy. Out of the 163,596 mothers, 1,195 were vaccinated preconceptionally/in pregnancy: 467 in the 28 days prior to LMP, 625 in the first trimester, and 103 in the second/third trimester. Most (861 of 1,195) received their initial dose in pregnancy; 29 (of 1,195) received >1 vaccine in pregnancy. Vaccinated mothers were more likely to be younger, unmarried, of enlisted rank, and in a combat role (but not health care occupation). These mothers were also more likely to receive other vaccines in pregnancy, including hepatitis A. Army mothers accounted for most YF vaccinations preconceptionally/in pregnancies from 2003-2005, which shifted to Navy mothers from 2006-2014. Understanding the characteristics of women who receive YF vaccination preconceptionally/in pregnancy may help guide future policy. Given the increasing number of military women, vaccine safety in pregnancy is a priority for protecting military families.

EFFECTS OF FINE PARTICULAR MATTER AND BLACK CARBON ON MARKERS OF OVARIAN RESERVE AND RESPONSE AMONG WOMEN UNDERGOING IN VITRO FERTILIZATION Audrey Gaskins* Audrey Gaskins, Kelvin Fong, Yara Abu Awad, Jorge Chavarro, Brent Coull, Joel Schwartz, Russ Hauser, Francine Laden, (Harvard T.H. Chan School of Public Health)

Background: Although studies suggest that air pollution may decrease fecundity, the specific mechanisms are still unclear. We examined the association between residential exposure to fine particular matter (PM2.5) and black carbon (BC) on markers of ovarian reserve and response among women undergoing in vitro fertilization (IVF) in New England. Methods: Our analysis included 343 women for the PM2.5 analysis (2005-2016) and 224 women for the BC analysis (2005-2011) enrolled in a prospective cohort study of couples undergoing a fresh IVF cycle at an academic fertility center. Using geocoded residential addresses, we used spatiotemporal models to estimate PM2.5 and BC exposure during the 3 months prior to IVF and during controlled ovarian stimulation (~12 days). We used multivariable generalized linear mixed models to evaluate the associations. Results are presented as the absolute or % change (95% CI) in the outcome per interquartile range (IOR) increase in PM2.5 or BC. Results: An IOR increase in exposure to PM2.5 in the 3 months prior to IVF was associated with slightly higher day 3 FSH levels [0.12 IU/L (-0.04, 0.29)] while an IQR increase in BC exposure was associated with higher peak estradiol levels [341.3 pmol/L (183.8, 498.7)]. During controlled ovarian stimulation, an IQR increase in PM2.5 was associated with a higher number of fertilized oocytes [7.4% (2.4, 12.7%)] while for BC exposure it was associated with higher number of mature [13.6% (5.4, 22.4%)] and fertilized oocytes [18.9% (9.0, 29.7%)]. Neither PM2.5 nor BC exposure was associated with endometrial thickness or total oocyte counts. Conclusions: Higher residential exposure to PM2.5 prior to IVF was associated with lower ovarian reserve and may be one mechanism linking air pollution to reduced fecundity. Paradoxically, higher short-term BC exposure was associated with better response to ovarian stimulation as measured by higher peak estradiol levels and higher mature and fertilized oocyte yields.

0402 S/P

MATERNAL CONCENTRATIONS OF SERUM PER- AND POLYFLUOROALKYL SUBSTANCES DURING PREGNANCY AND BIRTH SIZE IN BRITISH BOYS Anya Cutler* Anya Cutler, Zuha Jeddy, Kate Northstone, Kristin Marks, Terry Hartman, (Emory University Rollins School of Public Health, Centers for Disease Control and Prevention)

Per- and polyfluoroalkyl substances (PFAS) have been widely used in commercial and industrial manufacturing processes since the 1950's. Some epidemiology studies have found significant associations between PFAS exposure and reproductive health effects, such as semen quality, perinatal fetal toxicity, reduced fecundity, and reduced birth size in baby girls. This study examined the association of prenatal maternal serum concentrations of perfluorooctane sulfonate (PFOS), perfluorooctanoate (PFOA), perfluorohexane sulfonate (PFHxS), and perfluoroonanoic acid (PFNA) and birth size in boys. The study included 457 mother-singleton son dyads participating in the Avon Longitudinal Study of Parents and Children (ALSPAC). Birth weight (g), crown to heel length (cm), and head circumference (cm) were collected at delivery. PFAS were detected in all maternal serum samples, with the exception of two samples below the limit of detection (<0.1ng/mL) for PFNA. Median concentrations (IOR) were 13.8ng/mL (11.0, 17.7), 3.0ng/mL (2.8, 3.3), 1.9ng/mL (1.4, 2.5), and 0.4 ng/mL (0.3, 0.5) for PFOS, PFOA, PFHxS, and PFNA, respectively. In multivariable linear regression models adjusted for gestational age at birth, maternal age, maternal pre-pregnancy BMI, folic acid use, smoking during pregnancy, alcohol use during pregnancy, and parity, significant inverse associations were detected between PFOS (continuous) and birth weight ($\beta = -7.6726$, 95% CI = -14.0185, -1.3267) and crown to heel length ($\beta =$ -0.0375, 95% CI = -0.0654, -0.0096). However, we did not find statistically significant associations between birthweight or crown to heel length and PFOA, PFHxS and PFNA after adjustment for the aforementioned covariates. We concluded that prenatal exposure to high levels of PFOS may be associated with reduced birth size in male babies.

0401

MALE CELLULAR TELEPHONE USE AND FECUNDABILITY IN A NORTH AMERICAN PRECONCEPTION COHORT STUDY Elizabeth Hatch* Elizabeth E. Hatch, Sydney I. Willis, Amelia K Wesselink, Mikkelsen EM, CJ McKinnon, Kenneth J Rothman, Lauren A Wise, (Boston University School of Public Health)

Male factors contribute to nearly half of all infertility cases, and several studies suggest that semen quality may be declining in developed countries. In vitro studies have reported lower semen quality following radiofrequency exposure within the range emitted by cellular telephones. Several epidemiologic studies have found associations between cell phone use and semen quality, although results are inconsistent. We examined the association between exposure to cell phone radiofrequency radiation and fecundability in a preconception prospective cohort study, Pregnancy Study Online (PRESTO). At baseline, men reported detailed data on medical history, lifestyle and behavioral factors, including how many hours/day they carried their phone while turned on in the following locations: front, side, back pocket of pants, belt carrier, or shirt pocket. On bimonthly follow-up questionnaires completed by the female partners, pregnancy status was updated until reported pregnancy or for up to 12 months. Fecundability ratios (FR) and 95% confidence intervals (CI) were derived from proportional probabilities models, controlling multiple covariates such as age, race/ethnicity, education, smoking status and BMI. We restricted analyses to 1242 couples who had been trying to conceive for ≤6 cycles at study entry. FR (Cl) for hours carrying a cell phone at any body location were: 0.89 (0.52, 1.53), 0.93 (0.55, 1.57), 0.89 (0.53-1.50) and 0.71 (0.39-1.29), for <1-2, 3-7, 8-12, and ≥13 hours/day, compared with no hours, respectively. When we evaluated front pants pocket exposure, which was the most common primary location (62%), FR (CI) were 0.78 (0.64-0.98), 0.94 (0.75-1.18), and 0.79 (0.62-1.00) for <1-2, 3-7, and 8 or more hours respectively, relative to no hours in the front pocket. There was little association between back pocket location and fecundability. These results indicate no striking pattern, but could also be consistent with a slight reduction in fecundability.

0403 S/P

AMBIENT AIR POLLUTION AND INTRAUTERINE GROWTH RESTRICTION: PHYSICIAN DIAGNOSIS OF INTRAUTERINE GROWTH RESTRICTION VERSUS POPULATION-BASED SMALL-FOR-GESTATIONAL AGE Carrie Nobles* Carrie Nobles, Katherine Grantz, Danping Liu, Andrew Williams, Indulaxmi Seeni, Seth Sherman, Pauline Mendola, (National Institutes of Health, NICHD)

Introduction: Ambient air pollution, associated with systemic inflammation and oxidative stress, may affect placentation and induce epigenetic changes associated with intrauterine growth restriction (IUGR). Prior studies of air pollution and smallfor-gestational age (SGA), a commonly used proxy for IUGR, have had inconsistent results. We assessed ambient air pollution in relation to both IUGR and SGA in the NICHD Consecutive Pregnancy Study. Methods This study included 50,005 women with at least two singleton births (112,203 total births) at 20 Utah hospitals between 2002-2010. IUGR was captured from medical records and ICD-9 codes (656.5 "Poor fetal growth"), and SGA determined by population standards for birthweight <10th, <5th and <3rd percentile. Community Multiscale Air Quality (CMAQ) models estimated ambient levels of 7 criteria air pollutants for whole pregnancy, 3-month preconception, and 1st, 2nd and 3rd trimester exposure. Generalized estimating equations with robust Poisson regression accounted for interdependency of pregnancies within participant. Models adjusted for maternal age, race/ethnicity, pre-pregnancy body mass index, smoking, alcohol use, parity, insurance type, marital status, asthma and ambient temperature. Results: IUGR was diagnosed in 1.5% of infants, and 6.7% were <10th, 2.7% <5th and 1.5% <3rd percentile for SGA. Consistent positive associations of SO2, NO2 and PM10 and negative associations of O3 with IUGR were observed throughout preconception and pregnancy. For example, an interquartile increase in whole pregnancy SO2 was associated with a 16% (95% confidence interval [C1] 1.08, 1.25), NO2 a 17% (95% CI 1.09, 1.26) and PM10 a 12% (95% CI 1.06, 1.19) greater risk of IUGR. The association with SGA was less clear, with inferences limited by small and imprecise estimates. Conclusion: Results suggest chronic air pollution exposure may be associated with IUGR and that SGA may not be an adequate proxy for IUGR in this low-risk population.

NEONATAL CONCENTRATIONS OF ENDOCRINE DISRUPTING CHEMICALS AND CHILD BEHAVIORAL DIFFICULTIES IN A LONGITUDINAL US COHORT Akhgar Ghassabian* Akhgar Ghassabian, Erin M. Bell, Wanli Ma, Rajeshwari Sundaram, Mrudula Naidu, Kurunthachalam Kannan, Germaine M. Buck Louis, Edwina Yeung, (New York University School of Medicine, New York, NY)

Background: Experimental studies suggest that prenatal exposure to endocrine disrupting chemicals interferes with developmental processes in the fetal brain. Yet, evidence is inconclusive. Methods In a birth cohort (2008-2010, upstate New York), we quantified concentrations of bisphenol A (BPA), perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) in banked newborn dried blood spots using liquid chromatography tandem mass spectrometry. Mothers reported on children's behavior using the Strength and Difficulties Questionnaire at age 7 (650 singletons and 138 twins). Difficulties in behavior (i.e., emotional, conduct, hyperactivity, and peer problems) and prosocial skills were classified at validated cutoffs. We used logistic regression with generalized estimating equations to estimate the odds of having difficulties per exposure category. Models were adjusted for maternal and child characteristics, e.g., ethnicity, smoking, parity, and prepregnancy body mass index (and preterm delivery for BPA). Results: 111 children (12.1%) had behavioral difficulties and 55 had problems in prosocial skills. The median (interquartile range) of PFOS, PFOA, and BPA were 1.74 ng/ml (1.33), 1.12 ng/ml (0.96), and 7.93 ng/ml (10.79), respectively. Higher PFOS levels were associated with increased odds of having behavioral difficulties (OR per SD of log PFOS=1.33, 95%CI: 1.05-1.67). We observed associations between PFOS in the high relative to the lowest quartile and behavioral difficulties (OR for PFOS1.14-1.74=1.73, 95%CI:0.87-3.44; PFOS1.75-2.48=1.83, 95%CI:0.93-3.57; and PFOS>2.48=2.56, 95%CI:1.34-4.91 compared to PFOS<0.71). Higher PFOA levels were linearly associated with problems in prosocial skills (OR=1.36, 95%CI:1.05-1.76). We found no association of child behavior with BPA, nor interactions with sex or plurality. Conclusion: Increasing prenatal exposure to PFOS and PFOA, as reflected in neonatal concentrations, may pose risk of child behavioral difficulties.

SCREENING PREGNANT WOMEN FOR SUICIDAL BEHAVIOR IN ELECTRONIC MEDICAL RECORDS: DIAGNOSTIC CODES VS. CLINICAL NOTES PROCESSED BY NATURAL LANGUAGE PROCESSING Qiu-Yue Zhong* Qiu-Yue Zhong, Elizabeth W. Karlson, Bizu Gelaye, Sean Finan, Paul Avillach, Jordan W. Smoller, Tianxi Cai, Michelle A. Williams, (Harvard)

Objective: We examined the comparative performance of structured, diagnostic codes vs. natural language processing (NLP) of unstructured text for screening suicidal behavior among pregnant women in electronic medical records (EMRs). Methods: Women aged 10-64 years with at least one diagnostic code related to pregnancy or delivery (N=275,843) from Partners HealthCare were included as our "datamart." Diagnostic codes related to suicidal behavior were applied to the datamart to screen women for suicidal behavior. Among women without any diagnostic codes related to suicidal behavior (n=273,410), 5,880 women were randomly sampled, of whom 1,120 had at least one mention of terms related to suicidal behavior in clinical notes. NLP was then used to process clinical notes for the 1,120 women. Chart reviews were performed for subsamples of women. Results: Using diagnostic codes, 196 pregnant women were screened positive for suicidal behavior, among whom 149 (76%) had confirmed suicidal behavior by chart review. Using NLP among those without diagnostic codes, 486 pregnant women were screened positive for suicidal behavior, among whom 146 (30%) had confirmed suicidal behavior by chart review. Conclusions: The use of NLP substantially improves the sensitivity of screening suicidal behavior in EMRs. However, the prevalence of confirmed suicidal behavior was lower among women who did not have diagnostic codes for suicidal behavior but screened positive by NLP. NLP should be used together with diagnostic codes for future EMR-based phenotyping studies for suicidal behavior.

NOVEL USE AND COMBINATIONS OF POPULATION-BASED BIG DATA FOR THE STUDY OF RARE OUTCOMES AND TRANSIENT ECOLOGICAL EXPOSURES Ellicott Matthay* Ellicott C. Matthay, Kara E. Rudolph, Dana E. Goin, Kriszta Farkas, Jennifer Ahern, (Division of Epidemiology, University of California-Berkeley School of Public Health)

Recent increases in the size, scope, and availability of large health data facilitate epidemiologic studies that leverage and combine different data sources in efficient ways. One application in which these data are particularly useful is for populationbased case-control studies with transient ecological exposures. Large existing databases can be used to identify many cases and to link these cases to controls and exposure data for well-powered studies with a high degree of geographic and temporal precision. We compare and contrast several population-based case-control and case-crossover approaches that draw controls from different time periods and data sources including population-based registries, surveys, and healthcare utilization data. We discuss strengths and weaknesses of each approach, with particular attention to likely sources of bias when studying social contextual determinants of health and when the exposure and outcome have common temporal patterning. We illustrate key issues in an application to the study of acute, within-community variation in community violence and risk of self-harm. Cases were drawn from records of all deaths and hospital visits due to self-harm in California, 2005-2013 (N=358,230). Controls were the cases themselves (case-crossover), or California resident participants of the American Community Survey (case-control). Community violence was assessed using deaths and hospital visits due to interpersonal violence in the community of residence. Preliminary results differed by study design, likely reflecting differences in the control of temporal patterning and individual- and community-level confounders achievable with each design. We suggest that a case-crossover design with controls drawn from immediately before and after the case may be least vulnerable to bias. This design suggests that acute increases in community violence were not associated with self-harm. This methodology may serve as a model for future research.

0411

EVALUATING PREDICTIVE MODEL DISCRIMINATION USING MULTIPLE SOURCES OF ELECTRONIC HEALTH DATA: HOW MUCH DATA DO WE NEED? Craig S. Meyer* Craig S. Meyer, Ning Zhang, Mary Whooley, (San Francisco VA Health Care System)

Electronic health records are used to define health conditions used for risk ad justment in clinical epidemiologic research, but the accuracy of electronic health records is often unknown. We sought to determine the extent to which predictive model discrimination would improve when data from the Centers for Medicare and Medicaid Services (CMS) was combined with data from the Veterans' Affairs (VA) Corporate Data Warehouse. We calculated model performance for 12-month mortality after hospitalization for heart failure (HF) using inpatient data files from the VA alone vs. combined data from VA and CMS. We used national inpatient files from the VA to identify 44,753 Veterans over age 65 who were discharged from VA hospitals with a primary diagnosis of HF between 2007 and 2011. Among these patients, 11,134 (25%) also had inpatient data available from CMS National Claims History files. We compared the prevalence of 14 common health conditions (including hypertension, diabetes, and ischemic heart disease) in the 12 months prior their index hospitalization for HF based on ICD9-CM code sets in VA-only to combined VA-CMS data. Chi-squared test statistics compared the distributions of each health condition between the VA-only and the combined VA-CMS data. Two logistic regression models were used to model 12-month mortality following HF and calculate the C-statistic using each set of comorbidities. Patients were predominantly male (98%) and White (76%) with a mean age of 77 years. As compared with VA data, the prevalence of health conditions was on average 6.5% (range: 3.9% to 10.5%) higher based on combined VA-CMS data. The C-statistic for the model using VA-only data was 0.598 while the model using combined VA-CMS data had a C-statistic of 0.602 [Difference= 0.004, 95% CI= (-0.001, 0.107)]. When available, researchers may need to consider multiple sources of electronic health data for accurate risk adjustment variables in clinical research.

0413 S/P

QUALITY MEASURES FOR HEALTH SYSTEM QUALITY MEASUREMENT: HARNESSING BIG DATA TO ADVANCE GLOBAL HEALTH Hannah H Leslie* Hannah H Leslie, Xin Zhou, Donna Spiegelman, Margaret E Kruk, (Harvard TH Chan School of Public Health)

Background: Further improvements in population health in low- and middle-income countries demand high-quality health systems to address an increasingly complex burden of disease. Health facility surveys provide an important but costly source of information on health system readiness to provide care. We apply unsupervised learning methods in a novel attempt to improve the efficiency of health system assessment. Methods: We drew data from nationally representative Service Provision Assessment surveys conducted in 10 countries between 2007 and 2015. We extracted 649 items in domains such as infrastructure, medication, and management to calculate a score using all possible information and classified facilities into quintiles. We used backwards selection to successively discard indicators, using a cross-validated kappa statistic to assess performance against the 649-item index. We compared three approaches: a 49-item service readiness index (SRI) predefined by the World Health Organization, a new index based on backwards selection alone, and an enriched SRI. Results: 9238 facilities were fully assessed. A new 50-item index outperformed the SRL with a kappa statistic of 0.71 compared to the score using all possible indicators vs. 0.35 for the SRI. The enriched SRI with 100 items performed similarly to a new 100-item index, with kappa statistics 0.75 and 0.81, respectively. The new index and enriched SRI achieved kappa over 90% (compared to the 649-item index) with 300 items included. Conclusion: A facility readiness measure developed by global health experts performed poorly in capturing the totality of readiness information collected during facility surveys. Using machine learning approaches to identify the most informative items dramatically improved performance, particularly with 100 or more of the 649 available items. Machine learning approaches can make assessment of health facility readiness more efficient and enhance understanding of health system performance in LMIC.

DATA SHARING IN BIG DATA EPIDEMIOLOGY: 2 NOVEL-ISH APPROACHES Stephen J Mooney* Stephen J Mooney, Daniel J Westreich, Daniel Fuller, (Harborview Injury Prevention & Research Center, University of Washington, Seattle)

Open science requires sharing data. However, removing the 18 variables that HIP AA considers personally identifying (e.g. name, phone number) may be insufficient to ensure individual privacy in many datasets. For example, the date, time, and physician code of a clinic visit uniquely identifies a patient. Generally, improvements in probabilistic matching algorithms increase the risk of deductive disclosure, wherein merging of two de-identified datasets permits identification of an individual. We consider two approaches to privacy-protecting data sharing: 1) data perturbation and 2) blind analysis. Data perturbation algorithmically modifies potentially identifying observed variables to prevent study participants from being identified while maintaining bounds of information loss. For example, the Shift and Truncate algorithm first selects a single random integer for each individual, then shifts all clinical visit dates for that subject by that integer number of days, then removes visits whose dates could reveal the shift. This prevents identification by visit date while preserving within-person time-to-event relationships. Perturbed datasets might be considered de-identified where unperturbed data would not be. Blind analysis is a change to the research process rather than to the data. In blind analysis, an analyst develops and verifies analytic code using a mock dataset with variable fields matching those of the analytic dataset. She then sends that code to a person with approval to access raw data, who can review the code, run it, and return results - thus maintaining subject privacy. Blind analysis is often used by consortia with similarly formatted data but site-specific privacy requirements and not only preserves privacy but also encourages deliberate and reproducible data analysis. Data perturbation and blind analysis each have a history in collaborative research. Epidemiologists should be familiar with recent developments in these techniques.

CANNABIS SMOKING AND RISK OF CANCER: A META-ANALYSIS OF OBSERVATIONAL STUDIES Park, Sung Hoon* Park, Sung Hoon, Myung, Seung Kwon, (Department of Cancer Control and Population Health, National Cancer Center Graduate School of Cancer Science and Policy, Goyang, Gyeonggido, Korea.)

Background. Cannabis (also called marijuana) is one of the most widely used illicit substances in the world. While cigarette smoking is a well-known risk factor for many cancers, effect of cannabis smoking on the risk of developing cancer have remained unclear. This study aimed to evaluate the association between cannabis smoking and risk of cancer. Methods. We searched PubMed, EMBASE to locate relevant publications and the bibliographies of those articles were also reviewed in October 2017. Two evaluators independently reviewed and selected eligible studies based on the predetermined selection criteria. We included observational studies such as cross-sectional, case-control, and cohort studies reporting odd ratios (OR) or relative risks (RR) for the association between cannabis smoking and any type of cancer. Subgroup analysis was conducted by cancer type (lung, oropharynx, testicle, head and neck, and others) and by smoking duration (10 years). Results. We included a total of 20 observational studies, with two cohort studies and 18 casecontrol studies. These studies involved a total of 13,646 cancer patients and 151,572 participants without cancer. The random-effects meta-analysis of all 20 studies showed no significant association between cannabis smoking and the risk of cancer (OR or RR, 1.07; 95% CI, 0.88-1.31; I^2=72.6%). Subgroup meta-analysis by type of cancer showed that cannabis smoking increased the risk of cancers of lung, testicle, and head and neck, although these results were not statistically significant. Subgroup meta-analysis did show a statistically significant increased risk of cancer when duration of cannabis smoking exceeded 10 years (OR or RR, 1.43; 95% CI, 1.11-1.82; I^2=54.2%). Conclusion. The current meta-analysis found a statistically significant increased risk of cancer when duration of cannabis smoking exceeded 10 years. Subgroup analysis by type of cancer did not reach statistical significance.

0422 S/P

SOCIO-ECONOMIC AND RACIAL/ETHNIC DIFFERENCES IN E-CIGARETTE UPTAKE AMONG CIGARETTE SMOKERS: LONGITUDINAL ANALYSIS OF THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY Alyssa F. Harlow* Alyssa F. Harlow, Andrew Stokes, (Boston University School of Public Health)

Introduction: Socio-demographic differences in electronic cigarette use among cigarette smokers have not been previously characterized in the US adult population. Methods: We analyzed longitudinal data from Waves 1 and 2 of the nationally representative Population Assessment of Tobacco and Health (PATH) study. Differences by income (based on the federal poverty limit (FPL)) and race/ethnicity in e-cigarette uptake at Wave 2 among cigarette smokers who were e-cigarette nonusers at Wave 1 were assessed using multivariable logistic regression. We differentiated e-cigarette users who quit cigarettes (exclusive users) from those who did not quit cigarettes (dual users). E-cigarette-related attitudes and beliefs were evaluated to understand their potential contribution to socio-demographic differences in e-cigarette uptake and use patterns. Results: Among 6,592 cigarette smokers at Wave 1, 13.5% began to use e-cigarettes at Wave 2, of whom 91.3% were dual users. Compared to non-Hispanic Whites, non-Hispanic Blacks and Hispanics were less likely to become exclusive e-cigarette users (OR [Blacks] =0.27, 95% CI 0.09-0.82; OR [Hispanics] =0.44, 95% CI 0.19-1.01). Low-income smokers were less likely than higher-income smokers to become exclusive e-cigarette users (OR [200% FPL] =0.58, 95% CI 0.33-1.01). Black, Hispanic, and low-income smokers were most likely to believe e-cigarettes are more harmful than cigarettes, and Hispanics were most likely to believe that most people disapprove of ecigarettes. Conclusions and Implications: Black, Hispanic, and low-income smokers were less likely than White and higher-income smokers to begin using e-cigarettes in the context of quitting cigarettes, which may be partly explained by perceived harm and social norms of e-cigarettes. These findings suggest that socio-demographic differences in e-cigarette uptake may contribute to widening disparities in cigarette smoking.

0421 S/P

INVESTIGATING THE RELATIONSHIPS BETWEEN PERCEIVED AVAILABILITY OF MARIJUANA, PERCEIVED RISK OF MARIJUANA USE, AND USE OF MARIJUANA AMONG ADOLESCENTS IN CHILE, ARGENTINA, AND URUGUAY OVER TIME Julia Schleimer* Julia Schleimer, Ariadne Rivera-Aguirre, Alvaro Castillo-Carniglia, Hannah Sybil Laqueur, Kara Rudolph, Silvia S. Martins, Magdalena Cerdá, (Columbia University)

AIM Permissive marijuana laws have prompted concern about increased access to marijuana and the normalization of marijuana use among adolescents. In light of evolving drug policies, we estimated trends in associations between adolescent perceived availability and perceived risk of marijuana and past-month marijuana use in Uruguay (UY), Argentina (AR), and Chile (CL), and examined how the relationships changed from 2001-2015. METHODS Using biennial, cross-sectional data from students (grades 8-12) in UY, AR, and CL (n=504,782) from 2001-2015, we modeled the relationship of perceived risk of regular marijuana use (no/low vs. moderate/great) and perceived availability of marijuana (easy vs. difficult/not able to obtain) with any past-month marijuana use by country. To test if the relationships changed over time, we used weighted time-varying effect models. RESULTS Students who perceived no/low risk from marijuana use [AR OR=8.1, 95% CI=(7.5, 8.8); UY OR=10.8 (9.4, 12.7); CL OR=6.0 (5.7, 6.3)] and who perceived marijuana as easily available [AR OR=15.2, 95% CI=(13.5, 17.1); UY OR=18.9 (13.1, 27.3); CL OR=4.6 (4.3, 4.9)] had higher odds of past-month marijuana use. In AR, the association between risk and use weakened from 2001 (OR=17) to 2011 (OR=9), while the link between availability and use grew from 2005 (OR=8) to 2007 (OR=20) and remained stable thereafter. In UY, the association between risk and use decreased from 2003 (OR=33) to 2014 (OR=10), while the link between availability and use remained stable (OR=25 from 2005-2014). In CL, the association between risk and use weakened from 2001 (OR=7.5) to 2015 (OR=6), while the link between availability and use peaked in 2001 and 2013 (OR=6). CONCLUSION The relationship of perceived risk and marijuana use weakened over time, while availability became a stronger determinant of use, particularly in Uruguay and Argentina. Future studies should examine factors that modulate these relationships across and within countries.

0423 S/P

NEIGHBORHOOD SOCIOECONOMIC DISADVANTAGE, DISORDER, AND ALCOHOL AVAILABILITY ASSOCIATED WITH BINGE DRINKING FROM ADOLESCENCE INTO EARLY ADULTHOOD Brian J. Fairman* Brian J. Fairman, Bruce Simons-Morton, Denise L. Haynie, Danping Liu, Rise B. Goldstein, Ralph W. Hingson, Stephen E. Gilman, (Eunice Kennedy Shriver National Institute of Child Health and Human Development)

Whether or not neighborhood-level factors such as poverty and density of alcohol outlets lead to higher rates of problem alcohol use remains unclear. Although social disorganization theory posits that poverty and crime influence adolescent deviant behaviors like drinking, the evidence is mixed, and most studies relied on crosssectional and ecological designs. Therefore, we examined if neighborhood socioeconomic disadvantage, crime, and alcohol outlet density are associated with binge drinking in a multilevel study of adolescents followed to early adulthood. Data were from six annual waves of the NEXT Generational Health Study, a nationallyrepresentative cohort of 10th graders (mean age=16.2 yrs.) followed into early adulthood (mean age=21.2 yrs; n=2750). Binge drinking within the last 30 days was based on self-report. We measured neighborhood factors by linking participants' geocoded addresses to census tract data on income, education, employment, crime, and alcohol outlets. We used multilevel mixed-effects logistic regression to relate binge drinking over time to neighborhood-level exposures controlling for individuallevel demographics and family af fluence. Neighborhood socioeconomic disadvantage was related to a higher odds of binge drinking in adolescence, but statistically inconclusive. However, a lower disadvantage in early adulthood was associated with a higher odds of binge drinking (OR = 0.7). Participants who lived within 1 km of a single alcohol outlet were more likely to binge drink (OR = 1.9); those who lived close to 2 or more outlets was related to a higher (but not statistically significant) odds of binging. The impact of neighborhood crime was inconclusive. Adolescents from socioeconomically advantaged neighborhoods may be at a greater risk for binge drinking, especially as they transition into early adulthood. Alcohol availability might contribute to this relationship, but differences in community alcohol norms, parental, and peer influences should be investigated.

HARM REDUCTION PRACTICES AND OTHER CORRELATES ASSOCIATED WITH EXPERIENCING A FENTANYL-RELATED OVERDOSE AMONG YOUNG ADULTS WHO USE DRUGS Jacqueline Goldman* Jacqueline Goldman, Maxwell Krieger, Josiah D. Rich, Traci C. Green, Scott Hadland, Brandon D.L Marshall, (Department of Epidemiology, Brown University)

Background: From 2011-2016, the United States experienced a 55% increase in overdose deaths and a 260% increase in fentanyl related overdose. Uptake of overdose prevention strategies may be higher among those who have previously experienced an overdose. This study sought to examine harm reduction uptake and practices among those who had previously experienced a fentanyl-related overdose. Methods: From May-October 2017, we interviewed 93 young adults (age 18-35) with recent heroin, cocaine, or non-medical prescription opioid use residing in Rhode Island. We assessed socio-demographic characteristics, drug use patterns, overdose history, and participants' use of harm reduction practices, as well as other behaviors associated with experiencing a suspected fentanyl-related overdose. Results:Of the 93 people in our sample, 37% (n=34) reported ever having experienced an overdose, of whom 53% (n=18) reported having previously experienced a fentanyl-related overdose. Participants who had ever experienced a fentanyl-related overdose were more likely to use heroin (prevalence ratio [PR]=2.27, 95% confidence interval [CI]=1.96-3.79) and use injection drugs (PR=2.53, CI=1.85-3.46), compared to those who had not experienced a suspected fentanyl-related overdose. When asked "what do you do to avoid an accidental overdose?", those who had previously experienced a fentanyl-related overdose were more likely to report keeping naloxone nearby (PR=2.85, CI=1.76-4.62) and using with someone else around (PR=1.64, CI=1.12-2.41). Polysubstance drug use was high among our study sample and did not differ between those who experienced an fentanyl-related overdose and those who had not (PR=0.97, CI [0.61,1.53]) Conclusion: Findings suggest that those who previously overdosed on a drug containing fentanyl are engaging in effective harm reduction practices. Future harm reduction interventions should aim to reduce other behaviors that increase the risk of overdose, including polysubstance use.
ASSESSING MISCLASSIFICATION IN RECORDS AND PROXY INTERVIEWS TO CATEGORIZE DEMENTIA IN THE CARDIOVASCULAR HEALTH STUDY (CHS): A PROBABILISTIC BIAS ANALYSIS Andreea M/ Rawlings* Andreea M. Rawlings, Adina Zeki Al Hazzouri, Anne B. Newman, Alice M. Arnold, Bruce M. Psaty, Mary L. Biggs, Chenkai Wu, Lindsay M. Miller, Oscar Lopez, Kenneth J. Mukamal, Michelle C. Odden, (School of Biological and Population Health Sciences, Oregon State University, Corvallis, OR. Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD)

Background: Data routinely collected in observational studies from phone calls, medical records, and death certificates can be used to categorize dementia, though there may be misclassification. Probabilistic bias analyses can assess the magnitude, direction, and uncertainty of the error associated with misclassification. Methods: We categorized dementia among all CHS participants (n=5888) using medications, ICD-9 codes, use of proxy due to cognitive problems, and death certificates, and compared to the gold standard adjudicated dementia assessment in the CHS Pittsburgh Cognition Study (n=923; 515 developed dementia). Using the gold standard, positive (PPV) and negative predictive values (NPV) of dementia categorization were estimated within strata defined by race and sex. In probabilistic bias analyses, we reclassified participants from the full study by drawing from binomial distributions using estimated PPVs and NPVs in 10,000 replicates. We used Cox regression to estimate the hazard ratio (HR) of dementia associated with age, race, sex, hypertension, diabetes, and APOE4 genotype for each replicate and pooled the results. We compared these results to those from a Cox model using original data. Results: ICD-9 codes had low specificity and were excluded in further analyses. The PPV was differential by race (50% for blacks, 68% for whites) and NPV by sex (90% for females, 80% for males). In bias analyses, the HR for black race was attenuated from 1.51 (95%CI:1.24-1.85) to 1.41 (95%CI:1.14-1.75). The HR for male sex showed a directional bias, changing from 0.93 (95%CI:0.84-1.02) to 1.13 (95% CI:1.03-1.24). Estimates and inferences for the other covariates were not substantially different in bias analyses; standard errors for covariates were 3-10% larger. Conclusion: Differential misclassification may lead to nonconservative biases that reverse the direction of selected risk factors, but can be recognized and addressed using probabilistic bias analyses.

0432 S/P

LONG TERM PATTERNS OF NEIGHBORHOOD-LEVEL RACIAL SEGREGATION AND MIDLIFE COGNITIVE PERFORMANCE: CORONARY ARTERY RISK DEVELOPMENT IN YOUNG ADULTS (CARDIA) STUDY Michelle R. Caunca* Michelle R. Caunca, M. Maria Glymour, Tali Elfassy, Kiarri Kershaw, Stephen Sidney, Kristine Yaffe, Lenore Launer, Adina Zeki Al Hazzouri, (University of Miami Miller School of Medicine)

Neighborhood-level racial segregation strongly predicts poor health and may influence cognition. We examined the association of segregation patterns over 25 years and cognition in black participants from CARDIA (N=1569). Segregation was quantified by the Gi*-statistic z-score, representing the racial composition in focal and neighboring census tracts relative to the greater metropolitan area. A Gi* score was computed at in baseline and years 7, 10, 15, 20, and 25. At each year, segregation exposure was classified as high (Gi*>1.96), low (Gi*<0), or medium (Gi*=0-1.96). Segregation patterns over 25 years were classified as living in always high, increasing, always medium/low or decreasing, and fluctuating segregation. Scores were obtained on the Digit Symbol Substitution (DSST), Stroop Interference, and Rey Auditory Verbal Learning (RAVLT) Tests at year 25 and standardized. We used multiple linear regression models adjusted for year 25 covariates: age, sex, site, education, and marital status (Model 1), and further adjusted for body mass index, smoking, systolic blood pressure, and physical activity (Model 2). At year 25, mean age was 50 (SD=4) years, 60% were female, 27% always lived in high segregation, 6% lived in increasing segregation, 23% always lived in low/medium or decreasing segregation, and remaining 44% lived in fluctuating segregation. Compared to always living in low/medium or decreasing segregation, always living in high segregation was associated with worse Stroop (B=-0.26, 95% CI=-0.42, -0.10), DSST (B=-0.12, 95%CI=-0.24,0.003) and RAVLT scores (B=-0.12, 95%CI=-0.24,0.01) in sociodemographic adjusted models. Associations were attenuated after adjustment for health factors (Stroop: B=-0.24, 95%CI=-0.40,-0.08; DSST: B=-0.08, 95%CI=-0.21,0.04 and RAVLT: B=-0.09, 95%CI=-0.22,0.03). Greater exposure to high segregation was associated with worse cognition. Future work is needed to examine mechanisms and associations with cognitive change.

0431

SLEEP DURATION AND DISRUPTION AS RISK FACTORS FOR MORTALITY: COMPARISON OF SUBJECTIVE AND OBJECTIVE SLEEP MEASURES IN A NATIONAL COHORT OF OLDER ADULTS Diane S. Lauderdale* Diane S. Lauderdale, L. Philip Schumm, (University of Chicago)

Many cohort studies have found that sleep duration predicts mortality, usually in a Ushape with shorter and longer sleepers having higher risk than intermediate sleepers. Almost all of these studies assessed sleep with a survey question (e.g., "How much sleep do you usually get at night?"). The accuracy of such questions is routinely acknowledged as a limitation, and the increased risk for long sleepers is controversial. Wrist actigraphy offers an objective way of estimating sleep and has been added to a few cohorts. The correlation between survey and actigraph duration is low to moderate. Limited findings about actigraph sleep and mortality have mostly been negative, including cohorts of older adults (Rotterdam, MrOS). Here we examine survey and actigraph measures of sleep duration and disruption in a nationally representative cohort of US adults born 1920-1947, the National Social Life, Health and Aging Project. In 2010, an ancillary sleep study (n=727) collected 3 nights of actigraphy. We examine whether sleep duration measured by (1) survey question, (2) calculated from reported usual bedtime and wake time, and (3) actigraphy predicts 5-year mortality in logistic regression models, using linear plus quadratic terms to test for U shape and adjusting for demographics. We also examine whether sleep disruption predicts mortality, with a survey-based insomnia symptom score and several actigraph measures of disruption. Although the three durations have correlations with each other ranging only from .29 to .38, they all have significant U-shaped associations with mortality, with nadirs at different durations. The survey question has a much stronger long sleep effect than the other two. Insomnia score did not predict mortality, but actigraph disruption measures all strongly did. We found actigraph sleep time does predict mortality in a U shape, although the long sleep effect is relatively weak. Actigraph disruption measures are highly predictive of mortality risk.

0433 S/P

CAN BIOLOGICAL AGE PREDICT MORTALITY AND MORBIDITY MORE ACCURATELY THAN CHRONOLOGICAL AGE? FINDINGS FROM THE ROTTERDAM STUDY Reem Waziry* Reem Waziry, Luuk Gras, Sanaz Sedaghat, Henning Tiemeier, Gerrit J Weverling, Mohsen Ghanbari, Jaco Klap, Frank De Wolf, Albert Hofman, M Arfan Ikram, Jaap Goudsmit, (Harvard T.H. Chan School of Public Health, Boston, MA, USA; Erasmus Medical Center, Rotterdam, Netherlands)

Background: The burden of age-related disease and disability is on the rise with remarkable growth rates of aging populations globally. However, aging rate is not universal and chronological age alone is not a sufficient indicator of susceptibility to morbidity and mortality, at some late age, in healthy individuals. A better understanding of the biological aging process and indicators of healthy aging is needed. Aims: We aimed to assess biological age as a predictor of mortality and morbidity in the Rotterdam study. Methods: Nine physiological parameters were tested in plasma samples of 2000 individuals from the Rotterdam study, reflecting six body domains: metabolic, cardiac, lung, kidney, liver, immune function and inflammation. Biological age was calculated using structural equation modelling based on validated algorithms. Results: The sample included 1,699 individuals with complete data, among which 57% were females, with mean age=70 (IQR 65-76). In ad justed cox-regression models, biological age was a better predictor than chronological age for mortality (aHR=1.13 vs 1.01) and all-cause morbidity (aHR=1.06 vs 1.00). Biological age was also a better predictor for stroke (aHR= 1.15 vs 0.94), cancer (aHR=1.06 vs 1.04), diabetes mellitus (aHR=1.12 vs 0.91) and COPD (aHR=1.06 vs 1.04). Individuals biologically younger than their chronological age had lower incidences of stroke (3% vs 8%, P < 0.001), cancer (15% vs 20%P <0.01), diabetes mellitus (6% vs 9%) and COPD (7% vs 11%P=0.01) compared to those who were biologically older. Those who were biologically younger also had a lower BMI and smoked less at the time of examination. Conclusion: Biological age could predict, more accurately than chronological age, risk of mortality, all-cause morbidity and specific age-related diseases. Further research is needed to refine the clinical applications of biological age.

TRENDS IN INCIDENCE OF DEMENTIA AND ALZHEIMER'S DISEASE Lori Chibnik* Lori Chibnik, Frank J. Wolters, Reem Waziry, Claudine Berr, Alexa Bieser, Joshua Bis, Carol Brayne, Sirwan Darweesh, Kendra Davis-Plourde, Carole Dufouil, Leslie Grasset, Vilmundur Gudnason, Jaap Goudsmit, Leslie Grasset, Vilmundur Gudnason, Christoforos Hadjichrysanthou, Catherine Helmer, M Arfan Ikram, M. Kamran Ikram, Silke Kern, Lew Kuller, Lenore Launer, Fiona Matthews, Osorio Meirelles, Matthew Pase, Sudha Seshadri, Ingmar Skoog, Blossom CM Stephan, Mei Mei Wong, Anna Zettergren, Albert Hofman, (Harvard T.H. Chan School of Public Health)

Background Several studies have recently reported a decline in the incidence of dementia by up to 20% per decade, which may have large implications for the projected burden of disease, and provide important guidance to preventive efforts against dementia. However, individual studies are often hampered by limited sample size, and prior studies have therefore not been able to provide conclusive results regarding gender differences, and underlying causes of a declining trend. Methods We aggregated data from 7 population-based cohorts from the United States and Europe to determine changes in the incidence of dementia since 1990. Included cohorts are the Framingham Heart Study, the AGES-Reykjavik Study, the Rotterdam Study, the Gothenburg studies, the Three-City Study, the Personnes Agées Quid study, and the Cognitive Function and Ageing Studies. We first calculated age- and sex-specific incidence rates per study, and then defined nonoverlapping 5-year epochs within each study to determine within study trends in incidence. Estimates of change per 10-year interval were pooled using fixed effects meta-analysis. Results Of 46,976 individuals (60% women), 4719 developed dementia in the 5-year intervals. The incidence of dementia increased steeply with age, similar across studies, from about 5 per 1000 person years in individuals aged 65-69, to roughly 60 per 1000 person years for those aged 85-89. The incidence of dementia consistently declined with on average 22% per decade (95% confidence interval 16-27%; I2[95%CI]=56%[0-85%]). Estimates were somewhat lower for Alzheimer's Disease only (17% [8-25%]), but did not materially differ between men and women. Conclusion The incidence of dementia in Europe and North America has declined by 22% per decade over the past 25 years, consistent across available studies and similar for men and women Within this collaboration we further seek potential causes of these trends, including educational attainment, and

cardiovascular risk.

THE LONGITUDINAL RELATIONSHIP BETWEEN COUNTY SOCIAL DISORGANIZATION AND CHLAMYDIA RATES IN THE UNITED STATES Diana M. Sheehan* Diana M. Sheehan, Merhawi T. Gebrezgi, Mariana Sanchez, Tan Li, Kristopher P. Fennie, Mary Jo Trepka, (Florida International University)

PURPOSE: Structural strategies addressing social determinants of sexual risk behavior could augment individual-level interventions by addressing factors that limit a person's ability to carry out risk reduction. The study's objective was to examine the longitudinal relationship between social disorganization (SD) and chlamydia rates METHODS: Six years (2009-2014) of US county-level data from the County Health Rankings and the American Community Survey were merged. Chlamydia rates were defined as the number of newly diagnosed chlamydia cases per 100,000 population. Principal component analysis was conducted with 22 variables conceptually related to SD. Three factors emerged: socioeconomic deprivation, population and residential instability, and no English proficiency. Growth curve models were used to examine the degree to which SD factors affected chlamydia rates at baseline and over time controlling for rural area and population age. Regression models were used to explore 3-year time lags between SD factors and rates. RESULTS: Among 2,788 counties, the average chlamydia rate at baseline was 446.32 with an average increase of 12.86 cases per 100,000 population per year (p-value < 0001). Counties with high rates at baseline had higher average rates of change over time (p-value <.0001). Baseline deprivation (p-value <.0001) and instability (p-value <.0001) were positively associated with baseline rates. All SD factors were associated with chlamydia rate trajectories, with deprivation being negatively associated (p-value <.0001), and instability (p-value <.0001) and no English proficiency (p-value .006) being positively associated. Only deprivation was consistently associated with 3-year lagged rates (p-value <.0001) CONCLUSION: On average, the rate of new chlamydia infections is increasing across US counties, and more rapidly for those with the highest rates. Community-level social conditions continue to be associated with yearly chlamydia rates and their trajectory.

0441 S/P

PERCEIVED STRESS AND INCIDENT SEXUALLY TRANSMITTED INFECTIONS IN A PROSPECTIVE COHORT STUDY Rodman Turpin* Rodman Turpin, Rebecca Brotman, Mark Klebanoff, Xin He, Natalie Slopen, (University of Maryland, College Park)

Background: Psychosocial stress is associated with susceptibility to a number of infectious diseases. We hypothesize that stress may increase vulnerability to sexually transmitted infections (STIs) by suppressing immune function and increasing infection susceptibility. We sought to test the association between perceived stress and incident STIs. Methods: We conducted a secondary data analysis of 2,450 women enrolled in the Longitudinal Study of Vaginal Flora which followed women at quarterly visits for one year. Perceived stress was measured at baseline using Cohen's 10-item Perceived Stress Scale (PSS), a measure of stress in the past 30 days. We fit Cox proportional hazards models to test the association between perceived stress and incident STI (Chlamydia trachomatis, Neisseria gonorrhoeae, and Trichomonas vaginalis genital infections). We also tested bacterial vaginosis (BV), a high pH and low-Lactobacillus spp. state assessed by Nugent's Gram stain score in this study, and sexual behavior risk factors (condom use, multiple sexual partners, and partner sexual concurrence) as mediators using Vanderweele's difference method, with bootstrapping to test indirect effects. Results: The highest quartile of perceived stress was significantly associated with incident STI in an unadjusted model (HR=1.61; 95% CI 1.27-2.04) and a model adjusted for race, marital status, educational attainment and income (aHR=1.48; 95% CI: 1.16-1.88). Nugent score and sexual behaviors significantly mediated 60% of this association (indirect effect β =0.235; 95% CI: 0.167-0.321). Nine percent of this association was mediated through Nugent score independent of sexual behaviors, while 37% was mediated through sexual behaviors independent of Nugent score. Conclusion: This study indicates that perceived stress is associated with STI acquisition. High risk sexual behaviors and development of BV-both known risk factors for STI-are potential mechanisms underlying this association.

0442

MEASUREMENT OF CURRENT SUBSTANCE USE IN A COHORT OF HIV-INFECTED PERSONS IN CONTINUITY HIV CARE Catherine Lesko* Catherine Lesko, Alexander P. Keil, Richard D. Moore, Geetanjali Chander, Anthony T. Fojo, Bryan Lau, (Johns Hopkins Bloomberg School of Public Health)

Accurate, routine measurement of recent illicit drug use, alcohol use, and cigarette smoking among persons with HIV engaged in clinical care is challenging. The Johns Hopkins HIV Clinical Cohort collects two imperfect but routine measurements of recent substance use: medical record review (MRR) and self-interview (SI). We used Bayesian latent class modeling to estimate sensitivity and specificity of each measurement, and prevalence of substance use among 2,064 patients engaged in care from 2007 to 2015. Sensitivity of MRR was higher than sensitivity of SI for cocaine and heroin use. Median posterior estimates of sensitivity of MRR ranged from 44% to 76% for cocaine use and from 39% to 67% for heroin use, depending on model assumptions and priors. In contrast, sensitivity of SI was higher than sensitivity of MRR for any alcohol use, hazardous alcohol use, and cigarette smoking. Median posterior estimates of sensitivity of SI were generally above 80%, 85% and 87% for each substance, respectively. Specificity was high for all measurements. From one model, we estimated prevalence of recent substance use in the study sample to be 13% for cocaine, 9% for heroin, 49% for alcohol, 21% for hazardous alcohol, and 55% for cigarette smoking. Prevalence estimates from other models were generally comparable. Measurement error of substance use is non-trivial and should be accounted for in subsequent analyses.

0443 S/P

THE RELATIONSHIP BETWEEN DISCRIMINATION AND MISSED SCHEDULED HIV CARE APPOINTMENTS AMONG WOMEN LIVING WITH HIV Andrew E. Cressman* Andrew E. Cressman, Chanelle J. Howe, Amy S. Nunn, Adaora A. Adimora, David R. Williams, Mirjam-Colette Kempf, Aruna Chandran, Eryka L. Wentz, Oni J. Blackstock, Seble G. Kassaye, Jennifer Cohen, Mardge H. Cohen, Gina M. Wingood, Lisa R. Metsch, Tracey E. Wilson, (Department of Epidemiology, Centers for Epidemiology and Environmental Health, Brown University School of Public Health, Providence, Rhode Island)

Receiving regular HIV care is crucial for maintaining good health among persons living with HIV. However, racial and gender disparities in receipt of HIV care exist. African Americans (AAs) are more likely to miss HIV clinic visits than Caucasians. Compared to men, women have been observed to be less likely to establish HIV outpatient care or have at least two HIV outpatient visits in the past six months. Discrimination and its impact may vary by race/ethnicity as well as gender, and in turn contribute to disparities in receipt of HIV care. Vet the role of discrimination in HIV care receipt remains understudied. Data from 1,304 women in the Women's Interagency HIV Study between 10/1/2013 and 9/30/2016 were used to: (1) estimate the relationship between discrimination and missing any scheduled regular HIV care appointments and (2) assess whether this relationship is effect modified by race/ethnicity. Discrimination was measured by a participant's response to, "Overall, how much has discrimination interfered with you having a full and productive life?" Participants reported on missing any scheduled regular HIV care appointments in the last six months. The race/ethnicity of participants was AA (73.9%), Caucasian (11.3%), Hispanic (11.5%), and Other (3.3%). Median age was 48 years (first quartile, third quartile: 42, 54). Overall, 28.1% and 14.7% of participants experienced any discrimination and missed any appointments, respectively. In an analysis that adjusted for race/ethnicity and year of birth, the prevalence ratio for missing any appointments comparing women who experienced any discrimination to women who did not was 1.317 (95% confidence limits: 1.004, 1.729). The adjusted p-value for effect modification by race/ethnicity was 0.944. Women who experienced any discrimination that interfered with their life had a higher prevalence of missing any scheduled regular HIV care appointments. There was no evidence of effect modification by race/ethnicity.

0444 S/P

CD4 DECLINE AND ASSOCIATED MORTALITY FOLLOWING CANCER TREATMENT AMONG PEOPLE WITH HIV IN THE ERA OF ANTIRETROVIRAL THERAPY. Keri L. Calkins* Keri L. Calkins, Geetanjali Chander, Corinne E. Joshu, Kala Visvanathan, Catherine R. Lesko, Anthony T. Fojo, Richard D. Moore, Bryan Lau, (Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD)

Background: Cancer treatment in people with HIV (PWH) presumably results in a sharp decline and delayed recovery of CD4 cell counts. The extent to which these declines increase mortality is unknown. The objectives of this study are 1) to quantify the effect of cancer treatment on CD4 in PWH and 2) to estimate the association between treatment-related CD4 changes and all-cause mortality independent of mortality risk attributed to demographic characteristics, cancer type and stage. Methods: We included 219 PWH from the Johns Hopkins HIV clinic diagnosed with an incident cancer. There were 2186 CD4 measures. Initial cancer treatment was classified as immunosuppressive [chemotherapy/radiation, (IT)] or non-immunosuppressive [surgery/no treatment (NIT)]. Joint longitudinal survival models with shared random effects were used to estimate CD4 trajectories and the association between CD4 and all-cause mortality. The longitudinal model was a mixed effects model. A proportional hazards model was used for all-cause mortality. Models adjusted for confounders, including expected 5-year mortality using SEER estimates based on cancer type and stage. To reduce heterogeneity in types of IT, a sensitivity analysis was conducted only among solid tumor cancers. Results: IT resulted in an initial decline of 106 CD4 cells (95% CI= -134, -78) as compared to no change for those receiving NIT. Separation in CD4 trajectories between IT and NIT persists throughout follow-up. Following initial cancer treatment, every 100 CD4 cell increase, lagged by 6 months, resulted in a 27% reduction in mortality (HR=0.73, 95%CI= 0.63, 0.84). The results among solid tumors were similar including a 39% reduction in mortality (HR=0.61, 95% CI=0.48, 0.78) for every 100 CD4 cell increase. Conclusions: IT significantly reduces CD4 cell count in PWH. CD4 cell count declines following cancer treatment are associated with increased hazard of mortality independent of demographic characteristics, cancer type, and stage.

NEIGHBORHOOD GREEN SPACE ACCESS AT BIRTH, CHILDHOOD AND ADULTHOOD ASSOCIATED WITH BLOOD PRESSURE TRAJECTORIES ACROSS THE LIFE COURSE Marcia P. Jimenez* Marcia P. Jimenez, S.V. Subramanian, Gregory A. Wellenius, Eric B. Loucks, (Brown University School of Public Health)

Background: Neighborhood access to green space is increasingly investigated as a determinant of cardiovascular disease (CVD). However, longitudinal studies on neighborhood are rare, hampering the ability to address questions on causality and critical stages in the life-course. This research aims to evaluate the life course association between green space and systolic blood pressure (SBP), a major CVD risk factor, and assess vulnerable periods of life in which individuals might be more susceptible to their surroundings. Methods: We used longitudinal data from the New England Family Study with a 48-year follow-up to evaluate how access to green space at birth, childhood and adulthood is associated with SBP growth across the life course. Access to green space at each time point was evaluated using 3 measures distance to the closest green space, average area of green space, and green space density in the neighborhood. Multilevel models were used to examine the longitudinal association between time-varying markers of neighborhood accessibility to green space and SBP. We consider two-level structures arising from longitudinal studies where there are repeated measurements nested within individuals. Results: Preliminary results suggest that living 0.5 miles closer to a green space at childhood, is associated with a 11.4 mmHg lower rate of growth in SBP across the life-course (95% CI: -21.4, -1.4), adjusting for proximity to green space at birth and adulthood, age, sex, individual and parental socioeconomic status. Green space density and average area of green space within the neighborhood did not show statistically significant associations with SBP growth rate. Conclusion: Results suggest that childhood may be a critical time period where closer proximity to green space can reduce the burden of CVD risk. Studies across diverse populations are needed to confirm or refute these novel findings.

0452 S/P

JOB STRAIN AND THE PREVALENCE OF UNCONTROLLED HYPERTENSION AMONG WHITE-COLLAR WORKERS Mathilde Lavigne-Robichaud* Mathilde Lavigne-Robichaud, Xavier Trudel, Alain Milot, Mahee Gilbert-Ouimet, Caroline Duchaine, Chantal Brisson, (CRCHUQ-ULaval)

Background: High blood pressure (HBP) increases significantly cardiovascular disease risks. Hypertension may affect more than 90% of individuals over the life course. Nearly 15% of Canadians treated for HBP still have uncontrolled hypertension. A number of prospective studies have documented the deleterious effect of adverse psychosocial work factors from the job strain model on blood pressure. However, there is scarce evidence on the association between job strain and uncontrolled hypertension. Objectives: To examine the association between job strain and the prevalence of uncontrolled hypertension among white-collar workers from a large cohort in Canada. Methods: The study relies on a repeated cross sectional design involving three waves of data collection over a 5-year period. The study sample was composed of 473 white-collar workers treated for hypertension, accounting for a total of 737 observations. At each time, ambulatory BP (ABP) was measured every 15 minutes during the working day. Uncontrolled hypertension was defined as daytime ABP ≥135/85 mmHg. Job strain was evaluated with the demandcontrol model quadrant method using validated scales. Adjusted prevalence ratios (PR) and 95% confidence intervals (CI) were estimated using generalized estimating equations (GEE). Results: Men exposed to active jobs (1.43 [95% confidence interval: 1.07-1.92]) had a higher prevalence of uncontrolled hypertension compared to unexposed men. In women, the prevalence was higher in those exposed to the highest tertile of high psychological demands (1.77 [95% confidence interval: 1.07-2.92]). These results were observed after adjustment for sociodemographic and lifestyle factors. Conclusion: The present study showed a deleterious effect of adverse psychosocial work factors from the demand-control model on BP control in men. Reducing these frequent exposures at work might lead to substantial benefits on BP control at the population-level.

0451 S/P

COMPARING THE IMPACT OF POSITIVE PSYCHOSOCIAL RESOURCES ON FAVORABLE CARDIOVASCULAR HEALTH IN YOUNG ADULTHOOD Farah Qureshi* Farah Qureshi, Laura Kubzansky, Scott Delaney, (Harvard T.H. Chan School of Public Health)

Prior work has found associations between positive psychosocial factors in childhood and favorable cardiovascular health (FCH) in adulthood. Most studies group diverse factors to assess cumulative impacts, but positive youth development literature suggests the effects of internal assets (e.g. prosocial skills, positive identity) vs external assets (e.g. family relationships) may differ. This study examined if youth internal and external assets independently predict FCH in young adulthood using data from the National Longitudinal Study of Adolescent to Adult Health (n=14,798). Assets were measured via self-report at Wave 1 (mean age 15.6 yrs) and FCH components were obtained at Wave 4 (mean age 28.5 yrs). Standard covariates were assessed at Wave 1, and included socioeconomic factors and baseline health status. FCH (yes/no) was defined as being healthy on 5 factors following American Heart Association recommendations: no hyperlipidemia, diabetes, or hypertension, healthy BMI, and non-smoking. Parameters were derived from direct measures of cholesterol, glucose, HbA1C, blood pressure, and BMI, and self-reported relevant diagnoses, medication use, and smoking history. Assets were measured by 29 items used to derive separate indices for internal and external assets (range=0-5, each). After multiply imputing missing covariate and predictor data, associations of assets with FCH were examined using logistic regression. At Wave 4, only 5.0% (n=637) of the sample had favorable CVH. Total assets at Wave 1 predicted subsequent FCH (linear trend OR=1.08, p=0.005), but when disaggregated, internal assets maintained a strong association with FCH (linear trend OR=1.22, p=<0.001) and external assets did not (linear trend OR=0.95, p=0.3). Findings suggest youth assets are not equally protective, but intrapersonal factors may be particularly influential. Identifying the differential impact of internal and external assets is critical to design effective primordial prevention efforts.

0453 S/P

LONGITUDINAL ASSOCIATIONS OF NEIGHBORHOOD CRIME AND SAFETY WITH BLOOD PRESSURE: THE MULTI-ETHNIC STUDY OF ATHEROSCLEROSIS (MESA) Stephanie Mayne* Stephanie Mayne, Kari Moore, Tiffany M. Powell-Wiley, Kelly R. Evenson, Richard Block, Kiarri Kershaw, (Northwestern University)

Introduction: High neighborhood crime and low perceptions of safety may influence cardiometabolic health through chronic stress. Few studies have evaluated longitudinal associations of neighborhood crime/safety with blood pressure. Methods We included 833 participants of the Multi-Ethnic Study of Atherosclerosis aged 45-84 who lived in Chicago, Illinois. Outcomes included systolic and diastolic blood pressure (SBP, DBP) assessed 5 times from 2000-2012 (antihypertensive medication use accounted for by adding 10 mm Hg to SBP and 5 mm Hg to DBP). Exposures included individual-level perceived safety, aggregated neighborhood-level perceived safety, and past-year rates of police-recorded crime per 1,000 population within a 1-mile buffer of participants' residences. We used fixed-effects linear regression to estimate associations of changes in safety/crime with changes in blood pressure. Models were adjusted for time since baseline (piecewise linear splines with 2 knots) and time-varying covariates including marital status, income, alcohol use, smoking, physical activity, waist circumference, diabetes, and neighborhood socioeconomic status. We assessed differences overall and by sex. Results: A standard deviation increase in individual-level perceived safety was associated with a 1.76 mm Hg within-person reduction in SBP (95% CI: 0.49, 3.02). Patterns were similar between men and women (p-interaction for sex: 0.9). Neighborhood-level perceived safety was not associated with blood pressure change. An increase in police-recorded crime rate by 10 crimes was associated with reductions of 0.70 (0.22, 1.19) mm Hg in SBP and 0.25 (0.03, 0.47) mm Hg in DBP among women only (p-interaction for sex: <0.001 and 0.006, respectively). Conclusions: Results suggest individual perception of neighborhood safety may be particularly salient for SBP reduction relative to more objective neighborhood exposures. Findings for police-recorded crime were unexpected and warrant further examination.

SOCIAL INTEGRATION AND TEN-YEAR CARDIOVASCULAR MORTALITY IN A US PROBABILITY SAMPLE Steven D. Barger* Steven D. Barger, Olivia Triplett, Jared Cutler, Krissy Wolf, (Northern Arizona University)

Social relationships are strongly associated with longevity. Social integration, i.e., participation in a variety of social relationships, is inversely associated with all-cause mortality. However, less is known about the association of social integration with cause-specific mortality, particularly in diverse population-based samples. This study examined the association of social integration and cardiovascular disease (CVD) mortality (heart disease and stroke) in a probability sample of US adults (N=27,689). Social integration was assessed by tallying affirmative yes/no responses to questions regarding recent (past two weeks) in-person or phone contact with family members or friends; participation in group social activities; religious attendance; and going out to eat. Marital status was also included in the composite. Social integration categories were collapsed into four groups to ensure sufficient CVD events for analysis Vital status was ascertained ten years after the baseline survey (N=867 CVD events). Proportional hazards assumptions for Cox regression models were satisfied by stratifying on 5-year age cohort, race/ethnicity and education. When controlling for age, sex, race/ethnicity, social support and education, the two highest social integration categories were associated with lower CVD mortality rates (HRs=0.62 [95%CI 0.47-0.82] and 0.46 [0.35-0.59], respectively). These cause-specific hazards were attenuated but remained statistically significant when further adjusting for work force status, home ownership, smoking, and prior diagnosis of heart disease, stroke or diabetes (HRs=0.73 [95%CI 0.56-0.95] and 0.59 [95%CI 0.44-0.78], respectively. These data suggest that a larger number of social contacts is associated with reduced risk of CVD mortality. Examining behavioral and biological CVD risk factors could help illuminate the mechanisms through which social integration alters CVD mortality risk.

GENDER, OCCUPATIONAL CLASS, AND MENTAL HEALTH: EVIDENCE FROM A RETROSPECTIVE COHORT STUDY OF U.S. ALUMINUM MANUFACTURERS Holly Stewart* Holly Stewart, David Rehkopf, Valerie Meausoone, Ellen Eisen, Mark Cullen, (UC Berkeley School of Public Health)

Past research consistently finds that blue-collar workers experience more depression and psychiatric distress as compared with higher-status white-collar workers. However, findings from contemporary U.S. working populations and evidence regarding the mental health of women in historically male-dominated blue-collar jobs is limited. We examined the health and employment records of 30,074 men and 7,137 women employed at 32 U.S. Alcoa aluminum manufacturing plants between 2003 and 2013. Cox proportional hazards models were used to estimate the association between occupational class (blue- vs. white-collar status) and depression among men and women. To explore survivor bias, we also estimated the association between occupational class and depression separately among workers hired after the start of follow-up (i.e. new hires) and among workers already employed by the start of follow-up (i.e. prevalent hires). Attained age was used as the time scale, and all models were simultaneously adjusted for race/ethnicity, marital status, number of dependent children, calendar year, and plant location. The risk of depression was increased among blue-collar workers as compared with white-collar workers among men (HR = 1.25, 95% CI 1.17 -1.33) and women (HR = 1.34, 95% CI 1.22-1.47). Among men, the HR for depression was consistent across all workers, new, and prevalent hires. Among women, however, we find evidence of an association between blue-collar status and depression among prevalent hires (HR = 1.44, 95%CI 1.29 - 1.63) but not among new hires (HR = 1.01, 95% CI 0.86 - 1.19). We find that among both men and women, the risk of depression is increased among bluecollar workers relative to white-collar workers. Further, our findings suggest that survivor bias for depression may operate differently for men and women in our study cohort.

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NIGHTSHIFT WORK BEFORE AND DURING PREGNANCY AND OFFSPRING MENTAL HEALTH DISORDERS IN ADOLESCENCE Susanne Strohmaier* Susanne Strohmaier, Elizabeth E. Devore, Celine Vetter, Stacey Missmer, Heather Eliassen, Olivia Okereke, Eva S. Schernhammer, (Brigham and Women's Hospital and Harvard Medical School)

Studies suggest that nightshift work induces epigenetic alterations and especially exposure surrounding pregnancy may lead to behavioral programming in the offspring. We investigated the association between maternal rotating nightshift work history before pregnancy (4,044 mothers, 4,813 children) and nightshift work during pregnancy (545 mother-child pairs) and offspring mental health outcomes through adolescence among children enrolled in the Growing Up Today Study 2 between 2004 and 2013, and their mothers participating in the Nurses Health Study 2. Outcome definitions were based on self-reported physician diagnosed depression or anxiety, regular antidepressant use, and depressive symptoms (assessed via the Center for Epidemiologic Studies Depression Scale). Generalized estimating equations regression models were used to estimate multivariable adjusted ORs and 95%CIs. We observed no association between maternal nightshift work before pregnancy and risk of any of the considered mental health disorders in their children. Similarly, longer duration of nightshift work was not associated with the risk of any of the considered outcomes (all PTrend>0.09). However, compared to offspring of women without a history of rotating nightshift work, risk of depression was significantly elevated for offspring of women with any rotating nightshift work before pregnancy if they were definite morning chronotypes (OR=1.92; 95%CI=1.16-3.18), whereas this was not the case for women with intermediate or evening chronotypes (OR =0.92; 95%CI=0.67-1.26; PInteraction=0.004). Risks of mental health outcomes for children of women with or without nightshift work during pregnancy were not significantly different. Overall, while nightshift work before or during pregnancy was not associated with offspring mental health in our study, our results indicate that maternal chronotype might play a role in the relationship between nightshift work before pregnancy and offspring depression outcomes.

0461 S/P

DEATHS OF DESPAIR IN AN ICONIC INDUSTRIAL COHORT OF AUTOWORKERS Suzanne M. Dufault* Suzanne M. Dufault, Holly Stewart, Ellen A. Eisen, (UC Berkeley School of Public Health)

Between 1999 and 2014, the US suicide rate rose by 24%, and deaths from drug overdoses nearly tripled. Deaths from suicide and drugs, along with alcohol-related liver diseases-collectively described as "deaths of despair"-have been increasing sharpest for working age Whites with only a high school education. However, little evidence exists regarding the specific nature of these trends within the manufacturing sector. We examined trends in deaths from suicide and alcoholrelated liver disease in an iconic cohort of predominantly White male industrial autoworkers. The cohort includes 38,636 subjects who worked at least three years in one of three Michigan plants, followed for mortality from 1941 to 2010. Suicide and deaths due to alcohol-related liver diseases were identified based on ICD-9 and ICD-10 codes. We estimated the association between decade of birth and deaths of despair with hazard ratios (HR) using Cox proportional hazards models where follow up starts at leaving work, adjusting for sex and race. There was a spike in suicides within one year of leaving work accounting for 36% of all suicides with 64% occurring among employees who left work before age 55. The HR for all deaths of despair combined was 1.3 (95% CI [0.9924, 1.6248]) comparing the most recent birth cohort (born after 1950) to the earliest (born before 1930). When examined separately, the HR increased for the most recent birth cohort for both suicide and alcohol-related liver diseases (HR = 2.36, 95% CI [1.66, 3.34], HR = 2.68, 95% CI [1.96, 3.66], respectively). These rising rates from deaths of despair among autoworkers born after 1950 are consistent with national trends. However, failure to examine the trends among its components of suicide and alcohol-related liver disease may obscure the association.

0463 S/P

CUMULATIVE OCCUPATIONAL EXPOSURE TO DIESEL ENGINE EXHAUST AND HEMATOLOGIC PARAMETERS IN THE UK BIOBANK Jason Y.Y. Wong* Jason Y.Y. Wong, Bryan Bassig, Rena Jones, Jinming Zhang, Wei Hu, Bu-tian Ji, Debra Silverman, Nathaniel Rothman, Qing Lan, (National Cancer Institute)

Diesel engine exhaust (DEE) is a known human lung carcinogen. Previous studies have found alterations to immune cell counts and markers in workers occupationally exposed to DEE. We further investigated associations between occupational DEE exposure and hematologic parameters. We analyzed data from 119,255 volunteers aged 40-69 years who enrolled in the UK Biobank in 2006-2010 and provided an occupational history. DEE exposure was self-reported at baseline as: rarely/never (intensity coefficient (IC)=1), sometimes (IC=2), and often (IC=3) for each job. Cumulative exposure was calculated by multiplying IC and years at each job, and summing across all jobs. Blood was collected at baseline and complete blood count was measured. Linear regression models were used to estimate associations between quartiles (Q) of cumulative exposure (Q1: 0-55 (ref), Q2: 56-97, Q3: 98-154, Q4: ≥155) and log-transformed hematologic parameters, adjusted for center, age, sex, race, body mass index, smoking status/intensity, and Townsend deprivation index. Increased cumulative DEE exposure was non-linearly associated with elevated lymphocyte counts (Q2: β (SE)=2.3E-3 (2.6E-3), p=3.7E-1; Q3: 6.0E-3 (2.6E-3), p=2.3E-2; Q4: 5.5E-3 (2.7E-3), p=3.9E-2; p-trend=0.18). There was evidence of increased eosinophil (Q2: 1.1E-2 (5.5E-3), p=4.8E-2; Q3: 2.1E-3 (5.5E-3), p=7.0E-l; Q4: 1.1E-2 (5.7E-3), p=5.6E-2; p-trend=0.15) and decreased neutrophil counts (Q2: 4.6E-3 (2.7E-3), p=8.9E-2; Q3: -7.8E-3 (2.7E-3), p=4.5E-3; Q4: -4.2E-3 (2.8E-3), p=1.4E-1; p-trend=0.93) with higher exposure. No associations were found for basophil, monocyte, and total white blood cell counts. Similar trends were found in never-smokers, excluding those with prevalent immune/blood conditions, and comparing years of often/sometimes exposure to rarely/never exposed. Our findings provide further evidence that DEE exposure may alter immune processes, which are increasingly recognized for their mechanistic roles in lung carcinogenesis.

ESTIMATING COUNTERFACTUAL RISK OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE MORTALITY UNDER HYPOTHETICAL INTERVENTIONS ON OCCUPATIONAL EXPOSURE TO DIESEL EXHAUST Sadie Costello* Sadie Costello, Andreas Neophytou, Sally Picciotto, Jacqueline Ferguson, Holly Steward, Debra T Silverman, Ellen Eisen, (University of California, Berkeley)

Diesel exhaust particles are designated as definite human carcinogens, appear to have acute thrombotic and ischemic effects, and may play a role in respiratory and allergic diseases. However, we do not have compelling epidemiological evidence linking diesel exposure at work to any chronic respiratory disease. Studying the respiratory health effects of occupational exposures is complicated by the fact that workers with respiratory symptoms leave work and accrue less exposure compared to their healthier counterparts, i.e. the healthy worker survivor effect. To address the gap in understanding, we examined diesel-based risks of chronic obstructive pulmonary disease (COPD) in the Diesel Exhaust in Miners Study (DEMS) using the parametric g-formula, a method which handles the healthy worker survivor effect and allows for the estimation of counterfactual risks of disease under hypothetical interventions on exposure. Analyses were performed on 11,687 blue collar male workers at 8 non-metal mines in the US including 130 deaths from COPD. Follow up began at dieselization of each mine, between 1947 and 1967, and ended in 1997. We applied the parametric g-formula to assess hypothetical interventions on respirable elemental carbon (REC, a surrogate for diesel exhaust) and cumulative COPD mortality risk at age 90. The risk ratio comparing cumulative COPD mortality risk under a hypothetical intervention completely eliminating average daily REC to the observed risk was 0.87, with wide confidence intervals. Our findings indicate that reducing the occupational exposure to diesel exhaust may have resulted in a reduction in COPD mortality in this cohort of workers.

0465 S/P

ASSOCIATIONS BETWEEN TRAUMATIC BRAIN INJURY AND SELF-REPORTED LISTENING DIFFICULTY IN COMPLEX ACOUSTIC ENVIRONMENTS AMONG POST-9/11 WAR VETERANS Kelly M. Reavis* Kelly M. Reavis, Kathleen F. Carlson, M. Samantha Lewis, Cody Blankenship, Jane S. Gordon, Wendy Helt, James A. Henry, (VA Portland Health Care System, Oregon Health & Science University)

Traumatic brain injury (TBI) is the signature injury among post-9/11 war veterans, with blast exposure as the leading cause. Despite having normal hearing, it is common for veterans with TBI to experience difficulty understanding speech in complex acoustic environments. It is unknown if this difficulty is due to TBI itself, or to confounding factors such as physiologic effects of veterans' blast exposures beyond TBL The objective of this analysis was to examine associations between TBI and self-reported listening difficulty among post-9/11 veterans while accounting for blast exposure and other potential confounders. Participants in the longitudinal Noise Outcomes in Servicemembers Epidemiology Study completed baseline questionnaires to assess demographic and military service characteristics, blastexposure, military TBI history, and listening difficulty in competing acoustic backgrounds. We examined associations between number of reported military TBIs (0, 1, or ≥2) and mean Speech, Spatial, and Qualities of Hearing Scale (SSQ12) scores (lower scores indicate greater difficulty) using multivariable linear regression. Based on an a priori causal model, regression models were adjusted for self-reported blast exposure as well as demographic and military service characteristics. Of 309 participants, 71% had no TBI, 15% had one TBI, and 14% had ≥2 TBIs. Nearly all participants had normal hearing (93%) and almost half (46%) had blast exposure. After multivariable adjustment, veterans with one TBI (mean score=5.8; 95% CI: 5.1-6.4) and ≥2 TBIs (mean score=5.2; 95% CI: 4.5-5.6) had significantly lower SSQ12 scores compared to veterans without TBI (mean score=6.6; 95% CI: 6.2-7.1). We identified greater listening difficulty in complex acoustic environments among normal-hearing veterans with, versus without, TBI while accounting for blast and other potential confounders. This has significant implications regarding the rehabilitation needs of veterans with TBI.

EDUCATIONAL MOBILITY ACROSS GENERATIONS AND DEPRESSIVE SYMPTOMS OVER 10 YEARS AMONG US LATINOS Julia B. Ward* Julia Ward, Whitney R. Robinson, Brian W. Pence, Joanna Maselko, Sandra S. Albrecht, Mary N. Haan, Allison E. Aiello, (UNC-Chapel Hill)

In the US, Latinos suffer a disproportionate burden of depression. Low educational attainment has been associated with depression among Latinos, and recent data suggests that parental educational attainment may also influence mental health. However, few studies have collected intergenerational data to assess the joint impact of educational mobility across multiple generations on offspring depression. Using data from the Sacramento Area Latino Study on Aging (1998-2008), we assessed the influence of intergenerational education on depressive symptoms over 10 years among 1,786 Latino individuals (mean age=70.6 years). Educational mobility was classified: stable-low (low parent and low offspring education), upwardly mobile (low parent and high offspring education), stable-high (high parent and high offspring education), or downwardly mobile (high parent and low offspring education). Depressive symptoms were measured with the Center for Epidemiological Studies Depression Scale (CES-D), with higher scores indicating more depressive symptoms. To quantify the association between educational mobility and CES-D scores over follow-up, we fit marginal models using generalized estimating equations to account for repeated CES-D measurements and adjusted for identified confounders. Multiple imputation was employed to account for missingness. Within individuals, depressive symptoms remained relatively stable over follow-up. Compared to stable-low education, stable-high education and upward mobility were associated with significantly lower CES-D scores (Beta=-2.75 and -2.18, respectively). Downwardly mobile participants had slightly lower CES-D scores than stable-low participants (Beta=-0.77). Our results suggest that sustained low educational attainment across generations may adversely impact depression, and improved educational opportunities in under-resourced communities may counteract the adverse impacts of low parental education on Latino mental health.

0472

PRETERM BIRTH AND SELECTION IN UTERO AMONG MALES FOLLOWING THE NOVEMBER 2015 PARIS ATTACKS Tim Bruckner* Tim Bruckner, Elodie Lebreton, Natali Perrone, Beatrice Blondel,, (Public Health, University of California, Irvine)

On November 13, 2015, coordinated terrorist attacks swept through Paris. This large stressor, like the 9/11 terrorist attacks in the US, may have perturbed the health of pregnant women. We test the hypothesis that these unexpected attacks preceded an increase in the risk of preterm parturition among live born males as well as excess male loss in utero. We focused on males given previous findings of elevated male frailty following population stressors. We applied interrupted time-series (ARIMA) methods to 70 monthly birth cohorts in the Paris region (n=1,049,057). We inspected a concurrent response as well as lags of up to four months (i.e., Nov 2015, Dec 2015, Jan 2016, Feb 2016, Mar 2016) to ensure capturing any delayed associations. We find an elevated incidence of preterm birth among males in November 2015 and January 2016 (coefficient for Nov 2015 = .006, 95%) confidence interval [C1]: .0002, .012; coef. for January 2016 = .010, 95% CI: .004, 016), which equates to an 11 % increase above expected levels in the count of preterm births. Females, by contrast, show no change in preterm. In addition, the sex ratio fell below expected values in December 2015, January 2016 and February 2016 (coefficient for Dec 2015 = -.032, 95% CI: -.063, -.0001; coef. for Jan 2016 = -034, 95% CI: -.064, -.003; coef. for Feb 2016 = -.032, 95% CI: -.063, -.002). Results remain robust to alternative specifications and control for outliers. Falsification tests using female births further support perinatal responses only among males, which rules out the threat that time-varying confounders shared across both sexes drive our findings. We infer support for the hypothesis that, among males, the November 2015 Paris attacks accelerated parturition and increased the risk of fetal loss. Strengths of the dataset include gestational age estimates on 99.6% of live births in Paris. The population-based nature of the register also permits external validity of results to the Parisian region.

0471 S/P

RACIAL RESIDENTIAL SEGREGATION AND RACIAL DISPARITIES IN STILLBIRTH IN THE UNITED STATES Andrew Williams* Andrew Williams, Maeve Wallace, Carrie Nobles, Pauline Mendola, (Epidemiology Branch, Division of Intramural Population Health Research, Eunice Kennedy Shriver National Institute of Child Health and Human Development)

Background: Although stillbirth rates are declining, blacks experience two-fold higher rates of stillbirth compared to whites. It remains unclear whether current and/or persistent racial residential segregation is associated with black-white stillbirth disparities. Methods We examined 49,969 black and 71,785 white births from 14 hospitals the Consortium on Safe Labor (2002-2008). We measured blackwhite segregation for each hospital referral region using the dissimilarity index (how blacks and whites are distributed in an area) and the isolation index (the probability that blacks and whites interact), categorized into population-based tertiles. Current segregation was based on birth year segregation levels. Persistent segregation was measured by comparing the 1990 segregation level to birth year segregation. Stillbirth was fetal death ≥23 weeks gestation reported in medical records. Hierarchical logistic regression models estimated race-specific associations between current and persistent segregation and stillbirth, adjusted for maternal demographic and clinical factors, and area-level poverty. Results For current segregation, low segregation was more beneficial to blacks (Dissimilarity OR: 0.43 95% CI: 0.29, 0.63; Isolation OR: 0.25 95% CI: 0.16, 0.41) than whites (Dissimilarity OR: 1.42 95% CI: 0.77, 2.59; Isolation OR: 0.33 95% CI: 0.21, 0.53). For persistent segregation, decreasing segregation was also more beneficial to blacks (Dissimilarity OR: 0.53 95% CI: 0.32, 0.89; Isolation OR: 0.19 95% CI: 0.10, 0.38) than whites (Dissimilarity OR: 0.75 95% CI: 0.41, 1.37; Isolation OR: 0.82 95% CI: 0.46, 1.48). Approximately 900 stillbirths among blacks could be prevented annually in the US by decreasing residential segregation. Conclusions: Low and decreasing levels of segregation were associated with reduced odds of stillbirth, with blacks benefitting more than whites. Reducing structural racism, like segregation, may help reduce black-white stillbirth disparities.

0473 S/P

LIFE COURSE INCOME AND THE TRANSMISSION OF PSYCHOLOGICAL DISTRESS: AN INTERGENERATIONAL ANALYSIS OF THE PANEL STUDY OF INCOME DYNAMICS (PSID) Bozena Katie* Bozena Katie, George Rhoads, Soyeon Kim, Jeannette Rogowski, Javier Escobar, Sandra Echeverria, (Rutgers University School Public Health)

Low household income over the life course has been found to influence later mental health. We sought to ascertain how the family income trajectory over three generations impacts psychological distress symptoms (PD) in third generation young adults. We matched 2014 grandparent and grandchild pairs in the PSID and used group-based trajectory modeling to estimate both the 20-year household income trend of grandparents (1967-1986) and the life course household income trend of their grandchildren (birth to age 17). Grandparents' income trends (GP) were linked to grandchildrens' life course income (GC) to construct family intergenerational income trajectories (IIT) spanning a nearly 40-year period. Log binomial regression models accounting for family clustering were fit and prevalence ratios for moderate/severe PD as measured by the K-6 instrument were obtained. The largest proportion of young adults belonged to high (GP) to high (GC) IIT (32%), followed by middle-high (22%) and middle-low (21%). Few had low-high or high-low IIT (5.8% and 5.4% respectively), and 14% were of low-low IIT. Compared to those of high-high IIT, those of middle-low ITT were 68% more likely to have increased levels of PD as young adults (RR: 1.68; 95% CI: 1.17, 2.43); this relationship was attenuated after adjusting for young adult characteristics and parents' marital status, education, and (any) psychiatric diagnoses (aRR: 1.55; 95% CI: 0.93, 2.57). Those of high-low IIT had increased PD compared to high-high IIT (aRR: 1.27; 95% CI: 0.75, 2.13), but there was no difference in PD for the low-low group when compared to the high-high IIT group (aRR: 0.88; 95% CI: 0.47, 1.66). These findings suggest that downward fluctuations in household income over generations may impact current psychological distress to a greater degree than low but stable income trends when adjusted for other distress indicators. More research is needed to aid in the prevention of mental illness in families over time.

THE ASSOCIATION BETWEEN IMMIGRATION HISTORY AND INFLAMMATORY MARKER PROFILES AMONG OLDER MEXICAN AMERICAN ADULTS Chantel Martin* Chantel Martin, Mary Haan, Lindsay Fernandez-Rhodes, Anne Lee, Allison Aiello, (UNC Chapel Hill)

Foreign-born Hispanics have healthier cardiometabolic profiles upon arrival in the US than their US-born counterparts, yet this advantage diminishes as length of residence increases. Underlying mechanisms explaining this paradox have been understudied. Using baseline data from 1,290 predominately older Mexican Americans in the Sacramento Area Latino Study on Aging (SALSA), we examined the association between immigration history and biomarkers of inflammation, including interleukin-6 (IL-6), soluble forms of type 1 and 2 receptors of tumor necrosis factor-alpha (sTNF-R1 and sTNF-R2), C-reactive protein (CRP), leptin, and adiponectin using linear regression models. Immigration history was derived from measures of immigrant generation and duration of US residence: 1) 1st generation in the US <15 years (reference group); 2) 1st generation in the US ≥15 years; 3) 2nd generation; and 4) ≥3rd generation. Compared to the reference group, IL-6 levels were 19.6% (95% CI 2.3, 39.8) higher for 2nd generation and 30.6% (95% CI: 8.7, 56.8) higher for \geq 3rd generation Mexican Americans after adjusting for age, gender, education, and income. Similar associations were observed for STNF-R1, sTNF-R2, and CRP in relation to immigration history. Furthermore, when compared to the reference group, leptin levels were higher among 1st generation Mexican Americans with ≥15 years of US residence, 2nd generation, and ≥3rd generation Mexican Americans. Additional adjustment for selected health and behavioral factors attenuated the associations; however, IL-6 and leptin levels remained higher for ≥3rd generation than 1st generation immigrants with <15 years (IL-6 percent difference= 22.1, 95% CI: 1.7, 46.7; leptin percent difference: 20.6, 95% CI: 3.4, 40.8). We found that Mexican Americans with longer US immigration histories had poorer inflammatory profiles. Additional research is warranted to understand the factors that shape trajectories of biological risk across generations of Hispanics.

0475 S/P

SOCIOECONOMIC MOBILITY AND OFFSPRING TYPE 2 DIABETES: A CASE FOR A MULTI-GENERATIONAL VIEW ON HEALTH Lindsay Fernandez-Rhodes* Lindsay Fernandez-Rhodes, Chantel Martin, Penny Gordon-Larsen, Mary N. Haan, Allison E. Aiello, (fernandez-rhodes@unc.edu)

While studies of mobility in socioeconomic status (SES) have mainly focused on change in SES across two generations (2-gen), few have collected historical data to assess the impact of SES across additional generations. Herein, we provide a methodological approach for accounting for 2-gen and three generations (3-gen) of SES mobility to demonstrate the potential biases associated with using only 2-gen of SES mobility. We used 608 primarily US-born adult Mexican American offspring (18-80 yrs) with Type 2 Diabetes (T2D) status as part of the Niños Lifestyle and Diabetes Study (2013-2014) to identify 390 participants who could be linked to both parental and grandparental data from the Sacramento Area Latino Study on Aging baseline and follow up. Within each generation we defined high SES as an educational attainment above the US/foreign-born median, to create four 2-gen and eight 3-gen SES categories. We used log-linear regression to estimate the association between 2-gen and 3-gen SES categories and offspring T2D (based on self-report, medication, elevated fasting glucose or glycated hemoglobin), after accounting for familial clustering, education location of each generation, and offspring age and sex. Although the three effect estimates between 2-gen categories and T2D were more precise than the seven effect estimates for the 3-gen categories (CLR=2.3-2.9 versus 3.0-19.7), the effect of stable high versus stable low 2-gen SES on T2D was attenuated by 67% (PR=0.5, 95% CI: 0.3, 0.7) as compared to the stable high versus stable low 3-gen effect (PR=0.3, 95% CI: 0.1, 0.9). The estimated 2-gen effects suggested that offspring T2D was patterned mainly by offspring SES (e.g. social mobility), whereas the 3-gen effects revealed the added importance of grandparental SES (e.g. accumulation of risk). Our preliminary results suggest that despite the challenges to collecting information on grandparental SES, it may reduce bias and better explain SES patterns of health disparities.

ARE ASSOCIATIONS BETWEEN PRENATAL ANTIDEPRESSANT EXPOSURE AND TODDLER BEHAVIOR MEDIATED BY GESTATIONAL AGE AT BIRTH? Mollie Wood* Mollie Wood, Sonia Hernandez-Diaz, Hedvig M.E. Nordeng, (University of Oslo)

Studies have linked prenatal selective serotonin reuptake inhibitor (SSRI) exposure and internalizing behavior problems in childhood, but none have examined the role of potential mediators of this association, such as gestational age at birth. Controlling unmeasured confounding in such studies is challenging. Previous simulation show that applying sibling designs, a method for controlling familial confounding, to mediation analysis out-performs standard analyses in the presence of shared unmeasured confounding. We conducted mediation analyses comparing a standard cohort and a sibling design. We included 21 908 births from Norwegian Mother and Child Cohort Study that were part of a sibling group, and were present at 18-month follow-up. Exposure to SSRIs was ascertained from self-report, and internalizing behavior was rated using the Child Behavior Checklist; gestational age (GA) came from birth registry linkage. We used effect decomposition to quantify total (TE), natural direct (NDE) and natural indirect (NIE) effects of prenatal SSRI exposure on behavioral outcomes, adjusting for confounders. Results are reported as odds ratios; additional analyses will include bootstrapping of confidence intervals. Cohort models showed a small increased risk of internalizing behavior problems associated with SSRI exposure (OR-TE 1.29, OR-NDE 1.28), and a NIE of 1.01, suggesting that about 5% of the risk was due to shortened gestational age at birth. The sibling design showed stronger associations (OR-TE of 2.60, OR-NDE 2.63), and NIE of 1.005, suggesting no indirect effect (proportion mediated=0.54%). The sibling analysis showed a substantial increased risk of internalizing problems in 18-month-old children associated with SSRI exposure; this was not mediated through gestational age. Cohort estimates resulted in lower TE and larger NIE, which might be explained by unmeasured shared confounding. The sibling design may help control for unmeasured chronic common causes in mediation analyses.

0482 S/P

THE USE OF AN INSTRUMENT FOR A MEDIATOR IN MEDIATION ANALYSIS: A SIMULATION STUDY AND APPLICATION TO AN ENVIRONMENTAL EPIDEMIOLOGY EXAMPLE Laura Corlin* Laura Corlin, Mark Woodin, (Tufts University)

We propose using an instrument for the mediator in mediation analysis. Assuming that the instrument and exposure are independent, this method avoids concern about unmeasured confounding of the mediator-outcome relationship and of the exposuremediator relationship. It also avoids issues where mediator-outcome confounders are affected by exposure. To understand how violations of the instrumental variable assumptions affect this method, and to understand the limitations in applied epidemiologic contexts, we 1) conducted a simulation study, and 2) applied this method in a real environmental health data set (the Boston Puerto Rican Health Study; BPRHS) considering the mechanism of action of a specific traffic-related air pollutant on changes in blood pressure. The coefficients for all parameters were based on empirical relationships among the exposure, mediator, instrument, and outcome in the BPRHS motivating example. Using realistic coefficients, an effective sample size of at least 100 participants was necessary to obtain consistent estimates. Varying the strength of the instrument-mediator relationship did not substantially change the direct or indirect effect estimates, though the weakest instruments (beta0.15), indirect effects could be consistently estimated even if the exposure-mediator relationship was weak. Instruments that had a common cause with the outcome had indirect effect estimates that appeared substantially weaker than they actually were (e.g. >20-fold weaker when using coefficients from the BPRHS example). The bias was amplified with stronger instruments. Using an instrument for a mediator allows mechanistic questions to be addressed within an observational environmental epidemiology study with small sample and effect sizes, although the method is not robust against violations of the instrument-outcome noconfounding assumption.

0481 S/P

INTEGRATING METHODS FOR ENVIRONMENTAL MIXTURES IN MEDIATION ANALYSIS: A STATISTICAL TOOL FOR EVALUATING ENVIRONMENTAL HEALTH DISPARITIES Andrea Bellavia* Andrea Bellavia, Paige Williams, Tamarra James-Todd, (Harvard T.H. Chan School of Public Health)

Mediation analysis has emerged as a primary statistical tool for evaluating health disparities. A growing body of literature suggests that environmental factors may be involved in current health disparities, arising from differences in social patterning that can impact biological processes related to health outcomes. However, methodological complexities specific to environmental mediators may make standard mediation techniques inadequate. For example, humans are simultaneously exposed to a mixture of environmental exposures that should be jointly evaluated. Methods for mixtures are available but have not been applied in a mediation context to address health disparities. To such end, standard methods such as multiple regression may prove challenging and inadequate. This presentation will describe how available methods for environmental mixtures can be integrated in a mediation analysis framework to evaluate the contribution of the mixture in a given disparity. Potential approaches are to i) apply statistical methods that reduce the mixture to a single summary score (e.g. weighted quantile regression) and evaluate the score as a single mediator; ii) reduce the dimension of the mixture by using classification approaches (e.g. principal component analysis), integrating the resulting factors as multiple independent and uncorrelated mediators; and iii) use other methods for mixtures (e.g. LASSO, Bayesian kernel machine regression) to identify and integrate those specific mixture components that are associated with the outcome of interest into the mediation model. Through the use of examples from simulated data we will present the advantages and disadvantages of each approach in terms of both implementation and interpretation, discussing the most suitable approach. Integrating chemical mixtures in mediation analysis would provide considerable benefits for evaluating environmental health disparities, with potential implications for public health policies and interventions.

0483 S/P

COMPARISON OF METHODS FOR LONGITUDINAL MEDIATION ANALYSIS USING COGNITIVE HEALTH DATA Judith Rijnhart* Judith Rijnhart, Jos Twisk, Annie Robitaille, Martijn Huisman, Martijn Heymans, (Department of Epidemiology and Biostatistics, Amsterdam Public Health Research Institute, VU University Medical Center, Amsterdam, The Netherlands)

Throughout the years, several methods for longitudinal mediation analysis have been proposed, such as multilevel analysis, multilevel structural equation modeling, the MacArthur approach, cross-lagged panel models, latent-growth curve models, and latent-difference score models. However, a comparison of these methods using reallife data is still lacking. Therefore, the aim of this study is to compare the results of these methods using real-life data, and to subsequently review the strengths and limitations of these methods. We compared the six methods for longitudinal mediation analysis using real-life data from the Longitudinal Aging Study Amsterdam (n = 2,485). Three waves of data were used to analyze processing speed as a mediator of the relationship between age and cognition. Overall, the six methods for longitudinal mediation analysis led to the same conclusion, i.e. that processing speed mediated the effect of age on cognition. However, big differences were observed in the magnitude and interpretation of the indirect effect estimates between the compared methods. As each method has its own hypotheses regarding the underlying mechanism of the mediated effect, it is very important to choose the appropriate method longitudinal mediation analysis. A choice that should be based on the data at hand and the research question to be answered.

MECHANISTIC MODELS REQUIRE INPUT PARAMETERS THAT OFTEN CANNOT BE ESTIMATED WITHOUT BIAS Eleanor Murray* Eleanor J Murray, , (Harvard T.H. Chan School of Public Health)

0484 S/P

Mechanistic models such as agent-based, or individual-level, simulation models are increasingly popular tools for assessing the effects of complex interventions in epidemiology and health policy research. These models require, by definition, some specification of the mechanism by which the interventions of interest operate. However, such mechanisms involve separating the direct and indirect components of the total effect of an intervention of interest on a downstream variable. For example, a model for the effect of anti-retroviral therapy among persons living with HIV/AIDS could require specification of the indirect effect of ART on opportunistic infections through changes to CD4 counts as well as the direct effect not mediated through these changes. As we have shown previously, even when all other model inputs are unbiased, the model inference will be biased if the direct effect is misspecified. However, obtaining an unbiased estimate of the direct effect, especially in the setting of treatment-mediator feedback, requires strong, untestable assumptions. Furthermore, even when an unbiased estimate of the direct effect can be obtained for some population, for example a trial where both intervention and mediator are randomized, additional strong assumptions are required to transport this estimate to the target population. Here, we describe these assumptions, as well as common scenarios under which they are expected to be violated. We demonstrate the potential for bias in the direct effect estimates using simulation, and discuss sensitivity analyses for estimating direct effects when the treatment-mediator feedback does not exist.

MEDICAL USE OF NEWLY MARKETED ER OPIOID ANALGESICS TENDS TO FOCUS ON BACK AND JOINT PAIN, NOT CANCER PAIN. Jessica C Young* Jessica C Young, Michele Jonsson Funk, Nabarun Dasgupta,, (University of North Carolina at Chapel Hill)

Background: Amidst the opioid epidemic, the introduction of abuse-deterrent extended-release opioids (EROs) aims to reduce risk associated with these medications. As newer drugs seek approval, understanding the intended use and defining the relevant patient population is vital in assessing the safety and effectiveness of these drugs. Few studies have focused on pain diagnoses among long-term ERO patients, a population of high interest in understanding the opioid crisis. We describe diagnosed painful conditions prior to initiation as a proxy for indication. Methods: We used Truven Analytics' MarketScan Commercial Claims and Medicare Supplemental data (2006-2014) to identify long-term users of EROs, defined as at least 90 days' supply with ≥ 2 prescriptions. We examined pain-related diagnoses in the 182-days prior to initiation of EROs, and the proportion with varying pain diagnoses, stratified by active ingredient and years since approval. Results: We identified 330,029 long-term users, with a mean age of 54 years; 43% were male. The most common ERO prescribed was oxycodone (26% of initiators) followed by fentanyl (23%). Among long-term users, 16% had a diagnosis of cancer in the baseline period and 88% had a non-cancer chronic pain diagnosis. The most common pain diagnoses were back pain (65%) and arthritis (48%). We observed substantial variation in type of pain managed across different opioid compounds. Opioids that had been on the market for over ten years were more than twice (18% vs. 8% of patients) as likely to be prescribed for cancer pain, compared to opioids that were newer to the market. Conclusions: In a national sample of adults with employee-sponsored insurance, newer extended-release opioids were prescribed to treat different types of pain compared to extended-release opioids that were approved by the FDA a decade ago, implying that different considerations in evaluating safety and effectiveness are needed.

0492 S/P

A NOVEL CLAIMS-BASED ALGORITHM TO PREDICT OPIOID

OVERDOSE IN THE US Jenny Sun* Jenny Sun, Jessica Franklin, Kathryn Rough, Rishi Desai, Sonia Hernández-Díaz, Krista Huybrechts, Brian Bateman, (1. Department of Epidemiology, Harvard T. H. Chan School of Public Health, Boston, Massachusetts, USA; 2. Division of Pharmacoepidemiology and Pharmacoeconomics, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, Massachusetts, USA)

Background: With the increasing rate of fatal opioid overdoses in the US, use of a surveillance tool to predict high-risk patients would be valuable for facilitating early intervention. We developed a claims-based algorithm to detect patients at high risk of opioid overdose. Methods: Patients with 1+ opioid prescription from the Optum Clinformatics insurance claims database (2011-2015) were identified and randomly allocated to the training (50% of cohort), validation (25%), or test set (25%). Patients were followed until first opioid overdose or censorship event. Pooled logistic regression was used to predict the odds of opioid overdose at each month during follow-up based on patient history from the preceding 3-6 months. We identified 80+ clinically-relevant candidate predictors including demographics, medical diagnoses, and prescriptions. Elastic net regularization was used for variable selection and minimization of overfitting. As a secondary analysis, random forest, a nonparametric data mining technique, was used to consider all possible interactions and transformations of candidate predictors. Results: We identified 5,293,880 opioid users; 2,682 patients (0.05%) had a claim indicating opioid overdose during follow-up. On average, patients who overdosed were younger and had more medical diagnoses and prescriptions. The final model comprised of 61 predictors. The strongest predictors were age 18-25 years (OR=2.21, ref=26+ years), 1+ diagnosis of suicide attempt (OR=3.68) or opioid dependence (OR=3.14) during the previous 6 months. In the test set, the model achieved a c-statistic of 0.89 and was well calibrated. The random forest model had similar performance (c-statistic=0.86). Conclusion: We propose an algorithm to prospectively identify patients at high-risk of opioid overdose using routinely collected healthcare utilization claims. Active monitoring programs using claims data would create an opportunity for intervention before an overdose occurs.

0491 S/P

TRENDS IN OPIOID AND NON-OPIOID PRESCRIPTION ORAL ANALGESIC USE BY HIV STATUS Chelsea Canan* Chelsea Canan, G. Caleb Alexander, Richard Moore, Irene Murimi, Geetanjali Chander, Bryan Lau, (University of Virginia)

Background. People living with HIV (PLWH) have a higher prevalence of pain compared to HIV-uninfected individuals and have a higher prevalence of risk factors for opioid misuse. Detailed, nationwide trends in prescription analgesic use by HIV status are not well described. Methods We analyzed Medicaid pharmacy claims from adults in 14 US states from 2001-2009 to identify opioid and nonopioid analgesic prescriptions. We compared trends in prescribing rates by HIV status. Then to reduce heterogeneity by HIV status, we 1) standardized the sample to characteristics of PLWH using inverse probability weights and 2) restricted the sample to a subgroup who shared a common comorbidity, diabetes, chosen for its relatively high prevalence and association with chronic pain. We estimated the incidence of chronic opioid therapy (COT) (≥90 consecutive days with an opioid prescription) among opioid-naïve individuals and estimated the association between HIV and COT. Results. Rates of both opioid and non-opioid analgesic prescriptions increased from 2001-2009. PLWH received approximately twice as many prescriptions as those without HIV. In an unadjusted Cox regression, PLWH had 3.06 (95% CI 2.76-3.39) times the hazard of COT compared to those without HIV. When restricting to patients with diabetes, rates of all analgesic prescriptions were approximately equal by HIV status and the unadjusted HR for COT decreased to 1.61 (95% CI 1.25-2.09). After adjusting for age, sex, state, comorbidity score, depression, bipolar disorder, and schizophrenia, the HR in the weighted subsample decreased to 1.26 (95% CI 0.97-1.63). Conclusions From 2001-2009 PLWH received more analgesic prescriptions than patients without HIV, due primarily to differences in demographics and health status. Regardless of differences in these adjustment factors, COT is high among PLWH; HIV providers must adhere to good prescribing practices and monitor patients for misuse.

0493 S/P

CASE-CROSSOVER DESIGN IN PHARMACOEPIDEMIOLOGIC STUDIES OF DRUG INTERACTIONS Katsiaryna Bykov* Katsiaryna Bykov, Murray A. Mittleman, Robert J. Glynn, Sebastian Schneeweiss, Joshua J. Gagne, (Harvard T.H. Chan School of Public Health)

Purpose: The case-crossover may be useful for studying the clinical outcomes of drug-drug interactions (DDI) in electronic healthcare data; however, experience with the design in the DDI context is limited. Methods: Using five US databases (1998-2013), we conducted case-crossover analyses of two DDI examples with prior evidence of harm: (1) cytochrome P450 (CYP)3A4-metabolized statins + CYP3A4-inhibiting antibiotics (clarithromycin, erythromycin) and rhabdomyolysis; and (2) clopidogrel + CYP2C19-inhibiting selective serotonin reuptake inhibitors (fluoxetine, fluvoxamine) and ischemic events. We considered the exposure histories of all eligible cases and conducted analyses with (1) a 3-parameter model with an interaction term and a 6-parameter saturated model that distinguished the ordering and chronicity of drug exposures; and (2) with or without active comparators. Results: In the statin example, the simpler, 3-parameter model produced estimates consistent with prior evidence with the active comparator (interaction term odds ratio [OR] 2.05, 95% confidence interval [CI] 1.00 - 4.23) and without (OR 1.99, 95% CI 1.04 - 3.81). In the clopidogrel example, this model produced results opposite of expectation (OR 0.78, 95% 0.68 - 0.89) unless the active comparator was used (OR 1.03, 95% CI 0.90-1.19). The saturated model showed considerable heterogeneity across strata; strata with concordant clopidogrel exposure likely produced the least biased estimates. Conclusion: A simpler model with the interaction term can be useful in evaluating outcomes of concurrent drug exposure in case-crossover studies, but a more complex saturated model can help identify heterogeneity across strata. Restriction or use of active comparator may be necessary in the presence of time-varying confounding.

0494 S/P

EFFECTS OF TIME-VARYING STRESS-ULCER PROPHYLAXIS STRATEGIES ON RISK OF VENTILATOR ASSOCIATED EVENTS Xiaojuan Li* Xiaojuan Li, Michael Klompas, Jessica G. Young, (Harvard Medical School & Harvard Pilgrim Health Care Institute)

Use of acid-suppressive medications for stress ulcer prophylaxis is common in ventilated patients. However, sustained use may increase risk of infectious ventilatorassociated complications (iVACs) including pneumonia. Prior observational studies of these medications on pneumonia failed to appropriately account for time-varying confounders, such as gastrointestinal bleeding, which are affected by past treatment. We used a retrospective cohort of ventilated patients to estimate the effect of timevarying stress-ulcer prophylaxis strategies on cumulative risk of iVACs and ventilator mortality, accounting for time-varying and baseline confounders, as well as competing risks. Using electronic health records, we identified 6133 patients aged 18+ on mechanical ventilation for 3+ days at Brigham and Women's Hospital (2009-2014). From ventilation day 3, we considered sustained treatment strategies that treat patients with proton pump inhibitors (PPIs), H2 blockers, or sucralfate. We estimated the 30-day risk ratio (RR) under each strategy relative to never receiving prophylaxis using the parametric g-formula, an extension of standardization for time-varying treatments and confounders, to appropriately control for time-varying confounding affected by past treatment. Compared to never receiving prophylaxis, we estimated a harmful yet non-statistically significant effect of nearly all prophylaxis strategies on iVACs. The effect estimate was strongest for H2 blockers RR and 95% CI= H2 blockers 1.45 (0.93-2.37), PPIs 1.41 (0.87-2.42), sucralfate 0.97 (0.34-2.35). Secondary analysis showed different estimates for low and high dose PPI strategies high 1.59 (0.89-2.85), low 1.29 (0.67-2.39). We found a protective effect on ventilator mortality that was strongest for sucralfate and weakest for high dose PPIs. Despite the consistent direction of effect estimates, we had no sufficient evidence to conclude that sustained use of stress ulcer prophylaxis increases iVACs risk.

ADMINISTRATION OF ANTINEOPLASTIC DRUGS, USE OF PERSONAL PROTECTIVE EQUIPMENT, AND FECUNDITY IN FEMALE NURSES Feiby L. Nassan* Feiby L. Nassan, Christina C. Lawson, Audrey J. Gaskins, Candice Y. Johnson, James M. Boiano, Janet W. Rich-Edwards, Jorge E. Chavarro, (Harvard T.H. Chan School of Public Health)

Objective: To examine the association between administration of antineoplastic drugs (AD) and fecundity among female nurses. Methods: AD administration and use of personal protective equipment (PPE) were self-reported at baseline among 2,649 participants of the Nurses' Health Study 3 who were trying to get pregnant. Women were asked if they were actively trying to become pregnant and the duration of their pregnancy attempt longitudinally. Multivariable accelerated failure time models were used to estimate time ratios (TR) and 95% confidence intervals (CI) adjusted for age, race, body mass index (BMI), smoking, marital status, hours of work, and other job factors (lifting heavy loads, ionizing radiation, disinfectants, anesthetic gases, and aerosolized drugs). Results: Mean (standard deviation) age and BMI at baseline were 30.7 years (4.7) and 26.0 kg/m2 (6.4). Forty-one percent reported administering AD (29.7% only in the past and 11.0% currently). Current (TR=0.98, 95%CI 0.85,1.12) and former administration of AD (TR =1.02, 95% CI 0.93,1.12) were unrelated to the ongoing duration of pregnancy attempt. Among women currently administering AD, those who administered AD for ≥6 years had a 27% (95%CI 6%,53%) longer duration of pregnancy attempt than women who never handled ADs in unadjusted analyses. This difference disappeared in adjusted analyses (TR=I.01, 95% CI 0.85,1.21). Women who currently administer AD but did not consistently use PPE (n=21) had a 25% (95%CI -21%,96%) longer median duration of pregnancy attempt than those who never handled AD. Conclusion: In a cohort of nurses planning pregnancy with a high prevalence of consistent use of PPE, administration of AD does not appear to have an impact on fecundity.

0502 S/P

PHYTOESTROGEN INTAKE AND FECUNDABILITY IN A NORTH AMERICAN COHORT OF PREGNANCY PLANNERS Amelia K Wesselink*

Amelia K Wesselink, Elizabeth E Hatch, Kenneth J Rothman, Katherine L Tucker, Ellen M Mikkelsen, Lauren A Wise, (Boston University School of Public Health)

Phytoestrogens are plant-derived compounds that have estrogenic and antiestrogenic effects, which may influence hormonal activity and reproduction. We examined the association between intake of isoflavones, a class of phytoestrogens found in soy products, with fecundability in a web-based preconception cohort of female pregnancy planners from the U.S. and Canada. Eligible women were age 21-45 years, in a stable relationship with a male partner, and attempting to conceive spontaneously. Participants completed a baseline questionnaire on demographic, behavioral, and reproductive factors, and a food frequency questionnaire, which we used to estimate intake of five isoflavones. We measured fecundability using data from bi-monthly follow-up questionnaires that ascertained pregnancy status. Women were followed until pregnancy, initiation of fertility treatment, loss to follow-up, or completion of 12 menstrual cycles, whichever came first. We restricted our analysis to 2,969 females who had been attempting to conceive for ≤6 menstrual cycles at study entry. We used proportional probabilities regression models to estimate fecundability ratios (FR) and 95% confidence intervals (CI). The mean energyad justed intake of isoflavones was 1.83 mg/day (range=0.08-52.97). Isoflavone intake was not substantially associated with fecundability: FRs for 0.75-0.99, 1-1.99, 2-4.99, and ≥5 compared with <0.75 mg/day were 1.13 (95% CI: 0.99-1.29), 1.05 (95% CI: 0.94-1.18), 1.02 (95% CI: 0.88-1.17), and 1.10 (95% CI: 0.91-1.34), respectively. FRs were slightly greater among women with body mass index <25 kg/m2 (FR for ≥5 vs. <0.75 mg/day=I.18, 95% CI: 0.92-1.51) and women aged ≥30 years (FR for ≥5 vs. <0.75 mg/day=I.21, 95% CI: 0.94-1.57). No substantial associations were observed between each individual isoflavone and fecundability. Our results indicate little association between isoflavone intake and fecundability.

0501 S/P

INFERTILITY AMONG AFRICAN AMERICAN WOMEN WITH SYSTEMIC LUPUS ERYTHEMATOSUS COMPARED TO HEALTHY WOMEN: A PILOT STUDY Meghan Angley* Meghan Angley, S. Sam Lim, Jessica B. Spencer, Penelope P. Howards, (Emory University)

Background: Some treatments for systemic lupus erythematosus (SLE) can cause infertility, but the effect of SLE itself on fertility is less clear. We examined infertility experiences in women with SLE compared to healthy women. Methods: We enrolled women ages 22-40, living in the Atlanta metro area, diagnosed with SLE after age 17 who had not had a hysterectomy before diagnosis. Women ever treated with cyclophosphamide were excluded. African-American women ages 22-40 from the same area recruited from a marketing list were used for comparison. Women were interviewed about their reproductive histories and goals, including how many children they would eventually like to raise. Periods of infertility were identified as times when they had regular, unprotected sex for ≥12 months without conceiving after age 20. We used logistic regression to examine the association between SLE and meeting reproductive goals and Cox proportional hazards regression to examine the association between SLE and time to first period of infertility. All models controlled for age, nulliparity and ever smoked on a regular basis. Results: Our sample included 76 women with SLE and 163 women without SLE. Both women with and without SLE had given birth to a median of 1 child. Compared to healthy women, women with SLE were less likely to have fewer children than they eventually wanted (odds ratio: 0.65; 95% confidence interval [CI]: 0.32, 1.35). However, women with SLE had a greater hazard of experiencing infertility after age 20 (hazard ratio [HR]: 2.21; 95% CI: 1.41, 3.46). When only periods of infertility while attempting pregnancy were considered, the association moved towards the null (HR: 1.48; 95% CI: 0.68, 3.20). Conclusions: This analysis suggests that women with SLE may be more likely to experience infertility than women without SLE, but this may not translate to an inability to meet reproductive goals among women with SLE.

0503 S/P

CADMIUM EXPOSURE AND OVARIAN RESERVE IN WOMEN AGES 35-49 YEARS: THE IMPACT OF URINARY CREATININE ADJUSTMENT METHOD ON RESULTS Kristen Upson* Kristen Upson, Katie M. O'Brien, Janet E Hall, Donna D. Baird, (Epidemiology Branch, National Institute of Environmental Health Sciences)

Several animal studies have demonstrated ovarian follicle depletion with exposure to cadmium, indicating its detrimental effect on ovarian reserve. In humans, urinary cadmium (uCd) characterizes long-term exposure, since the kidney is a major cadmium storage compartment. However, two prior human studies of uCd and serum follicle stimulating hormone (FSH), a biomarker of ovarian reserve, had inconsistent findings. We used data from the National Health and Nutrition Examination Survey III, 1988-94, to investigate the association between uCd (collected using spot urine samples) and serum FSH among 1,692 women ages 35-49 years with at least one intact ovary and not pregnant, breastfeeding, using oral contraceptives, or exhibiting a luteinizing hormone (LH):FSH ratio>2 (indicative of ovulation). We used a recently developed method to correct for urinary dilution using creatinine, covariate-adjusted standardization with covariate adjustment (CAS+CA), and compared our results to those obtained using two common methods, standardization and covariate adjustment (CA). Adjusted relative risks (RR) and 95% confidence intervals (CI) for the associations between quartiles of uCd and FSH concentrations ≥10 IU/L (indicating declining ovarian reserve) were estimated using Poisson regression. Our analysis using CAS+CA suggested a positive association between uCd concentrations and FSH (4th vs. 1st quartile: RR 1.4, 95% CI: 0.9-2.0, Ptrend=0.03). However, we observed estimates closer to the null with standardization (4th vs. 1st quartile: RR 1.2, 95% CI: 0.8-1.9, Ptrend=0.07) and larger in magnitude with CA (4th vs. 1st quartile: RR 1.8, 95% CI: 1.1-2.8, Ptrend=0.03). The difference in estimates may be due to the lack of appropriate adjustment for factors, such as fat-free mass, that can affect creatinine independent of hydration effects. After accounting for these factors using the CAS+CA method, our data suggest that cadmium exposure may contribute to ovarian aging in women.

0504 S/P

DAIRY CONSUMPTION AND RISK OF EARLY NATURAL MENOPAUSE Alexandra Purdue-Smithe* Alexandra Purdue-Smithe, Brian Whitcomb, JoAnn E. Manson, Susan E. Hankinson, Lisa M. Troy, Bernard A. Rosner, Elizabeth R. Bertone-Johnson, (University of Massachusetts Amherst)

Early natural menopause, defined as the cessation of ovarian function prior to age 45, affects approximately 10% of women and is associated with increased risk of cardiovascular disease and other conditions. Early menopause may also interfere with family planning due to early fertility loss. Biologic evidence suggests a potential role of the hormones in dairy foods in the ovarian aging process. Importantly, the concentration and bioavailability of these hormones depend largely upon the fat content of dairy foods. Despite biologic plausibility, no prior epidemiologic studies have evaluated how dairy intake is associated with risk of early menopause. We therefore evaluated how intakes of total, low-fat, high-fat and individual dairy foods are associated with early menopause in the Nurses' Health Study II. Premenopausal women were followed from 1991 until incident early natural menopause, age 45, oophorectomy, hysterectomy, death or 2011, whichever came first. Food-frequency questionnaires administered every 4 years were used to assess usual dairy intake. In Cox proportional hazards models adjusting for age, BMI, smoking, vitamin D and other behavioral and dietary factors, total baseline dairy intake of ≥4 servings/day versus <4 servings/week was associated with 23% lower risk of early menopause (95% confidence interval (CI) = 0.64, 0.93; P-trend = 0.08). Associations appeared to be limited to low-fat dairy foods (>2 servings/day versus <3 servings/month HR = 0.83; 95% CI= 0.68, 1.01; P-trend = 0.02). Skim/low-fat milk, in particular, was associated with lower risk of early menopause (each 1 serving/d increase HR = 0.94; 95% CI= 0.89-0.99). In contrast, high-fat dairy intake was not associated with early menopause. Low-fat dairy foods including skim/low-fat milk may represent modifiable risk factors to reduce risk of early menopause. Findings should be replicated in future epidemiologic studies.

PERSISTENT DISPARITIES IN PATHOGEN BURDEN IN THE U.S., 1999 – 2014 Rebecca C. Stebbins* Rebecca C. Stebbins, Grace A. Noppert, Evette Cordoba, Julia B. Ward, Lydia Feinstein, Jennifer B. Dowd, Allison E. Aiello, (UNC - Chapel Hill)

While social disparities in health are well established, the biological mechanisms by which social factors, such as socioeconomic status (SES) and race/ethnicity, impact downstream health are not well understood. Prevalent, persistent infections may be one explanatory mechanism given the disproportionate burden among disadvantaged groups and the long-term adverse health consequences associated with infection Using data on 17,651 participants from 8 waves of continuous NHANES, we examined trends in pathogen burden disparities over 16 years. We created a measure of burden for each participant equal to the sum of seropositives to persistent pathogens, divided by the number of tested persistent pathogens, resulting in a proportion that served as our pathogen burden score. We calculated cross-sectional age-adjusted mean pathogen burden scores for each category of poverty-to-income ratio (PIR), educational attainment, and race/ethnicity. Across all years, the highest age-ad justed mean pathogen burden score was consistently in the lowest SES category, while the highest category had the lowest mean score. In 1999-2000, those with a PIR3.5. By 2013-14, this gap had increased to 1.8 times the mean score, though the increase was not consistent across years. We also found persistent disparities by racial and ethnic categories. Those identifying as Non-Hispanic White had lower mean pathogen burden scores across all years compared to Mexican Americans, Other Hispanics, and Non-Hispanic Blacks, with an age-adjusted mean pathogen burden score in 1999-2000 of 29% compared to >46% for other groups. This gap broadly stayed the same across all years. In a nationally-representative sample, we found disparities in pathogen burden by income, educational attainment, and race/ethnicity that persisted across 16 years. Using socioeconomic indicators, this disparity increased over the study period.

THE POTENTIAL IMPACT OF INTERVENTIONS TO REDUCE ENTEROPATHOGEN INFECTION EARLY IN LIFE ON CHILD GROWTH: RESULTS FROM THE MAL-ED STUDY Elizabeth T. Rogawski* Elizabeth T. Rogawski, James A. Platts-Mills, Jie Liu, Aldo A.M. Lima, Gagandeep Kang, Amidou Samie, Rashidul Haque, Estomih R. Mduma, Margaret N. Kosek, Jose Paulo Leite, Ladaporn Bodhidatta, Najeeha Iqbal, Nicola Page, Ireen Kiwelu, Eric R. Houpt, (Dept. of Public Health Sciences, University of Virginia)

Background In low-resource settings with inadequate access to clean water and sanitation, early exposure to enteropathogens has been associated with poor linear growth, even in the absence of diarrhea. Vaccines and improvements in water and sanitation have been proposed as interventions to improve growth, but their potential impact is unknown. Methods Among 1,469 children in the birth cohort study, MAL-ED, we used the parametric g-formula to estimate the impact of interventions that would reduce pathogen infection on linear growth at 2 years of age. We considered two interventions: 1) a perfect quadrivalent vaccine that prevented infections by Campylobacter, Shigella, Giardia, and entercaggregative E. coli (EAEC), and 2) universal access to improved water and sanitation. We compared the average lengthfor-age z-score (LAZ) at 2 years before the hypothetical interventions (with the observed pathogen exposures) and after (with reduced exposures). Results Campylobacter (28% stools positive), Shigella (11%), Giardia (30%), and EAEC (51%) were highly common in this cohort. A perfect quadrivalent vaccine would be expected to raise the average LAZ at age 2 from -1.69 LAZ to -1.43 LAZ (difference: 0.25, 95% CI: 0.11, 0.38). Conversely, individual-level provision of improved water and sanitation did not meaningfully reduce pathogen infection, such that this intervention would be expected to have no effect on average LAZ at 2 years (LAZ difference: 0.00, 95% CI -0.02, 0.02). Conclusions It is unlikely that increasing individuals' water and sanitation access, without community-wide change in the environment, will sufficiently reduce pathogen exposure to cause populationlevel improvements in linear growth. The potential impact of a perfect vaccine was similar to effects of nutritional interventions, but the impact of a realistic vaccine would be smaller and likely insufficient to reverse the population-level deficit in linear growth faced by children in low-resource settings.

0511 S/P

INDIVIDUAL AND COMMUNITY-LEVEL RISK FACTORS OF LYME DISEASE IN PENNSYLVANIA USING ELECTRONIC HEALTH RECORDS Katherine A. Moon* Katherine A. Moon, Jonathan Pollak, Cara Nordberg, Christopher D. Heaney, Annemarie G. Hirsch, Brian S. Schwartz, (Johns Hopkins School of Public Health)

Lyme disease is the most common vector-borne disease in the United States. No epidemiologic studies using electronic health records (EHR) have yet evaluated risk factors for incident Lyme disease. With EHR data from 479,344 Geisinger primary care patients in 38 Pennsylvania counties in 2006-2014, we identified incident Lyme disease cases using diagnosis codes, laboratory test orders, and antibiotic orders. In exploratory analyses, we further classified cases into subgroups requiring positive serology and another with symptoms after treatment consistent with post-treatment Lyme disease syndrome (PTLDS). We first compared EHR-identified Lyme disease rates to surveillance rates by year, age, sex, and county. We next examined associations with sociodemographic factors, season, and comorbidities in a casecontrol analysis of Lyme disease cases and randomly selected controls (5:1) frequency-matched on year, age, and sex. We identified 9,657 Lyme disease cases, of whom 1,791 had positive serology. In addition, 1,897 (19.6%) cases had an encounter with an incident diagnosis of fatigue, pain, or cognitive difficulties within 52 weeks of their Lyme incident date, including 310 (3.2%) with encounters both before and after 30 weeks. EHR-derived annual incidence rates by county were between 4- and 7-fold higher than corresponding surveillance rates. In adjusted analyses (OR, 95% CI), white non-Hispanic race/ethnicity was associated with higher odds of Lyme disease (2.19, 1.86-2.58). Receipt of Medical Assistance (0.77, 0.68-0.87) and higher community socioeconomic deprivation (quartile 4 [0.48, 0.41-0.57] and quartile 3 [0.72, 0.64-0.82] vs. quartile 1) were associated with lower odds of Lyme disease. These results highlight the utility of EHR-based epidemiology, with rich longitudinal data on encounters, diagnoses, and laboratory test results, to improve surveillance and evaluation of Lyme disease risk factors and outcomes.

0513 S/P

RELATION OF OCCUPATIONAL FACEMASK USAGE ON INFLUENZA VIRUS CARRIAGE AND SELF-REPORTED INFLUENZA IN INDUSTRIAL HOG OPERATION (IHO) WORKERS IN NORTH CAROLINA, 2013-2014 Anastasia S. Lambrou* Anastasia S. Lambrou, Christopher D. Heaney, (Department of International Health, Johns Hopkins Bloomberg School of Public Health)

Occupational exposure to pigs is a risk factor for influenza. Industrial hog operation (IHO) worker practices, such as facemask wearing, may prevent potential occupational influenza. Data are lacking on whether facemask usage may protect IHO workers from influenza. Community organizers enrolled a cohort of 103 IHO workers in North Carolina between October 2013 and February 2014. At baseline and bi-weekly intervals over 4-months, data were collected on self-reported influenza symptoms, influenza-like-illness (ILI) and facemask usage. Baseline data asked IHO workers to recall behaviors and symptoms during the past year, while biweekly follow-ups asked about weekly recall of behaviors and symptoms. Nasal swabs from each study visit were assayed for influenza virus RNA presence by realtime RT-PCR. Self-reported facemask usage among IHO workers varied: 38% always, 44% sometimes, and 18% never wearing a facemask. At baseline, compared to IHO workers who reported never wearing a facemask, IHO workers sometimes wore a facemask were 0.26 (95% CI: 0.08, 0.84) and always wore a facemask were 0.09 (0.02, 0.48) times as likely to report influenza-like symptoms. Also at baseline, IHO workers who reported always vs. never wearing a facemask had 3.29 (0.36, 30.04) the odds of a PCR-positive influenza virus swab. Bi-weekly data suggested that the odds of ILI was lower among IHO workers who reported wearing a mask sometimes or always vs. never (OR: 0.12, 95% CI: [0.03, 0.42]). In bi-weekly data, IHO workers who sometimes or always vs. never wore a facemask had lower odds (OR: 0.05, 95% CI [0.01, 0.20]) of a positive swab for influenza virus. Increased frequency of occupational facemask usage may protect IHO workers from ILI symptoms and influenza but might contribute to influenza virus exposure by acting as a fomite. Examining this relationship further is crucial for IHO worker protection and for prevention of influenza transmission to household contacts and communities

CANCERS ATTRIBUTABLE TO INFECTIONS IN THE UNITED STATES IN 2014 Karena Volesky* Karena Volesky, Mariam El-Zein, Darren R. Brenner, Christine M. Friedenreich, Yibing Ruan, Stephen Walter, Abbey E. Poirier, Paul J. Villeneuve, Will King, Paul Demers, Prithwish De, Robert Nuttall, Leah Smith, Dylan O'Sullivan, Elizabeth Holmes, Perry Hystad, Eduardo L. Franco, (McGill University)

Introduction: Public awareness of the role of infectious agents in cancer etiology is low. Yet, in developed regions of the world, an estimated 9.2% of cancers diagnosed in 2012 were attributable to infections, while specific estimates for the USA are lacking. Cancer-causing infections can be avoided with current interventions, for example, hepatitis B virus (HBV) and human papillomavirus (HPV) with vaccination, and Helicobacter pylori with antibiotic therapy. The considerable untapped potential for primary prevention of carcinogenic infections makes quantifying their role in cancer etiology a priority. Objective: To estimate the proportion of incident cancer cases in 2014 attributable to infections among those aged 20 and older in the USA. Methods: Population attributable risks (PARs) were used to estimate the possible reduction in cancer incidence if infections were eliminated in the population. PARs were applied to cancer incidence data from the Centers for Disease Control and Prevention and the National Cancer Institute. Systematic literature searches for each infection provided the prevalence and relative risk estimates required to calculate PARs. Measurement error in earlier H. pylori prevalence estimates was corrected for a more sensitive assay. Results: The estimated number of infection-attributable cancer cases for 2014 was: 32,300 for HPV, 11,400 for H pylori, 7,800 for HCV, 3,800 for Epstein-Barr virus, 2,500 for HBV, 1,200 for Kaposi sarcoma, and 100 cases for human T-cell lymphotropic virus. These 7 infections were responsible for 3.7% (95% CI=2.8-4.6%) of the cancers diagnosed among adults in the USA in 2014; 4.0% among women and 3.4% among men. This results in 59,100 potentially avoidable cases among 19 associated cancer sites. Conclusion: Of the 1.5 million cancer cases diagnosed in 2014 among USA adults, 3.7% were attributable to infections-representing an important target for primary prevention to reduce the burden of infection-associated cancers.

0515

HELICOBACTER PYLORI SERO-POSITIVITY AND ITS ASSOCIATION WITH INCIDENT ALL-CAUSE AND ALZHEIMER DEMENTIA IN LARGE NATIONAL SURVEYS May A. Beydoun* May A. Beydoun, Hind A. Beydoun, Martine El-Bejjani, Greg A. Dore, Alan B. Zonderman, (NIA/NIH/IRP)

INTRODUCTION: Infectious agents were recently implicated in Alzheimer's Disease (AD) and other dementias' etiology, notably Helicobacter pylori (H. pylori). METHODS: We tested associations of H pylori sero-positivity with incident allcause and AD dementia and with AD-related mortality among US adults in a retrospective cohort study. Data from the National Health and Nutrition Surveys (NHANES) III, phase 1 (1988-1991) and 1999-2000 linked with Medicare and National Death Index registries were used (Baseline age≥45y, follow-up to 2013, Npooled=5,927). RESULTS: A positive association between H. pylori sero-positivity and AD mortality was found in men (HRadj,pooled=4.33, 95% C1:1.51-12.41, p=0.006), which was replicated for incident AD and all-cause dementia, with HRadj,pooled=1.45(95% C1:1.03-2.04, p=0.035) and HRadj,III =I.44(95% C1:1.05-1.98, p=0.022), respectively. These associations were also positive among higher socio-economic status (SES) groups. DISCUSSION: In sum, H. pylori sero-positivity's direct association with AD mortality, all-cause and AD dementia was restricted to men, and among higher SES groups

BENIGN THYROID DISEASES AND RISK OF THYROID CANCER: A NATIONWIDE COHORT STUDY Cari Kitabara* Cari Kitabara, (National Cancer Institute)

Background: Thyroid nodules, adenomas, and goiter have consistently been associated with thyroid cancer risk. Few studies have assessed whether thyroid dysfunction and thyroid autoimmunity influence this risk. Methods: We conducted a nationwide cohort study of all individuals in Denmark with a hospital-based diagnosis of benign thyroid disease linked with cancer incidence information for 1978-2013. We computed the excess risk of thyroid cancer among patients with benign thyroid diseases compared with the expected risk in the general population, using standardized incidence ratios (SIRs) excluding the first 12 months of followup. Results: SIRs were significantly elevated for all benign thyroid diseases examined. SIRs were higher in the earlier follow-up periods (suggesting a role of detection or diagnostic work-up bias) and higher for men than women. After excluding the first 10 years of follow-up, hyperthyroidism (n=38 TC cases, SIR=2.18, 95% CI 1.54-2.99), thyroiditis (n=6 cases, SIR=2.68, 95% CI 0.98-5.84), nontoxic nodular goiter (n=95, SIR=4.47, 95% CI 3.62-5.47), simple goiter (n=9, SIR=4.12, 95% CI 1.89-7.83), other/unspecified goiter (n=29, SIR=4.62, 95% CI 3.10-6.64), and adenoma (n=11, SIR=5.98, 95% CI 2.98-10.7) remained positively associated with thyroid cancer risk; no association was observed for hypothyroidism (n=4, SIR=0.59, 95% CI 0.16-1.50). Conclusions: We found strong increased risks of thyroid cancer more than 10 years following diagnosis of hyperthyroidism, thyroiditis, goiter, and adenoma. Hypothyroidism was less clearly associated with thyroid cancer risk.

0521

PHYSICAL ACTIVITY AND COLORECTAL CANCER RISK IN THE MULTIETHNIC COHORT STUDY Song-Yi Park* Song-Yi Park, Lynne R. Wilkens, Loïc Le Marchand, (spark@cc.hawaii.edu)

Physical activity has been associated with a lower risk of colorectal cancer. However, data is lacking on whether the association is consistent between sexes and across different races/ethnicities and anatomical subsites of tumors. To examine the associations between physical activity and colorectal cancer overall and in subgroups, we prospectively analyzed data from the Multiethnic Cohort, which mostly consists of African Americans, Native Hawaiians, Japanese American, Latinos, and whites living in Hawaii and California. In 1993-1996, participants aged 45-75 years entered the cohort by completing a comprehensive questionnaire including questions on sleep, sitting, and other physical activities. For the current analysis, physical activity was calculated as total daily hours spent in moderate or vigorous activities including sports and work. Cox proportional hazards models were used to estimate hazard ratios (HRs) of colorectal cancer by physical activity level ad justing for all colorectal cancer risk factors. During a mean follow-up of 17 years, 4,430 invasive adenocarcinoma cases of the colorectum were identified among 172,502 eligible participants. The multivariate HR of colorectal cancer for the highest vs. lowest quintiles of physical activity was 0.80 (95% CI: 0.70, 0.91) in men (P for trend= 0.003) and 0.95 (95% CI: 0.82, 1.11) in women (P for trend= 0.45, P for heterogeneity by sex = 0.24). Sleeping and sitting hours were not associated with colorectal cancer risk both in men and women. In men and women combined, the association with physical activity did not vary across the five racial/ethnic groups (P for heterogeneity= 0.64) and by anatomical subsite of tumors (right and left colon and rectum, P for heterogeneity = 0.51). The findings confirm the inverse association between physical activity and colorectal cancer, which appears to be stronger in men, and suggest that the association does not vary by race/ethnicity and anatomical subsite of tumors.

0522 S/P

DIABETES IN RELATION TO BARRETT'S ESOPHAGUS AND ESOPHAGEAL/ESOPHAGOGASTRIC JUNCTION ADENOCARCINOMAS: A POOLED ANALYSIS FROM THE INTERNATIONAL BEACON CONSORTIUM Jessica L. Petrick* Jessica L. Petrick, Nan Li, Lesley A. Anderson, Douglas A. Corley, Hashem B. El Serag, Linda M. Liao, Geoffrey Liu, Liam J. Murray, Joel H. Rubenstein, Nicholas J. Shaheen, Aaron P. Thrift, Piet A. van den Brandt, Thomas L. Vaughan, David C. Whiteman, Anna H. Wu, Marilie D. Gammon, Michael B. Cook, (Division of Cancer Epidemiology and Genetics, National Cancer Institute, Bethesda, MD, USA)

Diabetes serves as a proxy for hyperinsulinemia and has been associated with higher risks of numerous cancers, but the association between diabetes and tumors of the esophagus/esophagogastric junction remains unclear. We harmonized and pooled data from 13 studies in the International Barrett's and Esophageal Adenocarcinoma Consortium (BEACON), comprising 1,728 Barrett's esophagus (BE) cases, 2,311 esophageal adenocarcinoma (EA) cases, 1,943 esophagogastric junction adenocarcinoma (EGJA) cases, and 16,310 controls. Logistic regression was used to estimate study-specific odds ratios (ORs) and 95% confidence intervals (CIs) for self-reported, physician-diagnosed diabetes in association with BE, EA, and EGJA risks, adjusting for a common set of confounders (age, sex, obesity, and cigarette smoking). Study-specific ORs were then combined using random-effects metaanalysis. We also evaluated effect measure modification by gastroesophageal reflux disease (GERD), using likelihood ratio tests and the relative excess risk due to interaction (RERI). The odds for the association with diabetes was elevated by 35% for EA (OR=1.35, 95%CI: 1.00-1.82; 1^2=51.6%), 25% for EGJA (OR=1.25, 95%CI: 1.03–1.52; 1^2=0.0%), and 27% for EA/EGJA combined (OR=1.27, 95%CI: 1.06-1.53; 1^2=26.8%). GERD modified the diabetes-EA/EGJA association. On the multiplicative scale (p=0.04), the odds for the diabetes-EA/EGJA association was elevated by 63% among participants with GERD (OR=I.63, 95%CI: 1.19-2.22), but was null among those without GERD (OR=I.03, 95%CI: 0.74-1.43). On the additive scale (RERI=1.29, 95%CI: 0.22-2.36, p=0.02), the odds of EA/EGJA was elevated to 3.4 for participants with diabetes and GERD (OR=3.42, 95%CI: 2.49-4.69), compared to those without either factor. Little or no association was found between diabetes and BE (OR=0.87, 95%CI: 0.67-1.13). These results indicate that diabetes is associated with increased odds of EA and EGJA, which is confined to individuals with GERD.

0523

A PROSPECTIVE STUDY OF CIRCULATING BRANCHED-CHAIN AMINO ACIDS (BCAAS) AND OBESITY-RELATED CANCER RISK IN WOMEN Deirdre K. Tobias* Deirdre K Tobias, Aditi Hazra, Patrick R. Lawler, Paulette D. Chandler, Daniel I. Chasman, Olga Demler, Julie E. Buring, I-Min Lee, Susan Cheng, JoAnn E. Manson, Samia Mora, (Division of Preventive Medicine, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School)

Background: Obesity is a risk factor for ≥13 cancer sites, although underlying mechanisms remain largely unknown. Circulating branched-chain amino acids (BCAAs; isoleucine, leucine, valine) are strongly correlated with obesity and glucose intolerance; thus, we sought to prospectively evaluate plasma BCAAs with obesityrelated cancers. Methods: Participants in the Women's Health Study prospective cohort without a history of cancer at baseline blood collection were eligible for analyses (N=27,21 I, mean age=54 years). BCAAs were quantified via proton NMR spectroscopy, In-transformed, and standardized. We used Cox proportional regression models to evaluate risk of a composite endpoint of obesity-related cancers, defined per the International Agency for Research on Cancer 2016 report. Results: We confirmed 2,818 incident obesity-related cancers over a mean 18.2 years. Adjusting for age, race, smoking, diet, alcohol, physical activity, menopausal hormone use, body mass index (BMI) and obesity-related biomarkers (lipids, triglycerides, C-reactive protein), and other cancer risk factors, baseline leucine was positively associated with the composite obesity-related cancer endpoint (per standard deviation: 1.04 [1.00 to 1.08], p=0.04). Neither isoleucine (0.99 [0.95, 1.03]) nor valine (1.00 [0.96, 1.04]) was associated. Baseline obesity (BMI≥30 kg/m2) was associated with a 20% greater risk of obesity-related cancers (CI=I.09 to 1.34) compared with normal weight (BMI 18.5 to 24.9 kg/m2) after multivariable adjustment. This association was modestly attenuated ~11% after adjusting for circulating leucine levels. Conclusions: Plasma leucine was significantly associated with incident obesity-related cancers and explained a modest proportion of the relationship between obesity and cancer in this cohort of US women. Replication of these novel findings and further research is warranted to elucidate leucine's role as a potential intermediate between excess adiposity and cancer risk.

CANCERS AVERTED AMONG HIV-INFECTED ADULTS DURING 2008-2012 Jessica Yasmine Islam* Jessica Yasmine Islam, Ruth M. Pfeiffer, H. Irene Hall, Jianmin Li, Anna Satcher Johnson, Alicia Vargas, Glenn Copeland, Karen Pawlish, Bridget J. Anderson, Eric Engels, Meredith Shiels, (Division of Cancer Epidemiology and Genetics, National Cancer Institute, Rockville, MD; Department of Epidemiology, University of North Carolina Gillings School of Global Public Health, Chapel Hill, NC)

People living with HIV (PLWH) are at an increased risk of developing several cancers. Since 1996, the availability of modern highly active antiretroviral therapy (HAART) has improved immune function, and reduced the risk of certain cancers known to occur in excess among PLWH. We quantified the number of cancer cases averted in the US HIV-positive population during 2008-12. We utilized cancer incidence data (2001-2012) collected from the U.S. HIV/AIDS Cancer Match Study for anal, cervical, liver and lung cancers, Kaposi sarcoma (KS), non-Hodgkin lymphoma (NHL), Hodgkin lymphoma (HL), and cancer overall. We estimated sitespecific cancer incidence rates among PLWH stratified by age-group, race/ethnicity, sex, risk group, and calendar year. The number of PLWH in the US was obtained for the same strata using data from the CDC's National HIV Surveillance System for the years 2008-2012. During 2001-2012, nearly all site-specific cancer rates declined, except liver cancer rates, which remained stable over time. The largest declines in rates (all p < 0.0001) were observed for cervical cancer (61% decline), NHL (54%) and KS (49%). During 2008-2012, 36,674 cancer cases were estimated to have occurred among PLWH in the US. We estimated that had cancer rates remained stable since 2001, an additional 21,473 cancer cases would have occurred during 2008-12, including 8802 additional cases of NHL, 4263 cases of KS, 2617 lung cancers, 911 cervical cancers, and 459 HLs. Among PLWH, 19,697 cancers occurred during 2008-2012 in excess of what would be expected based on general population rates. The largest numbers of excess cases were observed for NHL (n = 5591), KS (n = 4060), anal cancer (n = 2774), and lung cancers (n = 2006). In the US, substantial progress has been made in preventing cancer among PLWH given the observed declining rates and estimated number of cancer cases averted. However, the large number of excess cancers highlight opportunities for further cancer prevention control initiatives.

0525

LATENCY ESTIMATION FOR CHRONIC DISEASE RISK Mingyang Song* Mingyang Song, Karin B. Michels, Walter C. Willett, Bernard A. Rosner, (Clinical and Translational Epidemiology Unit and Division of Gastroenterology, Massachusetts General Hospital, Harvard Medical School, Boston, Massachusetts)

Identifying the susceptible period when environmental factors affect disease risk is essential for understanding disease etiology. Most existing epidemiologic studies with repeated measures of exposures use oversimplified summaries of timedependent exposures, such as baseline or most current exposure, or the cumulative average of exposure over all available follow-up periods. While the cumulative average may reduce measurement error, it makes the assumption that exposure at each time point is equally predictive of disease. Another approach is to allow for a lag period when relating exposure to subsequent disease risk. In this paper, we introduce a damped exponential weighting model to relax the assumptions required for existing approaches and provide estimates of optimal exposure weights at different time intervals. This model can be fit using standard software and has been applied to assess several risk factors for colorectal and breast cancer in the Nurses' Health Study, in which detailed dietary and lifestyle information has been prospectively collected every 2-4 years since 1976. Our results suggest that at least 15 years of latency are needed to observe the maximal association of folate intake and body mass index with colorectal cancer. For postmenopausal breast cancer, body mass index within the past 10-15 years is more predictive of estrogen receptor (ER)+ / progesterone receptor (PR)+ cancer, while at least 30 years of latency are needed to observe the strongest association with ER-/PR- cancer. Our results underscore the value of an analytic approach to risk factor assessment to identify the temporal window with maximal impact on the outcome of interest.

INCREASING INCIDENCE OF VASCULAR DEMENTIA WITH HORMONE REPLACEMENT THERAPY Chun-Teng Tsai* Chun-Teng Tsai, Yu-Ching Chou, Chien-An Sun, (School of Public Health, National Defense Medical Center)

Background: Menopause is associated with sharply decreasing estrogen level in females, and changes in estrogen level may contribute to vascular-related diseases and lead to vascular dementia. Objective: This present study is to assess the possible association between hormone replacement therapy (HRT) and vascular dementia. Methods: This study was a retrospective cohort study based on the National Health Insurance Research Database (NHIRD) from 2000 to 2013. We identified approximately 22,856 individuals using estrogen and randomly selected 45,712 agematched subjects without using any estrogen as comparison cohort. All were observed until a diagnosis of vascular dementia, death, or December 31, 2013, whichever occurred first. The Kaplan-Meier method was used for calculating the cumulative incidence of vascular dementia in each cohort. Cox proportional regression hazards models were used to estimate hazards ratios (HRs) and 95% confidence intervals (CIs). SAS version 9.4 for Windows was used to analyze all the data. All statistical significance was set as p<0.05. Results: Kaplan-Meier analysis showed that the cumulative risk of vascular dementia in the estrogen cohort was significantly higher than that in the comparison cohort (log-rank test, p<0.001). In addition, Cox proportional regression showed that estrogen users had higher risk of vascular dementia than non-users (adjusted HR [aHR] of 1.50, 95% CI=I.39-1.62). Moreover, the longer duration of exposure to estrogen, the stronger risk of vascular dementia was. The aHRs at exposures of less than 91 defined daily doses (DDDs); 91-365 DDDs; and over 365 DDDs, were 1.37 (95% CI=1.22-1.55); 1.49 (95% CI=1.31-1.68); and 1.73 (95% CI=1.55-1.94), respectively, and the trend test, p<0.0001. Conclusion: The results of this population-based cohort study suggest that use of estrogen is associated with higher risk of vascular dementia.

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ANTHROPOMETRY, SOCIOECONOMIC STATUS OVER THE LIFE COURSE, AND COGNITION IN OLDER ADULTHOOD Sarah E. Tom* Sarah E. Tom, Maria Glymour, Eric B. Larson, Victoria Moceri, Lon White, Ruowei Yang, Paul K. Crane, (Columbia University)

Previous studies have shown that short stature, indicative of disadvantaged early life, is related to increased risk of poor cognition in older adulthood. However, the role of one's own education as a mediator on this pathway is unclear. Using the Adult Changes in Thought cohort, a study of incident dementia of Group Health members age ≥ 65 years, we tested the hypotheses that 1) shorter stature, knee height, and arm span and smaller head circumference were related to increased risk of poor cognition and cognitive decline, and 2) self-reported years of education mediated these associations. Anthropometry was measured by 2 years of follow-up. The Cognitive Screening Abilities Instrument (range: 0 - 100; a score of < 86 indicates cognitive impairment) was administered at each biennial visit to 1087 women and 788 men over a median of 10 years of follow-up. Mixed effects models with random slopes and intercepts accounted for repeated cognitive tests. Adjusting for age and parental education, women in the shortest two height quartiles had accelerated cognitive decline, compared to women in the tallest quartile (quartile 1 ß 0.055, 95% CI (0.053, 0.163); quartile 1 and visit year interaction β -0.028, 95% CI (-0.041, -0.015); slightly weaker associations for quartile 2). Weaker associations were present for arm span in women. Men with the smallest quartile of head circumference had accelerated cognitive decline, compared to men with the largest head circumference quartile (quartile 1 β -0.009, 95% CI (-0.129, 0.111); quartile 1 and visit year interaction β -0.016; 95% CI (-0.029, -0.002), with similar patterns for arm span and height. Own education did not mediate these relationships. The periods of early life through adolescence, when arm span and height increase, and in men ages 0-5 years, when the head grows rapidly, are relevant for later life cognitive decline. Early brain and cognitive development may confer life-long neurological advantages.

ONE-CARBON METABOLISM ENZYMATIC GENE POLYMORPHISMS ARE ASSOCIATED WITH COGNITIVE TRAJECTORY AMONG AFRICAN-AMERICAN URBAN ADULTS MAY A BEYDOUN* May A Beydoun, Salman Tajuddin, Danielle Shaked, Hind A. Beydoun, Michele K. Evans, Alan B. Zonderman, (NIA/NIH/IRP)

Background: The sex-specific link between longitudinal annual rate of cognitive change (LARCC) and polymorphisms in 1-C metabolism enzymatic genes remains unclear, particularly among African-American (AA) adults. Objectives: We tested associations of fourteen single nucleotide polymorphisms (SNPs) from MTHFR, MTRR, MTR and SHMT genes and select MTHFR latent classes (SNPLC) with LARCC. Methods: Up to 797 AA participants in the Healthy Aging in Neighborhoods of Diversity Across the Lifespan (HANDLS) study (Agebase:30-64y, 52% women) had ~1.7 repeated measures (Follow-up time, mean=4.69y) on 9 cognitive test scores, spanning domains of verbal and visual memory, verbal fluency, psychomotor speed, attention and executive function, namely the California Verbal Learning test [CVLT-List A (immediate recall), CVLT-DFR (delayed free recall)], Benton Visual Retention Test (BVRT), Animal Fluency (AF), Digits Span Forward and Backwards tests, and Trailmaking tests (Trails A and B). Multiple linear mixed-effects and ordinary least square regression models were conducted. Results: Overall, MTHFR SNPs rs484605I(AI317G, G>A) and rsI80113I(A1298C, G>T) were associated with slower and faster declines in AF, respectively, while rs2066462(CI056T, A>G) was related to slower decline on Trails B (executive function). Among men, rs484605I(AI317G, G>A) was linked to faster decline on BVRT (visual memory), while rs2066462(CI056T, A>G) and rs9651118(C>T) were associated with slower decline on CVLT-List A and rs9651118(C>T) with faster decline on CVLT-DFR. Among women, a slower decline on the combined domain "verbal memory/fluency" was observed with rsI801133(C677T, A>G) dosage. A minor MTHFR SNPLC was associated with faster CVLT-List A decline in men, while another one was linked to slower decline on AF in women, compared with a common MTHFR SNPLC. Conclusions: In sum, MTHFR gene variations can differentially impact longitudinal changes in multiple cognitive domains among AA adults

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COMPARISON OF EXISTING METHODS FOR ALGORITHMIC CLASSIFICATION OF DEMENTIA IN THE HEALTH AND RETIREMENT STUDY Kan Z. Gianattasio* Kan Z. Gianattasio, Qiong Wu, M.

Maria Glymour, Melinda C. Power, (Department of Epidemiology and Biostatistics, Milken Institute School of Public Health, George Washington University)

Background: Dementia ascertainment is difficult and costly, hindering the use of large, representative studies such as the Health and Retirement Study (HRS) to monitor trends or disparities in dementia. To address this issue, multiple researchers have developed algorithms to classify dementia status in HRS participants using data from HRS and the Aging, Demographics, and Memory Study (ADAMS), an HRS sub-study that systematically ascertained dementia status. However, the relative performance of each algorithm has not been systematically evaluated. Objective: To compare the performance of five existing algorithms, overall and by sociodemographic subgroups. Methods: We created two standardized datasets: (a) training data (N=786, i.e. ADAMS Wave A and corresponding HRS data, which was used previously to create the algorithms) and (b) validation data (N=530, i.e. ADAMS Waves B, C, and D and corresponding HRS data which was not used previously to create the algorithms). In both, we used each algorithm to classify HRS participants as demented or not demented and compared the algorithmic diagnoses to the ADAMS diagnoses. Results: In the training data, overall classification accuracies ranged from 80% to 87%, sensitivity ranged from 53% to 90%, and specificity ranged from 79% to 96% across the five algorithms. Overall accuracy was generally higher in the validation data (range. 82% to 98%), driven by higher specificities, as sensitivity was uniformly worse (range 17% to 61%). Classification accuracy was uniformly worse in non-Hispanic blacks and Hispanics compared to non-Hispanic whites. Conclusions Worse sensitivity in the validation dataset may suggest either overfitting or that the algorithms are better at identifying prevalent versus incident dementia. Further planned work will evaluate algorithm performance in external validation datasets.

LICENSURE OUTCOMES FOR DRIVERS REFERRED TO THE ENHANCED MEDICAL REFERRAL AND EVALUATION MANAGEMENT SYSTEM IN IOWA Jonathan Davis* Jonathan Davis, Brandon

Butcher, Cara Hamann, Cori Peek-Asa, (University of Iowa)

Background: Medical fitness-to-drive is an increasing concern as our population ages and people drive into older ages. Licensing authorities in each state allow for the referral and reexamination of a driver's fitness-to-drive. The Enhanced Medical Referral and Evaluation Management System (EMREMS) is a unique data system that tracks medical referrals and resulting licensure outcome. This analysis examines how the source of a driver's referral ultimately impacts their licensure status. Methods: Iowa Department of Transportation collected information on medical referrals and licensure with EMREMS from January 2014 to March 2017. The frequency of the referral source was described for all drivers age 70 and older. Recalls of previous referrals were not included as they represent subsequent interaction with the review process. The odds ratio for a driver having their license revoked compared to those that had their license issued was calculated using logistic regression. Results There were 5915 individual drivers over the age of 70 who were referred for medical review and received a licensure determination. Common sources of a referral were the following: line exam (n=3393, 57.4%), accident review (n=1263, 21.35%), law enforcement (n=601, 10.2%), self-referral (n=356, 6.0%), or physician (n=156, 2.6%). Individuals who were referred from a line exam, an accident review, or self-referral had a lower odds of having their license revoked compared to drivers referred from other sources. Drivers had a greater odds of having their license revoked if they were referred by law enforcement (OR=3.32, 95%CI: 2.66-4.15) or a physician (OR=5.36 95%CI: 3.32-8.64) compared to drivers with other referral sources. Conclusions: Law enforcement and physicians are an important resource for identifying drivers who are no longer fit to drive. The drivers they refer for licensure evaluation are more likely to have their license revoked compared to other referred drivers.

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BASELINE CHARACTERISTICS AND SCREENING OF RAPID EYE MOVEMENT (REM) SLEEP BEHAVIOR DISORDER (RBD) STATUS IN A POPULATION-BASED COHORT OF PARKINSON'S DISEASE PATIENTS. Aline Duarte Folle* Aline Duarte Folle, Kimberly Paul, Jeff Broinstein, Beate Ritz, (University of California, Los Angeles)

Parkinson's disease (PD) is commonly known by its motor symptoms, but all patients experience a number of different non-motor symptoms as well. Rapid eye movement (REM) sleep behavior disorder (RBD) is currently thought to be a prodromal non-motor sign of PD, associated with disease incidence, but it has also been proposed that PD with RBD is a distinct subtype of PD, associated with worst progression. Clarifying whether it constitutes a different subtype is crucial for neuroprotective trials and to provide better clinical care in PD. A few studies have studied this association, but all recruited participants from tertiary clinical settings, and included small numbers. We present a description of the distribution of baseline clinical and demographical characteristics of PD patients by RBD status, measured by a simple screening questionnaire. We also describe the flowchart for the cohort baseline and follow-ups. This is the largest population-based cohort of PD, and the only in the U.S. It included 831 participants at baseline (2001 to 2017), and 449 have been seen for at least one follow-up (2005 to 2017), all of those have been seen by a Movement disorders specialist to confirm diagnosis and clinical features Overall prevalence of ever having probable RBD-like features (pRBD) was 20.7%, 14.8% in the first and 24.7% in the second wave of recruitment. Compared to no RBD, the RBD group included a smaller proportion of females (23.5 vs. 39.6%), greater proportions of self-reported diagnoses of: myocardial infarction (8.6 vs 12.4%), anxiety (16.8 vs. 22.8%), and depression (26.3 vs. 35.8%), slightly lower MMSE scores (27.66 vs. 27.24), and higher averages for the number of selfreported comorbidities (4.02 vs 4.36), PD duration (2.97 vs 3.46), and years of education (13.58 vs. 14.27). Longitudinal studies of the association of RBD and PD features will help elucidate whether RBD represents a subtype of PD associated with poor outcomes, such as found in this analysis.

DOES EXPOSURE TO ORGANOPHOSPHATE PESTICIDES MODIFY THE ASSOCIATION OF LOW NEIGHBORHOOD SOCIOECONOMIC POSITION WITH GREATER COGNITIVE DECLINE? Kristina Van Dang* Kristina Van Dang, Mary Haan, Maria Glymour, Allison Aiello, Beate Ritz, Kimberly Paul, (University of California San Francisco)

Adverse cognitive effects of social exposures such as neighborhood socioeconomic position (NSEP) may be exacerbated by environmental neurotoxins, including organophosphate pesticides (OP). Mexican-Americans are differentially exposed to both low NSEP and high OP. We examined synergistic associations of NSEP and OP on cognitive decline in older Mexican-Americans. The Sacramento Area Latino Study on Aging (SALSA, N=1,789 with cognitive assessments and N=428 with OP assessments), a cohort of Mexican Americans aged 60-100 who completed a modified Mini-Mental State Exam (3MS) annually from 1997 to 2008. 3MS errors were log-transformed. Total OP pesticide exposure from California Pesticide Use Reports was dichotomized at the median. Baseline NSEP was a composite of six census tract measures from the 2000 Census (Z-scored). We used multilevel linear mixed models with random intercepts for census tract and participant to estimate effects of NSEP and OP pesticide exposure on 3MS decline. We tested for interactions of NSEP and OP pesticide exposure. Models were adjusted for baseline age, gender, diabetes, baseline BMI, rural/urban residence, occupation, years of schooling, and practice effect. In the full sample, higher NSEP predicted better 3MS (B=-0.07 95% CI:-0.10 to -0.03), but not 3MS decline (B=0.004 95% C1:-0.002 to 0.01). OP pesticide exposure was not associated with 3MS scores (B=-0.18, CI:-0.37 to 0.015), and did not predict decline (B=0.03 95% CI:-0.006 to 0.06). For those exposed to OP pesticides, each unit increase in NSEP was associated with 0.09 (C1: -0.15 to 0.32) better 3MS, compared to 0.08 (C1: -0.14 to 0.01) worse 3MS for people not exposed to OP pesticides, but these differences may have been due to chance (p=0.273 for the interaction). Higher NSEP predicted better cognitive scores, and higher OP pesticide exposure was associated with cognitive decline. We found little evidence for a qualitative interaction between NSEP and OP.

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SLEEP DISTURBANCES AND BLOOD PRESSURE IN COMMUNITY-DWELLING OLDER ADULTS Martine Elbejjani* Martine Elbejjani, Sarah Assaad, Monique Chaaya, (American University of Beirut)

Several findings suggest an important role of sleep disorder for cardiovascular health. However, current findings on sleep and hypertension are limited and mixed, particularly in older adults. In a community-based cohort of Lebanese adults aged 65 and older (n=484; mean age= 72.5 (SD=7.2)), we assessed the association of selfreported sleep disturbances with cross-sectional measures of hypertension, diastolic and systolic blood pressure, and heart rate. Sleep disturbances were assessed using the Geriatric Mental State (GMS)-Automated Geriatric Examination for Computer Assisted Taxonomy. Associations were estimated using linear regression models adjusted for sociodemographic and cardiovascular risk factors. The prevalence of sleep disturbances was 11%. Sleep disturbances were not associated with prevalent hypertension (Relative Risk=1.0; 95% CI= 0.9, 1.1) and showed a pattern of associations with lower systolic and diastolic blood pressure (-10.1; 95% Cl= -21.3, 1.1 and -4.6; 95% Cl= -11.1, 1.8). Participants with sleep disturbances had an increased heart rate (+3.5 bpm; 95% Cl= 0.37, 6.6). Adjustment for treatment for hypertension did not alter these conclusions. Results in this sample of older adults show a relationship of sleep disturbances with hypotension and increased heart rate, a combination that is suggested to occur with fatigue, psychosomatic conditions, and compromised cardiac health. Given data suggesting that hypotension at older age is associated with dementia , future studies should help understand the potential contribution of sleep changes at older age to this pathway and not only focus on hypertension.

SOCIAL NETWORKS OF THE OLD-OLD: AN EXPANDED TYPOLOGY AND ASSOCIATIONS WITH WELLBEING AND MOBILITY USING DATA FROM THE NUAGE COHORT. Stine Bordier Høj* Stine Bordier Høj. Alexandre Naud, Ruben Brondeel, Lise Gauvin, Lucie Richard, Pierrette Gaudreau, Helene Payette, Yan Kestens, (Centre de Recherche du Centre Hospitalier de l'Université de Montréal (CRCHUM))

Background Aging is associated with a shift towards smaller, less diverse social networks based more heavily in primary kinship ties. Network homogenisation and shedding of peripheral ties may diminish older adults' access to social capital, social participation, and subsequent wellbeing and mobility. Aims To examine social network types and their association with wellbeing and mobility among the old-old. We hypothesised that social network diversity would relate to better outcomes. Method Data were collected from 183 adults aged 79 to 93 years in Montreal, Canada. Eligible participants presented with limited/no cognitive impairment and did not reside in a long-term care facility. An activity-based name generator was used to derive 13 egocentric indicators of social network size, structure, spatial distribution, role and activity content from which network types were determined using latent class analysis. Class-specific mean differences in self-reported wellbeing (SF-36) and mobility (Life-Space score) were estimated under a distal outcome model using the BCH method in Mplus and adjusted for age, gender, education, and living alone. Results Mean network size was 7.9 persons, of which half were 'strong' ties (with whom one would discuss important matters). Five network types were identified: spousal-tie (20%), child-focused (29%), friendfocused (11%), diverse: friend-based (24%) and diverse: family-based (15%). Diverse classes are larger; less dense; contain fewer strong ties; and feature more frequent interaction. Compared with the spousal-tie class, diverse classes recorded lower scores on the SF-36 Vitality subscale (p<0.05). The diverse: family-based class also recorded lower SF-36 Physical Functioning and Life-Space scores (p<0.05). Conclusion Contrary to expectations, diverse social networks were associated with lower levels of vitality, physical functioning and mobility in the oldold. Analyses are cross-sectional, however, and reverse causation cannot be excluded.

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STREET DISORDER PREDICTS INCIDENT PHYSICAL FUNCTION LOSS AMONG OLDER ADULTS Laken Roberts* Laken Roberts, Laura Samuel, Sarah Szanton, Roland Thorpe, (Johns Hopkins School of Nursing)

The population of adults over age 65 is expected to double to 84 million by 2050 and 87% of older adults prefer to remain in their home as they age. It is important to understand the role of the local street environment in supporting an older adult's ability to maintain independence at home. We tested the hypothesis that more street disorder predicts higher risk of incident functional loss in a national sample of older adults. The National Health and Aging Trends Study conducts annual examinations among a nationally representative sample of Medicare beneficiaries aged 65 years and older. Street disorder in 2011 measured the count of five environmental problems observed on the participant's street (uneven walking surfaces/broken steps, litter, vacant homes/storefronts, foreclosure signs, and graffiti). This count was collapsed into no disorder (0, reference), low disorder (1), and high disorder (2-5) to improve linear fit with the logit of the outcome. Annually, physical function loss was based on participant-reported difficulty performing one or more of six tasks: walking three blocks; walking up 10 stairs; carrying a 10-pound object; bending over; reaching over head; and grasping small objects. Incident loss was categorized as none (0) versus any (1). Complementary log-log regression models estimated hazard ratios of incident physical function loss (2012-2015) as a function of 2011 street disorder among the 3,321 participants who were free of functional limitations in 2011. Adjusting for age, race/ethnicity, sex, and income-poverty ratio, residing on a street with low disorder (HR=1.20, 95% CI=1.03,1.39) but not high disorder (HR=1.15, 95% C1=0.93, 1.42) at baseline predicted higher risk of four-year physical function loss compared with residing on a street with no disorder. These results show that street disorder is relevant to functional loss in older adults. Importantly, street disorder is a modifiable environmental feature that can be targeted for intervention.

SMOKING, DRINKING, DIET AND PHYSICAL ACTIVITY – MODIFIABLE LIFESTYLE RISK FACTORS AND THEIR ASSOCIATIONS WITH AGE-TO-FIRST CHRONIC DISEASE Ryan Ng*

Ryan Ng, Laura Rosella, Rinku Sutradhar, Walter Wodchis, Zhan Yao, (University of Toronto)

Objectives: The objectives were to examine the incidence of a person's first chronic disease in relation to the adult life course; and to examine the relationships between modifiable lifestyle risk factors (smoking, drinking, diet, physical activity) and ageto-first chronic disease. Methods: Ontario adults who completed one of the first six cycles of the Canadian Community Health survey were linked to administrative data starting January 1, 2000. Individuals were followed up until December 31, 2014 for the incidence of their first chronic disease (congestive heart failure, chronic obstructive respiratory disease, diabetes, lung cancer, myocardial infarction, stroke) with death as a competing risk. By sex, the cumulative incidence function of age-tofirst chronic disease was estimated. The associations between lifestyle factors and age-to-first chronic disease were estimated using the Cox and Fine-Gray models ad justing for sociodemographic and health factors. Results: There were 112,870 adults, 15.1% of which developed at least one chronic disease. By age 105, 85.6% of females and 86.6% of males had a chronic disease. Of the lifestyle factors, heavy smoking had the strongest association with age-to-any first chronic disease in the Cox model (csHR=3.86; 95% C1=3.46,4.31), and was similar in the Fine-Gray model (sdHR= 2.51; 95% C1=2.27,2.76). The association of the lifestyle factors were modelled for each chronic disease separately, and the associations varied by sex, type of chronic disease, and the model used. For example, heavy smoking males had a much greater hazard for lung cancer (csHR=38.6; sdHR=25.4) than myocardial infarction (csHR=5.29; sdHR=3.98) as their first chronic disease. Conclusions: Most people will have at least one chronic disease by the end of their life. This study provides a novel approach using survival analysis to examine the incidence of chronic diseases relative to the life course and how their incidences are associated with lifestyle factors.

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INSOMNIA SYMPTOMS AND INCIDENT PAIN IN OLDER ADULTS: DIRECT AND MEDIATED PATHWAYS THROUGH DEPRESSION AND ANXIETY Galit Levi Dunietz* Galit Levi Dunietz, Louise O'Brien, Lynda Lisabeth, Kerby Shedden, Ronald D. Chervin, Erica Jansen, Leslie Swanson, (University of Michigan)

Introduction Pain is common among older adults and negatively impacts functioning. Sleep disturbances and mood disorders, specifically depression and anxiety, are closely associated with pain in older individuals, but the exact nature of these associations remain unclear. This study deconstructed the temporal effects of insomnia symptoms on incident pain into direct and indirect pathways, with focus on mediating pathways through depression and anxiety symptoms, within a nationally representative sample. Methods We utilized 2011-2013 data from the National Health and Aging Trends Study, a longitudinal, annual survey of 2,239 communitydwelling Medicare beneficiaries. From 2011-2013, participants completed annual inperson interviews that included assessments of sleep, mood, and pain. Causal mediation analysis was applied to examine the temporal direct effects of baseline insomnia symptoms on incident pain, and their indirect effects through symptoms of depression and anxiety. We excluded participants who endorsed baseline in 2011 Results Among patients who did not endorse pain in 2011, nearly 30% subsequently reported incident pain in 2013. Baseline insomnia symptoms predicted the development of new pain. Adjusted analysis showed a direct effect of insomnia symptoms on incident pain. Compared to older adults without baseline insomnia symptoms, participants who reported difficulty with sleep initiation or maintenance respectively had 24% (95% Cl 2%, 51%) and 28% (95% Cl 4%, 55%) higher odds of incident pain. Anxiety symptoms mediated the relationship between insomnia symptoms and incident pain, accounting for up to 17% of the total effect, but depressive symptoms did not. Conclusions These data provide new evidence that insomnia symptoms could contribute to incident pain in older adults, and that anxiety symptoms may in part mediate this relationship. Our findings raise the possibility that efforts to improve sleep, reduce anxiety, or accomplish both could serve as strategies to redu

THE IMPACT OF TOBACCO TAX INCREASE ON CURRENT SMOKING AND SMOKING DEPENDENCE OF HARDCORE AND NON-HARDCORE SMOKERS IN KOREA BETWEEN 2014 AND 2016: USING PROPENSITY SCORE MATCHING AND DIFFERENCE-IN-DIFFERENCE Ikhan Kim* Ikhan Kim, , (Seoul National University)

The aim of this study was to examine the impact of tobacco tax increase in Korea in 2015 on the current smoking and smoking dependence of hardcore and nonhardcore smokers. In this study, 2,084 participants of the Korean Welfare Panel Study who were smoking in 2014 were followed up for three years. Hardcore smokers were defined as those who had been observed as current smokers for the past five years and (1) had never planned to quit smoking for five years, (2) smoked more than 15 cigarettes a day, and (3) had not tried to quit smoking the past year. We calculated the age-standardized smoking prevalence, percentage of smokers who were hardcore smokers, and smoking dependence using hardcore smoking definitions. Using propensity score matching and difference-in-difference methodology, the changes in current smoking and smoking dependence between the hardcore and non-hardcore smokers in 2014 were compared. We found that the smoking prevalence and the proportion of hardcore smokers were decreased in Korea after the increase in tobacco tax. The percentage of smoker who never planned to quit and who had not attempted to quit the past year increased again, but were lower than the figures for 2014. The reduction in smoking prevalence was observed in both hardcore and non-hardcore smokers, which were 7%p larger in nonhardcore smokers, but the decreases in smoking dependence of hardcore smokers were greater than that of non-hardcore smokers for both years. These results provide evidence that the tobacco tax increases would be effective in reducing current smoking and smoking dependence of hardcore smokers as well as non-hardcore smokers.

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APPLICATION OF THE TRANSTHEORETICAL MODEL TO INTERPROXIMAL CLEANING BEHAVIOR IN PATIENTS WITH PERIODONTAL DISEASE Tzu-Yun Huang* Tzu-Yun Huang, Hsiao-Ling Huang, (Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University, Taiwan)

Background: Periodontal disease is considered one of the most common diseases in the population and, if left untreated, can lead to tooth loss. Regular interdental cleaning is associated with lower levels of bacterial plaque, dental calculus, and gingivitis. Objective: This study examined the applicability of the Transtheoretical Model (TTM) to understanding interproximal cleaning behavior in patients with periodontal disease. Method: A cross-sectional study was conducted. Overall, 215 patients with periodontal disease in the Dental Department of Kaohsiung Medical University in Taiwan were recruited. Patients with disability and routine use of bisphosphonates were excluded. The independent variable was stage of interproximal cleaning behavior change. The dependent variables analyzed were cleaning efficacy expectations, decisional balance (i.e., pros and cons), and the processes of change. We used a face-to-face interview to collect the information by a structured questionnaire. Fifty-one percent of patients were interproximal cleaning irregularly (precontemplation, contemplation, or preparation stages), whereas 24% were in the action stage (regularly active <6 months) and 25% were in the maintenances stage (regularly active ≥6 months). The multivariate regression model analyzed the stage of interproximal cleaning behavior change associated with dependent variables. Result: Compared to irregularly stage, patients in action stage and maintenances stage were significantly associated with pros (β =0.25 and 0.35) and cons (β =-3.86 and -5.27) of decisional balance, self-efficacy (β =6.46 and 7.05), experiential processes (β =3.58 and 5.54) and behavioral processes (β =2.84 and 3.19). Conclusion: Regularly active interproximal cleaning behavior was associated with efficacy expectations, decisional balance, and the processes of change. Results support the use of the entire TTM in examining interproximal cleaning behavior in patients with periodontal disease.

POPULATION RISK AND BURDEN OF HEALTH BEHAVIOR RELATED ALL-CAUSE, PREMATURE, AND AMENABLE DEATHS IN ONTARIO, CANADA USING LINKED MORTALITY FILES Laura Rosella* Laura Rosella, Kathy Kornas, Anjie Huang, Lauren Wallar, Catherine Bornbaum, David Henry, (University of Toronto)

Introduction: There is conflicting information on impact of health behaviours on mortality, in part, because behavioural history prior to death are not routinely collected. We linked survey and mortality data to examine the association of allcause and premature mortality with four common modifiable lifestyle behaviours to quantify behavior related premature death burden in a population-based sample. Methods. We analyzed data from a cohort of 149,262 adults in the combined 2000 to 2010 Canadian Community Health Surveys. By linking respondents to vital statistics data we identified 16,929 registered deaths up until December 31st 2015. The strength of the association between risk behaviours (smoking status, body mass index (BMI), physical inactivity, and alcohol consumption) and all-cause and premature mortality was estimated using sex-specific cox proportional hazards models, adjusting for age, income, and co-morbidity. We also estimated the proportion of decedents that died prematurely from causes amenable to the public health and medical care system. Results: After full adjustment, the behavior hazard ratios for all-cause mortality were increased for heavy smokers vs. non-smokers (males: 4.19 (3.74-4.71); females 3.89 (3.41-4.44); severely obese vs. normal weight (males: 2.11 (1.65-2.70); females 1.43 (1.17-1.75); physically inactive vs. active (males 1.29 (1.19-1.39); females 1.45 (1.32-1.59); and female heavy drinkers vs. light drinkers, 1.56 (1.29-1.90). Relative to all-cause mortality, the hazard ratios associated with smoking, physical inactivity and BMI were elevated for premature mortality. A disproportionate burden of amenable deaths is experienced by heavy smokers, severely obese, physically inactive and heavy drinkers. Conclusions: The findings demonstrate the utility of linked mortality data and emphasize the importance of efforts to reduce the prevalence of risk behaviours that contribute to a large burden premature deaths.

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LONG-TERM NONDAILY CIGARETTE SMOKING IN THE U.S.: USING CENSUS DATA FROM THE TOBACCO USE SUPPLEMENT-CURRENT POPULATION SURVEY (TUS-CPS) Carolyn Reyes-Guzman* Carolyn Reyes-Guzman, Neal Freedman, Maki Inoue-Choi, Gordon Willis, (NIH/NCI)

Background: Nondaily and low-intensity cigarette smokers remain the fastest growing segment of smokers in the U.S. Their long-term sociodemographic and smoking behavioral patterns, as well as trends in home or workplace smoking bans, are not well-studied and are a public health priority. Materials and Methods Our sample included 1,593,413 U.S. adults from nine survey periods of the TUS-CPS, using harmonized data from 1992-2015. We examined changes in the prevalence of long-term nondaily smoking by various sociodemographic factors and smoking behaviors like nicotine dependence, use of menthol cigarettes, age of smoking initiation and number of cigarettes per day (CPD) smoked. Long-term patterns in home or workplace smoking bans, and attitudes towards smoking bans in workplace and other indoor locations were also studied. Additionally, we evaluated changes over time among daily, former and never smokers. Results: We observed distinctive changes in the patterns of U.S. nondaily smokers over a 23-year period. Specifically, over time, nondaily smokers started using cigarettes at a younger age (mean age 19.1 years in the 1992-1993 cycle vs 17.7 years in the 2014-2015 cycle), and smoked less CPD on days they consumed cigarettes (mean 6.8 CPD in 1992-1993 vs. 4.4 CPD in 2014-2015). Additional significant findings were observed for other sociodemographic and smoking behaviors descriptors. Conclusion: Using a large and nationally-representative sample, our findings provide evidence that nondaily smokers' patterns have changed over time and that they have specific sociodemographic and smoking behavioral features that distinguish them from daily, former and never smokers.

WHO CAN TOLERATE A MARGINAL KIDNEY? PREDICTING SURVIVAL AFTER DECEASED-DONOR KIDNEY TRANSPLANTATION BY DONOR-RECIPIENT COMBINATION Sunjae Bae* Sunjae Bae, Jacqueline Garonzik Wang, Allan Massie, Kyle Jackson, Alvin Thomas, Xun Luo, Gahyun Bahn, Josef Coresh, Dorry Segev, (Johns Hopkins Bloomberg School of Public Health)

The impact of donor quality on post-kidney transplant (KT) survival may vary based on candidate health. Identifying candidates who can tolerate transplantation with kidneys from marginal donors, who are older or have comorbidities, would increase access to KT without sacrificing outcomes. However, little is known about the interaction of donor quality and candidate health. We developed a machine learning tool to estimate post-KT survival accounting for donor quality and candidate health together. METHODS: We studied deceased donor KT recipients (N=120,818) and waitlisted candidates (N=376,272) in 2005-2016 using the Scientific Registry of Transplant Recipients, a registry of all transplant recipients and waitlisted candidates in the US. We estimated 5-year dialysis and post-KT survival by Estimated Post-Transplant Survival (EPTS) and Kidney Donor Profile Index (KDPI), previously validated risk scores of candidate health and donor quality that are currently used in the national kidney allocation procedure. We used random forests, which can address interactions between multiple variables with minimal modeling assumptions. Survival benefit was defined as absolute reduction in mortality risk with KT vs dialysis. RESULTS: Our tool can be used to estimate 5-year dialysis and post-KT survival for any combination of KDPI and EPTS. For candidates with EPTS=80, 5-year estimated dialysis survival was 47.6%; 5-year post-KT survival was 78.9% with KDPI=20 and 70.7% with KDPI=80. Survival benefit decreased at higher KDPI scores, particularly when EPTS was higher. For candidates with EPTS=80, 5-year mortality risk decreased with KT by 31.2 percentage-points with KDPI=20 and 23.1 percentage-points with KDPI=80. For candidates with EPTS=20, the risk decreased by 19.5 percentage-points with KDPI=20 and 14.7 percentage-points with KDPI=80. CONCLUSION: Our decision tool may assist clinicians with assessment of survival benefit from a marginal kidney for a given transplant candidate.

PEDIATRIC ASTHMA IN SMALL MINORITY GROUPS: AN ANALYSIS OF 2006-2015 NATIONAL HEALTH INTERVIEW SURVEY Chi Wen* Chi Wen, Shelley Liu, Yan Li, Perry Sheffield, Bian Liu, (Icahn School of Medicine at Mount Sinai)

Object We aimed to explore asthma disparities and temporal trends among small minority groups including "American Indian/Alaska Native (AI/AN)", "Asian Indian", "Chinese", "Filipino", "other Asian", and "other or multiple race", using data from 2006-2015 National Health Interview Survey (NHIS). Method The study population consisted of children aged 4-17 years from the 2006-2015 NHIS, who answered yes or no to the question about lifetime asthma (N=88,369). We focused on four asthma outcomes: lifetime asthma, current asthma, asthma attack, and asthma emergency department (ED) visit. Weighted prevalence was summarized according to race. Survey logistic regression was used to assess the association between asthma outcomes and race adjusted for the covariates, including demographic and socioeconomic characteristics, allergy status and survey year. Cochran-Armitage trend test was used to examine the temporal trends of asthma prevalence according to race. All analyses were conducted in SAS (University Edition 2.3 9.4M3) survey procedures. Result Among the six small minority groups, prevalence of both lifetime asthma and current asthma was the highest in the "other/multiple race" group (21.6%; 13.6%). Among children with current asthma, prevalence of asthma ED visit was the highest in AI/ANs (25.8%). Compared to whites, American Indian/Alaska Natives (AI/AN), Filipinos, and other/multiple races, had significantly higher odds of lifetime asthma (ORadj [95% CI]: 1.3 [1.1, 1.6]; 1.7 [1.4, 2.1]; 1.6 [1.2, 2]) and current asthma (1.3 [1, 1.7]; 1.3 [1.1, 1.7]; 1.4 [1.1, 1.9]), and AI/ANs had higher odds of asthma ED visit (2.3 [1.1, 4.9]). Over 2006-2015, prevalence of asthma attacks increased among other/multiple races, while prevalence of asthma ED visit decreased in all but Filipino and other/multiple race children. Conclusion Small minority subgroups were at heightened risk of asthma and asthma associated outcomes, which highlights the need to further studies in these populations.

EPIDEMIOLOGY OF NASOPHARYNGEAL CANCER IN MOROCCO Amal Haimer* Hinde Hami, Amal Haimer, (Laboratory of Genetics and Biometry, Faculty of Science, Ibn Tofail University, Kenitra, Morocco)

Background: Nasopharyngeal carcinoma (NPC) is a rare malignancy in most parts of the world, with an incidence well under 1 per 100 000 person-years. It is the 18th most commonly diagnosed cancer in men and women and the 18th leading cause of cancer-related death in Northern Africa, with an estimated 2 979 new cancer cases (2 043 men and 936 women) and 1 705 cancer deaths in 2012 (GLOBOCAN 2012). The aim of this study is to determine the epidemiological characteristics of nasopharyngeal cancer in Morocco. Methods: This is a descriptive retrospective study of nasopharyngeal cancer cases, diagnosed and treated at Al Azhar Oncology Center in Rabat between 2005 and 2015. Results: During 2005-2015, 280 new cases were diagnosed with nasopharyngeal cancer at Al Azhar Oncology Center; 189 (67.5%) in men and 91 (32.5%) in women, giving a male-female ratio of 2.1 and accounting for 3.5% of all cancers reported during this period. The average age at diagnosis was 46.5±15.2 years (range 3-80 years). The risk of developing the disease is related to age, 82.8% of cases were diagnosed in patients aged 35 years and older at the time of diagnosis, with 64.5% of new nasopharyngeal cancer cases occurring among those aged 35-59 years. Among all diagnosed cases, 0.7% were diagnosed with metastatic disease and 7.1% died from the disease during the study period, accounting for 3% of all cancer deaths. Conclusions: Nasopharyngeal carcinoma has a unique and complex etiology that is not completely understood. Although NPC is rare in most populations, it is a leading form of cancer in a few well-defined populations, including natives of North Africa.

GEOGRAPHIC LOCATION AND MORTALITY AFTER BREAST CANCER DIAGNOSIS Ronald E. Gangnon* Amy Trentham-Dietz, Cora Allen-Coleman, Jane A. McElroy, John M. Hampton, Polly A Newcomb, Ronald E. Gangnon, (University of Wisconsin-Madison)

Breast cancer incidence and mortality rates have been higher in portions of eastern Wisconsin bordering Lake Michigan compared to other regions for over 50 years. We previously found that established individual-level risk factors do not explain this longstanding observation for breast cancer incidence using geocoded residential location data for case-control study participants in a series of four population-based case-control studies from 1988-2004. We now examine the association between residential location and breast cancer mortality among the 13,091 cases (including 2,091 deaths) enrolled in these studies. A generalized additive proportional hazards regression model for breast cancer mortality was used to estimate geographic risk as a local hazard ratio (HR, relative to the state average) using a two-dimensional thin plate spline, while adjusting for pre-diagnosis risk factors ascertained through linkage with the state cancer registry (age and stage at diagnosis) and from telephone interviews (parity, age at first birth, alcohol intake, body mass index, family history of breast cancer, menopausal status and age at menopause, postmenopausal hormone use, education, race, smoking, and mammography history). After adjustment for risk factors, breast cancer mortality was significantly higher than the state average in the south-eastern corner of Wisconsin (Kenosha HR 1.11, 95% CI 1.03-1.21; Racine HR 1.10, 95% CI 1.03-1.17; Walworth HR 1.07, 95% CI 1.01-1.15; Milwaukee HR 1.06, 95% CI 1.01-1.10; Waukesha HR 1.04, 95% CI 1.01-1.08). Breast cancer mortality was lower in Jackson county (HR 0.92, 95% CI 0.85-0.99) in the westcentral portion of the state. These results suggest that substantial geographic differences in breast cancer mortality persist across Wisconsin, even after accounting for individual-level risk factors. Additional analyses will examine whether adjustment for breast cancer treatment and post-diagnosis risk factors substantively influences the findings.

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MELANOMA AMONG BLACKS IN THE UNITED STATES MaryBeth Freeman* MaryBeth Freeman, Natasha Buchanan, (CDC/ORISE)

BACKGROUND Melanoma is one of the top ten most commonly diagnosed cancers in the United States (US) and is increasing. Few studies have examined melanoma among black populations due to lower risk of diagnoses compared to non-Hispanic whites (NHWs). However, blacks are often diagnosed at a later stage, have different predominant histology types, and have poorer survival compared to NHWs. We examined melanoma incidence and survival among black US populations by age, stage at diagnosis, anatomic site and histology. METHODS We examined population-based cancer registry incidence data from the Centers for Disease Control and Prevention's National Program of Cancer Registries (NPCR) and from the National Cancer Institute's Surveillance, Epidemiology, and End Results program, covering 99.1% of the U.S. population for the years 2010-2014. Cases were limited to non-Hispanic and Hispanic black populations, except when non-Hispanic whites were used as a comparison group. Survival data were from 34 NPCR program participating states. RESULTS From 2010-2014, melanoma incidence rates increased with increasing age, with the highest rates among males age 65 and older (5.4 per 100,000). Half of all melanomas were diagnosed at a localized stage. Lower extremities were the most commonly diagnosed anatomic melanoma site (47.2%). Among cases with a specific histology given, the most common were acral lentiginous melanoma (16.1%). From 2001-2013, the overall relative 5-year melanoma survival among blacks was 67%, compared to 90.4% among NHWs. Survival decreased with age and was poorer among males. CONCLUSION Although incidence of melanoma is relatively rare among black populations, survival rates lag behind that of NHW populations. Improved education of acral lentiginous melanoma histology among blacks and increased medical surveillance of this histology are needed due to its atypical presentation, which is not adherant to "ABCDE" guidelines traditionally used to identify melanoma.

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PERINEAL TALC USE, DOUCHING AND THE RISK OF ENDOMETRIAL CANCER Katie O'Brien* Katie O'Brien, Dale P. Sandler, Min Shi, Aimee D'Aloisio, Clarice R. Weinberg, (National Institute of Environmental Health Sciences)

Perineal talc use and douching could affect endometrial cancer risk through several possible pathways, including inflammation response, changes in vaginal and uterine microbiota, or endocrine disruption. Previous cohort studies of the association between talc use and endometrial cancer have reported elevated but not statistically significant effect estimates, and we know of no previous evaluations of the relationship between douching and endometrial cancer. Using data from the Sister Study, a prospective cohort of breast cancer-free women who had a sister previously diagnosed with the disease, we examined the relationship between endometrial cancer and self-reported use of talc or douche in the year prior to enrollment using Cox proportional hazards models. After excluding those with prior hysterectomy, 265 of 34,406 women reported an endometrial cancer diagnosis during follow-up (mean=8.4 years; range 0-12.7 years). Overall, 14% of women reported using talc in the last year and 13% reported having douched. We observed positive but not statistically significant associations between endometrial cancer and talc use (adjusted hazard ratio [HR]=1.15; 95% confidence interval [CI]: 0.83-1.60) and endometrial cancer and douching (HR=1.07; 95% CI: 0.72-1.58). Results were similar for analyses stratified by race, body mass index, and subtype (endometrium versus other location). Our results are consistent with the previous literature that talc use may be associated with a small increase in endometrial cancer incidence and we have plans to pool data across multiple cohorts to investigate the relationship further. The potential positive relationship between douching and endometrial cancer also merits further consideration.

PROGNOSTIC VALUE OF IMMUNE-RELATED BIOMARKERS IN NON-METASTATIC LUNG CANCER: A META-ANALYSIS Stephanic Tuminello* Stephanie Tuminello, Raja Flores, Wil Lieberman-Cribbin, Sacha Gnjatic, Miriam Merad, Rajwanth Veluswamy, Emanuela Taioli, (Department of Population Health Science and Policy and Institute for Translational Epidemiology, Icahn School of Medicine at Mount Sinai)

Background: Multiple studies have found lymphocytic infiltration of tumors to be associated with more favorable outcomes in non-small cells lung cancer (NSCLC); however the impact of specific immune components of the tumor microenvironment in NSCLC is controversial. We performed a meta-analysis to evaluate lymphocytes as prognostic biomarkers. Methods PubMed was searched to identify eligible studies comparing survival of surgically resected stage I-III NSCLC patients according to infiltration by lymphocyte subsets (i.e., CD3+, CD4+, CD8+, CD20+ and FoxP3). Meta-analysis was performed using a linear mixed-effects model to determine overall, disease specific and progression free survival. Results: Of the 1,343 queried articles, 37 articles were eligible and included 8,162 patients. High levels of CD4+ cells were significantly associated with improved overall survival (HR: 0.51, 95% CI 0.28-0.93; 5 studies, 883 patients, O p-value =0.20) and progression free survival (HR: 0.59, 95% CI 0.36-0.98; 4 studies, 571 patients, Q pvalue =0.70). High CD8+ cell infiltrates were also associated with improved overall survival (HR: 0.85, 95% CI 0.73-0.99; 12 studies, 3032 patients, Q p-value =0.29) and disease specific survival (HR: 0.55, 95% CI 0.31-0.9; 3 studies, 1304 patients, Q p-value =0.68), but not progression free survival. FoxP3+, expressed on Regulatory T cells, was associated with worse overall survival (HR: 2.03, 95% CI 1.39-2.96; 9 studies, 1547 patients, Q p-value = 0.34). High CD20+ B cells was suggestive of better overall survival, though this was not statistically significant (HR: 0.71, 95% CI 0.39-1.30; 3 studies, 569 patients, Q p-value = 0.64). Conclusion: The presence of tumor infiltration by specific lymphocytic subsets could be potentially useful as prognostic biomarkers for survival in resected stage I-III NSCLC patients

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ECONOMIC BURDEN OF CANCERS ATTRIBUTABLE TO INFECTION IN KOREA IN 2014 Nguyen Thi Xuan Trinh* Nguyen Thi Xuan Trinh, Jin Kyoung Oh, Minji Han, (National Cancer Center Graduate School of Cancer Science and Policy, Korea)

Background: Infection is a major public health hazard for a variety of cancers. Because of the time lag involved, the number of cancer cases due to infection is of considerable concern. To date, no studies have examined the economic burden of cancers linked to infection in Korea. Therefore, current information on the economic cost of infection-related cancers is required. Methods: The economic burden of cancers attributed to infection in Korea in 2014 is estimated using a prevalence approach. Here, cancer patients are defined as those having made medical claims using ICD-10 cancer codes, as recorded by the National Health Insurance System. Then, we multiply the costs by the population attributable fraction for each type of cancer. The study includes direct costs and indirect costs, where direct costs comprise the direct medical and non-medical costs of inpatients and outpatients. Then, indirect costs are estimated by identifying future income losses due to premature death, productivity loss during hospitalization and outpatient visits, and job loss. Results: In 2014, there were 100,059 infection-related cancer patients, accounting for 10.7% of all Korean cancer cases for that year. The direct costs of cancers attributed to infection stood at nearly USD 725 million, while the indirect costs were much higher, at USD 2.4 billion. The average expenditure of a typical patient was USD 31,286. In the case of men, cancers due to the Hepatitis B virus and Helicobacter pylori (HP) had a far greater economic burden than those of other cancer types. In the case of women, the human papillomavirus and HP caused the costliest infection-related cancers. Conclusions: It is imperative that more stringent steps be taken to reduce the huge burden of cancers linked to infection in economic terms.

OVERALL ENVIRONMENTAL QUALITY AND PROSTATE CANCER CHARACTERISTICS Jyotsna Jagai* Jyotsna S. Jagai, Achal Patel, Danelle T. Lobdell, David T. Greenwald, Michael R. Abern, (University of Illinois, Chicago)

Prostate cancer (PC) is one of the most common cancer types in the United States (U.S.) Cumulative environmental exposures have been associated with PC incidence. However, the impact of cumulative environmental exposures on PC aggressiveness is not well understood. To address this gap, we utilize the U.S. Environmental Protection Agency's (USEPA) Environmental Quality Index (EQI) to estimate county-level environmental quality in the U.S. The EQI captures exposure to over 200 environmental factors across five environmental domains (air, water, land, sociodemographic, and built) for 2000-2005. For persons diagnosed with PC from 2010-2014 (n=252,313), prostate specific antigen (PSA), biopsy Gleason score (bGS) and individual level covariates (age, marital status, sex, race) from the Surveillance, Epidemiology, and End Results Program (SEER) were linked to the EQI based on place of residence. PSA, a measure of protein produced by the prostate gland and used as a screening tool, was dichotomized (PSA>=20 vs. <20) and bGS, a score used to assess the aggressiveness of PC, was also dichotomized (high grade vs. low grade). We used mixed effects logistic regression to model EQI and domain-specific indices as quartiles (Q; Q4 worst environment) to estimate the OR and 95% CI for PC characteristics adjusting for individual-level covariates. PSA at diagnosis was not associated with overall environmental quality (EQIQ4: OR=0.96(0.86,1.06)). Overall environmental quality was positively associated with increased odds of more aggressive PC as measured by bGS (EQIQ4: OR=1.14(1.02,1.28)) with the strongest associations seen in the sociode mographic (SDQ4: OR=1.26(1.14,1.39)) and built (BQ4: OR=1.14(1.02,1.27)) domains. These results suggest associations between poor environmental quality and more aggressive PC at diagnosis. However, additional research is required to understand specific environmental drivers of PC aggressiveness. This abstract does not necessarily reflect EPA policy.

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GENETIC SUSCEPTIBILITY TO CHRONIC INFLAMMATORY INTESTINAL DISEASES AND PANCREATIC DUCTAL ADENOCARCINOMA: A PATHWAY ANALYSIS OF GENOME-WIDE ASSOCIATION STUDIES Fangcheng Yuan* Fangcheng Yuan,, (Johns Hopkins Bloomberg School of Public Health)

Background: Chronic inflammation is known to play a role in pancreatic carcinogenesis. Registry-based epidemiologic studies suggest associations between chronic inflammatory intestinal diseases and pancreatic ductal adenocarcinoma (PDAC). Methods: We examined the association between genomic regions (50 kb up and 50 kb down) surrounding germline variants for Crohn's disease, ulcerative colitis, inflammatory bowel disease (Crohn's disease and ulcerative colitis combined) and celiac disease identified in published genome-wide association studies (GWAS) and PDAC in 8,723 cases and 12,343 controls of European descent using summary statistic GWAS data from the Pancreatic Cancer Cohort Consortium (PanScan) and the Pancreatic Cancer Case Control Consortium (PanC4). We employed the summary adaptive rank truncated product (sARTP) method to test the overall association of the combined genomic regions for each respective disease. Results: Categorization of the genomic regions for ulcerative colitis, Crohn's disease, and inflammatory bowel disease were associated with PDAC at P-values < 0.05 (0.0030, 0.037, and 0.0018, respectively). After excluding the regions around the previously identified GWAS loci for PDAC in the NR5A2 gene (500 kb up and 500 kb down), only the inflammatory bowel disease genomic regions remained borderline significantly associated with PDAC (P-value = 0.047). The top genes contributing to the inflammatory bowel disease association after excluding the NR5A2 region included ACTR2, LINC00339, and TMEM8C (P-value < 6.0 × 10-4). Genomic regions for celiac disease were not associated with PDAC (Pvalue=0.31). Conclusions: Our results provide modest support for the hypothesis that genomic regions surrounding germline variants for gastrointestinal inflammatory diseases (based on published GWAS loci) are associated with PDAC.

SOCIODEMOGRAPHIC AND HEALTH-RELATED CORRELATES OF CERVICAL CANCER SCREENING. A CROSS-SECTIONAL ANALYSIS OF THE 2014-2016 BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM (BRFSS) SURVEY STRATIFIED BY RACE/ETHNICITY GROUPS Dongyu Zhang* Dongyu Zhang, Chengchen Zhang, Yuan Zhao, Qi Tan, (University of North Carolina at Chapel Hill)

Background. Papanicolaou test (Pap test) is widely used in the US. Although some studies investigated associations between sociodemographic and health-related factors and Pap test use, very few of them compared the associations by race/ethnicity groups, and this raised the need for a further investigation by race/ethnicity. Methods. We used data from the Behavioral Risk Factor Surveillance System between 2014 and 2016. Five race/ethnicity groups (non-Hispanic white, non-Hispanic African American, Hispanic, Asian, American Indian/Alaskan Native) were chosen and we selected 14 sociodemographic and health-related factors for analysis. Weighted proportions of Pap test use within the past 3 years were calculated for each race/ethnicity and we compared these proportions by using white women as the reference. Descriptive summary was conducted by providing the number of participants and weighted proportions at each level of the 14 factors. A multivariable logistic regression was used to investigate associations between these factors and Pap test use and an adjusted Wald test was used to examine the interaction between these factors and race/ethnicity. Results. A total of 237,094 women aged 21-65 years were included and 80.23% of them had a Pap test in the past 3 years. Pap test use rate was significantly higher among white, African American, and Hispanic women, and Asian women had the lowest rate. The 14 factors distributed differently across race/ethnicity groups. Overall, we found that older age, lower income, being never married, not having health care coverage, long duration since last checkup, and not having physical activity recently were inversely associated with Pap test use; however, detailed association patterns and magnitude of effect size were heterogeneous by race/ethnicity. Conclusion. We identified several correlates for Pap test use. This may help health practitioners establishing a race/ethnicity-oriented and cost-effective health promotion program in cervical cancer screening.

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ESTIMATING COMBINED POPULATION ATTRIBUTABLE RISK FROM MULTIPLE RISK FACTORS: THE COLORECTAL CANCER BURDEN ATTRIBUTABLE TO MULTIPLE LIFESTYLE RISK FACTORS IN ALBERTA, CANADA Yibing Ruan* Yibing Ruan, Stephen D. Walter, Abbey E Poirier, Amanda Barberio, Christine M. Friedenreich, Darren R. Brenner, on behalf of ComPARe Study Team, (Department of Cancer Epidemiology and Prevention Research, CancerControl Alberta, Alberta Health Services)

Objective: The method developed by Miettinen and Steenland (M-S approach) is often used to estimate combined population attributable risks (PARs) for multiple exposures. This approach makes the assumptions that exposures are independent and that risks are multiplicative, which may not be true in practice. Our objective was to address the bias of the M-S approach when the two assumptions are not met, using data from a large prospective cohort study. Methods: We used data from Alberta's Tomorrow Project to estimate the prevalence of cigarette smoking (never, former, current), obesity (normal, overweight, obese), and insufficient fruit/vegetable intake (Y/N). The combination of the three risk factors resulted in 18 joint exposure strata. We estimated the true combined PAR using the joint prevalence and HRs (estimated from a 3-way interaction model, adjusted for 11 covariates). We also estimated combined PAR using the M-S approach with marginal prevalence estimates and adjusted risks (estimated from a main effect model with the 3 risk factors, adjusting for the same covariates). Results: We observed 237 incident colorectal cancer cases among 26,127 participants of Alberta's Tomorrow Project with a median follow-up of 11 years. The three exposures were slightly correlated and their joint risks were sub-multiplicative. The true PARs were 15.6% for smoking, 34.2% for obesity, 12.4% for insufficient fruit/vegetable intake and 59.8% for the combined risk factors. In comparison, using the M-S approach, the PARs for smoking, obesity, insufficient fruit/vegetable intake, and combined were 14.9%, 33.5%, 12.3%, and 50.4%, respectively. Conclusion: In our study, M-S approach underestimated the combined PAR. M-S approach may under- or over-estimate the true combined PAR, possibly to a large extent. We urge researchers to be cautious when using the M-S approach to estimate combined PARs when the two assumptions are not met.

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DIABETES AND CARDIOVASCULAR DISEASE MORTALITY AMONG WOMEN WITH AND WITHOUT BREAST CANCER Luis A. Rodriguez* Luis A. Rodriguez, Patrick T. Bradshaw, Humberto Parada, Nikhil K. Khankari, Tengteng Wang, Rebecca Cleveland, Susan L. Teitelbaum, Alfred I. Neugut, Marilie D. Gammon, (Department of Epidemiology and Biostatistics, University of California, San Francisco)

Cardiovascular disease (CVD) is a leading non-cancer cause of death among women with breast cancer (BC) and diabetes is a risk factor for CVD mortality. Whether the diabetes-mortality association differs among women with and without BC is unclear. We examined the diabetes-mortality association among a population-based sample of 1,413 women diagnosed with first primary BC in 1996-97, and among 1,411 age-matched women without BC, who were interviewed in-person shortly after diagnosis (identification among women without BC). Vital status for all-cause (n = 712) and CVD-specific mortality (n = 300) through December 31, 2009 was determined via linkage with the National Death Index. Proportional bazard models were used to estimate adjusted hazard ratios (HRs) and 95% confidence intervals (CIs) for all-cause and CVD-specific mortality [cause-specific HR (csHR)]. Subdistribution HRs [sHR] for CVD mortality accounting for competing causes of death were estimated with the Fine-Gray model, which models the hazard from the cumulative incidence function of the outcome. Pre-diagnosis diabetes was associated with increased all-cause mortality among women with BC [HR (95% CI): 1.55 (1.15, 2.09)] and without BC [2.26 (1.52, 3.34); p-interaction: 0.13]. CVDspecific mortality was also elevated with diabetes in both groups [csHR, women with BC: 1.75 (1.07, 2.85); without BC: 2.08 (1.11, 3.87); p-interaction: 0.67]. After accounting for competing causes of death, the association between diabetes risk of CVD-specific mortality remained elevated [sHR, women with BC: 1.53 (0.92, 2.53); women without BC: 1.80 (0.94, 3.47); p-interaction: 0.69]. However, the association was lower than the cause-specific HRs given diabetes is related to other causes of death. BC survivors with an existing diabetes diagnosis are at an increased risk for all-cause and CVD-related mortality compared with those without diabetes, but the pattern is of similar magnitude compared to women without BC.

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PATTERNS IN SMOKING PREVALENCE AND LUNG CANCER INCIDENCE IN THE SURVEILLANCE, EPIDEMIOLOGY, AND END RESULTS PROGRAM (SEER-9) Rena R. Jones* Rena R. Jones, Hannah Creutzfeldt, David Check, Denise R. Lewis, Barry I. Graubard, Debra T. Silverman, Susan S. Devesa, (National Cancer Institute)

Introduction: Lung cancer incidence rates, regional patterns in these rates, and the predominant histologic types have changed over time. Whether these changes correspond to risk factors other than cigarette smoking requires understanding of temporal relationships between smoking prevalence and incidence patterns, which have not been well-explored. Methods: We used Behavioral Risk Factor Surveillance Survey data (1989-2013) to estimate age- and sex-specific prevalence of current smoking and Surveillance, Epidemiology, and End Results Program (SEER-9) data to compute age- and sex-specific lung and bronchus incidence rates for corresponding 5-year time periods. Poisson models stratified by sex and adjusted for age, time period, and SEER-9 registry were used to estimate the change in lung cancer rates associated with changes in both concurrent smoking prevalence and prevalence lagged 5,10, and 15 years. We further evaluated differences in these relationships by registry and histologic type. Results: Among both men and women, a 15-year lagged model provided the best fit of the relationship between smoking prevalence and lung cancer. Among men, we observed a 4.8% increase in overall incidence per 5% increase in smoking prevalence (95% CI: 3.4,6.2). This association was significantly stronger for women (9.3%, 95% CI: 7.8,10.9), likely because incidence rates among men peaked earlier. Differences in the relationship between smoking prevalence and lung cancer rates were also suggested by histologic type. Conclusions Our findings indicate the importance of considering a temporal lag when examining the relationship between smoking prevalence and lung cancer rates. Ongoing analyses of geographic variation in the smoking-lung cancer relationship using national data may identify whether non-smoking-related risk factors also contribute to changing incidence patterns.

BURDEN OF LOCAL-THERAPY DECISION REGRET IN OLDER WOMEN WITH BREAST CANCER: A POPULATION-BASED STUDY Pragati Advani* Pragati Advani, Xiudong Lei, Cameron Swanick, Benjamin Smith, (National Cancer Institute)

Background: Older women with breast cancer can often choose between several surgery and radiation treatment options. Little is known regarding how these choices contribute to decisional regret, a negative emotion reflecting the idea that another surgery/radiation decision may have been preferable. We examined the burden and correlates of surgery/radiation decisional regret among a population-based cohort of older breast cancer survivors. Methods: National Medicare claims for age≥67 female breast cancer incident in 2009 identified patients treated with lumpectomy+whole breast irradiation, lumpectomy+brachytherapy, lumpectomy alone, mastectomy without radiation, or mastectomy+radiation. From this cohort, we sampled 330 patients per group (total 1,650) of whom 1,253 agreed to receive a survey including the Decisional Regret Scale and EQ-5D-3L Health-Utility Scale. Predictors of surgery/radiation regret were evaluated using a multivariable generalized linear model. Correlation of surgery/radiation regret with health utility was tested using multivariable linear regression. Results: Response rate was 30.2% (n=498); 421 surveys were completed and included in this analysis. Median age at diagnosis was 72 years and surveys were completed 6 years after diagnosis. Overall, 23.8% (n=100) reported surgery/radiation regret. Type of local therapy was not associated with surgery/radiation regret, but predictors of increased regret included black race [Risk Ratio (RR)=2.09; P=0.001], less than college education (RR=1.92; P=0.0009), and axillary nodal dissection (RR=2.13; P=0.002). Surgery/radiation regret was not associated with health utility (P=0.37). Conclusion: Surgery/radiation regret afflicts nearly one-quarter of older breast cancer survivors and is associated with black race, less education, and extensive nodal but not breast surgery. Regret is distinct from health utility, suggesting it is a unique psychosocial construct that merits further study and mitigation strategies.

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SELF-REPORTED LATE EFFECT SYMPTOM CLUSTERS AMONG PEDIATRIC CANCER SURVIVORS Rebecca Williamson Lewis* Rebecca Williamson Lewis, Karen E Effinger, Karen Wasilewski-Masker, Ann Mertens, Canhua Xiao, (Children's Healthcare of Atlanta, Aflac Cancer and Blood Disorders Center)

Purpose: Overall survival for pediatric cancer is >80%; however, most survivors experience subsequent chronic conditions. Little is known about concurrent symptoms experienced. This analysis seeks to determine late effect symptom clusters among pediatric cancer survivors. Methods: Patients or parents of patients <18 years enrolled in the Childhood, Adolescent, and Young Adult Cancer Survivor Study indicated (yes/no) if they experienced certain symptoms after treatment. The sample was randomly divided for exploratory factor analyses identifying symptom clusters followed by confirmatory factor analyses. Symptoms with ≥10% prevalence were included. Cluster structure generalizability across subgroups was examined using congruence coefficients. Results: The sample included 579 survivors (74% non-Hispanic white, 45% leukemia, 12.8±4.5 years old, 5.9±3.5 years since therapy). Respondents averaged 3 symptoms with dental problems (31.3%) the most common. Three clusters were identified: 1) Gastrointestinal (GI): abdominal pain, diarrhea, constipation, nausea, vomiting (Cronbach's a=0.74); 2) Psychological: depression, anxiety, memory problems, anger management problems, sleep problems (a=0.71); and 3) Neurologic: problems walking, numbness/tingling, fatigue, back pain, chronic pain, weakness/inability to move legs (α =0.71). Confirmatory factor analysis confirmed the three cluster structure (Standardized Root Mean Square Residual: 0.09; Parsimonious Goodness of Fit: 0.96; Bentler-Bonett Normed Fit Index: 0.95) which was generalizable across most sub-groups. However, symptoms in the neurologic cluster varied in males, non-whites, young adult survivors, and those diagnosed at ≥ 5 years old (congruence coefficients <70). Conclusion: Three distinct late effect symptom clusters were identified in childhood cancer survivors with GI and psychological clusters remaining relatively stable across subgroups. Future studies will evaluate survivors with these clusters and the synergistic impact on quality of life.

PREVENTABLE FRACTIONS OF COLON AND BREAST CANCERS BY INCREASING PHYSICAL ACTIVITY IN BRAZIL: PERSPECTIVES FROM PLAUSIBLE COUNTERFACTUAL SCENARIOS Leandro Fórnias Machado de Rezende* Leandro Fórnias Machado de Rezende, Leandro Martin Totaro Garcia, Gregore Iven Mielke, Dong Hoon Lee, Kana Wu, Edward Giovannucci, Jose Eluf-Neto, (Departamento de Medicina Preventiva, Faculdade de Medicina FMUSP, Universidade de Sao Paulo)

Background: Currently, it is well-established that physical activity is associated with lower risks of colon and breast (post-menopausal) cancers. In this study, we estimated preventable fractions of colon and breast cancers in Brazil by increasing population-wide physical activity to different counterfactual scenarios. Methods: We estimated potential impact fractions using data from a representative national survey in Brazil and corresponding relative risks of colon and breast cancers published in a recent dose-response meta-analysis. Estimated cancer incidence was retrieved from GLOBOCAN. Five counterfactual scenarios for physical activity distributions were considered: (i) theoretical minimum risk exposure levels (≥8,000 metabolic equivalents of task per minute per week (MET-min/week); (ii) physical activity recommendation (≥600 MET-min/week); (iii) 10% reduction in physical inactivity prevalence (<600 MET-min/week); (iv) physical activity level in each federative state equals the most active state in Brazil; and (v) closing the gender differences in physical activity by increasing physical activity in women to levels observed in men. Results: About 3,630 or 19% of colon cancers and 6,712 or 12% of breast (post-menopausal) cancers could be prevented in Brazil by reaching ≥8,000 MET-min/week of physical activity. Achieving at the least the physical activity recommendation would prevent about 1,113 or 1.3% of breast cancers and 1,137 or 6% of colon cancers. Other counterfactual scenarios showed modest impact on cancer prevention, as follows: reducing gender differences in physical activity (384 or 1.1% breast; 122 or 0.6% colon); most active state scenario (168 or 0.3% breast; 189 or 1% colon); 10% reduction in physical inactivity prevalence (111 or 0.2% breast; 114 or 0.6% colon). Conclusions: Our counterfactual scenario estimates suggest that high levels of physical activity are required to achieve sizable impact on breast and colon cancer prevention in Brazil.

0595 S/P

HIGH ADHERENCE TO A MEDITERRANEAN-STYLE DIET AND THE DASH EATING PLAN IS INVERSELY ASSOCIATED WITH HIGH AGGRESSIVE PROSTATE CANCER IN PCAP. Lara R. Schneider* Lara Schneider, L. Joseph Su, Lenore Arab, Jeannette T. Benson, Laura Farnan, Elizabeth T.H. Fontham, James Hussey, Anwar T. Merchant, James L. Mohler, Susan E. Steck, (Department of Epidemiology and Biostatistics, Arnold School of Public Health, University of South Carolina, Columbia, SC)

Background: Several foods and nutrients have been linked to prostate cancer, but the effect of overall diet on prostate cancer aggressiveness is not well understood. Most research has examined a posteriori dietary patterns for relation to prostate cancer and the few studies that used a priori dietary patterns have been inconclusive. Methods: Data from the case-only North Carolina-Louisiana Prostate Cancer Project (PCaP) were used to examine the association between overall dietary quality, as measured by the Mediterranean Diet (MED) score and the Dietary Approaches to Stop Hypertension (DASH) score, and prostate cancer aggressiveness in African-American (AA) and European-American (EA) men. Dietary patterns were assessed using a modified NCI Diet History Questionnaire for a final sample of 1,899 research subjects (AA n=908, EA n=991). High aggressive prostate cancer was defined using Gleason grade, stage, and prostate-specific antigen values. Multivariable-adjusted logistic regression was used to model high aggressive prostate cancer (n=332) versus low-intermediate aggressive prostate cancer. Results Higher MED scores were inversely associated with high aggressive prostate cancer overall [OR: 0.66; 95% CI: 0.46 - 0.95 for high (score 6-9) vs. low (score 0-3)]; and results were similar for AA and EA men. A weaker inverse association between higher DASH scores and high aggressive prostate cancer was observed (OR: 0.76, 95% CI: 0.55 - 1.06 for the highest tertile (score >25) compared to the lowest tertile (score <20). Age modified the effect of MED score, with the inverse association between higher MED scores and aggressive prostate cancer evident among men aged ≥65 but not men < 65 years (pinteraction: 0.08). Conclusions: High adherence to a Mediterranean-style diet may decrease the risk of developing more aggressive forms of prostate cancer among both AA and EA men, particularly in men over the age of 65 years.

WEIGHT CHANGE AND RISK OF COLORECTAL CANCER IN THE PROSTATE, LUNG, COLORECTAL AND OVARIAN CANCER SCREENING TRIAL Fang Hu* Kathryn Hughes Barry, Fang Hu, Wen-Yi Huang, Andrea Buchwald, John D. Sorkin, Sonja I Berndt, (Department of Epidemiology and Public Health, University of Maryland School of Medicine, Baltimore, MD)

Body mass index (BMI) is an established risk factor for colorectal cancer. However, few studies have evaluated the role of weight change over the life course, and the literature is inconsistent regarding differences by sex and anatomic subsite. We investigated weight change in early-mid (age 20-50) and mid-later (age 50-baseline) adulthood and the risk of colorectal cancer in the Prostate, Lung, Colorectal and Ovarian Cancer Screening Trial. We included 56,510 screening arm participants who had no history of colorectal cancer and who had available data on weight and BMI and completed a baseline dietary questionnaire. Participants were ages 55-74 at baseline (1993-2001), and 721 developed colorectal cancer during follow-up through 2009. We categorized weight change per 5 years (kg) from age 20 to 50 as \leq -0.5, >-0.5 to \leq 0.5 (weight stable, referent group), >0.5 to \leq 1, >1 to \leq 2, and >2 kg, and that for age 50 to baseline as ≤ -0.5 , > -0.5 to ≤ 0.5 (weight stable, referent), >0.5 to ≤ 2 , >2 to ≤ 4 , and >4 kg based on their respective distributions. We used Cox regression to evaluate the association between weight change and colorectal cancer risk, adjusting for starting BMI and other potential confounders. For 5-year weight gain >2 kg from age 20 to 50, we observed a borderline significant increased risk of total colorectal cancer (HR=1.23, 95% CI: 0.96-1.58); findings were driven by proximal colon (HR=1.31, 95% CI: 0.95-1.81) and rectal cancer (HR=2.29, 95% CI: 1.12-4.69), with no association for distal colon cancer (HR=0.71, 95% CI: 0.43-1.17). Associations were less pronounced for weight gain from age 50 to baseline (for 5-year weight gain>4 kg for total colorectal cancer, HR=1.10, 95% CI: 0.83-1.46). There were no significant differences by sex. Our findings suggest that a moderate rate of weight gain from early to middle adulthood is associated with colorectal cancer, particularly proximal colon and rectal cancer, and indicate the importance of weight maintenance.

0598 S/P

OOPHORECTOMY AND RISK OF PRIMARY LIVER CANCER AND FATTY LIVER DISEASE IN THE CLINICAL PRACTICE RESEARCH DATALINK Andrea R. Ayers* Andrea R. Ayers, Barry I. Graubard, Marie C. Bradley, (National Cancer Institute)

The incidence of liver cancer and its precursor condition, fatty liver disease, are 2-3 times higher in males than females, but this discrepancy has not been fully explained by known risk factors. It has been hypothesized that hormones may account for the disparity. Evidence suggests that oophorectomy may increase liver tumor risk, while menopausal hormone therapy (MHT) may reduce risk. Thus, we conducted a nested case-control study within the UK Clinical Practice Research Datalink to examine the associations between oophorectomy and liver tumor risk, and whether MHT use modifies the associations. Controls were individually matched to cases of liver cancer (n=712 cases/2,844 controls), non-alcoholic fatty liver disease (NAFLD; n=7,314 cases/29,254 controls), and alcoholic fatty liver disease (AFLD; n=558 cases/2,231 controls). Adjusted odds ratios (ORs) and 95% confidence intervals (Cls) were estimated using conditional logistic regression. Effect measure modification by MHT use was examined using likelihood ratio tests and the relative excess risk due to interaction (RERI). Overall, oophorectomy was not associated with an elevated liver cancer risk (OR=1.10, 95%CI: 0.75, 1.62), and no interaction with MHT was found. However, oophorectomy prior to age 50 was associated with a 22% elevated risk (95%CI: 0.77, 1.95). Oophorectomy was associated with a 24% elevated NAFLD risk (95%CI: 1.12, 1.37). Compared to women without oophorectomy or MHT use, oophorectomy only and MHT only were each associated with a 50% elevated NAFLD risk. However, the combination of oophorectomy and MHT showed evidence of a negative interaction on the multiplicative (p=0.001) and additive scales (RERI=-0.38, 95% CI: -0.69, -0.07, p=0.02). No associations were seen between oophorectomy and AFLD. These findings suggest that oophorectomy may increase risk of NAFLD, but not AFLD. A suggestion of elevated liver cancer risk associated with pre-menopausal oophorectomy, however, warrants further study.

OVARIAN CANCER INCIDENCE AMONG ASIAN ETHNIC SUBGROUPS IN THE UNITED STATES Alice Lee* Alice Lee, Emma Navajas, Lihua Liu, (California State University, Fullerton)

Although ovarian cancer is the most fatal gynecologic malignancy in the United States, its burden is not equally distributed. Non-Hispanic Whites (NHWs) have the highest incidence, whereas Asian/Pacific Islanders (APIs) have the lowest. In addition, incidence has declined among NHWs, but this decrease appears to be less evident among APIs. Since most ovarian cancer research aggregates APIs into a single group, it is unclear whether these observations persist when specific API ethnic subgroups are considered. Using population-based cancer registry data from the Surveillance, Epidemiology, and End Results Program, we examined ovarian cancer incidence among various API ethnic subgroups in the United States from 2000 to 2014. Incidence rate ratios (IRRs) and 95% confidence intervals (Cls) were calculated, comparing each API ethnic subgroup to NHWs Annual percent changes (APCs) were also calculated to evaluate trends over time. Disease histotype was considered in our analyses when appropriate. All API ethnic subgroups evaluated had a statistically significant lower risk of ovarian cancer compared to NHWs; Chinese women had a 44% reduced risk (IRR=0.56, 95% CI 0.53-0.60), whereas Filipina women had a 28% reduced risk (IRR=0.72, 95% CI 0.68-0.76). However, in comparison to NHW women, Chinese, Japanese, Filipina, and Vietnamese women showed an increased risk of clear cell ovarian cancer, with risk being greatest among Japanese women (IRR=1.78, 95% CI 1.41-2.23). Also, while a significant decrease in ovarian cancer incidence was observed in NHW women (APC -1.90), a larger decrease was observed in Japanese and Chinese women (APC -2.90 and -2.23, respectively). There are clear disparities in ovarian cancer incidence when the heterogeneity of the API racial group is considered. This may result from underlying differences in biology, genetic makeup, and lifestyle. Understanding these differences can shed light on disease etiology and help shape future prevention strategies.

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CANCERS ASSOCIATED WITH HUMAN PAPILLOMAVIRUS, UNITED STATES, 2010-2014 Simple Singh* Simple Singh, S. Jane Henley, Virginia Senkomago, Elizabeth A. Van Dyne, Mona Saraiya, Lauri B. Markowitz, Vicki B Benard, (CDC)

Background: Persistent infection with oncogenic human papillomavirus (HPV) types has a causal role in nearly all cervical cancers and in many vulvar, vaginal, penile, anal, and oropharyngeal cancers. The 9-valent HPV vaccine protects against infection from 7 HPV oncogenic types 16/18/3 1/33/45/52/58. Purpose: To assess the incidence of HPV-associated and HPV-attributable cancers by age, race, and sex and cancer site. Methods: We analyzed CDC's National Program of Cancer Registries and NCI's SEER Program data for 2010-2014. HPV-associated cancers are invasive cancers at anatomic sites (i.e., cervix, vulva, vagina, penis, oropharynx, anus, and rectum) with cell types in which HPV DNA frequently is found. We estimated HPV-attributable cancers by multiplying the number of HPV-associated cancers by the percentage attributable to HPV based on a genotyping study. Agead justed rates were calculated. Results: From 2010-2014, 41,038 new HPVassociated cancers (rate of 11.9/100,000) occurred in the U.S. each year; 23,716 among women (rate of 13.5/100,000), and 17.322 among men (rate of 10.1/100,000). Among women, cervical cancer is the most common HPV-associated cancer with 11,670 cases followed by cancers of anus (n=4,114), Vulva (n=3802), oropharynx (n=3,297) and vagina (n=833), with rates of 7.2, 2.2, 2.0, 1.7 and 0.4 per 100,000 respectively. Among men, oropharyngeal cancers are the most common with 13,976 cases followed by anal (n=2,106) and penile (n=1,240) cancers, with rates of 8.0, 1.3, and 0.8 per 100,000 respectively. We estimated that 32,500 cancers (79%) were attributable to HPV each year. Of these, 30,000 cancers could have been prevented by the 9-valent HPV vaccine, including 26,200 caused by HPV types 16 and 18, and 3,800 caused by HPV types 31/33/45/52/58. Conclusion: Ongoing surveillance of HPV-associated and HPV-attributable cancers using populationbased registries is needed to monitor burden, trends, and the impact of HPV vaccination for these potentially preventable cancers.

HELICOBACTER PYLORI TREATMENT EFFECTIVENESS IN DEVELOPING COUNTRIES: A META-ANALYSIS Susan Thapa* Susan Thapa, , (University of Arkansas for Medical Sciences)

Background: Helicobacter pylori is a putative risk factor for peptic ulcers and gastric cancer. Current treatment guidelines for H pylori are based on results from developed countries. Hence, these guidelines may not be generalizable to developing countries where the burden of infection is greatest. Therefore, we conducted a network meta-analysis to find sources of heterogeneity in treatment effectiveness and the most effective regimens for developing countries. Methods: We searched Medline, EMBASE, Web of Science, LILACS, the Cochrane library and the African Index Medicus for H pylori trials from developing countries. We conducted network meta-regression analyses to identify potential sources of heterogeneity and the most effective regimens within patients groups responding similarly to treatment Results. We included 31 regimens from 309 eligible studies and 36 developing counties. Identified sources of heterogeneity included studies conducted in Turkey, treatment duration and antimicrobial resistance. Seven regimens, all which contained clarithromycin, were used outside of Turkey where clarithromycin resistance was> 20%. Eradication observed for these 7 regimens ranged from 58% to 76%. When clarithromycin resistance was $\leq 20\%$ outside of Turkey, the most effective regimen contained clarithromycin, furazolidone and a proton pump inhibitor (PPI) for 7 days (Risk Difference [RD] = 0.89; 95% CI: 0.79, 0.99). The most effective regimen used in areas with high metronidazole resistance contained clarithromycin, amoxicillin and metronidazole for 14 days (RD=0.97; 95% CI: 0.49, 1.00). In areas with low metronidazole resistance, the regimen containing amoxicillin and a PPI followed by metronidazole, levofloxacin and a PPI was most effective (RD=0.93; 95% CI 0.78, 1.00). Most effective regimens were not included in current treatment guidelines. Discussion. Current treatment guidelines for H pylori eradication differ from what is most effective in developing countries.

0601 S/P

PATTERNS OF CHRONIC ILLNESS AMONG BREAST CANCER SURVIVORS AGED 65 AND OLDER Theodore P. McDade, MD, MPH* Theodore P. McDade, MD, MPH, Catarina I. Kiefe, PhD, MD, Thomas K. Houston, MD, MPH, (University of Massachusetts Medical School)

Background: Survivors of breast cancer often have comorbid disease prior to it's diagnosis, and may also develop post-treatment sequelae. This population is likely at increased risk for both specific chronic illnesses, as well as higher overall chronic illness burden, however, longitudinal patterns underlying this have not previously been well characterized. Methods: Breast cancer diagnoses from 2000-2013, were identified in SEER-Medicare data, along with a 5% Medicare random non-cancer sample for the same time period. Exclusion criteria were: age < 65, death before 2014, male sex, non-adenocarcinoma of breast, non-enrollment in Medicare parts A and B or HMO enrollment 12-months before and 9-months following diagnosis, and diagnosis via autopsy or death certificate. Information from the 27 Medicare chronic condition (CC) flags for 1999 and 2014 (pre- and post- diagnosis and treatment, respectively) were utilized. Student's t-test was performed to compare CCs of breast cancer survivors with the non-cancer group. Logistic regression models were used to adjust for age and race. Results: N=170,544 (74,921 breast cancers; 95,623 non-cancer). Breast cancer patients started with higher total CC (OR 1.20 (95%CI 1.19-1.21)), were at greater risk of higher total CC 15 years later (OR 2.24 (95%CI 2.20-2.29)), and had the largest increase (Student's t p<0.0001). There are similar patterns of risk for cardiovascular, neuropsychiatric, musculoskeletal, pulmonary, ophthalmic, and endocrine CC subtypes, with cardiovascular CCs predominating (OR 2.85 (95%CI 2.79-2.92)). Conclusions: Breast cancer survivors face substantial future chronic illness burden, imparted by both prior comorbidities and additional subsequent CCs, some related to therapy. Their cardiovascular risk is nearly 3 times that of individuals without a cancer history of the same age. Further research is needed to understand potential long term impacts of strategies targeting chronic illness prevention and/or control.

0610 S/P

HAIR CORTISOL AND RISK OF HYPERTENSION Pravleen Bajwa* Pravleen Bajwa, Leonelo Bautista, (University of Wisconsin-Madison)

Background Uncertainty about the role of chronic psychosocial stress (CPS) in the development of hypertension is partly due to poor accuracy of CPS measures. Blood, urinary, and salivary cortisol, and catecholamine, are influenced by daily physiological fluctuations. Hair cortisol (HC), an alternative marker, captures systemic cortisol levels over months, and is not highly affected by circadian rhythms and transient events. We assessed whether HC is independently associated with hypertension (systolic/diastolic BP≥140/90 mmHg or medication). Methods We collected hair samples in 75 consecutive participants in the Survey of the Health of WI, 2015 and measured HC using an ELISA test. Those with HC \geq median (78.11 pg/mg) were considered exposed. We identified a minimally sufficient adjustment set of variables (MSAS: age, gender, age-by-gender interaction, abdominal obesity, alcohol intake) for estimating the unconfounded effect of HC on hypertension using Pearl's back-door criterion, and included it in our models. We used approximate Bayesian logistic regression via penalized likelihood estimation with data augmentation to quantify this association. We selected a prior OR of 1.0-4.0, consistent with previous knowledge about hypertension risk factors, and obtained 95% CI by bootstrapping. We also compared HC level in hypertensives and normotensives using bootstrapped non-parametric kernel regression. Results Mean age was 46.9 years, 37.3% were male, and 26.7% were hypertensive. After adjusting for MSAS variables, the prevalence of hypertension increased by 93% (95% CI: 1.42, 2.68) in exposed individuals. A sensitivity analysis with a prior OR of 0.61-3.70 resulted in a 63% (95% CI: 1.04, 2.50) increase. MSAS adjusted average HC was 87.3 pg/mg (95% CI: -23.7, 217.0) higher in hypertensives than in normotensives. Conclusions CPS, as measured through HC, may independently increase the risk of hypertension. However, it should be replicated in larger samples and prospective cohort studies.

0612 S/P

TIME TRENDS IN HYPERTENSION PREVALENCE, AWARENESS, TREATMENT, AND CONTROL IN RURAL BANGLADESH Molly Scannell Bryan* Molly Scannell Bryan, Maria Argos, Faruque Parvez, Yu Chen, Alauddin Ahmed, Tariqul Islam, Farzana Jasmine, Muhammad G. Kibriya, Habibul Ahsan, (University of Illinois at Chicago)

Prompt diagnosis and treatment of hypertension can prevent morbidity and mortality. However, in Bangladesh, like many developing nations, the burden of hypertension is not well-established, even as rapid demographic and economic changes in the past decade have increased the prevalence of many known risk factors. Although barriers to awareness, treatment, and control of hypertension are likely to exist in Bangladesh, the magnitude of these barriers, and their change over time has not been systematically reported. This study uses baseline data collected from 34,793 population-based participants enrolled in the Health Effects of Arsenic Longitudinal Study in Araihazar, Bangladesh, which recruited during three enrollment cycles ending in2002 (n=11,489), 2008 (8286), and 2014 (15,018). Ageand gender-specific rates of hypertension prevalence (defined as systolic>=130, diastolic>=80, or medication) were estimated, and plotted for each enrollment cycle, with CIs from likelihood ratio tests. Among those who were hypertensive, we estimated age- and gender-specific rates of awareness (diagnosis of hypertension), treatment (antihypertensive medication), and control (systolic<130, diastolic<80). Hypertension prevalence was 36.6% (36.1-37.1), and increased 5.5 percentage points from the 2000-2002 enrollment to the 2010-2014 enrollment (p<0.0001) Less than 12% (10.8-12.3) of those with hypertension were aware of it; 6% (5.6-6.4) were treated, and control of the hypertension was achieved in I.I% (0.9-1.2). Awareness (p<0.001), treatment (p<0.001), and control (p<0.001) all increased during the study period, especially in older age groups, which will be shown graphically. These results quantify the increasing burden of hypertension in rural Bangladesh using the most recent clinical guidelines, and establish low rates of awareness, treatment, and control that is likely mirrored in other countries undergoing similar economic transitions.

0611 S/P

THE RELATIONSHIP BETWEEN HYPERTENSION AND BLOOD PRESSURE REACTIVITY IN A POPULATION-BASED SAMPLE OF CENTRAL PA ADOLESCENTS - THE PENN STATE CHILD COHORT (PSCC) Chen Chen* Chen Chen, Duanping Liao, Edward O Bixler, Fan He, (Penn State College of Medicine)

Objective: To determine the relationship between hypertension and gravity-induced blood pressure (BP) reactivity in a population sample of adolescents. Methods: In PSCC study, Systolic and diastolic BP (SBP and DBP) were measured in seated, supine and standing positions. The SBP and DBP reactivity were defined as the difference between supine to standing BP, and analyzed as hyper-, normal-, and hypo-reactivity. Seated BP was measured three times after 5 minutes of resting. The average of the last two measures was used to define hypertension, as SBP > 130 or DBP >80 mmHg. Continuous seated BP was analyzed using analyses of covariance (ANCOVA), and hypertension status was analyzed using logistic regression. All models were adjusted for age, sex, race, and BMI percentile. Results: The mean of age of the participants was 17 years (SD=2.3 years). There were 227 male, and 329 white, out of entire 419 participates. The age, race, sex, and BMI percentile adjusted means of seated SBP (SE) were 115 mmHg (1.6 mmHg), 113 mmHg (0.6 mmHg), and 119 mmHg (1.7 mmHg), respectively in hyper-reactivity, normal reactivity, and hypo-reactivity groups when using 10th and 90th percentiles of Δ SBP as respective cutoff points. A similar pattern of "U" shape relationship was observed across three categories of ADBP. Sensitivity analyses were performed using different cutoff points, and similar patterns of relationships were observed. From the logistic regression models, a similar pattern of a "U" shape relationship between binary defined hypertension and BP hyper- and hypo-reactivity, especially in hyperreactivity. For example, hyper-reactivity and hypo-reactivity of SBP were associated with hypertension status, with OR=5.0 and OR =1.8, respectively. Conclusions: These findings suggest that in adolescents, hyper- and hypo- reactivity of BP, especially SBP reactivity, may predispose these individuals at a higher risk of developing hypertension in later life.

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CHOLESTEROL LEVELS AND THE RISK OF HEMORRHAGIC STROKE AMONG WOMEN Pamela M. Rist* Pamela M. Rist, Julie E. Buring, (Brigham & Women's Hospital)

Background and purpose: Some studies have suggested that low cholesterol levels, specifically low density lipoprotein cholesterol (LDL-C) levels, may increase risk of hemorrhagic stroke. However, few studies have explored this association in female populations. Methods: We performed a prospective cohort study among 27,937 women enrolled in the Women's Health Study who had measured levels of LDL-C, high density lipoprotein cholesterol (HDL-C) and total cholesterol at baseline. We used Cox proportional hazards models to analyze the association between cholesterol categories and risk of hemorrhagic stroke. Results: During a mean of 11.0 years of follow-up, 148 hemorrhagic stroke events occurred (94 intracerebral hemorrhages and 43 subarachnoid hemorrhages). After multivariable adjustment, compared to those with normal LDL-C levels of 100-129.9 mg/dL, the risk of hemorrhagic stroke was 1.44 times (95% CI: 0.93, 2.21) higher among those with LDL-C level <100 mg/dL. A sensitivity analysis suggested that the slightly increased risk of hemorrhagic stroke seen among those with LDL-C level <100 mg/dL is driven primarily by those with LDL-C levels <70 mg/dL (HR=2.24, 95% CI 1.12, 4.47). Unexpectedly, we also observed an increased risk of hemorrhagic stroke among those with substantially elevated LDL (≥160 mg/dL) compared to those with normal LDL-C levels of 100-129.9 mg/dL (HR=1.61 times; 95% CI 1.00, 2.60). We observed no association between HDL-C or total cholesterol categories and the risk of hemorrhagic stroke. Conclusion: We did not observe significant associations between LDL-C levels and the risk of hemorrhagic stroke but we could not exclude a potential increased risk of hemorrhagic stroke among those with very low LDL-C levels (<70 mg/dL). Future studies should explore the observation that substantially elevated LDL (≥160 mg/dL) may be associated with risk of hemorrhagic stroke.

HIGH-SENSITIVITY CARDIAC TROPONIN T AND NATRIURETIC PEPTIDE AT MIDDLE AGE AND PROGNOSIS AFTER INCIDENT MYOCARDIAL INFARCTION AT LATER LIFE Yejin Mok* Yejin Mok, Yingying Sang, Shoshana H. Ballew, Ron C. Hoogeveen, Christie M. Ballantyne, Wayne Rosamond, Josef Coresh, Elizabeth Selvin, Kunihiro Matushita, (Department of Epidemiology and the Welch Center for Prevention, epidemiology and Clinical Research, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA)

Background: We have recently demonstrated that traditional risk factors at middle age are associated with prognosis after incident myocardial infarction (MI) at later life. Whether such an association is present for high-sensitivity cardiac TnT (hscTnT) and N-terminal pro-B-type natriuretic peptide (NT-proBNP) is unknown. Methods: In the Atherosclerosis Risk in Communities (ARIC) Study, we divided hscTnT and NT-proBNP levels at visit 2 (1990-1992) into 5 categories at the same percentiles hs-cTnT (<3, 3-5, 6-8 9-13, and \geq 14 ng/L) and NT-proBNP (<37.8, 37.8-65.7, 65.8-107.2, 107.3-237.7, and ≥237.8 pg/mL. We evaluated the associations of these cardiac markers with composite and individual outcomes of allcause death, cardiovascular death, recurrent MI, heart failure, and stroke among 1,092 persons who experienced an MI cases after baseline through 2013 (11.7 years from baseline on average), using Cox model after adjustment for conventional risk factors at incident MI Results: During a median follow-up of 3 years, 775 individuals developed the composite outcome after incident MI. Hazard ratio (HR) of composite outcome was 1.43 (95%CI, 1.06-1.92) for hs-cTnT \geq 14 vs. \leq ng/L. NT-proBNP generally demonstrated a dose-response relationship, with HR of 1.28 (95%CI, 1.05-1.56) for 37.8-65.7, 1.25 (1.01-1.54) for 65.8-107.2, 1.40 (1.10-1.77) for 107.3-237.7, 1.92 (1.46-2.53) for ≥237.8 pg/mL Both hs-cTnT and NT-proBNP were associated with all-cause and cardiovascular death, and NT-proBNP was additionally associated with heart failure after incident MI. The associations were consistent even after accounting for MI severity score. Conclusions: hs-cTnT and NTproBNP measured in middle age were associated with prognosis after incident MI later in life, with more robust relations for NT-proBNP. These results further support the importance of cardiac health at middle age and suggest potential usefulness of these cardiac biomarkers for the prognosis following ML

0616 S/P

HEPATITIS B VIRUS INFECTION AND DEVELOPMENT OF CHRONIC KIDNEY DISEASE: A COHORT STUDY Yun Soo Hong* Yun Soo Hong, Seungho Ryu, Yoosoo Chang, Miguel Caínzos-Achirica, D Zhao, Tariq Shafi, Mariana Lazo, Roberto Pastor-Barriuso, Juhee Cho, Eliseo Guallar, (Johns Hopkins University Bloomberg School of Public Health)

Background and aims: The effect of chronic hepatitis B virus (HBV) infection on the risk of chronic kidney disease (CKD) is controversial. We examined the prospective association between hepatitis **B** surface antigen (HBsAg) serology status and incident CKD in a large cohort of men and women. Methods: A cohort study of 299,913 adults free of CKD at baseline who underwent health screening exams between January 2002 and December 2016. Incident CKD was defined as the development of an estimated glomerular filtration rate (eGFR) < 60 ml/min/1.73m2 and/or proteinuria. Results: Over 1,673,701 person-years of follow-up, we observed 13,924 incident cases of CKD (3,225 cases of eGFR < 60 ml/min/1.73m2 and 11,072 cases of proteinuria). In the fully adjusted model comparing positive to negative HBsAg participants adjusting for age, sex, study center, baseline eGFR, smoking status, alcohol intake, level of education, physical activity, body mass index, and the presence of hypertension, diabetes, and fatty liver disease, the hazard ratio (HR, 95% confidence interval) for incident CKD was 1.11 (1.03 - 1.21; P = 0.01). The corresponding HR for incident proteinuria and for eGFR < 60ml/min/1.73m2 were 1.23 (1.12 - 1.35; P < 0.001) and 0.89 (0.73 - 1.07; P = 0.21), respectively. The associations were similar across categories of liver enzyme levels at baseline. Conclusion: In this large cohort, HBsAg positive serology was associated with higher risk of incident CKD, and we provide novel evidence that this association was due to a higher incidence of proteinuria in HBsAg positive participants. Our study adds to the growing body of evidence suggesting that chronic HBV infection may be a contributor to the increasing incidence of CKD.

THE MODIFYING AND MEDIATING EFFECTS OF HOMA-BASED INSULIN RESISTANCE ON THE RELATIONSHIP BETWEEN RBP4 CONCENTRATION AND ADOLESCENT METABOLIC SYNDROME Pei-Wen Wu* Pei-Wen Wu, Wei-Ting Lin, Sharon Tsai, Chun-Ying Lee, Hsiao-Ling Huang, Chien-Hung Lee, (Kaohsiung Medical University)

Insulin resistance (IR) has a vital pathological effect on numerous cardiometabolic disorders. Retinol-binding protein 4 (RBP4) is secreted principally by mature adipocytes, and is observed to be up-regulated in adipose tissues. Earlier investigations have found that IR is both associated with high serum levels of RBP4 and cardiometabolic risk. This warrants the evaluation of the modifying and mediating effects of IR on the relationship between RBP4 levels and adolescent metabolic syndrome (MetS). We studied 320 of adolescents who were randomly selected from a large-scale investigation (N=2727) conducted to monitoring the risk profile of pediatric cardiometabolic disorder in southern Taiwan. Comprehensive demographic factors, dietary and physical variables, and anthropometric and clinical outcomes of each adolescent were obtained. The original homeostasis model assessment of IR (HOMAI-IR) and an updated HOMA nonlinear computer model of IR (HOMA2-IR) were used to assess the effects. Study data was evaluated using logistic models adjusted for potential covariates. Our study found that the prevalence of IDF-defined adolescent MetS was 4.41%. The levels of HOMAI-IR and HOMA2-IR were both associated with RBP4 concentrations and MetS. The association between RBP4 concentrations and the number of abnormal IDF-defined MetS components was significantly enhanced by higher HOMAI-IR and HOMA2-IR (both P for interaction, <0.05). The two HOMA-based IRs were observed to explain 11.0% to 14.5% of the association of RBP4 levels with 2 or more abnormal MetS components. Although the results were obtained from a crosssectional study, our findings highlight the potential modifying and mediating effects of HOMA-based insulin resistance on the relationship between RBP4 levels and adolescent MetS.

0617 S/P

DECREASED KIDNEY FUNCTION AS A RISK FACTOR FOR HOSPITALIZATION AT OLDER AGE: INCREASED SENSITIVITY WITH SERUM CYSTATIN C Eugenia Wong* Eugenia Wong, Morgan Grams, Natalie Daya, Junichi Ishigami, Casey M. Rebholz, Shoshana H. Ballew, Kunihiro Matsushita, Josef Coresh, (Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health)

Background: Current guidelines stage chronic kidney disease (CKD) by estimated glomerular filtration rate (eGFR) and albuminuria (ACR). Serum creatinine is the standard clinical measure (eGFRcr) with cystatin C recommended as a confirmatory measure (eGFRcys). CKD is common in older age but the magnitude of hospitalization risk across CKD stages is uncertain as is the additional utility of measuring cystatin C. Hypothesis: Functional decline of the kidneys, as indicated by advanced CKD stages based on eGFRcr and eGFRcys, will be associated with increased risk of all-cause hospitalizations. Methods: We evaluated 5,669 participants (mean age, 76 y; female, 57%; African-American, 23%) of the Atherosclerosis Risk in Communities study at Visit 5 (2011-2013) . eGFR was measured by both serum creatinine and cystatin C. Incidence rate ratios (IRR) for allcause hospitalizations were estimated using negative binomial regression. Reclassification to a lower eGFR category by cystatin C was also examined as an additional covariate. Results: 6,124 hospitalizations occurred over 19,788 personyears of follow-up. Prevalence of CKD (eGFR<60) by eGFRcr was 30% and 51% by eGFRcys. After adjustment for demographics, behaviors, and comorbidities, the IRR [95% CI] for hospitalizations by CKD stage were: eGFRcr [vs. 60-89 ml/min/1.73m2], 45-59: 1.2 [1.1,1.3], 30-44: 1.4 [1.1,1.6], 15-29: 2.3 [1.7,3.2] and albuminuria [vs. <30 mg/g], 30-300: 1.5 [1.4,1.7], 300+: 1.8 [1.4,2.3]. Stroke, cancer, CHD, and heart failure had IRRs of 1.3, 1.3, 1.5, and 2.0, respectively. eGFRcys classified 41% of individuals to a lower eGFR category and this reclassification was associated with IRR [95% CI] of 1.4 [1.2-1.5]. Conclusion: Risk of hospitalization at older age is related to established measures of CKD including eGFRcr and albuminuria with adjusted incidence rate ratios comparable to other major comorbidities. Risk is 40% higher when severely reduced eGFR is detected by cystatin C versus creatinine.

ASSOCIATION OF OBESITY AND MORTALITY IN INDIVIDUALS WITH CARDIOVASCULAR DISEASE AND WELL-CONTROLLED RISK FACTORS Usama Bilal* Usama Bilal, Mariana Lazo, Josef Coresh, Melinda Power, (Drexel University)

Whether patients with excess weight and cardiovascular disease should be advised to lose weight remains controversial. Our objective was to evaluate the association of overweight/obesity on 10-year mortality after achieving clinical control of intermediary risk factors (blood pressure, glucose, total cholesterol and inflammation markers) among persons with cardiovascular disease. This study uses data from 1,187 individuals aged 55 or above with self-reported history of cardiovascular disease, no history of smoking or severe weight loss from the National Health and Nutrition Examination Survey from 1988-1994 and 1999-2010. We categorized people into normal weight (BMI 18.5 to 24.9 kg/m2) or overweight/obese (BMI >=25 kg/m2). Well-controlled risk factors were defined using clinical guidelines, and absent inflammation was defined as an absence of elevated inflammation markers. We estimated total effects and controlled direct effects using a Cox Proportional Hazards model. Compared with normal weight, overweight/obesity was associated with a 46% increase in the hazard of mortality (HR=1.46, 95% CI: 0.99 to 2.15) after adjusting for age, sex and race. After controlling for glucose, blood pressure, LDL-cholesterol, and inflammation, overweight/obesity was associated with a 26% increase in the hazard of mortality (HR=1.26, 95% CI 0.84 to 1.89). This attenuation was stronger when considering obese (BMI >=30 kg/m2) people separately, where the increased hazard of mortality relative to those of normal weight was reduced from 37% to 6% after controlling for all risk factors. Well-controlled glucose, blood pressure, LDL-cholesterol and inflammation attenuate, but do not fully eliminate the association between overweight/obesity and mortality. Clinical interventions to control intermediary risk factors remain a useful approach to secondary cardiovascular prevention, while additional efforts to improve weight loss among patients with CVD seem to remain justified.

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ASSOCIATION BETWEEN MYOCARDIAL INFARCTION AND COGNITIVE DECLINE AMONG US ADULTS: A CROSS-SECTIONAL STUDY USING NATIONALLY REPRESENTATIVE DATA Anuja Sarode* Vinay K. Cheruvu, Anuja Sarode, Melissa Zullo, (College of Public Health, Kent State University, Kent, OH, 44242)

Association between myocardial infarction and cognitive decline has not been fully elucidated. And, to the best of our knowledge, this association has not been studied yet in a large community sample of US adults. Therefore, the objective of the current study is to study the association between myocardial infarction and cognitive decline in US adults, Cross-sectional data from the 2015-2016 Behavioral Risk Factor Surveillance System (BRFSS) were used for this study (n = 207,696). Myocardial Infarction(MI), the primary exposure of interest, was binary (Yes / No). Cognitive decline (Yes / No) was determined based on the response to the following question: "During the past 12 months, have you experienced confusion or memory loss that is happening more often or is getting worse?". Weighted prevalence estimates of MI and cognitive decline along with corresponding 95% confidence interval (CI) were computed. Logistic regression was used to examine the association between MI and cognitive decline after adjusting for all potential confounders. Statistical analysis accounted for complex sampling design of the BRFSS. The prevalence of MI and cognitive decline among US adults was 6.1% (95% CI: 5.9-6.3) and 10.0% (95% CI: 9.7 - 10.4) correspondingly. The prevalence of cognitive decline was significantly higher in adults with an MI event compared to those who did not have an MI event: 19.5% (95% CI: 17.8 -21.2) vs. 9.4% (95% CI: 9.1-9.7). After adjusting for all potential confounders, adults who reported having an MI event were at a significantly higher likelihood to report cognitive decline compared to those who did not report having an MI event: 1.30 (95% CI: 1.15 -1.47). Findings from the current study suggests that cognitive decline is an adverse consequence in patients with MI. Healthcare professionals should screen MI patients for cognitive decline. Targeted interventions should be integrated into disease management to mitigate cognitive decline.

HAS THE SKYROCKETING COST OF INSULIN AFFECTED GLYCEMIC CONTROL IN THE US? Mitra Mosslemi* Mitra Mosslemi, (Epidemiology Department, School of Medicine, University of California Irvine)

Background: Major randomized control trials conducted during the 1990s demonstrated the central role of managing A1C levels in diabetes care. Previous studies have shown a significant improvement in A1C among US adults between 2001-2004. On the other hand, insulin price has been increasing steadily since 1999, and the rate of increase has intensified since 2009. The potential effect of the intensified rise in insulin price on the glycemic control among patients with diabetes in the US has not been studied. Methods: Data from the National Health and Nutrition Examination Survey (NHANES) 2009-2014 and yearly insulin price data from Truven Health Analytics were used to investigate the association between the trends in increasing cost of insulin and the national glycemic control in the US adults (aged ≥18 years) with diagnosed diabetes. First, we performed a Cochran-Armitage trend analysis on the insulin price and the number of patients with $A1C \ge 8$ (poor control) from 2009 to 2014. Next, we used multivariate regression analyses to test which of the demographic, diabetes-related and/or insulin price contributes to the A1C variation in the period of 2009-2014, controlling for other factors. Results Using NHANES data, we demonstrated that the mean A1C level among individual with diagnosed diabetes inclined from 7.33 in 2003-2004 to 7.44 (7.36-7.52, p<0.01) in the period of 2009-2014. The Cochran-Armitage test demonstrated the expected increasing trend in the proportion of poorly controlled A1C among diabetes patients with the increasing cost of insulin (from 22% to 28%, p<0.01). In the final model (F=7.17, p<0.0001), the family income to poverty (F=3.83, p=0.04) and its interaction with insulin price ($\mathbf{F}=5.22$, p=0.02) were the only statistically significant contributors to the A1C variations (at p < 0.05). Conclusions This study suggests that glycemic control is worsened in recent years among US adults with diabetes and the deterioration is associated with the increasing price of insulin.

THE EFFECT OF A COMMUNITY HEALTH WORKER IN A CLINIC SETTING FOR DIABETES MANAGEMENT Chad M. Coleman* Chad M. Coleman, David Willens, Anupama Nair, Andrew Bossick, Linda Hopkins-Johnson, Ganesa Wegienka, (Henry Ford Health System)

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Background: Diabetes control can be more challenging in low-income communities. Methods A community health worker (CHW), with the purpose of efficiently using clinic resources and coaching to manage diabetic patients to glycemic control, was added to a clinical care team in an internal medicine clinic in downtown Detroit (K15). The CHW was also tasked with additional responsibilities that involved general wellness of the participants, such as solving barriers to health (e.g., accessing food resources). This program's effectiveness was evaluated by assessing the rates which participants obtained A1e measures and achieved A1e levels <8.0%. Eligible patients were those whose primary care physician was based in K15, age 18-75 years, and were new users of long acting/basal insulin or already on insulin with elevated blood sugar. Clinical results were compared to those of a similar population of diabetic patients at a nearby Henry Ford Health System primary care clinic (Harbortown) without a CHW. Results 137 patients enrolled (52.6% female, 93.3% African-American, 58.9% Medicare/Medicaid Dual eligible). The average age was 55.0 years (SD=10.5) and average BMI was 34.4 kg/m2. 127 (92.7%) had an A1e measure in the year before enrollment and 79 of the 127 (62.2%) also had an A1e measure in the six months after enrollment. The overall A1e within participants decreased after enrollment (means 11.4% to 9.5%). Among individuals with both a pre- and post-enrollment A1e (n=76), A1e decreased (means 11.1% to 9.5%, p<0.05). Of the 76 participants who had both pre- and post-enrollment A1e measures, 40 (52.6%) had a decrease ≥ 1 % and 16 (21.1%) had A1e drop to <8%. Compared to Harbortown patients, CHW program participants had a larger drop in mean A1e and started with higher mean A1e measures (11.1% vs. 10.0%). Conclusion: Among the 76 individuals with a pre- and post-enrollment A1e, there was an average decrease of 1.57%. Multivariate analyses are ongoing.

0632

A PROSPECTIVE AND LONGITUDINAL STUDY OF PLASMA PHOSPHOLIPID N-3 AND N-6 POLYUNSATURATED FATTY ACIDS IN RELATION TO RISK OF GESTATIONAL DIABETES Yeyi Zhu* Yeyi Zhu, Mengying Li, Shristi Rawal, Stefanie N. Hinkle, Jing Wu, Jagteshwar Grewal, Huixia Yang, Michael Y. Tsai, Assiamira Ferrara, Cuilin Zhang (Kaiser Permanente Northern California Division of Research)

Objectives Despite recommendations on dietary intakes of polyunsaturated fatty acids (PUFAs) for cardiometabolic health, data on n-3 and n-6 PUFAs in relation to diabetes risk remain debated. Further, data are lacking in pregnant women. We prospectively investigated individual plasma phospholipid n-3 and n-6 PUFAs throughout pregnancy in relation to risk of gestational diabetes (GDM). Methods Within the NICHD Fetal Growth Studies-Singleton Cohort of 2,802 pregnancies, 107 GDM cases were ascertained by medical record review and matched to 214 non-GDM controls on age, race/ethnicity, and gestational week (GW) at blood collection. Individual plasma phospholipid n-3 and n-6 PUFAs concentrations were measured by gas chromatography at GW 10-14, 15-26, 23-31, and 33-39. Results: Overall, n-3 PUFAs decreased slightly and n-6 PUFAs did not change appreciably across gestation. Among n-3 PUFAs, docosapentaenoic acid (22:5n3) at GW 15-26 was significantly and inversely associated with subsequent risk of GDM [adjusted odds ratio comparing the highest vs. lowest quartile (aORQ4-Q1) = 0.29 (95% CI 0.10, 0.85), P-for-trend = 0.048]. Among n-6 PUFAs, gamma-linolenic acid (18:3n6) and dihomo-gamma-linolenic acid (20.3n6) at GW 10-14 were positively associated with risk of GDM [aORQ4-Q1 = 2.53 (1.12, 5.68) and 3.42 (1.37, 8.54), respectively, both P-for-trend <0.05], whereas docosatetraenoic acid (22:4n-6) at GW 15-26 was inversely related to risk of GDM [aORQ4-Q1 = 0.30 (0.11, 0.83), P-for-trend = 0.015]. Further, per standard deviation increase in PUFAs n-6/n-3 ratio at GW 15-26 was related to a 1.64-fold (1.09, 2.46) increased risk of GDM. Conclusions: Our novel findings highlight the potentially important differential roles of individual n-3 and n-6 PUFAs and the PUFAs n-6/n-3 ratio during early to mid-pregnancy for GDM development. Our findings may underlie distinct nutritional, metabolic, or physiological processes and inform potential prevention strategies.

ACUTE PESTICIDE POISONING IN NORTH WEST MOROCCO: THE EPIDEMIOLOGICAL EVIDENCE Soumaia Hmimou* Hinde Hami, Soumaia Hmimou, (Laboratory of Genetics and Biometry, Faculty of Science, Ibn Tofail University, Kenitra, Morocco)

Background: Acute pesticide poisoning is a major preventable public health problem, especially in developing countries. The aim of this study is to describe the epidemiological characteristics of acute poisoning with pesticide in the region of Tanger-Tetouan in North West Morocco. Methods: This is a descriptive retrospective study of acute pesticide poisoning cases, recorded between 2014 and 2015 in the regional hospitals. Results: During the period of study, there were 246 cases of acute pesticide poisoning, aged 1 to 65 years. Of these, 10.9% were children under the age of 15 years. The average age of the patients was 23.1±10.1 years. More than two-thirds of the cases (72.6%) were females with a female-male ratio of 2.6. Nearly 98% of reported cases resulted from oral exposure, 1.2% from dermal exposure and only 0.8% from inhalation. According to recorded data, pesticides were used as a means of suicide in 18% of cases. The risk was mainly related to the use of rodenticides and insecticides. The poisoning symptoms were varied, depending on the types of pesticides, the route of exposure, the duration of exposure and the delay before treatment. Among the cases for whom the evolution is known, 3.7% of them died. For other cases, the outcome was favorable with or without sequelae. Conclusions: Many situations involving pesticide exposure are linked to education and certain socio-economic conditions. These conditions tend to occur more often in developing countries. Preventive measures should be taken to rationalize pesticide use, which pose a real public health problem, not only for users, but also for the general population.

RESIDENTIAL GREEN SPACE AS A PREDICTOR OF 30-DAY READMISSION AND 30-DAY MORTALITY FOLLOWING ACUTE MYOCARDIAL INFARCTION Stephanie Williams* Stephanie Williams, Murray Mittleman, Peter Jamies, Chih-Da Wu, Elissa Wilker, (Boston University)

Background Many hospitals have implemented interventions focused on improving quality of care to reduce readmission soon after discharge following acute myocardial infarction (MI), but studies suggest that these approaches are not always effective. Residential proximity to green space is associated with numerous health benefits, including lower incidence of chronic illnesses and mortality. Therefore, we addressed the relationship between residential green space and 30-day readmissions and mortality within 30 days. Methods Patients discharged from Beth Israel Deaconess Medical Center in Boston following a first diagnosis of Acute MI (ICD 9 Code 410.xx) from 2009-2014 were included. We determined 30-day readmission from medical records and 30-day mortality from the Social Security Death Index. Addresses were linked to Normalized Difference Vegetation Index (NDVI) data averaged for the month of July from 2000-2014 as an indicator of residential green space. Logistic regression models were adjusted for clinical, demographic and socioeconomic factors. Results Of the 2,490 participants (63% men, mean age: 70 ± 14 years), 143 (8%) were readmitted within 30 days of discharge, and 53 (3%) died within 30 days of discharge. In our multivariable adjusted logistic regression models, compared to living in the highest quartile of NDVI, living in the lowest quartile was associated with higher all cause readmission within 30 days (OR: 1.17, 95% CI: 0.59-2.31) and 1.79 times higher odds of mortality with in 30 days (95%CI: 0.59, 5.43) but confidence intervals were wide. Conclusions No clear pattern of association was observed for associations between NDVI and readmission or mortality. However, elevated point estimates were observed for both outcomes. Both readmission and mortality were low in this population and our estimates had wide confidence intervals. Our findings suggest a role for additional work examining how neighborhood-level characteristics influence post-discharge prognosis.

0643 S/P

ONE HEALTH AND EPIDEMIOLOGIC METHODS: IN THE SAME NEIGHBORHOOD? Julianne Meisner* Julianne Meisner, Stephen J. Mooney, Peter M. Rabinowitz, (University of Washington)

One Health considers human, animal, and environmental health as interconnected systems. The COHERE checklist has recently been developed to standardize reporting of One Health research, however attention to appropriate methods for One Health analyses remains limited. Using cross-sectional data from rural communities in Uganda, we explore the impact of livestock exposure on tuberculosis, drawing on methods used in neighborhood effects epidemiology. Complete tuberculosis (TB) skin test (TST) and self-reported cattle herd size data are available on 548 individuals (162 households, 50 villages). Intraclass correlation coefficients (ICC) were calculated for TST results at household and village level. Linear regression with robust standard errors (SE) was used to estimate the herd size-TST association assuming independent outcomes, and a generalized estimating equation to estimate this association under violations of independence. The estimated ICCs were 0.222 and 0.195 at the household- and village-level, respectively. In the model not accounting for clustering, a ten head increase in herd size was associated with a 4.37 millimeter lower TST (SE: 0.798; 95% confidence interval (CI): -5.93, -2.81). When clustering by village was accounted for, this SE increased to 0.964 (ß: -4.19, 95% CI: -6.07, -2.31). Failure to account for clustering biases SE estimates As cattle TB is poorly-controlled in Uganda and can be transmitted to humans, the naïve expectation is a positive herd size-human TB association. However, herd size is distal to human exposure to cattle-origin TB-violating consistency-and "selfselection" of herd size is largely explained by wealth, violating exchangeability. Formal examination of methods appropriate to research at the human-animalenvironment interface, potentially drawing on learnings from neighborhood research, can strengthen One Health conclusions.

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A LONGITUDINAL ANALYSIS OF THE BODY BURDEN OF PCBS IN RESIDENTS OF THE GREAT LAKES BASIN Grace M. Christensen* Grace M. Christensen, Michelle Raymond, (Wisconsin Department of Health and Family Services)

The Great Lakes (GL) basin has a long history of contamination with polychlorinated biphenyls (PCBs), a class of persistent pollutants known to negatively impact environmental and human health. This analysis examines longitudinal trends and impact of fish consumption on PCB body burden among residents of the GL basin. A cohort was established in 1993 to gather longitudinal information on fish consumption habits and chemical exposure. PCBs were measured in a subsample of cohort members in 1993, 2001, 2004, and 2014. Participants with least two PCB measurements were included in this analysis (n=333). Spearman's correlation coefficients and non-parametric signed rank tests were used to assess cross-sectional relationships between PCBs and consumption of GL fish and participant characteristics (sex, age, BMI, blood lipids). Mixed effects regression models were used to evaluate effects of time and covariates on serum concentrations of total PCBs (∑PCBs) and 12 individual PCB congeners. Least square means for $\log - \Sigma PCBs$ and congeners were estimated from these models and backtransformed to geometric means. Adjusted means for Σ PCBs and most individual congeners decreased over time, with the exception of PCB 132/153 and PCB 170/190 which increased slightly between the 2004 and 2014 follow-up periods (PCB 132/153: 1.75 [95%CI: 1.64, 1.86] vs. 2.17 [95%CI: 1.99, 2.36]ng/gserum; PCB 170/190: 1.18 [95%CI: 1.16, 1.20] vs. 1.24 [95%CI: 1.21, I.27]ng/gserum). The most substantial decrease occurred between the 1993 and 2001 followup periods, where \sum PCBs decreased from 3.75 to 2.42 ng/g-serum (p2 meals/month of GL fish was associated with a 1.13 ng/g increase in **DPCBs** compared to those that ate <1 meal/month (p=0.04). Serum concentrations of most PCB congeners have decreased significantly over the last two decades in this cohort, which is consistent with longitudinal trends observed in prior studies.
BISPENOL-A IN BREAST ADIPOSE TISSUE OF BREAST CANCER CASES AND CONTROLS Katherine W. Reeves* Katherine W. Reeves, Sallie Schneider, Jingchuan Xue, Kurunthachalam Kannan, Holly Mason, Melissa Johnson, Grace Makari-Judson, Mary Diaz Santana, (University of Massachusetts Amherst)

Bisphenol-A (BPA) is an endocrine-disrupting chemical that has been linked to obesity and hypothesized to increase breast cancer risk. Prior studies report accumulation of BPA in peripheral adipose tissue, yet whether BPA accumulates in breast adipose tissue is unknown. In this pilot study, we sought to determine if BPA accumulates in breast adipose tissue and to compare BPA concentration between breast cancer cases and controls. We recruited 36 breast cancer patients undergoing mastectomy and 14 healthy women undergoing reduction mammoplasty at Baystate Medical Center, Springfield, MA. Samples of breast adipose tissue were collected and BPA concentration was determined using HPLC-ESI-MS/MS, with a limit of quantitation (LOQ) of 0.38 ng/g. We assessed variation in BPA concentrations within-breast and between-breasts for a single woman. We used generalized estimating equation models to compare age- and BMI-adjusted mean BPA concentrations between cases and controls. BPA was detectable above the LOQ in 26.1% of case samples and 38.5% of control samples. BPA concentrations were highly variable within-breast and between breasts among both cases and controls. Mean BPA concentration was similar between cases and controls (0.39 vs 0.41 ng/g, p=0.74). Among cases with a tissue specimen from each breast (n=6), the mean BPA concentration was borderline significantly higher in the affected versus nonaffected breast (0.45 vs 0.30 ng/g, p=0.10). We report, for the first time, that BPA accumulates at low frequency and concentration in breast adipose tissue, however, such accumulation may not differentiate breast cancer cases and controls. High variability within- and between-breasts suggests a heterogeneous distribution of BPA in breast adipose tissue and thus the need for multiple specimens to accurately classify exposure in future studies.

0646 S/P

URINARY CONCENTRATION OF PARABENS MIXTURE AND PREGNANCY GLUCOSE LEVELS AMONG WOMEN FROM A FERTILITY CLINIC Andrea Bellavia* Andrea Bellavia, Yu-Han Chiu, Lidia Mínguez-Alarcón, Jennifer B Ford, Myra Keller, John Petrozza, Paige L Williams, Xyaoyun Ye, Antonia M Calafat, Russ Hauser, Tamarra James-Todd, (Harvard T.H. Chan School of Public Health)

Background: A number of endocrine disrupting chemicals (EDC) are associated with gestational diabetes (GDM). Few studies, however, have investigated the association between pregnancy exposure to parabens, widely used as antimicrobials, and glucose levels, used to define GDM. Furthermore, little is known about this association in subfertile women-a group at high risk of GDM. Methods Using a prospective cohort study, 241 women from the Environment and Reproductive Health (EARTH) Study had data available on 1st and/or 2nd trimester urinary methyl- (MP), butyl- (BP), and propyl-paraben (PP) concentrations, as well as late 2nd trimester 1-hour non-fasting glucose levels from the GDM screening test. Trimester-specific associations of specific gravity adjusted MP, BP, and PP with ad justed difference in mean pregnancy glucose levels were first evaluated in linear regression models. Paraben mixtures were also assessed using Bayesian Kernel Machine Regression (BKMR), a novel method that flexibly models the joint effects of chemicals in a non-parametric fashion. Results: When assessed individually with regression models, we observed positive associations of BP at both 1st and 2nd trimesters with glucose levels (e.g comparing the 4th quartile: ß=7.8 mg/dL; 95% CI:-2.9,18.6; vs the 1st quartile: \(\beta=10.6 mg/dL; 95\)% CI:0.7,20.5). When investigating paraben mixtures with BKMR, we found a positive association between 1st trimester BP and mean glucose levels ($\beta = 10.2 \text{ mg/dL}$; 95% CI0,20.4) and a suggestive negative association between 1st trimester PP and glucose ($\beta = -13.9$ mg/dL; 95% CI: -30.4,2.6). We observed no evidence of interaction among parabens. Conclusion: We found concentrations of BP, when assessed individually and as a mixture, to be positively associated with glucose levels. Given the widespread use of parabens in consumer products, certain parabens may dysregulate glucose levels during pregnancy, with implications for GDM risk.

S/P indicates work done while a student/postdoc

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ARSENIC CONCENTRATIONS IN DRINKING WATER AND ASSOCIATIONS WITH BLADDER CANCER INCIDENCE, ACCOUNTING FOR POPULATION SERVED Danelle Lobdell* Alison Krajewski, Monica Jimenez, Danelle Lobdell, Tim Wade, Jyotsna Jagai, (ORISE/US EPA, NHEERL)

Drinking water concentrations from community water systems (CWS) have been used to estimate county-level exposure to contaminants, such as arsenic. Many studies neglect to account for how exposure may differ within counties based on population served (PS) by a CWS. Accounting for PS by CWS provides a more direct estimate of individual exposure to a contaminant from drinking water. To explore the influence of PS by CWS, three county-level arsenic exposure measures were constructed: unadjusted for PS; controlled for PS (as a covariate); and accounted for PS (concentration multiplied by proportion of PS by county population). CWS arsenic concentrations, obtained from four northeast states (MA, ME, NH, and RI) for 2000-2009, were aggregated to county-level and linked to county-level bladder cancer incidence for 2010-2014 from National Cancer Institute State Cancer Profiles Poisson regression models estimated incidence rate ratios (IRR) and 95% CI for associations between bladder cancer and four arsenic exposure categories (50 ppb), adjusting for potential confounders. For unadjusted arsenic concentrations, the IRRs were 1.65 (95% CI: 1.26, 2.16), 1.02 (95% CI: 0.79, 1.33) and 1.81 (95% CI: 1.38, 2.38) for categories 2-4, compared to <10 ppb, the lowest exposure category. For arsenic concentrations controlled by PS, the IRRs were 1.24 (95% CI: 0.93, 1.64), 0.72 (95% CI: 0.54, 0.96) and 1.41 (95% CI: 1.06, 1.86) for categories 2-4, compared to <10 ppb. After accounting for PS, the IRRs were 0.62 (95% CI: 0.49, 0.80), 1.15 (95% CI: 1.02, 1.30) and 1.16 (95% CI: 1.02, 1.32) for categories 2-4, compared to <10 ppb. Using different methods with respect to PS by CWS in measured drinking water arsenic concentrations resulted in positive but varied associations to bladder cancer. Thus, it is important to account for PS when developing drinking water exposure measures. This abstract does not reflect EPA policy.

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PHTHALATE EXPOSURE AND RISK OF BACTERIAL VAGINOSIS AMONG U.S. REPRODUCTIVE-AGED WOMEN, NHANES 2001-2004 Ruth J. Geller* Ruth J. Geller, Rebecca M. Brotman, Ami R. Zota, (George Washington University Milken Institute School of Public Health)

Introduction: Consumer product chemicals, such as phthalates, that are found in feminine products may affect the vaginal microbiota and the etiology of bacterial vaginosis (BV). Our objective was to estimate the association between phthalate exposure and BV in a cross-sectional, population-based sample of reproductive-aged women. Methods: We used data on 940 women aged 18-49 in the National Health and Nutrition Examination Survey, 2001-2004. Phthalate metabolites were measured in urine and include mono-ethyl phthalate (MEP), mono-n-butyl phthalate (MnBP), and metabolites of di (2-ethylhexyl) phthalate (DEHP). To control for measurement error from urinary diluteness, we used covariate-adjusted standardization with inclusion of creatinine as a covariate. BV was assessed using Nugent's Gram stain score, categorized as no BV (score 0-3), intermediate (4-6) and Nugent-score BV (7-10). We used survey-weighted multinomial logistic regression to model the Nugent-score categories, adjusting for age, race/ethnicity, BMI, education, frequency of vaginal douching, and number of lifetime sex partners. Results: In unadjusted models, MnBP (Q4 RR 3.12, 95% CI 1.79, 5.41, p trend <0.001), and ΣDEHP metabolites (Q4 RR 2.43, 95% CI 1.43, 4.12, p trend=0.04) were associated with BV. The association of MnBP with BV persisted after ad justment for confounders (Q4 RR 2.25, 95% CI 1.21, 4.18, p trend=0.02). However, associations for MnBP and DDEHP were attenuated after creatinine adjustment (MnBP Q4 RR 1.13, 95% CI 0.63, 2.04, p trend= 0.49; 2DEHP Q4 0.67, 95% CI 0.33, 1.38, p trend=0.25). Conclusion: Elevated urinary concentrations of phthalates were observed among women with Nugent-score BV. Associations were attenuated after creatinine adjustment; however, this adjustment may not be optimal as urinary diluteness may be physiologically related to BV. We recommend further investigation of environmental chemicals and BV using novel methods for direct assessment of intravaginal exposure.

USING RESIDENTIAL PROXIMITY TO WIND TURBINES AS AN ALTERNATIVE EXPOSURE MEASURE TO INVESTIGATE THE ASSOCIATION BETWEEN WIND TURBINES AND HUMAN HEALTH Rebecca Barry* Rebecca Barry, Sandra I Sulsky, Nancy Kreiger, (University of Toronto)

The Community Noise and Health Study was developed by Statistics Canada to investigate the association between residential proximity to wind turbines and healthrelated outcomes using modelled wind turbine noise as a main exposure, and examining health-related outcomes using both self-report and objective measures. This analysis aimed to examine an alternative primary wind turbine exposure, residential proximity to wind turbines. This analysis followed the same methods used by Statistics Canada Results suggest that living further away from wind turbines is associated with increased environment domain quality of life scores (B =1.23 (SE=0.145), p=0.046). There was also a positive association between living further away from wind turbines and the scores for the physical health quality of life domain (\beta=1.26 (SE=0.20), p=0.043). Our findings indicate that residential proximity to wind turbines is correlated with annoyance (OR=0.19; 95% C1=0.07, 0.53, p=0.001). This suggests that the odds of reporting being annoved by a turbine are reduced for every kilometer a person lives further away from a wind turbine. These associations differ in some respects from associations with noise measurements. Results can be used to support discussions between communities and wind-turbine developers regarding potential health effects of wind turbines.

0650 S/P

MORTALITY IMPACTS OF THE JULY 21, 2012, FLOOD IN BEIJING, CHINA Meilin Yan* Meilin Yan, Tiantian Li, G. Brooke Anderson, (Colorado State University)

On July 21, 2012, Beijing, China suffered its heaviest rainfall in 61 years. The average rainfall was 170 mm across Beijing and reached 460 mm in the Fangshan District in less than 24 hours, and it caused heavy flooding throughout Beijing. However, little is known about the mortality risk of this severe flood. We conducted a matched analysis comparing mortality risks on the flood-exposed day to similar unexposed days in 2008-2011, and controlling for potential confounders, to estimate the relative risks (RRs) of daily death counts in Beijing from this flood. We incorporated a distributed lag approach in this analysis to consider the daily risks during a five-day window from two days before to two days after the most severe flood day. Finally, we calculated excess death attributable to this flood based on the estimated RRs. Mortality risks were substantially increased during the flood period for all-cause, circulatory, and accidental mortality, with the highest risks observed on the flood day. On the day of most severe exposure, the RRs were 1.56 (95% CI, 1.32-1.85), 1.67 (1.38-2.02), 1.19 (0.62-2.31), and 4.69 (2.98-7.38), for all-cause, circulatory, respiratory, and accidental mortality, respectively, resulting in 84, 42, 2, and 24 excess deaths. Over the full flood exposure period, we estimated 141 excess all-cause deaths, approximately double the official reported death toll (77) for July 21-22, 2012. Results were robust to modeling choice and the matching method for selecting unexposed days. Our results indicated considerable impacts of this flood on public health, and that much of this impact may come from increased risk of nonaccidental deaths. To our knowledge, this is the first study analyzing the mortality risks of Beijing 2012 flood. This study offers critical evidence in assessing floodrelated health impacts, as urban flooding has recently become more frequent and severe in China.

0649 S/P

HAZARDOUS AIR TOXICS AND BREAST DENSITY Alexandra White* Alexandra J. White, Clarice R. Weinberg, Ellen S. O'Meara, Brian L. Sprague, Dale P. Sandler,, (National Institutes of Environmental Health)

Mammographic density is strongly related to breast cancer risk. Identifying associations between environmental exposures and breast density may lead to better understanding of environmental risk factors for breast cancer. Toxic metals and polycyclic aromatic hydrocarbons (PAHs) may influence breast density via their ability to induce oxidative stress and act as endocrine disruptors. We evaluated airborne metals and PAHs in relation to breast density using data from the Breast Cancer Surveillance Consortium, a geographically diverse registry of women in the US who have undergone mammograms. Study participants included 313,493 women who had a mammogram in 2011. Residential levels of airborne PAHs and toxic metals (antimony, arsenic, cadmium, chromium, cobalt, lead, nickel, mercury and selenium) were assessed using the 2011 EPA National Air Toxics Assessment database. Airborne toxics were estimated at the zip-code level for study participants' 2011 residences. Adjusted multinomial logistic regression was used to estimate odds ratios (OR) and 95% confidence intervals (Cl) for associations between airborne toxics and breast density, as determined by BI-RADS score. 47% of the women were classified as having dense breasts (BI-RADS 3 or 4). Living in an area with higher levels of antimony, arsenic, chromium, cobalt, lead, manganese, nickel, or PAHs was associated with a higher BI-RADS score. Women who lived in areas with arsenic, lead and cobalt levels above the median had a 2-fold higher odds of BI-RADS 4 relative to BI-RADS 1 (arsenic OR=2.38, 95% CI 2.26-2.51; lead OR=2.93, 95% CI 2.79-3.08; cobalt OR=2.47, 95%CI 2.34-2.60). Little to no association with breast density was observed for cadmium, mercury or selenium levels. In this first study to evaluate the association between airborne toxics and breast density, we observed that women in areas of higher airborne metals and PAHs were at higher odds of having dense breasts, a marker of enhanced breast cancer risk.

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INVESTIGATING THE ASSOCIATION BETWEEN CHANGE IN WALKABILITY AND CHANGE IN BODY MASS INDEX FROM CHILDHOOD TO ADOLESCENCE: FINDINGS FROM THE NEIGHBORHOOD QUALITY COHORT STUDY Tracie A Barnett* Tracie A. Barnett, Hugues Richard, Gisele Contreras, Melanie Henderson, (INRS-IAF and CR CHU Sainte-Justine)

Objective: To estimate the relationship between change in pedestrian-related features in residential neighborhoods observed between 2008 and 2006, and change in body mass index. Methods: QUALITY is an ongoing cohort study of 630 Quebec youth with a history of parental obesity. Baseline data were collected 2008 when children were aged 8-10 years, and a follow up was completed in 2016 (mean age at follow-up 16.9 years). At both time points, anthropometrics were measured by a trained nurse, and neighborhood audits were conducted around each participant residence. BMI was based on CDC age- and sex- specific growth curves; ten contiguous street segments were evaluated for the presence of specific pedestrian aids, including markings, signs, lights, chokers, and contrasts, both mid-segment at intersections. The difference in the proportion of segments with pedestrian aids (2016 - 2008) was computed for each participant. The outcome was defined as the difference in BMI z-score. Participants were categorized as having lived in neighborhoods that deteriorated if the proportion of segments with pedestrian aids decreased by at least 10%. Multivariate linear regression models were estimated, adjusting for parental BMI and age at follow-up. Analyses were restricted to participants with complete data and who had not moved residence between 2008 and 2016 (n=217; 55% boys). Results: At baseline, 34% of children were overweight or obese. On average, 56% of street segments had pedestrian aids at both time points, yet just over one quarter of neighborhoods deteriorated between 2008 and 2016. Having lived in neighborhoods that deteriorated was associated with an increased in BMI z-score overall, and most notably in older boys (beta=0.35 BMI z-score units, 95% CI=0.05-0.65). Conclusion: Failure to maintain pedestrian-facilitating features may be increasing the obesogenic potential of residential neighborhoods, possibly by discouraging active transportation.

NO CROSS-SECTIONAL ASSOCIATION BETWEEN ARSENIC EXPOSURE AND SERUM PROSTATE-SPECIFIC ANTIGEN LEVELS IN U.S. MEN OVER 40 YEARS OLD: 2003-2010 NHANES Madhi Saranadasa* Madhi Saranadasa, Catherine Bulka, Maria Argos, (University of Illinois at Chicago)

Background: Inorganic arsenic is a lung, bladder, and skin carcinogen that contaminates drinking water globally. Recent ecologic studies conducted in Illinois and Iowa have reported that counties with higher average arsenic concentrations in public drinking water had elevated prostate cancer incidence. However, individuallevel data regarding inorganic arsenic exposure and prostate cancer are lacking, Objective: We evaluated the cross-sectional relationship between inorganic arsenic exposure, as measured in urine, and serum total prostate-specific antigen levels among American men, aged 40-85 years, using data from the 2003-2010 National Health and Nutrition Examination Survey (NHANES). Methods: Participants were excluded based on use of finasteride, history of prostate cancer and recent prostate gland inflammation, prostate biopsy or rectal exam. We estimated exposure to inorganic arsenic by subtracting urinary arsenobetaine (a form of non-toxic organic arsenic derived mainly from seaf ood intake) from urinary total arsenic. Values below the detection limit were imputed as the limit of detection divided by the square-root of 2. Both serum PSA levels and the estimated urinary inorganic arsenic concentrations were log-transformed to improve normality. Survey-weighted linear regression models were used to assess the cross-sectional association between serum PSA levels and inorganic arsenic exposure, adjusted for age, ethnicity, smoking status, BMI, hypertension, diabetes and urinary creatinine. Results: In our sample, the median PSA level was 1.00 ng/mL (IQR: 0.60, 1.86). Higher serum PSA levels were associated with older age, African-American ethnicity, lower BMI and nondiabetic status in our adjusted linear models. However, a null association was observed between serum PSA levels and urinary inorganic arsenic (percent change in PSA per 2-fold increase in urinary inorganic arsenic: 0.96, 95% CI: -3.34, 5.48). Results were not appreciably different when urinary inorganic arsenic was

ANIMALS AND INFLAMMATORY BOWEL DISEASE; AN INTERNATIONAL PERSPECTIVE Faraz Mahmood Ayyaz* Faraz Mahmood Ayyaz, Susan Hutfless, (Services Hospital Lahore)

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Background: Inflammatory bowel diseases (IBD) have a pathogenesis that may correlate to changes in the gut microflora, environmental factors and genetic predisposition. Associations with animals in the environment are debated upon in IBD. Previous studies have not compared the associations in areas with prevalent pet ownership versus countries where pet ownership is an emerging trend. Methods: The Migrant IBD Microbiome Analysis Study (MIMAS) aimed to conduct a large-scale study on the inflammatory bowel disease envirome. 1660 participants were recruited in the United States, India and China and from self-reporting participants on ResearchMatch Cases were matched to friends or family controls. Participants completed a questionnaire online or with a health professional. The data was stored and accessed on RedCap. Results: 70.4% of IBD cases had lived with pets during childhood compared with 61.6% of controls (p= 0.000428). This trend was not consistent across the countries; USA and China had a higher number of reported cases than India (USA 63.0% vs 36.9%; India 50% vs 50%; China 60% vs 64%). Pet ownership during adulthood mirrored the childhood pet exposure in all countries. Dogs were the most common pets overall and farm animals were more frequently reported among cases from India than USA or China. More pet-owners reported a diagnosis of Crohn's disease rather than ulcerative colitis (CD=58.5% vs UC=39.1%) compared to people who had never lived with animals, in whom the diagnoses of Crohn's disease and ulcerative colitis were similar (CD=49.8 % vs UC= 48.6%). More asthmatics with IBD reported as having lived with animals compared to cases which had never lived with animals. Conclusion: IBD cases were more likely than controls to have lived with animals during childhood and adulthood. Participants reporting association with farm animals developed ulcerative colitis more frequently than Crohn's disease. Infectious transmission from pets may be a possible trigger in IBD development.

Cancer Institute)

IMPACT OF ORAL COLLECTION METHOD ON THE ORAL MICROBIOTA Emily Vogtmann* Emily Vogtmann, Xing Hua, Leon Zhou, Yunhu Wan, Shalabh Suman, Bin Zhu, Casey Dagnall, Amy Hutchinson, Kristine Jones, Belynda Hicks, Rashmi Sinha, Jianxin Shi, Christian C. Abnet, (National

Background: Replication of findings from studies of the human microbiota and health outcomes has been difficult which may be related to the use of variable collection methods for microbial profiling. Therefore, we compared oral microbial characteristics of four oral collection methods. Methods: Forty individuals provided oral samples using the OMNIgene ORAL kit every two months over 10 months. At the second, fourth, fifth, and sixth visits, an additional sample was collected using Saccomanno fixative, Scope mouthwash, or a non-ethanol mouthwash. DNA was extracted using the QIAsymphony, the V4 region of the 16S rRNA gene was amplified and sequenced using the MiSeq, and data were processed using DADA2. The average alpha diversity measures were compared with the OMNIgene ORAL sample collected at the same timepoint using a paired t-test. A distance-based coefficient of determination for the beta diversity metrics was calculated to evaluate the percentage of variability explained by subject, sample collection method and visit. Results: The OMNIgene ORAL samples tended to have slightly higher alpha diversity compared to the Scope mouthwash, non-ethanol mouthwash, and the saliva in Saccomanno. For observed species, the OMNIgene ORAL samples had on average 126.4 (standard deviation [SD] 31.9) compared to 120.2 (SD 31.2) for Scope mouthwash samples (p=0.005). Most of the variability in the beta diversity measures was explained by between subject differences, with a smaller amount of variability explained by collection method, and very little variability explained by the visit. Conclusions: The collection method appeared to modify the oral microbial characteristics of the sample, however the greatest variability in the oral microbiota was explained by between subject differences and not oral collection method. This data suggests that future studies should use one common collection method for all individuals in order to make all comparisons within the same collection method.

GENETICS

G X E STUDY OF CHILDHOOD STRESS AND GENETIC RISK VARIANTS IN MULTIPLE SCLEROSIS CASES AND CONTROLS Mary Horton* Mary Horton, Lisa Barcellos, Catherine Schaefer, (University of California, Berkeley)

0661 S/P

Multiple sclerosis (MS) etiology involves substantial genetic and environmental components, however, most MS risk remains unexplained. Evidence suggests interactions between genetic variants and environmental triggers explain some of the risk and complexity of MS. Childhood stress has been implicated in early-life origins of adult disease and, because stress has mechanistic underpinnings related to inflammation and immunity, childhood stress may play a role in MS etiology. Prior studies have reported an association between childhood stress and MS risk; however, none have tested whether an individual's genetic make-up interacts with stress in childhood to modify MS risk. The objective of our study was to test for interaction between MS- or stress-related genetic risk variants and exposure to childhood stressful life events and susceptibility to MS. We included ~1,500 MS cases and ~12,000 non-MS controls from the Kaiser Permanente Northern California MS Research Program. Occurrence of 10 stressful life events during two time periods (≤10 years and 11-20 years of age) were retrospectively measured using a modified version of the Life Event Record. Genotyping was performed using saliva or blood DNA samples. We included established MS risk variants including those in the major histocompatibility complex (MHC) and ~200 non-MHC variants. Additionally, we included variants within ~30 candidate stress-related genes involved in hypothalamic-pituitary-adrenal axis regulation. To assess geneenvironment interaction and risk of MS, we used logistic regression with product terms of childhood stressful life events and genetic variants associated with MS or stress. We adjusted for genetic ancestry principal components and used the Benjamini-Hochberg procedure to control the false discovery rate resulting from multiple testing. Initial results from the analysis will be presented and analytic methods and issues will be discussed.

0662 S/P

HALLUCINATIONS AMONG PATIENTS WITH PARKINSON'S DISEASE ARE ASSOCIATED WITH A HIGHER MORTALITY Cynthia Kusters* Cynthia Kusters, Jeff Bronstein, Beate Ritz, (University of California, Los Angeles)

Objective: To examine the association between hallucinations and mortality among patients with Parkinson's disease (PD). Background: Although the diagnosis of PD is established based on motor symptoms, non-motor symptoms, such as hallucinations, are very common. The prevalence of hallucinations increases with disease duration and a prevalence as high as 60% has been described in previous studies. We analyzed whether patients with hallucinations have an increased mortality compared to PD patients without this debilitating symptom. Methods: A population-based cohort study (Parkinson's Environment and Gene study) of 246 incident PD patients were followed. The presence of hallucinations was assessed with the Unified Parkinson Disease Rating Scale (UPDRS) during their first follow-up visit and mortality was assessed using death certificates. A cox survival regression analysis was performed analyzing the time since the measurement of hallucinations. We ad justed for disease severity and other well-known risk factors for PD-related mortality, namely for age at diagnosis, disease duration at baseline, UPDRS motor score, cognitive score (Mini Mental State Examination) and the levodopa-equivalent dosage of PD medication. Results' Hallucinations were present in 9% of the patients during the first follow-up visit. The median follow-up for PD patients was 8.3 years from the baseline visit (range: 0.4 – 14.0 years). The crude Hazard Ratio (HR) was 2.26 (95%CI: 1.33-3.83). Adjustment for disease severity did not change the hazard ratio significantly. The adjusted HR was 2.19 (95% CI: 1.23-3.88). Conclusion: PD patients with hallucinations have an increased mortality, even after adjusting for disease severity. Our study provides support that non-motor symptoms, such as hallucinations, have a large impact on disease progression.

INCREASED EDUCATION REDUCES ALL-CAUSE MORTALITY IN BANGLADESH FOR WOMEN BUT NOT MEN: A PARADOX. Gene R. Pesola* Gene R. Pesola, Yu Chen, Vernon M. Chinchilli, Maria Argos, Lin Tong, Faruque Parvez, Tariqul Islam, Alauddin Ahmed, Rabiul Hasan, Alfred I. Neugut, R.G. Barr, Habibul Ahsan, (Mailman School of Public Health (Epidemiology) & Dept. of Medicine (Section of Pulmonary/Critical Care, Harlem Hospital/Columbia Univ., New York, N.Y.)

Background: It is generally believed that those with more education have a reduced long-term mortality. This concept has been poorly studied in undeveloped countries. The purpose of this investigation was to assess educational level in an undeveloped country to see if education matters. Methods: A population-based sample of 11,744 Bangladeshsis aged 18 to 75 was recruited from the Health Effects of Arsenic Longitudinal Study (HEALS) and followed for 13-14 years The outcome, all-cause mortality, was evaluated in those with varying educational levels from zero up to 16 years. The median education of 2 years was dichotomized into education < 2 years as exposure versus education of 3 to 16 years as referent. Kaplan-Meier survival curves and Cox Proportional Hazard models were used to determine group differences. Results The Kaplan-Meier survival curves revealed a significant separation between groups with a higher mortality in those with reduced education; this occurred for both the total population and gender specific populations, (p 2 years of education). The data was then analyzed by gender. In females, the crude and adjusted HR were 2.80 (2.15 - 3.66) and 1.88 (1.41-2.50)-fold greater risk of death for those with a lower education, respectively. In males, the crude and adjusted HR were 1.23 (1.07 - 1.42) and 1.07 (0.92 - 1.24), respectively. Conclusions: Although it is generally felt that increased education results in decreased mortality over time in developed countries, in developing countries like Bangladesh this may only be true for women. Clearly for men in Bangladesh, increased education does not result in an all-cause mortality reduction.

0672

THE ASSOCIATION BETWEEN SLEEPING PILL USE AND DEPRESSION AMONG ADULT INDIVIDUALS RESIDING IN BRAZIL: DOES AGE GROUP, GENDER, AND OWNING A PET MODIFY THIS ASSOCIATION? S. Cristina Oancea* S. Cristina Oancea, Patrick W. Olson, Luciana B. Nucci, (University of North Dakota, School of Medicine and Health and Sciences)

Introduction: Poor sleep quality is known to be positively associated with depression (DE), a mental health disorder estimated to be the leading cause of disability in the world in 2017. Individuals take sleeping pills (SP) to help improve their sleep quality. The goal of the current study, which is the first of its kind, is to investigate the effect modifying role of age group, gender and owning a pet on the association between SP and DE among adults residing in Brazil. Methods: Adults who responded to the 2013 Brazilian National Health Survey were included in the study. The association between the use of SP and DE was investigated using weighted and adjusted multivariable linear regression models. The effect modifying role of age group (18-39, 40-59, 60+ years old (YO)), gender, and owning a pet (cat, dog and/or bird) was examined. Results: Out of the final study sample of 57,301 individuals, 18.6% were 60+ YO, 33.9% were 40-59 YO, 55.5% were females and 44.3% owned a dog. The prevalence of using SP was 5.2% and of DE was 6.8%. There was a significant effect modifying role of age group (p=0.0011), gender (p=0.0001), and marginally significant of owning a dog (p=0.0665) on the weighted and adjusted association between SP and DE. The odds of DE among females 40-59 YO, not owning a dog, were 2.6 times greater (95%CI: 1.7-3.9) when using SP compared to their counterparts not using SP. The odds of DE among males 40-59 YO, owning a dog, were 9.35 times greater (95%CI: 5.3-16.7) when using SP compared to their counterparts not using SP. The odds of DE among males 60+ YO, owning a dog, were 2.4 times greater (95%CI: 1.2-4.8) when using SP compared to their counterparts not using SP. Conclusions: The results of the present study emphasize the importance of focused depression related interventions by gender and age groups, as well as the possible benefit or detriment of owning a dog for those adults residing in Brazil who take SP.

DISTANCE TO MAJOR DELIVERY CENTERS AND ADVERSE BIRTH OUTCOMES IN BOTSWANA – A GPS MAPPING PROJECT Ellen C. Caniglia* Ellen C. Caniglia, Rebecca Zash, Kathleen E Wirth, Modiegi Diseko, Gloria Mayondi, Shahin Lockman, Mompati Mmalane, Joseph Makhema, Scott Dryden-Peterson, Kale Z. Kponee, Oaitse John, Roger L. Shapiro, (Harvard T.H. Chan School of Public Health)

Background: High risk of adverse birth outcomes in Botswana may be associated with geography and distance to a major delivery center. Methods: A birth outcomes surveillance system at 8 ma jor delivery sites (2 tertiary referral hospitals, 5 district hospitals, 1 primary health center) collected data on ~45% of all births in Botswana from 2014-2016. We calculated distance from first antenatal care clinic (ANC) visited in pregnancy, a proxy for maternal home, to the nearest delivery site for ANCs with available GPS coordinates (>80%). We used log-binomial regression models to calculate relative risks (RRs) for 5 adverse birth outcomes: stillbirth, preterm delivery (<37 weeks), very preterm delivery (<32 weeks), small-forgestational-age (SGA) (<10th%tile), and very SGA (<3rd%tile), and a combined endpoint of any of the 5 adverse birth outcomes. Our models included distance as a continuous variable (linear and quadratic terms), HIV status, and maternal demographic and medical and obstetric history variables measured at the first ANC visit. We used the models' predicted values to estimate adjusted RRs for 25km, 50km and 100km distances compared with 0km. We also mapped adverse birth outcomes by ANC. Results: Of 53,098 eligible women, 16,037 (31%) experienced an adverse birth outcome. Lack of occupation, low education, increased parity, and any previous medical diagnosis were associated with farther distances to the nearest delivery site. The adjusted RR (95% Cl) for any adverse birth outcome was 1.03 (1.02, 1.05) for 25km, 1.06 (1.03, 1.08) for 50km and 1.10 (1.06, 1.14) for 100km distances compared with 0km. We will present RRs by distance and HIV status and spatial heat maps for each adverse birth outcome, and discuss the role of selection bias in this surveillance study. Conclusions: We mapped the risk of adverse birth outcomes in Botswana and identified a modest increased risk of adverse birth outcomes associated with farther distances from the nearest delivery site.

0673 S/P

LONGITUDINAL CHANGES IN VIRAL LOAD SUPPRESSION AMONG ADOLESCENTS LIVING WITH HIV IN URBAN PERU Carly A Rodriguez* Carly A Rodriguez, Lenka Kolevic, Milagros Wong, Maribel Munoz, Alicia Ramos, Molly F Franke, (Department of Global Health and Social Medicine, Harvard Medical School, Boston, MA)

AIDS-related deaths among adolescents have increased in the last decade despite decreases in other age groups. Studies suggest viral load (VL) suppression suffers in adolescence but little data exists from Latin America. Among adolescents on combined antiretroviral therapy (cART) in Peru, we examined how VL suppression rates changed from childhood to adolescence. We conducted a retrospective chart review of all adolescents ages 10-18 on cART and receiving care at the Instituto Nacional de Salud del Niño in Lima, Peru, a low HIV prevalence setting with low mortality among those on cART. VLs throughout infancy to adolescence were abstracted from charts. Analyses were restricted to VLs taken ≥6 months after cART initiation. We modeled the association between age and VL suppression with restricted cubic splines and an autoregressive structure to account for multiple VLs per person. We graphed the probability of VL suppression by age and tested for a relationship between age and VL suppression using the likelihood ratio test. Of 132 adolescents, we analyzed 116 (87.9%) with a known cART initiation date and ≥ 1 VL measured after ≥6 months of cART. The median age was 14.8 (IQR 4.4) and the mean age of cART initiation was 6.3 (IQR 5.2). A total of 1553 VL measures (median 13 per adolescent) were available over a median follow up period of 8.0 years (IQR 5.1). We observed a statistically significant (p<0.0001) relationship between age and VL suppression. Suppression rates increased steadily from infancy to early adolescence, reaching a maximum rate of 82.7% (95% CI 77.1-87.1) at age 13.2 years and declining thereafter to 67.7% (95% CI 45.5-84.1) by age 18. This is the first report from Latin America to examine longitudinal changes in VL suppression into adolescence. Consistent with other settings, decreases in VL suppression occurred in adolescence. Though this is a survival cohort of adolescents alive and on cART, this unlikely explains the observed decline in VL suppression.

MATERNAL PERCEPTIONS OF CHILD DEVELOPMENT IN RURAL MADAGASCAR Esther Chung* Esther Chung, Emanuela Galasso, Ann Weber, Lia C.H. Fernald, (University of California, Berkeley)

BACKGROUND: Maternal perceptions have been demonstrated to be associated with early child development (ECD) outcomes. However, few studies examine a mother's perception of her child's development after the neonatal period and no studies have examined maternal perceptions of child development in a very lowincome context such as rural Madagascar. METHODS: Using data from a clusterrandomized controlled trial, we compared maternally perceived and objectivelyderived child development. Maternally perceived ECD was measured using a ladder ranking based on the MacArthur subjective social status scale. Objective ECD was measured using the Ages and Stages Questionnaire: Inventory, a caregiver-reported and observation-based score, which was age-standardized. We took the difference between perceived and objective ECD and created three categories: underestimation (less than -2), approximately correct (between -1 and 1), and overestimation (greater than 2). RESULTS: Over half of mothers inaccurately described their children's development; 4% of mothers underestimated and 48% overestimated. The relationship between maternally perceived and objectively derived ECD was modest (Kendall's tau-b=0.18, p<0.01). A multinomial logistic regression adjusting for child, maternal, and household covariates revealed that mothers were more likely to overestimate their child's development if the child was older (RRR: 1.03, 95% CI: 1.01-1.04) and had a higher weight-for-age z-score (RRR: 1.13, 95% CI: 1.01-1.27). Compared to the lowest wealth quintile, mothers in the highest quintile were more likely to overestimate their child's development (RRR: 1.32, 95% CI: 1.00-1.75). CONCLUSIONS: In this rural sample of Malagasy women, maternal perceptions of child development do not align with objective measures, with many women overestimating their child's development. Future work in this field could inform behavioral interventions to improve development outcomes in this population.

GEOGRAPHIC VARIATION IN RACIAL DISPARITIES IN THE TREATMENT OF EARLY STAGE HEPATOCELLULAR CARCINOMA IN THE UNITED STATES, 2005 – 2014 Katherine Ross* Katherine Ross, Joel Wedd, (Emory University)

Background: Procedural management (PM), including interventional radiology and surgery, confers dramatically improved survival for patients with localized hepatocellular carcinoma (HCC). Black patients are least likely to be treated with PM. We assessed geographic differences in racial disparities in receipt of PM for localized HCC. Methods: Data from 18 cancer registries representing 12 states is available from the Surveillance, Epidemiology and End Results (SEER) program. Inclusion criteria were being black or white and diagnosed with localized HCC (defined by the SEER staging system) between 2005 and 2014. PM was defined as local tumor destruction, resection, lobectomy, or transplantation. Risk ratios and confidence intervals comparing receipt of PM among black patients to white patients were calculated for each state. Reasons given for not receiving PM were also compared. Results The proportion of patients receiving PM for localized HCC ranged from 28.6% in New Mexico to 56.8% in Hawaii; 36.0% of white patients received PM compared to 32.3% of black patients. Black patients were significantly less likely than white patients to receive PM in Louisiana, Kentucky, Michigan, New Jersey, and Georgia. There were no differences by race in reason for not receiving PM except for patient death (6.9% of black vs. 5.1% of white patients). Discussion: Racial disparities in the receipt of PM, often the optimal treatment strategy for localized HCC, vary by state. All registries in the southern U.S. had significant racial disparities in receipt of PM. One limitation is the lack of data on ethnicity, as previous studies have shown that Hispanics are less likely to receive PM than non-Hispanics There are substantial racial disparities in survival from HCC, which may be partially attributable to differences in clinical care and treatment decisions. Further research is needed to identify reasons for the under-utilization of PM among black patients with localized HCC in the South.

0682 S/P

GENDERED RACISM, CONTEXTUALIZED STRESS, AND DEPRESSION IN PREGNANT, BLACK WOMEN Lasha Clarke* Lasha Clarke, Halley Riley, Elizabeth Corwin, Anne Dunlop, Carol Hogue, (Emory University Rollins School of Public Health)

Introduction: Chronic stress is known to be associated with depression. However, few studies have considered the unique impact of gender- and race-based stress on depression among pregnant, black women, already at disproportionate risk for adverse birth outcomes. This cross-sectional study tested the psychometric properties of a culturally-specific stress scale, and examined the association of pregnant, black women's contextualized stress with depressive symptomology. Methods: Pregnant, black women (n=295) receiving first trimester prenatal care completed scales to measure culturally-specific stress and depressive symptomology during their first visit for the prospective Emory University African American Microbiome in Pregnancy Study. Contextualized stress was measured by the 39-item version of the Jackson Hogue Phillips Contextualized Stress Measure (JHP-C), originally developed through community-based participatory research with black woman collaborators. Cronbach's alphas for the scale and its five contextual domains indicated good internal consistency ($\alpha=0.77-0.86$). Depressive symptomology was defined as Edinburgh Depression Scale (EDS) score ≥ 10 . Results: 28.5% of the sample had an EDS score ≥ 10. The JHP-C showed moderate concurrent validity with the EDS (r=0.49, p<.0001). In a multivariable model, the JHP-C and covariates accounted for approximately half of the variance in EDS scores (R 2=48.3, p< .0001). Among the five JHP-C domains, burden was most correlated with depressive symptomology (r=0.56, p<.0001; multivariable R2=50.9, p<.0001). Conclusion: Stress rooted in black women's multidimensional identity is associated with depression, which can cause harm during pregnancy. To best understand and ameliorate black women's experiences with stress, researchers and practitioners should use stress measures that center black women's voices.

SYPHILIS OUTBREAK IN HAMILTON COUNTY, OHIO 2009-2013 DISPROPORTIONATELY AFFECTS BLACK /AFRICAN AMERICAN WOMEN OF REPRODUCTIVE AGE Katherine Bowers* Katherine Bowers, David Carlson, Craig Davidson, Alonzo Folger, (Cincinnati Children's Hospital Medical Center)

Syphilis during pregnancy presents risks to the mother and infant including increased risk for fetal loss, still birth, preterm birth and low birth weight. Since 2000, there has been a steady increase in the incidence of both primary and secondary syphilis in the United States. Mirroring this national epidemic, a recent increase in syphilis prevalence has been observed in Hamilton County, Ohio, which includes the city of Cincinnati. The objective of this analysis was to describe the syphilis epidemic among an urban population of women between 2009 and 2013 and determine whether certain risk behaviors are more frequent among women with syphilis who become pregnant compared with women who do not become pregnant. A passive syphilis surveillance system collected reports of infection ascertained by clinical laboratory results. Regional emergency departments provided syphilis testing for any person presenting with STI symptoms. The health department conducted case interviews to collect demographic data, lab results, disease classification, and risk characteristics. To compare women with syphilis to all women in Hamilton County, data for females in Hamilton County was obtained from the United States Census Bureau. Two comparisons were made: 1) women with syphilis to women of Hamilton County; 2) women who were pregnant to non-pregnant women of reproductive age. Differences were identified using t-tests and chi-square tests for continuous and categorical variables, respectively. Among 774 cases, a racial disparity was observed with greater than 85% of syphilis cases among women of reproductive age were black or African American women, while only 26% of the population is black or African American. Pregnant women were more often engaging in heterosexual sex either intoxicated and/or with anonymous partners compared with non-pregnant women. Prevention efforts could emphasize testing of high risk individuals prior to pregnancy to prevent congenital cases and risks to infants.

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ASSESSING SOCIAL DETERMINANTS OF HEALTH-SEEKING BEHAVIOR FOR DELIVERY AMONG PREGNANT WOMEN IN MALAWI: A LATENT CLASS ANALYSIS Rachel Yorlets* Rachel Yorlets, Katie Iverson, Sanam Roder-DeWan, Anna Davies Gage, Humphreys Nsona, Hannah H. Leslie, Mark G. Shrime, (Boston Children's Hospital)

Background: In the era of the Sustainable Development Goals, reducing maternal and neonatal mortality is a priority (SDG 3.1 and 3.2). With one of the highest maternal mortality ratios in the world, Malawi provides a significant opportunity for improvement. One effort to improve maternal outcomes involves increasing access to high-quality health facilities for delivery. This study aimed to determine the role that quality plays in women's choice of facility for delivery. Methods: A revealedpreference latent class analysis was performed with data from 6,625 facility births among women in Malawi from 2013 to 2014, utilizing data from the 2014 Malawi Millennium Development Goal Endline Survey and the Malawi Service Provision Assessment. Responses were weighted for national representativeness, and model structure and class number were chosen using the Bayesian information criterion. Results: Two classes of preferences exist for pregnant women in Malawi. Most of the population (66.9%, 95%CI: 59.1-74.7%) prefer closer facilities and facilities that do not charge fees. The remaining third of the population (33.1%, 95%CI: 25.3-40.9%) prefers hospital care, facilities with higher basic obstetric readiness scores (a measure of structural capacity), and locations that are further away from their home. Women in this class are statistically significantly more likely to be in the top wealth quintile and primiparous than the majority of the women. Conclusion: For only one-third of pregnant Malawian women, primarily those who are primiparous and wealthy, the structural capacity of a facility (a metric of quality), factored into their choice of facility for delivery. Most women instead prioritize closer and free care. Interventions designed to increase access to high-quality care in Malawi will need to take distance and fees into account, as structural capacity alone is not predictive of facility type selection in this population. Funding: Bill & Melinda Gates Foundation OPP1161450

RACIAL DIFFERENCES IN THE ASSOCIATION BETWEEN SOCIOECONOMIC STATUS AND BIOLOGICAL AGE IN THE CORONARY ARTERY RISK DEVELOPMENT IN YOUNG ADULTS (CARDIA) STUDY. Sarah Forrester* Sarah Forrester, David Jacobs, Rachel Zmora, Pamela Schreiner, Veronique Roger, (University of Massachusetts Medical Schooletts)

Background: Socioeconomic status (SES) and inequity have been linked to physical health differences between Blacks and Whites. We examined the association between SES in adulthood and biological age (BA), a marker that represents the chronological age (CA) at which most "normal" persons share a physical state. Generally, younger biological age is considered a marker of better health. Method: CARDIA participants (549 Black and 853 White), were followed from age 32-47 in 2005-06 for 15 years through 2015-16. BA was defined by the 2006 Klemera and Doubal method (KDM) as equal to CA plus a random variable, RBA, that minimizes the distance between m regression lines and m biomarker points within an m dimensional space of all biomarkers. Biomarkers were selected based on knowledge of their association with aging, availability, and significant association with CA: total and HDL cholesterol, glucose, waist-to-hip ratio, c-reactive protein, forced expiratory volume in 1 second, and mean arterial pressure. SES was a composite score based on the individual's availability of food, difficulty paying for basics and medical care, income, assets, home ownership, and education where a higher SES value indicated better SES. We used linear regression to measure the association between SES at Y15 and BA at Y30 (ages 47-62), testing for interactions and then stratifying by race. All models controlled for sex and CA. Results: SES score was significantly lower in Blacks compared to whites (p<0.001). Overall, the association between adult SES score and BA differed by race, p-value for interaction = 0.042: a I-point increment in adult SES score was associated with a 0.51 year (95% CL -0.90 --0.11) decrease in BA among Blacks and a 0.065 year (95% CI: -0.31 - 0.18) decrease in BA among Whites. Conclusion: Although Blacks generally have lower SES, our results suggest that higher SES may be associated with younger biological age among Blacks.

0686 S/P

THE HEALTH EFFECTS AND INEQUALITIES OF THE DEATH OF FAMILY MEMBERS IN YOUNG ADULTS Naomi Thyden* Naomi Thyden, Nicole Schmidt, Theresa Osypuk, (University of Minnesota)

The death of a parent or sibling early in life is a stressful event that causes a significant disruption in one's life. Because people of color die earlier than white individuals, young people of color may be more likely to experience the death of a close family member. However, little research has investigated whether the experience of nuclear family death varies by race, or affects health. We examine how a nuclear family death is associated with health in a nationally representative prospective cohort begun in adolescence. We used data from the National Longitudinal Survey of Youth 1997 with respondents ages 18-22 from the 2002 survey (n=7,883). Respondents reported if a sibling, parent, or spouse had died (nuclear family death) in the past 5 years. The outcomes were the Mental Health Inventory (ranging from 5 (poor) to 20 (good)), obesity (BMI>=30), self-reported health (poor, fair, good, very good, excellent, modeled linearly), and alcohol use(# drinks per day). We estimated the effect of family death using regression adjusted for baseline self-reported health, household income, parent education, urban/rural, census region, race/ethnicity, and sex. White respondents were less likely to have nuclear family death in the past 5 years (3.4%) than those who were Hispanic (4.4%), Black (6.9%), Asian or Pacific Islander (7.2%), or American Indian (9.8%) (race/ethnicity joint test p=.0001). As hypothesized, experiencing a family death was significantly associated with worse mental health (β (SE): -0.72(.15), 95%CI: -1.02, -42), higher obesity odds (OR: 1.33, 95%CI: 1.02-1.72), and worse general health (B(SE): 0.11(.05), 95%CI: 0.13-0.21), but it was not associated with alcohol use (β(SE): -0.20(.28), 95%CI: -0.75, 0.35). Because young people of color are more likely to experience the death of a close relative, and because nuclear family deaths are associated with worse health, this exposure may play a role in perpetuating health disparities by race.

CHALLENGES OF LONGITUDINAL HEALTH RESEARCH IN JAIL POPULATIONS: IDENTIFYING AND LINKING INCARCERATION AND HEALTH RECORDS Ricky Camplain* Ricky Camplain, Robert T. Trotter II, Meghan Warren, Viacheslav Y. Fofanov, Crystal M. Hepp, Nicole Pagel, (Northern Arizona University Center for Health Equity Research)

Conducting longitudinal health research among incarcerated individuals poses unique challenges, specifically among jail inmates. Recidivism and the disruption of housing stability creates barriers to primary data collection and follow up. We describe a secondary data analysis centered on the integration and analysis of existing health and incarceration data to capture a longitudinal view of the health and healthcare utilization of individuals incarcerated at Coconino County Detention Facility in Flagstaff, AZ. To identify ever incarcerated individuals, the Criminal Justice Information Service, containing criminal history, arrest records, and court results, will serve as a finder file. We will link incarceration records with Superior Court of Arizona data, community primary health and behavioral clinics' electronic health records (EHR), hospital and emergency discharge claims, death records, and in-jail EHRs provided by the Coconino County Detention facility. Individuals in separate data sets will be merged by social security number, name, date of birth, and/or address. All data are available from 2008-2016. Leveraging existing data provides a unique opportunity to create a longitudinal cohort of incarcerated individuals. Specifically, we will build a data repository, describe the epidemiology and of health conditions and health disparities in jail populations and directly compare health of ever incarcerated individuals to the general population. Although there are many advantages to our approach, there are limitations EHR and administrative claims are not collected for research purposes and exhibit challenges familiar to epidemiologists. Further, individuals may be incarcerated in Coconino County but not reside or seek care in the Northern Arizona region. The linkage of existing data may enhance public health surveillance of individuals ever incarcerated to determine short and long term health outcomes among this population and help identify need for intervention.

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A BAYESIAN SPATIO-TEMPORAL ANALYSIS ON RACIAL DISPARITIES IN HYPERTENSIVE DISORDERS OF PREGNANCY IN FLORIDA, 2005-2014 Hui Hu* Hui Hu, Hong Xiao, (Department of Epidemiology, University of Florida)

Disparities in hypertensive disorders of pregnancy (HDP) exist among racial and ethnic groups in the US. However, little is known about spatio-temporal variations in HDP disparities between African American women and non-African American women. To fill this gap, we used the geocoded Florida Vital Statistics Birth Records to investigate spatio-temporal variations in HDP disparities from 2005 to 2014. A Bayesian hierarchical regression approach was used, with all models fit using the Integrated Nested Laplace Approximation (INLA). Specifically, a spatio-temporally varying coefficient model of the disparity between African American and non-African American women was used. County-level variation was firstly examined, followed by census tract-level variation assessment in counties where high HDP disparities were observed. Our results suggest that a spatio-temporal heterogeneity model best accounts for the observed HDP disparities, after controlling for age, education, pregnancy smoking, and pre-pregnancy body mass index (BMI). A significant disadvantage in HDP was revealed for African American women in Florida overall (Relative Risk or RR: 1.27, 95% credible interval or 95% CI: 1.25, 1.29), and significant spatial variations in this disparity have been observed. The greatest HDP disparities between African American and non-African American women occurred in North Central Florida counties (the Big Bend region of Florida), with consistent patterns from 2005 to 2014. Analyses at census tract-level further identified areas with significantly high HDP disparities within these counties. Findings from this study provide important information for public health agencies and policymakers to reduce HDP disparities at the population level.

SOCIAL GRADIENTS IN PSYCHOLOGICAL DISTRESS: EVIDENCE FROM THE 2014-16 HEALTHY CHICAGO SURVEYS Fernando De Maio* Fernando De Maio, Emily Laflamme, Phillip Held, Raj C. Shah, Brittney Lange-Maia, Jana Hirschtick, Nik Prachand, David Ansell, (DePaul University)

Objectives: Chicago's public health plan targets psychological distress among residents in high hardship communities. Our study documents the social patterning of distress across the city, identifying social gradients and how they may vary by race/ethnicity. Methods: Secondary analysis of the 2014-16 Healthy Chicago Surveys (N = 7,649). Psychological distress was measured with the Kessler Psychological Distress Scale (K6). Household income was used to operationalize the social gradient. Using a logistic regression model adjusted for race/ethnicity, gender and age, we examined the social patterning of distress. Stratified models were used to examine if the income gradient varied by race/ethnicity. Results: In total, 15.4% of adults screened for some degree of distress. This reflects an estimated 321,048 adults in Chicago (95% CI = 295,831 to 346,265). The prevalence of serious psychological distress was higher in Non-Hispanic Black and Hispanic respondents (6.2% and 5.0%) than among non-Hispanic White respondents (3.5%; $\chi 2 = 20.04$, p < 0.001). Compared to respondents with the highest income, low income respondents were most likely to have at least mild psychological distress (OR = 3.39, 95% CI= 2.84 - 4.79), followed by those in the middle income group (OR= 2.23, 95% CI= 1.67 - 2.98). Stratified analyses suggest that the gradient may be steepest for non-Hispanic Whites. Conclusion: In Chicago, the burden of psychological distress is heavily patterned by a social gradient. Recognizing the heterogeneity that exist within city-level data, future research should explore community-level factors that may influence the steepness of the social gradient in psychological distress.

HEALTH DISPARITIES

0689 S/P

ESTIMATING HEALTH DISPARITIES IN THE SOCIAL CONTEXT OF RESIDENTIAL AND OCCUPATIONAL SEGREGATION: STRUCTURAL POSITIVITY CONSIDERATIONS Jonathan Platt* Jonathan Platt, John Pamplin, (Columbia University)

Researchers and policy makers have dedicated considerable attention to the social context as a determinant of health and health disparities. For example, studying residential neighborhoods, researchers estimate the impact of neighborhood walkability on racial disparities in obesity; in the workplace, studies may estimate the effect of fringe benefits on gender disparities in depression. To estimate valid causal effects from these exposures, studies must satisfy assumptions of: exchangeability (i.e., comparability between treatment groups), positivity (i.e., positive probability of assignment to each exposure level), no interference, and no unrepresented versions of treatment. However, when examining group differences, issues of positivity may become significant in situations of high neighborhood or occupational segregation. By definition, segregation implies a non-overlapping distribution of contextual characteristics, often leading to substantively unequal exposures and opportunities for groups. When identified, researchers can address near positivity violations by either: restricting the study sample to only subjects for whom the positivity assumption is not violated, redefining the effect of interest to apply to only those treatments that do not violate positivity, or excluding those covariates that violated the positivity assumption. Importantly, these approaches can cause significant bias when inferences are based on groups comparisons with limited overlapping exposure levels, or they may substantively change the interpretation and the external validity of study estimates. The present analysis illustrates the consequences of structural positivity violations in studying contextual determinants of health disparities through two examples: neighborhood segregation by race, using data from the National Survey of American Life, and occupational segregation by gender, using data from the National Longitudinal Survey of Youth.

ENHANCING HEALTH-EQUITY DISSEMINATION STRATEGIES WITHIN A POLICY RESEARCH CENTER IN THE SOUTHEAST UNITED STATES Frances Dean* Frances Dean, Jammie M. Hopkins, DrPH, MS, Divine Offoegbu, DrPH, MPH, (The University of Georgia)

Background - Health equity work has been framed by disseminating innovative products on a local and national level. Many organizations have been creating projects around health equity, but have been struggling to make the information understandable to audiences not involved with health policy. Objective(s) -The objective of this project is to inform the direction of an evolving comprehensive knowledge translation and dissemination plan for the Transdisciplinary Collaborative Center (TCC). In achieving this, the content of two innovative TCC dissemination platforms were critically assessed and enhanced: 1) Health Equity (HE) Vision Board and 2) Collaborative Partnership Map. Method(s) - A brief interview guide was refined, and informal interviews were conducted with faculty, staff and students at Morehouse School of Medicine to gather their attitudes, perceptions, and current health equity-related work. The interview data were added to the existing Health Equity Vision Board data, compiled into a multimedia database (n=58), and a thematic content analysis was conducted. A map of TCC collaborative partners (n=133) was updated by members of the TCC research and project staff, and several map enhancements were applied to the map on the Google Map platform. A descriptive analysis of partner data was conducted using SPSS. Result(s) - Results for the Vision Board showed that healthcare was a growing issue and access to adequate resources are prominent to achieving health equity with the power of education. Results for the map showed most collaborators to be academic (26.3%) and CBO (16.5%) organizations. Conclusion(s)- Comprehensive frameworks are greatly encouraged for dissemination and promotion of health equity within various settings (i.e., workplace, communities). Key Word(s) - health equity, dissemination project, research centers, dissemination products, health disparities

0691

HYDROXYUREA USE AND INITIATION AMONG CHILDREN WITH SICKLE CELL ANEMIA Sarah Reeves* Sarah Reeves, Kevin Dombkowski, (University of Michigan, Child Health Evaluation and Research Center)

Background: Hydroxyurea (HU) reduces the incidence and severity of pain crises among children with sickle cell anemia (SCA) and is recommended by the National Heart Lung and Blood Institute. Objective: Describe HU use and initiation among children with SCA. Methods: The study population consisted of children ages 1-18 with SCA enrolled in Medicaid for ≥1 year (2005-2012) in Florida, Louisiana, Michigan, South Carolina, or Texas. Children with SCA were identified using a validated method of \geq 3 SCA-related administrative claims within a year. HU use was defined as claims for >30 days of filled prescriptions within a year and summarized by year and state. HU initiation was explored among a subset of SCA cases enrolled in Medicaid for 2 consecutive years Initiation was defined as no HU use in the index year, followed by HU use in the subsequent year; children with no HU use either year were the comparison group. Health services utilization was summarized; subsequently, logistic regression assessed the association between HU initiation and number of outpatient, inpatient, and emergency department (ED) visits in the index year, adjusted for age. Results: A total of 7963 children contributed 22,424 person-years; average age was 8 years and 48% were female. HU use increased over time from 9% to 18% and varied by state. Among those with HU use (n=4967 person-years), mean number of days filled was 167 (SD=113). The subset enrolled for two years included 3,965 children (50%); 885 (22%) initiated HU and 3080 (88%) had no HU use in either year. On average, these children had 2.0 inpatient admissions, 3.6 ED visits, and 21.0 outpatient visits. Each additional inpatient admission was associated with higher odds of HU initiation (OR=1.10, 95%CI:1.05,1.15), as well as each additional ED visit (OR=1.06, 95%CI:1.04,1.09). Conclusion: HU use was uncommon among children with SCA. Strategies targeting the numerous healthcare encounters may be appropriate to increase its initiation.

THE ASSOCIATION BETWEEN SUBSTANCE USE AND NUMBER OF SEXUAL PARTNERS AMONG MEN WHO HAVE SEX WITH MEN IN ATLANTA, GA Supriya Sarkar* Supriya Sarkar, Amyn Malik, Aaron Holleman, Carolyn Brown, (Emory University)

Background: High-risk sexual behavior is a strong risk factor for contracting HIV and other STIs. Among men who have sex with men (MSM), these risk factors include condomless anal intercourse and increased number of sexual partners. Moreover, the use of alcohol and non-injection substances may interfere with the ability to make safe choices regarding sexual behavior. Since non-injection use is prevalent in this population, a better understanding of the relation between substance use and high-risk sexual behavior among MSM is important for public health programming. Methods: The Involve[men]t study prospectively followed black and white MSM in Atlanta, GA for two years at six-month intervals between 2011-2014. Using self-reported longitudinal data from this cohort, we fit regression models to estimate the association between substance use in the past six months and higher number of reported sexual partners, accounting for correlated data. We selected a Poisson marginal model with a compound symmetric R-matrix, and considered confounders included age, student status, education level, sexual orientation (gay or bisexual), race, signs of alcoholism, and income. Results: Among 803 participants, men who used non-in jection drugs in the last six months had 1.29 times (95% CI: 1.15, 1.44) the number of sexual partners in the same time interval compared to those who did not use drugs after controlling for age, signs of alcoholism, and sexual orientation. Conclusion: Non-injection drug use in past six months was associated with an increase in the number of sexual partners among MSM. Non-alcohol substance use as a risk factor for high risk sexual behavior has tended to receive less attention compared with alcohol use as risk factor, and results from this study may represent an important consideration when designing public health interventions and policies targeted at decreasing the risk of STIs and HIV among this population.

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YOUTH IN THE CONTINUUM OF HIV CARE IN FLORIDA, 2014–2015 Merhawi T Gebrezgi* Merhawi T Gebrezgi, Diana M Sheehan, Daniel E Mauck, Kristopher P Fennie, Emma C Spencer, Lorene M Maddox, Mary J Trepka, (Florida International University)

Background: Youth, aged 13-24, have poor outcomes throughout the HIV continuum of care. Using routinely collected HIV surveillance data, we aimed to determine individual (age, year and facility of diagnosis, sex, race/ethnicity, mode of HIV transmission and AIDS status in 2015) and neighborhood (socioeconomic status, rural-urban status and non-Hispanic Black density) predictors of non-linkage, non-retention, and non-viral suppression among youth living with HIV in Florida. Methods: We used Poisson regression modeling with robust error variance estimation to calculate prevalence ratios of interest. Linkage to care was defined as documentation of an HIV laboratory test within three months of HIV diagnosis for those diagnosed with HIV during 2014 or 2015 (N=1676). For those diagnosed 1993-2014 (N=2872), retention in care was defined as having two or more care indicators (labs, medical visits, prescriptions), at least three months apart in 2015, and viral suppression (VS) was defined as having a last viral load <200 copies/mL during 2015. Results: Among youth living with HIV in Florida, 73.7% were linked. 65.4% were retained, and 48.9% were virally suppressed. After adjusting for all covariates, non-Hispanic Blacks compared to non-Hispanic Whites had higher prevalence for non-linkage, non-retention and non-viral suppression. For nonlinkage to care, those diagnosed at blood banks and HIV screening facilities (compared to outpatient care), and those with a history of injection drug use (compared to heterosexual) had higher prevalence. For non-retention, age group 18-24 years-old had higher prevalence. Age group 21-24, and those living in high Non-Hispanic Black density neighborhoods had higher prevalence of non-viral suppression. Conclusion: Less than half of youth living with HIV were virally suppressed, particularly non-Hispanic Black youth. Disparities in care and treatment for youths appear to be present across both individual and neighborhood characteristics.

TRANSPORTATION BARRIERS DECREASE HIV VIRAL LOAD SUPPRESSION AMONG WOMEN LIVING WITH HIV Christina Ludema* Christina Ludema, Megan Richards, Andrew Edmonds, Stephen R. Cole, Joseph J.

Christina Ludema, Megan Richards, Andrew Edmonds, Stephen R. Cole, Joseph J. Eron, Jr., Adebola A. Adedimeji, Jessica Donohue, Antonina G. Foster, Mirjam C. Kempf, Joel E. Milam, Kartika Palar, Carrigan L. Parish, Michael W. Plankey, Kathleen M. Weber, Tracey E. Wilson, Adaora A. Adimora, (Indiana University)

Initiating and maintaining HIV care is an essential component of healthy life for people living with HIV (PLWH). One barrier to care is transportation; qualitative work among PLWH, HIV case workers and care providers consistently identifies transportation difficulty as a contributor to missed visits, particularly in rural and Southern populations. Among PLWH (n=1,386) from the Women's Interagency HIV Study we assess the effect of difficulty with transportation to HIV care appointments on two clinical outcomes HIV viral load suppression (<200 copies/mL) and blood pressure control (systolic <135 and diastolic <85). Transportation difficulty (endorsing the following statement: not having transportation to get to or from a regular HIV care visit) was ascertained yearly from 2014, and correlation with clinical outcomes was assessed six months later (the next study visit). Generalized estimating equations adjusted for age, race, ethnicity, income, marital status, health insurance, AIDS Drug Assistance Program use, drug use, alcohol consumption, and depression were used to account for repeated measurements over time. We used multiple imputation to account for missing data. Absence of transportation difficulty was associated with better HIV viral suppression (aRR 1.42, 95% CI: 1.15, 1.77) and non-significantly associated with blood pressure control (aRR 0.82, 95% CI: 0.66, 1.03). Comparing women with transportation difficulty to those without, more missed HIV appointments in the last 6 months (32% versus 11%, p<0.01) and similar proportions attended any healthcare visit in the last 6 months (89% versus 93%, p=0.11). These results suggest that transportation difficulties contribute to missed visits and lack of HIV viral load suppression among women living with HIV. Non-emergency medical transportation assistance is available through public programs (e.g., Medicaid); however, a more robust transportation support system is needed to provide full access to HIV care to PLWH.

0703 S/P

DEVELOPMENT AND EVALUATION OF A HUMAN PAPILLOMAVIRUS (HPV) VACCINE COMIC BOOK FOR COLLEGE STUDENTS IN NORTHEAST OHIO: AN APPLICATION OF INTEGRATED BEHAVIOR MODEL (IBM) Obianuju Genevieve Aguolu* Obianuju Genevieve Aguolu, Lynette Phillips, Tara Smith, Vinay Cheruvu, Laurie Wagner, (College of Public Health, Kent State University, Kent, Ohio)

Human papillomaviruses (HPV) cause cancers and the most common venereal diseases in both sexes in the United States (US). Young adults are mostly affected. HPV vaccine was approved in the US in 2006. They are safe and effective, but coverage is low compared to other vaccines for young adults, implying missed vaccination chances, and a need to improve HPV vaccination promotion strategies. Comics are potentially effective for health education of diverse groups, because they are easily accessible, low-cost, catchy, and unobtrusive. They may help to improve HPV vaccine knowledge and attitudes; thereby increasing vaccine coverage and decreasing HPV sequelae. We designed an educational HPV vaccine comic book for college students based on the IBM. We hypothesized that reading it could improve their HPV vaccine knowledge, beliefs, attitude, perceived norm, personal agency, and intention to complete HPV vaccination in the next 12 months. We conducted a mixed methods study using pretest/posttest design in a diverse population of 18 to 26-year-old male and female students (n=314), recruited from a college in northeast Ohio in 2017 to review the comic book. Participants were satisfied with the comic and reported it is an acceptable way to get HPV vaccine information, easy to read, culturally relevant, with good quality information and graphics. Correlations with intention included attitude: r=0.44**; perceived norm: r=0.57**; and personal agency: r=0.17*. After the intervention, t-test analyses showed increase in mean HPV vaccine knowledge score: 50%-90% **; attitude: 0.66**, CI: 0.51-0.82; perceived norm: 0.34**, CI: 0.23-0.44; personal agency: 0.54**, CI: 0.38-0.70; more positive beliefs, and intention to complete HPV vaccination within the next 12 months: 1.51**, CI: 1.29-1.73, (*=p<0.05; **=p<0.0001). Findings will aid researchers to develop effective interventions for increasing HPV vaccine coverage. Future research will explore its use in clinics to increase vaccine uptake.

THE ASSOCIATION BETWEEN HEAVY ALCOHOL USE AND DECREASED VIROLOGIC SUPPRESSION IN PERSONS WITH HIV DEPENDS ON CONCURRENT SYMPTOMS OF DEPRESSION Anthony Todd Fojo* Anthony Todd Fojo, Catherine Lesko, Keri Calkins, Richard Moore, Mary E. McCaul, Heidi E. Hutton, William C. Mathews, Heidi Crane, Katerina Christopoulos, Karen Cropsey, Michael J. Mugavero, Kenneth Mayer, Brian W. Pence, Bryan Lau, Geetanjali Chander, (Johns Hopkins University School of Medicine)

Background: Depression and substance misuse negatively impact HIV continuum of care outcomes. Few studies have examined the ways in which depression and specific substances interact to affect HIV control. Methods: We analyzed a cohort of 14,380 persons with HIV (PWH) in care across seven US sites which collect patientreported measures of depression and substance use. We used logistic regression with generalized estimating equations to identify how symptoms of depression interact with use of alcohol, cocaine, opioids, and amphetamines on three continuum of care outcomes: retention in care, receipt of ART, and consistent virologic suppression over the subsequent year. We conducted a secondary analysis that stratified symptoms of depression according to whether subjects were concurrently taking an antidepressant. Results: Heavy alcohol use interacted with depressive symptoms: among subjects with no-mild symptoms of depression, heavy alcohol use had no association with virologic suppression (OR 1.00 [0.95-1.06]), but among those with moderate-severe symptoms, heavy alcohol use was associated with reduced viral suppression (OR 0.80 [0.74-0.87]). This interaction persisted only in subjects not on antidepressants. There were no significant interactions between depression and substance use with respect to retention in care or receipt of ART. Conclusions: Depression and heavy alcohol use interact to lower the odds of achieving consistent virologic suppression. This highlights the need for multifaceted interventions that target alcohol use and depression simultaneously, and reinforces the importance of diagnosing and treating depression in PWH, especially in the setting of alcohol misuse.

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PROVIDER AND PATIENT CHARACTERISTICS ASSOCIATED WITH HIGH VIRAL SUPPRESSION AMONG HRSA RYAN WHITE HIV/AIDS PROGRAM OUTPATIENT AMBULATORY HEALTH SERVICE PATIENTS Pamela Klein* Pamela Klein, Allison Marier, Miranda Fanning, Stacy Cohen, Laura Cheever, (HHS/HRSA)

The Health Resources and Services Administration's Ryan White HIV/AIDS Program (RWHAP) is a comprehensive system of HIV medical care, medications, and essential support services for low-income people living with HIV (PLWH) in the US. The proportion of RWHAP outpatient ambulatory health service (OAHS) providers whose patient population achieved 90% viral suppression (VS) was quantified, and provider and patient characteristics associated with high VS were identified. RWHAP provider characteristics (region, provider type, rural location, number of patients), patient demographics (gender, age, health care coverage), and VS were examined using patient and provider data from the RWHAP Services Report 2010-2015. VS was defined as the most recent viral load (VL) test result <200 copies/mL among patients with ≥1 OAHS visit during the calendar year and ≥1 VL test. Mean VS by provider ("provider-aggregated VS") was calculated. Multivariate, multinomial logit regression was conducted to determine patient and provider characteristics associated with provider-aggregated VS in 2015, resulting in marginal effects (ME) and 95% confidence intervals (CIs). In 2015, 792 OAHS providers served 346,496 RWHAP patients; 83.4% were virally suppressed. The proportion of providers with ≥90% VS increased from 4.0% in 2010 to 17.7% in 2015. Providers with higher proportions of youth aged 13-24 (ME: 2.94, 95% CI: 1.29-4.59), and uninsured patients (ME: 0.23, 95% CI: -0.01, 0.47) were less likely to have high provider-aggregated VS. Providers in the South were less likely to have high provider-aggregated VS than other providers (ME 0.15, 95% CI: 0.02-0.29). In 2015, 17.7% of RWHAP providers had high provider-aggregated VS. Patient characteristics were more strongly associated with provider-aggregated VS than provider characteristics. The successful identification of characteristics associated with high VS may help in the development and implementation of interventions and tools to improve VS.

0705 S/P

ESTIMATING THE PREVALENCE OF HIV AMONG LIVER TRANSPLANT CANDIDATES IN THE UNITED STATES Ashton Shaffer* Ashton Shaffer, Alvin G. Thomas, Allan B. Massie, Sally Gustafson, Jon Snyder, Brittany Shelton, Rhiannon Reed, Jayme E. Locke, Mara McAdams-DeMarco, Dorry L. Segev, (Johns Hopkins University)

End-stage liver disease is a leading cause of morbidity and mortality for HIV+ individuals. Since 2002, the annual number of HIV+ liver transplant recipients in the US has increased from 8 to 50. However, HIV-status is not collected in the national transplant registry for candidates on the waitlist, limiting our ability to characterize or study health disparities in this unique population. To address this knowledge gap, we created a novel linkage between the national transplant registry and pharmaceutical claims data from a national technology and analytics company (QuintilesIMS). We used prescription fills of HIV-specific medications to identify HIV+ candidates listed from 2002 to 2012. We compared demographic and health characteristics of HIV+ (vs. HIV-) candidates using rank-sum and chi-squared tests. Comparing our linked study population to the registry source population, we explored the level and pattern(s) of missingness. We then estimated the prevalence of HIV in the US using multiple imputation by chained equations (MICE), assuming the data were missing-at-random. In our study period, the linkage (n=72,374 candidates) contained 85% of the national registry population, with an HIV prevalence of 0.80% (581 HIV+ candidates). Compared to HIV- candidates, HIV+ candidates were more likely to be younger (median [IQR] 51 [46-55] vs. 55 [49-60]), black (19.1 vs. 8.1%), male (82.3 vs. 64.6%), have liver disease due to hepatitis C (51.5 vs. 31.4%), and have public insurance (47.7 vs. 37.1%), and were less likely to be obese (18.5 vs. 40%) (p<0.001 for all). By MICE, the overall prevalence of HIV among US liver transplant candidates was 0.88% (95%CI 0.81 %-0.94%). In conclusion, HIV+ liver transplant candidates represent a sizeable, understudied population. Estimating the prevalence of HIV in this population is the first, critical step toward understanding how HIV-status might impact a candidate's survival and access to liver transplantation.

0707 S/P

HOT SPOTS OF ADOLESCENT ED-DIAGNOSED STIS, WASHINGTON DC Menolly Hart* Menolly Hart, Gia Badalato, (OHSU-PSU School of Public Health)

Background: A goal of Healthy People 2020 is to "increase access to quality services to prevent sexually transmitted diseases and their complications." Adolescents are disproportionally affected by sexually transmitted infections (STIs) and frequently seek care for sexual health in the emergency department (ED) setting. Objective: (1) To describe the spatial distribution of adolescents with ED-diagnosed STIs in a large urban area; (2) to compare census tract groups and identify STI positivity "hot spots"; and (3) to determine the presence of STI testing sites in STI positivity "hot" spots Design/Methods: Retrospective cross-sectional medical record review of all ED visits to the two pediatric EDs in Washington, DC made by District residents aged 13-19 years old in 2016. We abstracted patient and visit level factors. We calculated Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (GC) positivity rates using census data by census tracts. We performed Moran's I and Hot Spot Analysis (Getis-Ord Gi) to determine if positivity rates were clustered where testing sites were not. All analyses were conducted in ArcMap 10.4 and SAS 9.3. Results In 2016, 1,128 patients were tested for CT or GC in pediatric EDs and 194 (17.2%) tested positive for either CT or GC. The mean age of patients who tested positive was 17. 0 (+/- 1.5) years and the majority of patients were black (n=190, 97.8%) female (n=139, 71.7%) and publicly insured (n=164, 84.5%). STI positivity rates clustered by census tract (Moran's I: 0.152, Z=7.007, p=<.001) with Ward 6 having the highest STI positivity rate (21.5%). Hot spots of STI positivity were located in Ward 6 and partially in Ward 7 & 8. Five STI testing sites are located within the STI positivity hot spots. Conclusion(s): Geospatial techniques identified hot spots of EDdiagnosed STIs. Within the hot spots, multiple alternative testing sites exist. Future research should investigate factors associated with adolescent ED utilization compared to office-based visits

IMP ACT OF A CHANGE IN SEPSIS DEFINITION ON INTENSIVE CARE EPIDEMIOLOGY AND COST: COMPARISON OF SEPSIS-2 AND SEPSIS-3 DEFINITIONS Felix K. Chang* Felix K. Chang, Matthew D. Stanley, Timothy G. Buchman, Shamim Nemati, Gari D. Clifford, Allan D. Kirk, Eric A. Elster, (Uniformed Services University of the Health Sciences and the Walter Reed National Military Medical Center)

Background. Sepsis is a serious medical condition of high concern. To better recognize and diagnose it, clinicians adopted a new definition for sepsis in 2016. Since it was the third time the condition was meaningfully defined, it is referred to as Sepsis-3. Heavily relying on the Sequential Organ Failure Assessment score, sepsis' new definition is more stringent than its earlier version, Sepsis-2. Unfortunately, it also rendered all the epidemiological and cost studies of sepsis, which were done prior to the definition change, incompatible with those that will be done in the future. This study seeks to create a translation mechanism between the two sets of sepsis studies and, thus, preserve the relevance and value of an entire generation of epidemiological studies. Methods. We conducted a three-year retrospective case review of 33,771 patient stays in Emory University Hospital's intensive care units (ICU) to identify how many patients would have been diagnosed with sepsis under the definitional criteria for Sepsis-2 and Sepsis-3. We then assessed the difference between the average treatment costs for sepsis under its two definitions using data gathered from a literature review and the AHRQ's Healthcare Cost and Utilization Project. Results. We determined that, of the total number of ICU patient stays, 10,271 would have had a sepsis diagnosis under the Sepsis-2 definition and 8,088 would have had a sepsis diagnosis under the Sepsis-3 definition. We further estimated that from a provider's perspective the average cost to treat Sepsis-2 patients was \$41,289 and Sepsis-3 patients was \$45,500. Conclusion. The more stringent Sepsis-3 definition would have resulted in 21.9% fewer sepsis diagnoses than the Sepsis-2 definition. However, the average cost to treat sepsis under its new definition would be 10.2% higher than under its old one. As a result, we expect sepsis' definition change will produce a modest decline in sepsis' total economic burden in the ICU.

0712

DISTRIBUTION OF VIRAL LOADS AMONG HEPATITIS C-INFECTED INDIVIDUALS SERVED BY TWO LARGE COMMERCIAL LABORATORIES IN THE UNITED STATES. Mona Doshani* Mona Doshani,

Lauren Canary, Melissa Collier, Claudia Vellozzi, Xiaohua Huang, Jeannette Whitcomb, (imf6@cdc.gov)

Background Hepatitis C virus (HCV) infects an estimated 3.5 million persons in the United States and is the leading cause of cirrhosis and hepatocellular carcinoma. Current clinical guidelines recommend that HCV-antibody positive individuals have a confirmatory RNA viral load (VL) test performed; quantitative RNA VL is indicated for guiding treatment decisions. Third party payers may require documentation of decreases in VL following treatment initiation for approving treatment refills. Understanding differences in HCV VL distribution across laboratories may support clinical decisions as well as aid in the development of new assays. The aim of this study is to describe the distribution of HCV VL among Hepatitis C-infected persons using data from two independent large commercial laboratories. Methods We analyzed data received from Quest Diagnostics (Quest) and Laboratory Corporation of America (LabCorp) from 2011-2016 for all persons who had detectable quantifiable HCV RNA. Because commercial assays each have a lower limit of quantification (LLOQ) and lower limit of detection (LLOD), results may be reported differently depending on the assay used. Data were transferred into a log scale and further stratified by gender, age, and genotype to compare differences in the distributions of VL. Results During 2011-2016, among persons tested for HCV RNA at Quest, 624,222 (53.6%) were HCV RNA positive with a median VL of 6.07 log10/ml and interquartile range (IQR) of 5.47-6.48. At LabCorp, 558,866 (56.6%) tested positive with a median VL of 6.14 log10/ml and IQR of 5.49-6.63. Stratification of VL by demographic variables did not show any differences in the median VL in all categories. Conclusion Our study demonstrated similar VL results in both laboratories. Furthermore, inclusion of results on the lower end can inform future assay development and refinement as smaller quantities of VL may need to be measured.

0711 S/P

URINARY LEAD LEVEL AND GUT COLONIZATION BY ANTIBIOTIC RESISTANT BACTERIA: EVIDENCE FROM A POPULATION-BASED STUDY Shoshannah Eggers* Shoshannah Eggers, Nasia Safdar, Ajay K. Sethi, Paul Peppard, Kristen Malecki, (University of Wisconsin School of Medicine and Public Health)

Infection by antibiotic resistant bacteria is a global health crisis, and asymptomatic colonization increases risk of infection. Non-human studies have linked heavy metal exposure to selection of antibiotic resistant bacteria, however, few epidemiologic studies have been done. This study analyzes the association between urinary lead level and colonization by antibiotic resistant bacteria in a non-clinical human population. Data came from the Survey of the Health of Wisconsin (SHOW) and its ancillary microbiome study. SHOW is a population-based health survey collecting data on many health determinants and outcomes, and biological specimens. Participants for this study are Wisconsin residents, age 18 and older, who participated in SHOW in 2016 and submitted urine and stool specimens. Urinary lead was measured using inductively coupled plasma mass spectrometry. Colonization by antibiotic resistant organisms was assessed by culturing for methicillin resistant Staphylococcus aureus, vancomycin-resistant enterococci, and fluoroquinolone resistant Gram-negative bacilli in stool samples. Logistic regression was performed in SAS version 9.4, with the dichotomous outcome of no antibiotic resistant colonization (negative) vs. colonization by bacteria with full or intermediate antibiotic resistance (positive). Among 465 participants, 42 (9%) tested positive. Positive colonization was highest in those age ≥70 years, females, those who selfidentify as black, and those living in an urban area. Geometric mean urinary lead was 0.296 µg/L for negative participants and 0.313 µg/L for positive participants. Logistic regression adjusted for creatinine level showed 2.5 times increased odds (OR 2.55, 95% CI 1.20-5.39) of positive colonization for those in the highest quartile of urinary lead compared to those in the lower 3 quartiles. These novel results suggest that lead exposure is associated with gut colonization by antibiotic resistant bacteria in a community-based human population.

0713 S/P

QUANTIFYING POTENTIALLY INFECTIOUS SHARING PATTERNS AMONG PEOPLE WHO INJECT DRUGS IN BALTIMORE, MD M Kumi Smith* M Kumi Smith, Matthew Graham, Carl A Latkin, Shruti H Mehta, Derek A T Cummings, (Gillings School of Global Public Health, University of North Carolina Chapel Hill)

Mixing matrices in the study of infectious diseases quantify how people with similar or different characteristics make contacts that put them at risk for disease transmission. Little empirical data on mixing patterns among people who inject drugs (PWID) are available to inform our understanding the spread of blood borne disease in this population. A better understanding of population mixing can also inform design and evaluation of emerging interventions to use treatment to control HIV and hepatitis C virus in PWID. Egocentric network data provided by PWID regarding their drug using network members from Baltimore, Maryland, were used to construct mixing matrices of drug equipment sharing patterns according to individuals' age, race and sex. Patterns of contact between each subgroup were estimated as the ratio of observed shares between each age group relative to the expected shares under the proportionate mixing assumption, with confidence intervals estimated by bootstrapping partnerships. From 2005 to 2007, 647 participants who reported at least one drug equipment sharing partner in the past 6 months provided information on a collective 2651 partnerships. Baseline network sizes were on average larger among younger, female, and non-black respondents. Mixing according to race was highly assortative (assortativity ratio, 11.6), while less so for mixing by age (2.4) and sex (1.3). Highly assortative mixing by race highlights the existence of demographically isolated clusters for whom generalized treatment interventions may have limited benefits unless targeted directly. Age-assortativity was similar to levels observed in studies of casual mixing, a critical insight given the known role of this type of assortativity in driving transmission of pathogens such as influenza and tuberculosis. Low sex-assortativity indicates that factors beyond personal preference drive partner selection and suggests a complex overlap of drug sharing and sexual networks.

INCIDENCE AND PREVALENCE OF ANTIBODY TO HEPATITIS C VIRUS IN FDNY FIRST RESPONDERS BEFORE AND AFTER WORK AT THE WORLD TRADE CENTER DISASTER SITE Yang Liu* Yang Liu, Mayris P. Webber, Hillel W. Cohen, Theresa Schwartz, Michael Weiden, Kerry Kelly, Viola Ortiz, Rachel Zeig-Owens, Nadia Jaber, Hilary L. Colbeth, David J Prezant, (Fire Department of the City of New York)

Objective : Firefighters and emergency medical service workers respond to various emergencies, including mass casualty events. The goals of the current study are to: 1) assess the impact of work at the World Trade Center (WTC) site in relation to the incidence of new, post-9/11/2001 (9/11) antibody to Hepatitis C Virus (anti-HCV); and, 2) evaluate secular trends in seroprevalence of anti-HCV in WTC-exposed Fire Department of New York City (FDNY) responders over time. Methods: The FDNY-Bureau of Health Services monitors WTC-exposed responders by offering physical exams and routine blood work every 12-18 months. Data were collected from 2000-2012 on routinely collected specimens. Results: Incidence of anti-HCV seroconversion was 0.42 per 100 persons in the trans-9/11 period (pre-9/11 to first post-9/11 test), as compared with 0.34 per 100 persons in the post-9/11 period (1st post to 2nd post-9/11 test), rates that were not significantly different (P=0.68). The overall prevalence at the time of each worker's last anti-HCV test was 1.3%, with the highest age-specific rate (4.6%) in older men, aged 50-59 on 9/11. Seroprevalence, as measured in 2-year intervals, declined from 1.79 per 100 in the pre-9/11 period to 0.49 per 100 in the final period (2011 - 2012) (P test for trend P<0.0001). Conclusions: Work at the WTC site was not associated with anti-HCV seroconversion in the FDNY WTC-exposed population, as shown by similar seroconversion rates during trans-9/11 and post-9/11 periods. Similarly, the decreasing overall prevalence of anti-HCV from 2000 to 2012 mirrors national and local trends, suggesting a waning of the HCV epidemic in the US.

0716 S/P

THE INTERFACE BETWEEN SEXUAL AND INJECTING RISK FOR HEPATITIS C VIRUS INFECTION AMONG PEOPLE WHO INJECT DRUGS IN MONTREAL Brendan Jacka* Brendan Jacka, Élise Roy, Stine Høj, Geng Zang, Nanor Minoyan, Didier Jutras-Aswad, Julie Bruneau, (Centre de recherche du Centre hospitalier de l'Université de Montréal)

Background Although hepatitis C virus (HCV) infection is both preventable and curable, acquisition remains high in key populations. Historically, few studies of HCV infection and acquisition have examined the contribution of sexuality. This study examined the association of recent sexual activity with HCV baseline seropositivity, and with HCV acquisition among those HCV seronegative at baseline. Methods HEPCO study participants (2004-2016) were eligible for HCV baseline seropositivity analysis (all) or HCV incidence analysis (baseline HCV seronegative with >2 visits). Questionnaires and HCV serology performed at baseline and 3-6 monthly follow-up. Recent sexual activity (past 3-6m) was a time-updating variable: no sexual partner, opposite sex partner only, or same-sex (+/-opposite) partner. Logistic and Cox regression models assessed associations between recent sexual activity and HCV baseline seropositivity and time to HCV seroconversion, respectively. Result At baseline, 65% (980 of 1518) were HCV seropositive, mostly male (83%), median age 38 years (IQR: 29-46), and recently injected cocaine (63%). In unadjusted logistic regression, reporting opposite-sex partner [OR: 0.45, 95% CI: 0.35, 0.58], or same-sex partner (OR: 0.50, 95% CI: 0.34, 0.73) were less likely to be HCV seropositive at baseline compared to participants reporting no sexual partner. In 432 HCV seronegative participants, an incidence rate of 12.44/100py (10.59-14.54) was observed. Reporting recent same-sex partner (HR: 2.06, 95% CI: 1.20, 3.54) but not opposite-sex partner only (HR: 1.33, 95% CI: 0.91, 1.95) was associated with HCV seroconversion relative to reporting no sexual partner. Conclusion In this cohort of PWID, reporting recent same-sex partners was associated with reduced odds of HCV seropositivity at baseline, but greater risk of HCV acquisition. Suggesting complicated interactions of risk behaviours, and the need for targeted prevention strategies for people who report same-sex activity.

0715

ESTIMATING THE EFFICACY OF CHLORHEXIDINE DECOLONIZATION IN PREVENTING MRSA: A BAYESIAN APPROACH Eric Lofgren* Eric Lofgren, (Washington State University)

The use of chlorhexidine gluconate (CHG) washes to decolonize the skin of patients with methicillin-resistant Staphylococcus aureus (MRSA) has been suggested as a means to control the transmission in high risk settings, such as intensive care units. While randomized clinical trials (RCTs) have been promising, observational studies have been equivocal. In both cases, it is difficult to directly estimate the perapplication efficacy of CHG, an important factor in understanding the discrepancy between study designs, as well as for modeling and cost-effectiveness studies. We construct a stochastic compartmental model of MRSA transmission within an ICU to include a CHG-based intervention as a unknown parameter. Using the results of a MRSA prevention RCT as well as a meta-analysis of CHG-related studies, we use Approximate Bayesian Computation to estimate the per-application efficacy of CHG. We then use this fitted model to assess whether or not the clinical standard of a decolonizing bath every 24 hours is an optimal treatment regime. Based on an incidence rate ratio (IRR) of MRSA acquisitions from CHG in a meta-analysis of 0.67, we estimate a CHG efficacy, expressed as a probability of decolonizing a patient, to be 0.11 (95% Credible Interval: 0.05, 0.17). Assessing the frequency of CHG application, application intervals of 12, 24, and 48 hours are all superior to a control scenario, there is no meaningful difference within those intervals, with IRRs of 0.66, 0.66 and 0.67 respectively. While capable of producing reductions in MRSA acquisition rates, these results suggest that the efficacy of CHG is relatively modest. There may be room for significant room for improvement in the formulation of CHG-based products or their application. CHG is also relatively robust to fluctuations in administration timing, and concerns about patient comfort, skin irritation, etc. may be able to be accounted for without jeopardizing clinical effectiveness

0717 S/P

INDIRECT CALCULATION OF THE RISK OF REACTIVATION TUBERCULOSIS AMONG PERSONS WITH IMMUNOSUPPRESSIVE MEDICAL CONDITIONS Carly A Rodriguez* Carly A Rodriguez, Timothy C Heeren, C Robert Horsburgh, (Department of Epidemiology, Boston University School of Public Health)

Background Immunosuppressive medical conditions increase the risk of progression from TB infection (LTBI) to TB disease, but direct measurement of this risk is usually precluded by preventive therapy for LTBI. Therefore, a method for indirect calculation of this parameter is needed. Methods Meta-analyses of the risk of TB and LTBI associated with smoking, low BMI (BMI <18.5), and diabetes were reviewed to identify summary estimates of the relative risk for LTBI and TB disease associated with each condition. An indirect method for calculating the relative risk for progression is described, whereby the increased risk of progression to TB for those with LTBI is determined by dividing the relative risk (RR) of TB disease associated with the condition by the RR of LTBI associated with the condition. Odds ratios reported in meta-analyses were converted to RRs through a correction method using the incidence of TB disease among those without the condition. Confidence intervals for the estimated RR of progression were calculated from the standard errors of the natural log of the RRs for TB and LTBI. Where needed, continuous risks were converted to dichotomous risks by adjusting for the global distribution of the parameter of interest. Results Indirect calculation of the RR of progression from LTBI to TB for smoking was 1.44 (95% CI: 1.06, 1.95), for low BMI was 3.53 (95% CI: 3.05, 4.09), and for diabetes was 2.66 (95% CI: 1.91, 3.70). Conclusion Screening and treatment for LTBI among persons with immunosuppressive medical conditions offers an opportunity to prevent TB before disease progression. Measurement of the RR of LTBI and the RR of TB disease associated with a medical condition allows indirect calculation of a ratio of RRs of progression from LTBI to TB disease, thus providing the amount of disease that could potentially be prevented by screening and treatment for LTBI among persons with the medical condition.

APPLICATION OF A MULTIPLEX SALIVARY IMMUNOASSAY TO DETECT SPORADIC INCIDENT NOROVIRUS INFECTIONS IN A PROSPECTIVE COMMUNITY STUDY Timothy J. Wade* Timothy J. Wade, Shannon Griffin, Andrey Egorov, Elizabeth Sams, Edward Hudgens, Stephanie DeFlorio-Barker, Trevor, Jennifer Styles, Kevin Oshima, (US EPA)

Norovirus is one of the most common causes of gastroenteritis. Following infection, anti-norovirus salivary immunoglobulin G (IgG) rises steeply within 2 weeks and remains elevated for several months; this immunoconversion can serve as an indicator of infection. We used a multiplex salivary immunoassay to detect incident norovirus infections in a cohort of 484 visitors to a beach on Lake Michigan in 2015. Saliva was collected on the day of the beach visit (S1); after 10-12 days (S2); and after 3-5 weeks (S3). Luminex microspheres were coupled to recombinant antigens of genogroup I (G1) and II (GII) noroviruses and incubated with saliva. 1mmunoconversion was defined as at least 4-fold increase in anti-norovirus 1gG antibody response (median fluorescence intensity, MFI) from S1 to S2 and a 3-fold increase from S1 to S3 with a minimum S2 MF1 above the 75th percentile prediction interval of a cubic spline regression of MF1 on age. Ten participants (2.1%) immunoconverted: 5 to Gl norovirus (1%); 8 to GII (1.7%); and 3 to both. Four of the 10 participants (40%) reported at least one gastrointestinal symptom; diarrhea was the symptom most strongly associated with immunoconversion (OR=5.4, 95% CI 1.3-22.5). Participants 10-18 years old had the highest incidence of immunoconversion (5%). White race and greater household size were moderately (p<0.1) associated with immunoconversion; however, swimming during the beach visit was not (aOR=1.4, 95% CI 0.15-12.3). Although the sample size was insufficient to fully examine risk factors, this study demonstrated that the salivary immunoassay can be used to study norovirus epidemiology in a community. Furthermore, because saliva is simple, painless and inexpensive to collect, this approach is an efficient and novel way to study infectious agents in large cohorts. This abstract does not reflect EPA policy.

A PROPORTIONAL ODDS MODEL OF HIGH-RISK DRIVERS' ATTRIBUTES ASSOCIATED WITH ROAD TRAFFIC CRASHES IN KUWAIT Saeed Akhtar* Saeed Akhtar, Eisa Aldhafeeri, Farah Alshammari, Hana Jafar, Haya Malhas, Marina Botras, Noor Alnasrallah, (Department of Community Medicine and Behavioral Sciences, Faculty of Medicine, Kuwait University, Kuwait)

Objectives: This cross-sectional study assessed one-year period prevalence of one, two, or three or more road traffic crashes (RTCs) and identified the attributes of high-risk drivers associated with this ordinal outcome among young adults in Kuwait. Design and settings: During December 2016, 1500 students enrolled in 15 colleges of a public university in Kuwait were invited to participate in the study. Students 18 years old or older and who drive by themselves were eligible. Data were collected using a structured self-administered questionnaire. One-year period prevalence of RTCs (one, two, three or more) was computed. Multivariable proportional odds model was used to identify the attributes of high-risk drivers associated with ordinal outcome. Results: Of 1500 invited individuals, 1465 (97.7%) participated, of which 71.5% were female, 56.4% were aged between 21 and 25 years, and 67.1% were Kuwaitis. Among 1465 participants, one-year period prevalence of one, two and three or more RTCs was 23.1% (338), two 10.9% (160) and 4.6% (68) respectively. The variables associated with the ordinal RTCs outcome in the final multivariable proportional odds model included habitual violation of speed limit (proportional (Prop) OR= 1.40; 95% CI 1.12- 1.75; p = 0.003), crossing red light (Prop OR = 1.64; 95%CI: 1.30 - 2.06; p < 0.001), received three or more speeding tickets (Prop O R = 1.63; 95% CI: 1.10 - 2.42; p = 0.015), three or more times parked in no parking zone (Prop OR = 1.64; 95% CI = 1.06 - 2.55; p = 0.027) and being a patient with epilepsy (Prop OR = 4.37; 95% CI: 1.65 - 11.55; p = 0.003). Brant test revealed that the proportional odds assumption was met by all the variables in model singly as well as in combination. Conclusion: High one-year period prevalence of one, two and three or more RTCs was recorded. Targeted education based on identified attributes and enforcement of existing traffic laws may reduce the RTCs frequency in this relatively young population.

0722

QUALITY OF LIFE 15 YEARS AFTER 9/11 AMONG PERSONS INJURED ON THE DAY OF THE ATTACKS WHO HAVE NOT REPORTED POST-TRAUMATIC STRESS DISORDER (PTSD) SYMPTOMS POST-DISASTER Robert Brackbill* Robert M Brackbill, Lisa Gargano, Laura DiGrande, Howard Alper, Sascha Garrey, (NYC Department of Health and Mental Hygiene)

PTSD is often the focus of quality of life studies in persons exposed to 9/11 with non-fatal injury included as a cofounder. However, general population studies demonstrate injury can affect health through diminished quality of life caused by long-term pain and/or disability. In this study, we assessed the current quality of life of persons in jured on 9/11 who did not report experiencing PTSD symptoms 14 years after 9/11. We hypothesized that the long term effects of injury included both physical and mental health impairment even among those without PTSD. Method. The World Trade Center Health Registry is a longitudinal cohort of persons (N=71,437) directly exposed to 9/11 that includes four waves of data collection. In early 2017, persons who reported injury on 9/11 and a non-injured comparison group were administered a survey (N = 6,748 of 8,580 completed). This analysis is restricted to respondents who never reported PTSD symptoms (Injured n= 284, Noninjured n=3,116). Level of severity of injury was based on need for assistance devices or medical intervention. Study outcomes included specific measures of quality of life and physical and mental health domains. Results. Persons injured on 9/11 who had a subsequent medical intervention (e.g. surgery or physical therapy) were significantly more likely to be limited in their usual activities compared to noninjured (OR=3.5, 95% CI, 2.2,5.6) and those injured without a medical intervention were also significantly more likely to report that pain interfered with normal work (OR=1.8, 95% CI, 1.1,2.8). There was a significant 5 point difference in physical health functioning (SF12) for persons injured, with or without medical intervention compared to non-injured but there was no significant difference for mental health functioning. Conclusion. Counter to our hypothesis, there was no significant decrease in mental health functioning among persons injured on 9/11 who had no history of PTSD for 14 years but physical quality of life was reduced.

0721 S/P

INTERPERSONAL VIOLENT INJURY TRENDS IN CALIFORNIA, 2005 TO 2016 Christopher Rowe* Christopher Rowe, Ellicott Matthay, Jennifer Ahern, (University of California, Berkeley)

Interpersonal violent (IPV) injury is a major public health problem in the United States. Although homicides have largely declined since the 1990s, non-fatal violent injuries are far more common and receive less attention. We sought to describe recent trends in non-fatal IPV in jury and compare rates across means and demographic groups in a large and diverse state. We used California (CA) state hospitalization and emergency department discharge records with ICD codes to calculate rates of IPV injury from 2005-2016 by year, overall and by means, age, gender, and race/ethnicity. In results through 2013 (to be updated through 2016), the overall IPV injury rate remained relatively stable (343 per 100,000 in 2005; 355 per 100,000 in 2013). However, this overall trend masks considerable heterogeneity. During 2005 to 2013, the largest portion of injuries involved bodily force (i.e., hands, feet, etc.) (142 per 100,000 in 2013) and overall rates were highest among 15-29 year olds (755 per 100,000), men (482 per 100,000), and non-Hispanic Black individuals (1,206 per 100,000). From 2005-2013, IPV in jury rates increased among non-Hispanic Black (930 to 1,206 per 100,000) and White individuals (282 to 320 per 100,000) while remaining stable or decreasing among other racial/ethnic groups. Rates increased among those aged 30-44 (426 to 469 per 100,000), 45-59 (217 to 313 per 100,000), and 60+ (52 to 72 per 100,000), and among females (198 to 231 per 100,000), while remaining stable or decreasing among younger age groups and males. Increasing rates were driven primarily by increases in bodily force and other injuries (composed mostly of ICD-9 code E968.8: Assault by other specified means). Although the overall rate of non-fatal IPV injury in CA was relatively stable from 2005-2013, several groups have experienced substantial increases. These trends warrant further examination to better understand their causes and whether these patterns exist in other parts of the U.S.

0723 S/P

EXAMINATION OF STATE-LEVEL TRENDS IN MOTOR VEHICLE CRASHES AMONG OLDER ADULTS Aimee J. Palumbo* Aimee Palumbo, Melissa R. Pfeiffer, Kristi B. Metzger, Allison E. Curry, (Children's Hospital of Philadelphia)

As the number of older adults in the US increases, older adults will make up a greater proportion of drivers than ever before. Driving is critical for the well-being and quality of life for older adults, but age-related health conditions have been associated with driving reduction or cessation and may increase crash risk for those who continue to drive. Most studies exploring crashes among older drivers are limited to fatal or serious crash events, and no rigorous examination of older driver crash rates using individual-level data has been conducted. The objectives of this study were to estimate per-driver crash rates and to describe the nature and circumstances of crash involvement among drivers age 65 and older. We examined individual-level linked data on licensing and police-reported crashes of New Jersey drivers age 65+ during 2010-2014. Monthly crash rates were calculated as the number of crashes per 1000 licensed drivers. Crash frequencies and rates were calculated separately by sex and 5-year age groups, up to age 85. Among licensed drivers, males had a crash rate of 3.9 per 1000 licensed driver-months and females had a crash rate of 3.0 per 1000 licensed driver-months over the entire time period. Crash rates were similar across age groups, declining for all age groups from 2012 through 2014. One third (34%) of crashes involved driver's vehicles at least 10 years old. Among older male drivers, 9% of crashes involved an unlicensed older driver; among female drivers 2% of crashes involved an unlicensed older driver. The prevalence of unlicensed older males involved in crashes suggests that a substantial proportion of older males are driving without an active license. Furthermore, vehicle age may be related to safety characteristics of vehicles, and may have an important influence on risk of injury among older adults involved in crashes. More research is needed to understand driving exposure and crash risk in this population.

CONCURRENT USE OF PRESCRIPTION OPIOIDS AND ALCOHOL AND FATAL MOTOR VEHICLE CRASHES: A POPULATION-BASED CASE-CONTROL STUDY Guohua Li* Guohua Li, Stanford Chihuri, (Columbia University)

In light of the ongoing opioid epidemic, the impact of prescription opioids on traffic safety has become a serious concern. Using a case-control design, we assessed the individual and joint effects of prescription opioids and alcohol on fatal crash risk. Cases (n = 3,606) were drivers who were involved in fatal motor vehicle crashes in the United States at specific times on Fridays and Saturdays between July 20 through December 1 in 2006, 2007 and 2008, and between June 7 through March 30 in 2012, 2013, and 2014. Controls (n = 15,604) were drivers who participated in the 2007 and 2013 National Roadside Surveys of Alcohol and Drug Use by Drivers. Cases and controls were selected from the same times of day, days of week and months of year. Overall, cases were significantly more likely than controls to test positive for prescription opioids (5.0% vs. 3.7%, p < 0.001), alcohol (56.0% vs. 7.0%, p < 0.0001) and both prescription opioids and alcohol (2.2% vs. 0.2%, p < 0.0001) 0.0001). Relative to drivers testing negative for both prescription opioids and alcohol, the adjusted odds ratios of fatal crash involvement were 1.72 [95% confidence interval (CI): 1.37, 2.17] for those testing positive for prescription opioids and negative for alcohol, 17.74 (95% CI: 16.09, 19.56) for those testing positive for alcohol and negative for prescription opioids, and 21.40 (95% CI: 14.13, 32.42) for those testing positive for both prescription opioids and alcohol. Prescription opioids and alcohol are each associated with significantly increased risks of fatal crash involvement. When used together, prescription opioids and alcohol appear to confer a positive interaction effect on fatal crash risk on the additive scale.

INJURIES/VIOLENCE

0725 S/P

MASS SHOOTINGS AND PERMISSIVENESS-RESTRICTIVENESS OF STATE GUN LAWS Paul Reeping* Paul Reeping, Magdalena Cerda, Charles C. Branas, (Department of Epidemiology, Columbia Mailman School of Public Health)

Objective: This cross-sectional time-series study examines the relationship between the permissiveness-restrictiveness of state gun laws and mass shootings. Background: Previous studies have shown that gun laws are negatively associated with day-to-day firearm fatalities, however, there have been no studies of the permissiveness or restrictiveness of state gun laws and the occurrence of mass shootings. Methods: We used the 1997-2017 editions of the "Traveler's Guide to the Firearms Laws of the Fifty States,"3 in constructing the independent variable of interest. This annually published guide gives a rating between 0 (restrictive) and 100 (permissive) for the firearm laws of all 50 states. Mother Jones (MJ), the Gun Violence Archive (GVA), and Supplementary Homicide Reports from the FBI's Uniform Crime Reporting System (UCR) were used to construct outcome variables on mass shootings. For UCR, mass shootings were defined as instances where 4+ individuals were killed in a single event by gunfire and was stratified to analyze instances when the perpetrator was a stranger to the victims. Data were analyzed using GEE with a poisson distribution and log link. An offset of state population was used and median income, percent high school graduation, percent single mother household, percent in poverty, percent who voted, and percent white were included as time-varying confounders. Results: For every ten-unit increase in permissiveness of firearms in a state, there is a significant or nearly significant 8.7% (p=0.034), 10% (p=0.040), and 10.4% (p=0.069) increase in mass shootings for the fully ad justed models UCR (all), UCR (strangers) and MJ, respectively. The GVA data were insignificant. Conclusion: Stricter laws on firearms in a state are associated with fewer mass shootings after accounting for population and multiple, key confounding factors. More studies are warranted given these findings and the pressing need to stem the continued stream of mass shootings in the US.

INCREASES IN HUMAN PAPILLOMAVIRUS VACCINATION AMONG ADOLESCENT AND YOUNG ADULT MALES IN THE UNITED STATES, 2011-2016 Eshan U. Patel* Eshan U. Patel, M. Kate Grabowski, Anna L. Eisenberg, Zoe R. Packman, Patti E. Gravitt, Aaron A. R. Tobian, (Department of Pathology, Johns Hopkins University School of Medicine, MD, USA)

In the United States, human papillomavirus (HPV) vaccination has been recommended for females since 2006 and males since 2011. There are limited data on HPV vaccine uptake among all age groups eligible for HPV vaccination (ages 9-26 years), particularly for males. This nationally-representative study assessed temporal trends in self-reported HPV vaccination (≥1 dose) among 9-26-year-olds sampled in the 2011-2016 National Health and Nutrition Examination Surveys (n=7368). Adjusted prevalence differences (aPD) in HPV vaccination were calculated from marginal predicted probabilities estimated by sex-stratified multivariable logistic regression models, which included adjustment for study period, age group, race/ethnicity, health insurance, poverty status, and immigration status. Among females, HPV vaccination significantly increased overall from 37.7% in 2011-2012 to 45.7% in 2015-2016 (aPD,+7.1%; [95% CI: +0.1%,+13.7%]). However, upon stratification by age group, HPV vaccination did not significantly change over time among adolescent females aged 9-10, 11-12, or 13-17 years (P>0.05). Among males, HPV vaccination significantly increased overall from 7.8% in 2011-2012 to 27.4% 2015-2016 (aPD,+18.8%; [95% CI: +14.1%,+23.5%]). In stratified analyses among males, significant increases in HPV vaccination over time were observed in every stratum of age, race/ethnicity, health insurance and poverty level, as well as by immigration status (P≤0.05). The marked increase in HPV vaccination observed among age-eligible males is encouraging. However, HPV vaccine coverage remains low overall with minimal gains in vaccine uptake among females, thereby emphasizing the need to develop and implement evidence-based strategies to overcome residual barriers to HPV vaccination.

ASSOCIATION BETWEEN SELF-INJURY AND EPILEPSY AMONG ADOLESCENTS: A COHORT STUDY USING STATEWIDE EMERGENCY DEPARTMENT DATA FROM CALIFORNIA Cristina Lidón-Moyano* Cristina Lidón-Moyano, Sidra Golman-Mellor, Deborah Wieve, Magdalena Cerda, (UC Merced)

Both epilepsy and suicidality are major causes of adolescent morbidity, and over the lifecourse are associated with substantial economic and personal costs. Recent epidemiologic studies suggest bidirectional associations between epilepsy and suicidal behavior, with strong evidence that epilepsy triples the risk of death by suicide. Emerging evidence also suggests that suicidal behavior increases risk for both developing epilepsy and for worse disease prognosis, but this association is poorly understood, especially in adolescence. We examined this question in a retrospective cohort study using statewide, all-payer, individually linked emergency department (ED) data from California. Risk of future ED visits for epilepsy (assessed using ICD-9 diagnostic codes) was compared between two groups of patients aged 10-19 years who presented to a California ED in 2010: Self-harm patients, identified using ICD-9 injury codes E950-E959 (n=5,158); and controls, who were randomly selected from all other patients and matched 3:1 to self-harm patients on age, sex, visit month, and zip code (n=14,286). Covariates included adolescent race, insurance, and prior history (2006-2009) of ED visits for epilepsy, mental health problems, and other complaints. Nearly 3% of self-harm patients (mean age=16.6 years; 63.6% female) had a subsequent visit for epilepsy, vs. 1.4% among controls. In multivariate models, self-harm patients showed higher risk (RR=1.37, 95% CI [1.08, 1.74]) for future epilepsy-related ED visits. However, this association was specific to males (male RR=1.69, 95% C1=1.27, 2.27; female RR=1.01, 95% C1=.67, 1.52; interaction p=.012). Findings from our large, population-based study of adolescent ED patients suggest that self-harm behavior is associated with worse epilepsy prognosis, especially among males. Future research should investigate the causal pathways underlying this association, in order to improve patient prognosis for both self-harming and epileptic adolescents.

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NONMEDICAL USE OF PRESCRIPTION OPIOID USE AND SUICIDAL IDEATION/ATTEMPTS Julian Santaella-Tenorio* Julian Santaella-Tenorio, Silvia S. Martins, Katherine M. Keyes, Luis E. Segura, Magdalena Cerdá, (Columbia University)

Since 2000 there has been a rise in suicide rates among whites and American Indian/Alaska natives. Evidence suggests that the opioid crisis may have contributed to this increase as these two populations also had the highest prevalence of nonmedical use of prescription opioids (NMPO) and related disorders. In this study we estimated the association between opioid use and suicidal ideation/attempts using longitudinal data to have better certainty about the temporality of this association while adjusting for potential confounders. Method: Data was from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) waves I and II. Exposures were: Past-year NMPO and related disorder measured at wave I. The outcomes were: prevalent and new onset suicidal ideation and attempts since last interview measured at wave II (~3 years after). A propensity score was predicted based on a set of confounders including history of other substance use (i.e., sedative use), psychiatric disorders (mood and personality disorders) and family history of drug problems. The log-transformed propensity score was used as a covariate in log linear models. All analyses were conducted using 5 sets of imputed data. Results: A total of 547 (1.8%) of participants had NMPO in the past year, and 104 (0.33%) had an NMPO-related disorder. NMPO was associated with new onset suicidal attempt (Risk Ratio [RR]=2.46; p0.05). NMPO-related disorder was associated with prevalent suicidal ideation (RR=1.87; p<0.01), new onset suicidal ideation (RR=2.83; p<0.01), and prevalent suicidal attempt (RR=3.15; p=0.01), but not with new onset suicidal attempt (RR=2.16; p=0.43). Conclusions: Findings suggest that those with NMPO related problems could be at risk of suicidal ideation and attempt. Suicidal ideation/behavior can be an additional side effect of opioid abuse that can be considered in treatment settings.

EARLY CHILDCARE PREDICTS CHILDREN'S EMOTIONAL AND BEHAVIOURAL TRAJECTORIES INTO MIDDLE CHILDHOOD. DATA FROM THE FRENCH EDEN MOTHER-CHILD COHORT STUDY. Maria Melchior* Maria Melchior, Ramchandar Gomajee, Fabienne El Khoury, Sylvana Côté, Judith van der Waerden, Laura Pryor, (maria.melchior@inserm.fr)

Background Studies on the impact of early childcare on children's later behavioural and emotional difficulties have yielded contrasting results and often been limited by a short duration of follow-up. Methods We examined associations between childcare type (childminder, centre-based or informal care) prior to school entry at age 3 years and behavioural and emotional difficulties in middle childhood (age 3 to 8 years) in a community sample of children (n = 1428) in France (EDEN cohort study). The type of professional childcare children were in principally depended on availability extraneous to family characteristics. Children's behavioural and emotional difficulties (emotional symptoms, peer relations, hyperactivity-inattention, conduct problems, prosocial behaviours) were ascertained by the Strengths and Difficulties Questionnaires (SDQ at ages 3, 5.5 and 8 years). Trajectories of children's difficulties (high, intermediate or low) over time were estimated using group-based trajectory modelling. Family and child characteristics were accounted for via Inverse probability weights based on propensity scores of childcare type. Results Compared to children in informal childcare, those who attended centre-based childcare had lower levels of emotional difficulties (ORIPW-adjusted = 0.35, 95%CI: 0.17-0.71) and of peer relationship problems (ORIPW-adjusted = 0.31, 95% CI: 0.15-0.67) up to age 8 years. Children who spent at least 1 year in centre-based childcare had lower levels of hyperactivity/inattention and higher levels of prosocial behaviours than those who were looked after by a childminder. Girls and children from a favourable family background reaped more benefits from being in childcare than boys and children from a less favourable background. Conclusion High quality childcare, such as offered in center-based childcare settings in France is associated with positive psychological development into middle-childhood.

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LONG-TERM PARTICULATE MATTER EXPOSURE AND ONSET OF DEPRESSION IN MIDDLE-AGED MEN AND WOMEN Zhenyu Zhang* Zhenyu Zhang, Joao Monteiro, Di Zhao, Yoosoo Chang, Seungho Ryu, Danbee Kang, Juhee Cho, Ho Cheol Shin, Eliseo Guallar, (Johns Hopkins University)

Background: Long-term exposure to particulate matter (PM) air pollution is associated with all-cause mortality and adverse cognitive outcomes, but the association with depressive symptoms remains inconsistent. Objective: To evaluate the prospective association between particulate matter air pollution and the development of depressive symptoms assessed using the Center for Epidemiological Studies Depression (CES-D) scale. Methods: Prospective cohort study of 124,082 men and women free of depressive symptoms at baseline who attended regular screening exams in Seoul and Suwon, South Korea, from January 1st, 2011 through December 31st, 2015. PM2.5 and PM10 exposure were estimated using a land use regression model based on each participant's residential postal code. Development of depressive symptoms was defined as a CES-D ≥16. Results In fully adjusted models, the hazard ratios for the development of depressive symptoms associated with a 10 µg/m3 increase in 12-month and 60-month PM10 exposure were 1.13 (95% CI 1.09 to 1.18) and 1.08 (1.03 to 1.12), respectively. The corresponding hazard ratios for PM2.5 were 1.06 (95% CI 0.89 to 1.27) and 1.60 (1.02 to 2.53), respectively. Similar results were obtained when incident depression diagnosis was based on self-reports of doctor's diagnosis or on use of antidepressant medication. Conclusions: In this large cohort study, we found a positive association between longterm exposure to outdoor PM air pollution and the development of depression. Our findings add to the increasing body of evidence that links air pollution to adverse mental health outcomes.

NO ASSOCIATION BETWEEN NEIGHBORHOOD DISADVANTAGE AND DEPRESSIVE SYMPTOMS AMONG ADOLESCENTS FOLLOWED INTO EMERGING ADULTHOOD Rise B. Goldstein* Rise B. Goldstein, Awapuhi K. Lee, Jacob S. Jeffers, Brian J. Fairman, Jeremy W. Luk, Denise L. Haynie, Bruce G. Simons-Morton, Stephen E. GIlman,, (Health Behavior Branch, Division of Intramural Population Health Research, Eunice Kennedy Shriver National Institute of Child Health and Human Development)

Introduction According to recent studies, residents of disadvantaged neighborhoods have higher levels of depressive symptoms; however, most of these studies have focused on adults and used cross-sectional designs. Therefore, we prospectively examined associations of two aspects of neighborhood disadvantage (social fragmentation and income inequality) with depressive symptoms over six yearly waves of a nationally representative survey of adolescents. Methods The NEXT Generation Health Study enrolled 10th-grade students from 80 United States high schools in 2010. Depressive symptoms were assessed with the pediatric Patient Reported Outcome Measurement Information System (PROMIS) from Waves 2-6. Social fragmentation and income inequality were measured at the census-tract level using geolinked data from the American Community Survey 5-year estimates. We used linear mixed-effects models to relate time-varying neighborhood disadvantage to PROMIS T-scores at Waves 2-6 controlling for neighborhood racial composition, respondent sex, age, race/ethnicity, family affluence, and Wave 1 depressive symptoms. Results Respondents (n=2647) were 55% female, 16.3 years old at Wave 1, and completed an average of 4 follow-up assessments. Neighborhood disadvantage was not associated with depressive symptoms. Regression coefficients (SE) for the 2nd through 4th (vs. first) quartiles of social fragmentation were 0.25 (0.29), -0.07 (0.39), and 0.35 (0.43). Coefficients for income inequality were 0.15 (0.30), -0.37 (0.31), and -0.33 (0.34). Conclusion Social fragmentation and income inequality, which were associated with depressive symptoms in prior studies of adults, were not associated with scores on an established measure of depressive symptoms in a nationally representative cohort of adolescents. These findings raise questions for future research regarding developmental timing of neighborhood effects on mental health and their potential heterogeneity across the United States

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TRAUMA EXPOSURE, POSTTRAUMATIC STRESS DISORDER SYMPTOMS, AND HORMONE REPLACEMENT THERAPY AFTER MENOPAUSE IN WOMEN Sun Jae Jung* Sun Jae Jung, Jennifer Sumner, Carolyn Gibson, Yong joo Kim, Andrea L Roberts, Qixuan Chen, Laura Kubzansky, Eric B Rimm, Karestan C Koenen, (Harvard University T.H. Chan School of Public Health)

Background: Posttraumatic stress disorder (PTSD) is a common and often persistent psychiatric disorder that occurs twice as frequently in women as in men. PTSD has been linked to increased cardiometabolic risk, and use of female hormone therapy may potentially contribute to or reduce the risk of these health conditions. We hypothesized that women with PTSD and trauma exposure will have increased use of hormone therapy compared to women with no trauma exposure. Method: We used data from 34,461 women in Nurses' Health Study II which began in 1989. History of trauma and PTSD were asked with Short Screening Scale for DSM-4 PTSD in 2008. Use of hormone replacement therapy (HRT) after menopause was assessed in every survey from 1989, and we utilized the data from 2009 to compare baseline association. We made bivariate outcome (yes/no) for HRT use. Logistic regression was used to estimate multivariate-adjusted odds ratios and 95% confidence intervals for HRT use, adjusting age, childhood factors, reproductive factors, other comorbidities, and behavioral factors in the final model. Result: In multivariable adjusted models, we found significant associations for PTSD with HRT use (p-trend <0.001; trauma with no PTSD symptoms, 1.12 [95% CI:1.05-1.20]; 1-3 PTSD symptoms, 1.34 [95% CI:1.36-1.45]; 4-5 PTSD symptoms, 1.47 [95% CI:1.33-1.61]; and 6-7 PTSD symptoms, 1.46 [95% CI:1.30-1.64]). Conclusion: PTSD was associated with higher likelihood of HRT use in a dosedependent pattern. Further research is needed to explore the role of HRT as a possible mediating mechanism between PTSD and cardiometabolic diseases.

ACCESS TO AFFORDABLE DAYCARE AND WOMEN'S MENTAL HEALTH IN RAJASTHAN, INDIA: EVIDENCE FROM A CLUSTER-RANDOMIZED SOCIAL INTERVENTION Ari jit Nandi* Ari jit Nandi, Sam Harper, (McGill University)

The provision of affordable and reliable daycare services is a potentially important policy lever for reducing gender inequality, improving health and socioeconomic well-being, and empowering women in resource limited settings. This clusterrandomized trial uses data from a sample of 2859 mothers with age eligible children to evaluate the impact of providing access to a community-based daycare program on women's mental health roughly two years later. The study takes places in 160 village hamlets in rural Rajasthan, India, which were randomized to intervention or control groups after a baseline survey. Symptoms of common mental disorders were assessed using a Hindi version of the 12-item General Health Questionnaire (GHQ-12). At baseline, the mean number of GHQ-12 symptoms was 2.12 (SD=2.45). Treatment assignment increased the probability that a respondent used a daycare by 33 percentage points. Mothers living in treated hamlets reported 0.17 fewer symptoms of distress (95%CI=-0.41, 0.07) at follow-up. We found some variability in treatment effects according to block of residence and baseline characteristics, with the largest reductions in mental distress observed among women employed year round prior to the intervention. Analyses exploring the impact of maternal use of a daycare using two-stage least squares (2SLS) instrumental variables analysis showed that daycare use decreased symptoms of mental distress by 0.44 (95% CI=-0.97, 0.09) symptoms, or roughly 21% compared to the baseline mean. The provision of affordable, community-based daycare was associated with substantial uptake and showed potential for improving mothers' mental health in a lower-income, rural context.

MENTAL HEALTH VARIABLES ASSOCIATED WITH EMERGENCY DEPARTMENT ADMISSION IN COPD PATIENTS: APPLICATION OF SELECTIVE INFERENCE Hayden L. Smith* Hayden L. Smith, Corey S. Ellis, (UnityPoint Health)

Background: Statistical models are used in medical research for feature selection. Generated results are conditional on the model building process. Naïve interpretations of variables not declared a priori can result in type I errors. The use of data splits can help address the problem, but decreases sample sizes. Selective inference is a method that adjusts estimate coverage to remove possible bias from conditional results. Objective: to model Emergency Department (ED) admission status for COPD exacerbations using the selective inference process. Methods: COPD patient data from three EDs for a three year period were used to model hospital admission status Variable selection occurred via LASSO logistic regression with 10-fold cross-validation for lambda selection. Model coefficients were used in the selectiveInference R package. Traditional naïve model building (e.g., stepwise, logistic, etc.) was also conducted post hoc for comparative purposes. Results: Study sample consisted of 607 unique COPD patients with an ED encounter for exacerbation. Fifty percent of patients were admitted. Variables of heart rate (i.e., 5 bpm; AOR: 1.2; 95% CI 1.1, 1.3), oxygen saturation (AOR: 0.95; 95% CI: 0.92, 0.98), and comorbidities of anxiety (AOR: 6.7; 95% CI: 4.0, 11.4) and depression (AOR: 6.8; 95% CI: 3.5, 16.7) were associated with admission status. The model had 76% (95% CI: 0.73, 0.80) accuracy and external data sensitivity analyses revealed a confounder(s) equi-associated with the outcome and heart rate, oxygen saturation, anxiety, or depression would require an odds ratio of 1.5, 1.2, 7.5, or 6.5 to nullify the reported respective individual variable associations. Conclusions Reproducibility in medical research is a concern. The presented study used selective inference to address limitations of conducting inferential statistics on conditional model results. Mental health variables had not been previously reported in the literature as associa6ted with admission status.

MODEL CHOICE IN MICROBIOME PROFILING MATTERS:A COMPARISON OF STATISTICAL TESTS TO PROFILE

DIFFERENTIALLY DISTRIBUTED OTUS Jun Hu* Jun Hu, Na You, Xiang Zhou, Yuanqi Zhang, Min Zhang, Meifen Zheng, Pinjin Hu, Susan Hutfless, Min Zhi, (Guangdong Key Laboratory of Colorectal and Pelvic Floor Diseases, The Sixth Affiliated Hospital of Sun Yat-sen University, Guangzhou, Guangdong, China.)

Background: 16S rRNA sequences have been frequently used to profile the diversity of organisms in a sample. Standard techniques rely upon one statistical method mainly. However, the selected OTUs are not concordant when multiple tests are examined. We aimed to compare microbiome OTUs using three different modeling approaches in the data discovery phase. Method:Stool microbiota structure of 29 cases and 24 household matched controls was profiled by Miseq sequencing of the V5-V6 region of the 16S RNA gene. Three tests were used to calculate and compare relative abundances of OTUs in and between case and control groups: Wilcoxon Signed Rank, Kolmogorov-Smirnov and Chi-square. We compared the unique family/genus/species identified by each test, the overlap by test and the total number of unique groupings identified if all 3 tests were used. For brevity, we limited our output to the 50/100 most statistically significant results per test. Result: Included cases, aged at 32.54+ 9.53 years, diagnosed in the Sixth Affiliated Hospital of SYSU Inflammatory Bowel Disease Center from April to December 2015. Householdmatched controls, aged at 33.50 + 9.18, provided samples on the same day as cases; use of antibiotics within 6 weeks of specimen collection was not allowed. When limiting the results to the top 50/100 OTUs per test, only 14 OTUs were jointly detected by all three methods, 14 OTUs were detected by both the Wilcoxon Test and Kolmogorov-Smirnov test, and 4 OTUs were detected by the other test pairs. The chi-square test detected the largest number of OTUs (n=28). Moreover, with the KS test and Chi-Square test, 1 OUT(denovo 27644) closely related to Clostridiales was enriched in the case group while denovo 62 related to Megasphaera was enriched in control group. These two phyla can not be found by Wilcoxon test. Conclusion: The ranking of statistically significant OTUs differ by statistical test used. Identifying OTUs that overlap across multiple methods is desired for data discovery.

0751 S/P

A SIMULATION STUDY OF BAYESIAN FACTOR ANALYSIS FOR EPIDEMIOLOGICAL ASSESSMENT OF THE CAUSAL EFFECT OF ENVIRONMENTAL CHEMICAL MIXTURES Liheng(Harry) Zhuang* Liheng(Harry) Zhuang, Lawrence McCandless, (SImon Fraser University)

In the field of environmental epidemiology, it is often challenging to estimate the causal effects of chemical mixtures due to the high-dimensional nature of the exposures characterized by co-linearity and interactions between variables. In addition, exposure measurement error and the statistical power of multiple comparisons in chemical mixtures are also potential challenges. This study aims to develop and investigate a novel Bayesian factor analysis method for estimating the causal effect of environmental chemical mixtures A simulation study was conducted to compare the estimations of the causal effects of environmental chemical mixtures using several different statistical methods including the novel Bayesian factor analysis, Bayesian hierarchical linear models, least absolute shrinkage and selection operator (LASSO), and traditional approaches such as multiple linear regression. The performances of models were evaluated on their abilities to describe the effects of chemical mixtures in addition to individual chemical variables. Forest plots of each statistical models were produced to compare and contrast the performances. Bias, variance and mean squared error of the above models were also produced and compared with each other. The preliminary results demonstrated that the novel Bayesian factor analysis model is shown to have several advantages over other methods: (1) Ability to identify latent variables of mixtures (2) Ability to classify the contribution of individual chemicals to the overall mixture. (3) Allow easier interpretation of the results. However, the model also have shown several weakness: (1) Requires high quality data with small exposure measurement errors (2) Requires evidences regarding interaction pathways of individual chemicals. Based on our findings, Bayesian factor analysis is a potentially useful tool for estimating the effect of epidemiological assessment of environmental chemical mixtures.

0753

APPLICATION OF THE "INTENT TO ATTEND" ASSESSMENT TO PREDICT MISSING DATA AND ADHERENCE IN A PEDIATRIC CLINICAL TRIAL Sarah A. Keim* Sarah A. Keim, Kelly M. Boone, Joseph Rausch, (Nationwide Children's Hospital/Ohio State U)

A 2010 National Research Council report on missing data in clinical trials recommended that trial participants be asked about their intent to attend subsequent study visits as a means to improve handling of missing data when participants fail to complete study activities. This method has not been applied outside a single adult psychiatric trial and a simulation study, so its general utility remains uncertain. Our Omega Tots trial (n=377, Columbus OH, 2012-17) tested a daily dietary supplement, with the goal of improving cognitive development in toddlers born preterm. We asked parents at the baseline visit to rate how likely (1=very unlikely -10=very likely) they were to complete the 6-month study (3 total study visits). 20% of parents gave a rating \$45,000) were more likely to give a rating <10, compared to families with lower incomes ($\chi 2=4.6$, p=0.03). Parents who rated 10 had a lower odds of attending the last study visit (OR=0.33, 95% CI: 0.06, 1.12) and having complete primary outcome data (OR=0.11, 95% CI: 0.003, 0.67). Conversely, higher intent to attend ratings were associated with fewer number of days late the family was for their last study visit (mean=5.5 days late for ratings <10 vs 2.4 for rating=10, r=-.17, p<.01). Intent to attend ratings were unassociated with how many medication diaries parents completed, medication adherence, or whether adherence data were missing entirely. In this pediatric clinical trial, intent to attend ratings had complex relationships to participant demographics and study participation indicators which had not been previously examined or were contrary to the prior small literature. It is possible that social desirability bias may influence question response and be differential by SES, and this may undermine the utility of the intent to attend approach.

FURTHER REMARKS ON COVARIATE BALANCE FOR NO CONFOUNDING Etsuji Suzuki* Etsuji Suzuki, Toshihide Tsuda, Eiji Yamamoto, (Department of Epidemiology, Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama University)

Covariate balance is often addressed as a key feature to control confounding in epidemiology, and many researchers have been concerned about whether covariate balance is achieved between the exposed and the unexposed groups in their analyses. A recent study proposed a mapping between covariate balance under the sufficientcause model and exchangeability conditions in the counterfactual model, highlighting the facts that covariate balance is a stronger condition than no confounding and that the required covariate balance depends on the target population of interest. In this presentation, we aim to further explore the relationship between covariate balance and exchangeability under a situation in which one can assume no preventive action, or sufficient-cause positive monotonicity. Based on the link between the sufficient-cause model and the counterfactual model, we emphasize that covariate balance depends on the target population of interest. When the target is the exposed group, covariate balance and exchangeability become consistent under the assumption of no preventive action. However, when the target is either the unexposed group or the total population, covariate balance is a stronger condition than no confounding even under the assumption of no preventive action. We also show that, under the assumption of no preventive action, the condition for covariate balance when the target is the unexposed group becomes equal to the corresponding condition when the target is the total population, which is stronger than the corresponding condition when the target is the exposed group. This study exemplifies that it would be of significance to understand the subtle difference between exchangeability and covariate balance, based on the link between the counterfactual model and the sufficient-cause model.

0756 S/P

ESTIMATING PER-PROTOCOL EFFECTS IN RANDOMIZED TRIALS: USING THE PLACEBO ARM TO ASSESS CONFOUNDING Eleanor Murray* Eleanor J Murray, Miguel A Hernan, (Harvard T.H. Chan School of Public Health)

Background: Adherence-adjusted effects, such as the per-protocol effect, can provide valuable information to supplement intention-to-treat analyses, especially in randomized trials with substantial non-adherence and loss to follow-up, or when assessing safety outcomes. However, per-protocol effects have been viewed with skepticism because they require adjusting for post-randomization covariates, which many investigators believe cannot be done without bias. Much of this objection can be traced to analyses of adherence in the placebo arms of trials such as the Coronary Drug Project (CDP). However, we previously re-analyzed this data and showed that modern statistical advances could remove the bias observed in the CDP. Here, we extend this placebo-arm approach to describe a general framework for checking assumptions about adherence-outcome confounding and describe how to apply these statistical advances to estimating the per-protocol effect. Methods: We present several case studies for assessing assumptions and estimating the per-protocol effect from randomized clinical trials. We describe the required assumptions for unbiased estimation of the per-protocol effect and a method to assess the validity of these assumptions, under certain conditions, using a comparison of adherers versus nonadherers in the placebo arm. We discuss several practical concerns related to the implementation of this comparison, including specifying the definition and doseresponse functional form for adherence, and adding adjustment for loss to followup. We then describe the estimation the per-protocol effect when model assumptions are supported by the placebo-arm comparison. Discussion: Adherence ad justment in randomized trials is feasible when the required assumptions are valid and sufficient data exist. Although these assumptions cannot be empirically verified, we can attempt to provide support for the validity of the per-protocol effect estimate by using a placebo-arm adherence assessment.

WITHIN-WOMAN PHENOL AND PHTHALATE VARIABILITY IN PERICONCEPTIONAL URINE SPECIMENS AFTER LONG-TERM STORAGE Ana K. Rosen Vollmar* Ana K. Rosen Vollmar, Donna D. Baird, Allen J. Wilcox, Clarice R. Weinberg, Anne Marie Z. Jukic, (Department of Environmental Health Sciences, Yale School of Public Health)

Phthalates and phenols, endocrine disruptors, are rapidly excreted from the body. Sources of exposure can vary over time, making within-person variability a concern for assigning exposures in epidemiologic studies. We used data and urine samples from the North Carolina Early Pregnancy Study to characterize within-person variability. Women attempting pregnancy completed daily diaries and collected daily urine samples for up to 6 months preconception and 2 months postimplantation if they conceived. Urinary hCG was used to identify implantation day. Three daily urine specimens were selected from all menstrual cycles not resulting in clinical pregnancy, and preimplantation in conception cycles. Equal aliquots were combined to create cycle-specific pooled specimens (738 preimplantation cycles from 221 women). We also pooled 3 postimplantation urine aliquots (145 pregnancies). Concentrations of phenols and phthalate metabolites were measured by mass spectrometry, creatinine-adjusted, and replaced with LOD/ $\sqrt{2}$ if below the level of detection. Temporal variability and changes from preconception to early pregnancy were assessed using intraclass correlation coefficients (ICCs) and mean withinwoman differences. Preimplantation ICCs ranged from 0.36 for bisphenol-A and mono(2-ethyl-5-hydroxyhexyl) phthalate to 0.74-0.75 for dichlorophenols All other ICCs were between 0.38 and 0.59. All but one phthalate metabolite decreased from the preimplantation average to early pregnancy (within-woman percent changes: -2.8% to -59.9%, p<0.02 for all). Parabens and other phenols decreased -9.7% to -15.7% (p0.1 for all). Preimplantation reproducibility is good for dichlorophenols, and poor to fair for all other exposures, indicating that more than 3 repeat samples would better characterize women's exposure levels. Preconception phenol and phthalate levels may not accurately reflect early pregnancy levels.

0757 S/P

GENERALIZING RESULTS FROM A HIGH INCIDENCE SETTING TO ESTIMATE INTENTION-TO-TREAT AND PER-PROTOCOL EFFECTS OF HIV PRE-EXPOSURE PROPHYLAXIS IN A LOW-INCIDENCE TARGET POPULATION Jacqueline Rudolph* Jacqueline Rudolph, Stephen Cole, Adaora Adimora, (University of North Carolina at Chapel Hill)

Randomized controlled trials (RCTs) to determine efficacy of pre-exposure prophylaxis (PrEP) in preventing HIV are seldom conducted in US women because their lower HIV incidence requires impractically large studies. Results from trials in high incidence settings, like Sub-Saharan Africa, may not apply to US women because the populations differ on factors like age, sexual behavior, and adherence. We propose a strategy to evaluate PrEP efficacy using data from both settings to obtain 4 parameters: (1) intention-to-treat (ITT) and (2) per-protocol effects in Africa as well as the (3) ITT and (4) per-protocol effects generalized to the US. While per-protocol effects have previously been generalized, we add a new step to obtain the generalized ITT. To illustrate, we simulated two populations a RCT in 4000 African women and an open label trial of 500 US women. Both trials assigned participants to PrEP vs placebo in a 1:1 ratio. We simulated age as a baseline treatment effect modifier differing between the settings and condom use as a confounder of post-randomization adherence and HIV. Parameters (1) and (2) were estimated using standard implementation of g-computation for ITT and per-protocol effects. For (4), we adapted the approach for (2) by first taking 200 resamples of the African data (weighted by inverse odds of sampling) so the African population had a similar age distribution as the US target. For (3), we used the resamples from (4) and further let adherence be the levels observed in the US. We report RRs averaged over 500 simulations and the expected standard error (SE) for each estimator. ITT and per-protocol effects in Africa were 0.68 (SE: 0.11) and 0.33 (SE: 0.09). In the US, they were 0.48 (SE: 0.08) and 0.24 (SE: 0.08). The generalized effects were further from the null than in Africa because US women were more likely to be over age 22 (which was associated with a stronger PrEP effect) and to adhere (leading to a stronger ITT effect).

DIFFERENCES IN CONDITIONAL VERSUS MARGINAL ESTIMATES IN COLLAPSIBLE ESTIMATORS Ian Shrier* Ian Shrier, Annabelle Redelmeier, Russell Steele, Mireille Schnitzer, (Lady Davis Institute, McGill University)

A study reports "The logistic regression risk ratio (RR) is 2.00 after adjusting for confounders". Many readers would consider that this implies that treatment doubles the probability of a beneficial outcome. However, regression produces "conditional estimates", which "break" the association between the confounder and the outcome. Alternatively, marginal structural models create "marginal estimates", which "break" the association between the confounder and treatment. It is well-known that conditional and marginal estimates differ with a non-collapsible estimator (odds ratio) when the outcome is common. The purpose of this study is to show when these estimates differ for collapsible estimators (e.g. RR). We first simulated a marginal effect of binary treatment A on binary outcome Y (RR=2), with a binary confounder C causing A (RR=0.7) and Y (RR=0.3) for 1M subjects Results were unbiased in large samples for both regression (1.99) and marginal structural model (1.99) estimators. Next, we simulated data with the same causal effects as before, but added an interaction A*C on Y (RR=1.5). Conditional estimates yielded RR=2.00 for A, 2.00 for C, and 1.49 for A*C. The marginal structural model estimate was 2.66 for the effect of A on Y. Although the conditional estimates for A and A*C could be combined to obtain the correct marginal effect (which was 2.67 as expected), it is rarely done and many readers would misinterpret the RR=2 as a marginal effect. Further, because most studies are not powered for statistical significance of interaction term, interaction terms are often dropped from models. When marginal estimates are the objective, marginal estimators should be used even for collapsible estimators.

ARTEFACTUAL CHANGES IN MEASURES OF EFFECT OVER TIME: A CAUSAL APPROACH TO TREND ANALYSIS Luis Segura* Natalie Levy, Luis Segura, Julian Santaella, (Department of Epidemiology, Mailman School of Public Health, Columbia University)

Introduction. Trend analysis is a valuable tool for evaluating changes in exposureoutcome relationships over time and informing public health policy. However, this approach has been criticized for the possibility of producing artefactual findings. We aim to describe how misleading results can arise when measures of effect are compared over time and how this might be addressed. Methods. We use directed acyclic graphs and a sufficient component cause model to provide a theoretical understanding of how time trends in the measure of effect (e.g. changes in the risk ratio over time) can be seen even in the absence of a true causal effect of the exposure on the outcome. We illustrate this using the example of the effect of alternative tobacco product use on adolescent future intention to smoke. Using simulation, we demonstrate the possible impact of this bias and circumstances under which valid results might be obtained. Results. Under an assumption of no causal effect of the exposure on the outcome, artefactual trends in the measure of effect may be seen when the relationship between a confounder and the exposure and/or outcome changes over time. The magnitude of an apparent trend is dependent on the strength of the effect of the confounder on the exposure and/or outcome and the extent to which these relationships change with time. Valid trends can be estimated when the confounder is stable or can be held constant over time regardless of whether or not the exposure causes the outcome. Conclusion. Conducting a valid trend analysis requires a thoughtful understanding of the underlying causal structures and how this might change when populations are compared at different time points.

0760

MULTIPLE IMPUTATION BY CHAINED ENSEMBLE SUPERLEARNING Aaron Shev* Aaron Shev, Hannah Laqueur, Rose Kagawa, (University of California, Davis)

Background: Multiple Imputation by Chained Equations (MICE) provides a flexible framework in which nearly any model for the distribution of the missing data can be equipped for sampling values. This flexibility also leaves the model open to issues arising from misspecification. We propose an extension of MICE that uses SuperLearner, an ensemble predictive algorithm that weights predictions from several models, to improve upon the accuracy of MICE while simultaneously reducing chances for misspecification. Methods: In a simulation study, we evaluate the performance of MICE equipped with Super Learner as compared to MICE equipped with linear regression and MICE equipped predictive mean matching (PMM). Data is simulated under two situations that might result in a misspecified model: 1) when the outcome is a non-linear function of predictors, 2) when data is not missing at random. Data is simulated by randomly generating predictors, and an outcome is created as a function of the predictors with a random error term. Predictor and outcome values are then selected to be missing according to the parameters of the simulation. MICE is used to estimate the mean and variance of an outcome. Results: Our preliminary results showed SuperLearner performing on par or better than the regression method and nearly equal to PMM in scenarios where the outcome is a non-linear function of the predictors. In the case where values were not missing at random, SuperLearner yeilded a 10% reduction in the root mean square error, when compared to PMM, and a 1% reduction in the width of the confidence intervals. Conclusion: Extending MICE to use SuperLearner for sampling missing values provides a robust solution to the problem of misspecification when using the MICE algorithm to impute data. Our preliminary results have shown this approach has promising applications especially when there may be violations of the missing at random assumption.

0761

MULTILEVEL MADNESS Laura B. Balzer* Laura Balzer, Joshua Schwab, Mark J. van der Laan, Maya L. Petersen, (UMass-Amberst)

Multilevel (hierarchical) data structures are ubiquitous in Public Health and Medicine; patients are nested within hospitals, students within schools, and households within neighborhoods. In such settings, effect estimation is complicated by dependence arising from shared cluster-level factors (measured or unmeasured) as well as social and biological interactions between subunits with a cluster. In this work, we review common approaches to multilevel data, including generalized estimating equations, random effects models, and parametric fixed effects models. For each we discuss the underlying causal and statistical assumptions. We then present targeted maximum likelihood estimation (TMLE) for estimating effects of either cluster-level or individual-level exposures. In non-clustered data settings, TMLE has previously offered several advantages, including robustness to model misspecification, reduced variance, and integration of machine learning. Simulations are used to compare the methods, and each is applied to real data from an ongoing HIV prevention and treatment study. Our theoretical and practical results suggest TMLE with Super Learner is a promising alternative for estimating the effects in multilevel data settings.

EVALUATING MULTIPLE AIR TOXICS ASSOCIATED WITH PRETERM BIRTH USING PENALIZED ESTIMATORS Ghassan B Hamra* Ghassan B Hamra, Richard MacLehose, Amy Kalkbrenner, (Johns Hopkins University)

It is well known that particulate matter air pollution has negative impacts on health, including preterm birth. Less understood is the identity of the etiologically-relevant constituents, whether these are chemicals bound to particulate matter and/or other air pollutants arising from shared sources (e.g. vehicle traffic). Penalized estimators can be a useful tool to study the impact of multiple, highly correlated exposures on health. An example of this includes the hundreds of airborne metals and volatile organic compounds, termed air toxics, air pollutants that share sources and spatial gradients with particulate matter. Here, we assessed the relationship of air toxics measured as part of the National Air Toxics Assessment (1999, 2002, 2005) to preterm birth. Air toxics concentrations arising from the emissions-based model were linked to records of live birth using the census tract corresponding to the maternal address at the time of birth, including a complete cohort of births in Milwaukee, Wisconsin from 1998 to 2006 (n = 8,596, 9.4% born preterm). We considered three penalized estimators that have been proposed for use in these types of settings: least absolute shrinkage and selection operator (LASSO), ridge regression, and elastic net, the latter of which is a combination of the penalties applied in the former two. We compared these three estimators in theoretical and practical terms. When applied to mixtures of air toxics data, these three methods produced different results with substantively different conclusions for many air toxics. We suggest general approaches for moving forward with mixture data as well as with penalized estimators.

0763 S/P

USE OF RECORD LINKAGE TO IMPROVE COMPLETENESS OF POPULATION-BASED SURVEILLANCE DATA Lindsey M Duca* Lindsey Duca, Toan Ong, Amber Khanna, David Kao, Tessa Crume, (Colorado School of Public Health, University of Colorado Anschutz Medical Campus)

Record linkage of individual health care data is important to answer epidemiologic research questions. However when conducting studies that link data from existing healthcare systems, researchers are often faced with the challenge of identifying records in a dataset that refer to the same individual. Since individual healthcare systems do not share common identifiers, record linkage and de-duplication is necessary to implement. We will review our novel record linkage algorithm and linkage results in order to provide a platform to conduct population-based surveillance of chronic diseases. A population-based congenital heart disease (CHD) surveillance system of patient's age 11 to 64, was created through the cross-linkage of multiple electronic data sources across Colorado. Record linkage and deduplication was performed between five single sources used for case ascertainment; healthcare facilities, safety-net clinics, and claims data. Our record linkage method consists of three main steps pre-processing, encryption, and probabilistic record linkage. Our method extends upon the Fellegi-Sunter scoring technique while also correcting for missing data problems. The performance of our algorithm was evaluated using linkage performance measures: precision, recall and f-measure. We identified a total of 24,907 CHD cases from five primary case findings sources; Denver Health (n=495), Kaiser Permanente (n=2,330), UCHealth (n=11,234), Centura Health (n=3,270), and All Payer Claims (n=7,578). Using first name, last name, date of birth, social security number, and street number as match variables, with a missing data treatment of weight redistribution to perform record linkage and de-duplication, we identified 19,846 unique CHD cases (~5,000 cases were duplicates). Record linkage opens up new opportunities for analyses in the field of epidemiology and provides an invaluable tool to assess resource utilization in any capacity when examining multiple healthcare systems.

0764

ESTABLISHING A THREE-GENERATION PROSPECTIVE STUDY: BOGALUSA DAUGHTERS Emily Harville* Emily Harville, Lydia Bazzano, Dorothy Breckner, (Tulane University)

Background: The Developmental Origins of Disease hypothesis has spurred increased interest in how prenatal exposures affect lifelong health, while mechanisms such as epigenetic transfer allow for the possibility of multigenerational influences on health. Such factors are not well captured within conventional epidemiologic study designs. We explored the feasibility of collecting information on the offspring and grand-offspring of a long-running study. Methods The Bogalusa Heart Study is a long-running study of life-course cardiovascular health in a semirural, biracial population (65% white and 35% black). Female participants who had previously provided information on their pregnancies were contacted to obtain contact information for their daughters aged 12 and older. Daughters were then contacted to obtain reproductive histories, and invited for a clinic or lab visit to measure cardiovascular risk factors. Results: The recruitment goal of 240 participants within one year was met. 63% had a full clinic visit, 22% a phone interview only, and 14% a phone interview and agreed to visit a commercial lab located near to them. 42% of the daughters were black, 58% white. Mean and median age at interview was 27, with 17% under the age of 18. Mean age at menarche was 12.7, median 12.0, range 9-20. Mean age at first pregnancy was 21. 34% of women 18+ were nulligravid, while most had 1 or more pregnancies. The range of the grandchildren's age was 0-33 years old; mean age of the youngest child for a given mother was 5.2 (median 2.6) and of the oldest was 8.8 (median 7.8). Mean birthweight in generation 3 was 3278 g, range 2270 to 4117. Median gestational age was 40 weeks, range 34-42. Conclusions: It is feasible to contact the children of participants even when participants are adults, and initial information on the grandchildren can also be determined in this manner.

0765 S/P

BIAS IMPLICATIONS USING INVERSE PROBABILITY WEIGHTING IN QUANTITATIVE BIAS ANALYSIS Rebecca J Song* RebeccaJ Song, Julie M Petersen, Takara L Stanley, Matthew P Fox, (Boston University School of Public Health, Department of Epidemiology)

It is unclear if inverse probability weighting (IPW) can be used to control for confounding after exposure or outcome misclassification correction using quantitative bias analysis (QBA) methods, and yield unbiased effect estimates. We simulated 50 binary exposure (E), confounder (C1), and disease (D) scenarios in 106 subjects. Each simulation used risk differences (RD) and prevalences (Pr) where RDED was fixed at 0.2, unless it was being varied. The following parameters were varied: RDED=0.1, 0.3, or 0.5; RDEC1= -0.2, -0.1, 0.3, 0.4, or 0.6; RDDC1= -0.2, -0.1, 0.1, 0.4, or 0.6; Pr(C1+)=.1, .3 or .5; Pr(E+|C1)=.1, .2 or. 5; Pr(D+|C1-,E-)=.15, .3 or .5. We evaluated 8 scenarios with a second confounder (C2) where, RDEC2 and RDDC2 = -0.2, -0.1, 0.4, 0.5 and Pr(C2+)= .2. We simulated a nondifferentially misclassified exposure (Emis) or disease (Dmis), separately, using Bernoulli trials with sensitivity of 0.85 and specificity of 0.9. We then used standard simple QBA methods to correct for misclassification. Lastly, we calculated the predicted p(E+), using the corrected Emis with C1 (and C2) as the independent variable(s). Weights were applied as 1/p(E+) among E+ and 1/[1-p(E+)] among Eto adjust for confounding. We compared the true RD of E and D (RDED-True) to the corrected, weighted RD (RDED-Weight) and the misclassified RD (RDED-Mis). In 25 exposure misclassification scenarios, 1 resulted in a RDED-Weight with >10% bias. In 25 outcome misclassification scenarios, we saw increasing bias in 7 scenarios with larger and positive RDDC1 or RDDC2 (>10-26 % bias). When RDEC1 was - 0.2 and RDDC1 was 0.1, there was ~18% bias with either exposure or outcome misclassification. All RDED-Weight were less biased than the observed RDED-Mis. Our simulations show that IPW after misclassification correction can produce unbiased estimates if the disease-confounder relation is moderate in strength. Models with positive and negative RDs with the confounder may result in biased estimates .

TRANSLATABLE SENSITIVITY ANALYSIS IN EPIDEMIOLOGIC STUDIES Neil J Perkins* Neil Perkins, Enrique F Schisterman, (NICHD/DIPHR)

P-values in epidemiology have become increasingly controversial. A proposed alternative is bits of information. Bits of information are -log2(p) transformed p-values which relay an easier to interpret metric of the observed data under the null model. A p-value of 0.05 is equivalent to 4.3 bits of information against the null model and conveys an observation about as surprising as 4 tails from 4 coin flips. P-values 5 bits for pregnancy and >3 for live birth. These analyses show that it would remain surprising that preconception low dose aspirin would have shown no effect on pregnancy had pregnancy status been completely observed and how bits of information can be an easy to interpret tool to convey surprisal in the context of early withdrawals.

0767 S/P

SIMULATING DIRECTED ACYCLIC GRAPHS TO ADDRESS LIMITATIONS IN TRADITIONAL EPIDEMIOLOGICAL METHODS Joshua Havumaki* Joshua Havumaki, Marisa Eisenberg, (University of Michigan, Department of Epidemiology)

Directed acyclic graphs (DAGs) are used in epidemiological studies to help provide unbiased measurements of the effect of an exposure on an outcome. Compartmental models (CMDs) simulate flows between disease states on the population level and can be used to explore different counterfactual scenarios. In this study, we conduct two distinct modeling exercises to examine the utility of methods that convert DAGs to CMDs. In general, we show how a DAG derived CMD can be used to (1) conduct multifaceted sensitivity analyses and (2) relax statistical assumptions. Our first example is taken from chronic disease literature. We simulate the obesity paradox or the seemingly protective effect of obesity on mortality among a diseased population with shared risk factors (i.e. the protective effect of obesity on mortality among diabetic smokers). Specifically, we use a CMD derived from a published DAG to examine how epidemiological data can inform CMD parameterization and how the proposed causal mechanism (i.e. CMD structure) can lead to the obesity paradox. Our second example is taken from infectious disease literature. A key assumption in traditional causal inference is that the outcome of one individual does not depend on the exposure of other individuals i.e. no interference between units. In this exercise, we conduct a simulation study and quantify the direct and indirect effects of cholera vaccination using a CMD derived from a simplified DAG. We first simulate a cluster-randomized control trial to quantify the effects using traditional methods. We next examine how epidemiological data can inform our CMD parameters Finally, we examine counterfactually how effects of vaccination change under varying levels of interference between clusters. Ultimately, we aim to develop an operationalized workflow to use CMDs derived from DAGs to address limitations in traditional statistical methods.

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A NOVEL BIAS OFFSET METHOD FOR ADJUSTMENT OF

UNMEASURED CONFOUNDERS Onyebuchi A Arah* Onyebuchi A Arah, , (UCLA Fielding School of Public Health, Los Angeles, CA)

Uncontrolled confounding is a critical threat to identifying and estimating causal effects. Expectedly, investigators must make the untestable assumption of no uncontrolled confounding given the covariates they measured and controlled for in their study. When this assumption fails, as if it often does in observational studies, investigators are encouraged to conduct bias analysis to quantify how sensitive their findings are to unmeasured confounders. A common approach has been to apply bias formulas externally to the biased effect estimates obtained from data analysis. Often, the external application of bias formulas can be quite involved for new investigators or in complex data settings. Therefore, this study introduces a simple bias offset method that intuitively adapts external bias formulas for use in the generalized linear model framework. We show how this novel generalized bias offset method is based on creating and applying a bias offset variable that is a function of (i) the association of the unmeasured confounder with the outcome ad justed for the exposure and measured confounder, and (ii) the probability model of the unmeasured confounder conditional on the exposure and measured confounders. It is programmable using data steps during planned analysis of record level data in standard software, thus avoids cumbersome external programming seen with external bias formulas. The bias offset variable can then be used with appropriate link functions in mean, risk and rate difference or ratio regression models. Simultaneous bias adjustments of the coefficients of the exposure and the measured confounders can be achieved with one offset variable. Bootstrapping can be used to obtain bias-adjusted CIs It also extends into probabilistic bias analysis where bias parameters are sampled from distributions. Simulated data examples and applications based on Evans cohort data are provided using user-friendly SAS, Stata, SPSS and R codes

REPRODUCTIVE CHARACTERISTIC ASSOCIATIONS WITH LEUKOCYTE TELOMERE LENGTH Jacob Kresovich* Jacob Kresovich, Christine Parks, Dale Sandler, Jack Taylor, (NIEHS)

Background: Telomeres are hexanucleotide repetitive sequences located at the ends of chromosomes that protect against chromosomal shortening during DNA replication. Studies have observed that leukocyte telomere length is longer in females and that telomerase, the enzyme responsible for replenishing telomere length, may be activated by estrogen. We hypothesized that women with reproductive characteristics associated with greater estrogen production will have longer telomeres. Methods: We performed analyses in a case-cohort (n= 1,081) subsample of the Sister Study, a prospective study of risk factors for breast cancer. Blood samples were collected at enrollment when women were cancer-free; 353 women were diagnosed with breast cancer through follow-up but breast cancer was unrelated to telomere length. Relative telomere length (rTL) was measured by multiplex qPCR. Age at menarche, parity, breastfeeding, and menopausal status were self-reported at baseline. Linear regression models were adjusted for age, race, paternal age, physical activity, hormone use and case status. Results: In mutually ad justed models. rTL increased for each year of delayed menarche onset ($\beta = 0.02$, 95% CE 0.00, 0.03), longer breastfeeding duration (per 12 months, $\beta = 0.006, 95\%$ CI: 0.00, 0.01) and postmenopausal status (\beta= 0.06, 95% CI: -0.01, 0.13). rTL was inversely associated with increasing parity ($\beta = -0.02$, 95% CI: -0.03, -0.00). We sought to replicate these findings in a smaller study of early cohort participants but were unable to detect any associations. Conclusions: We observed reproductive characteristics were associated with rTL, though effect estimates were modest in size. Lack of reproducibility may be due to lower assay precision in the earlier subsample. Although we observed associations, they were generally not in the hypothesized direction. We conclude that reproductive characteristics linked to estrogen production may not explain gender differences in leukocyte telomere length.

RISK OF STROKE AMONG SURVIVORS OF THE SEPTEMBER 11, 2001 WORLD TRADE CENTER DISASTER Shengchao Yu* Shengchao Yu, Howard Alper, Angela Nguyen, Robert Brackbill, (New York City Department of Health and Mental Hygiene)

September 11 disaster (9/11) related psychological stress and dust cloud exposure were both shown to increase risk of developing several physical conditions. However, risk of stroke among 9/11 survivors has not yet been examined. Using four waves of longitudinal data from the World Trade Center (WTC) Health Registry surveys, this study investigated the association between 9/11-related posttraumatic stress disorder (PTSD), dust cloud exposure, and subsequent development of stroke. This study included 42,527 adult enrollees in the WTC Health Registry who were followed longitudinally up to 14 years after 9/11. Stroke was defined as self-reported physician-diagnosed first stroke, reported between study enrollment (2003-2004) and a follow-up survey. Adjusted hazard ratios (AHR) were estimated to assess associations between 9/11-related PTSD, dust cloud exposure, and risk of developing stroke. Incidence of stroke was significantly higher among those with 9/11-related PTSD (3.53 vs. 1.64 per 1,000 person-years, p<0.001) or intense dust cloud exposure (2.33 vs. 1.77 per 1,000 person-years. p=0.040) than those without; and it was even higher for those who had both than those who reported neither (4.30 vs. 1.61 per 1,000 person-years, p<0.001). While adjusting for socio-demographic characteristics and other risk factors of stroke, participants with PTSD had an increased risk of developing stroke (AHR 1.69, 95% CI 1.42-2.02); and participants with intense dust exposure on 9/11 also had an increased risk of developing stroke (AHR 1.29, 95% CI 1.09-1.53). Our results also indicated that factors related to older age may have larger impact on the risk of developing stroke than 9/11-related PTSD among the older age group (65+). Findings from this study suggest that individuals with 9/11-related PTSD and/or intense dust exposure may have an increased risk of developing stroke.

0781 S/P

WEATHER AND RISK OF MIGRAINE HEADACHE ONSET AMONG MIGRAINEURS Wenyuan Li* Wenyuan Li, Suzie Bertisch, Elizabeth Mostofsky, Catherine Buettner, Michael Rueschman, Murray A. Mittleman, (Harvard T.H. Chan School of Public Health)

Rationale: Migraine is a common recurrent neurologic disorder that affects about 15% of American adults. Although migraineurs often attribute the headache onset to weather conditions, few studies have used objectively recorded meteorological data to quantify the association, and have had mixed results. Method: We conducted a prospective cohort study (2016-17) among 101 adults in the Boston area with episodic migraine. For 6 weeks, participants wore actigraphs and completed daily questionnaires to record migraine headache onset, duration, and other lifestyle factors. We obtained daily average temperature, relative humidity, and barometric pressure measured at Boston Logan Airport Weather Station. We conducted a nested case-crossover analysis matched on day of week to examine the association of weather with risk of migraine headache onset. By design, each participant was compared to themselves on headache days and referent days. We used a conditional logistic regression model and adjusted for season using sine and cosine of day of the year. Results: The mean age was 35 (standard deviation (SD) 12) years and 88% were women. There were 884 migraine headache days. During follow up, mean(SD) temperature was 56.3(16.0) °F, relative humidity was 67.5(16.6) %, and barometric pressure was 30.0(0.2) inHg. An interquartile range lower daily average temperature (10°F) and higher relative humidity (27%) on the day of migraine headache were associated with 4% (95% CI 0.94, 1.15) and 11% (95% CI 0.98, 1.25) higher odds of migraine headache onset compared to other days. The association for temperature appeared stronger in the cold season (October-March), while the association for relative humidity appeared stronger in the warm season (April-September). Barometric pressure was not associated with migraine headache onset. Conclusions: Lower temperature but higher relative humidity were associated with higher incidence of migraine headache. The associations appeared to differ by season.

THE ASSOCIATION BETWEEN MATERNAL BITTER TASTE SENSITIVY AND CHILD VEGETABLE INTAKE Heather McGrane Minton* Heather McGrane Minton, Susan Groth, David Q. Rich, Ann Dozier, Diana Fernandez, (St. John Fisher College)

Background: The majority of Americans have vegetable intake below the recommended amounts per the United States Department of Agriculture Food Pattern Recommendations. Bitter taste sensitivity, the ability to detect bitter taste, has been shown to influence vegetable intake such that adults with bitter taste sensitivity (tasters) eat fewer vegetables than adults without bitter taste sensitivity (non-tasters). Children's vegetable intake may be influenced by their bitter taste sensitivity, as well as their mothers' sensitivity, as mothers are typically responsible for child's food intake. The goal of our study was to examine whether bitter taste sensitivity (mother or child) was associated with vegetable intake in 4-6 year olds. Methods: For our cross-sectional study, we recruited 168 mother-child dyads from an upstate New York community. We assessed taster status phenotype, demographic variables, and maternal report of vegetable intake (self and child) using food frequency questionnaires. Results: Using linear regression models, we found no differences between mother's taster status and the child's mean daily servings of vegetables (intake) and mean number of types of vegetables consumed in the past year (variety) (β=-0.16, 95% CI: -0.57, 1.81; β=-0.86, 95% CI: -1.90, 0.19, respectively). Of note, mother's mean daily servings of vegetables was associated with child's vegetable intake (β=0.45, 95% CI: 0.28, 0.61) and variety (β=0.50, 95% CI: 0.07, 0.93) after adjusting for mother's taster status. Similar estimates were found for child taster status and child vegetable intake and variety. Conclusion: Mother's own vegetable intake, regardless of her own taster status, can override child innate preferences based upon bitter taste sensitivity. Longitudinal studies exploring the association between bitter taste sensitivity and child's vegetable intake are needed to examine mother's prenatal vegetable intake and postnatal mother and child eating patterns.

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ARTIFICIAL SWEETENED BEVERAGES AND LIVER FUNCTION SCORES AMONG WOMEN WITH PRIOR GESTATIONAL DIABETES Stefanie N. Hinkle* Stefanie N. Hinkle, Shrisit Rawal, Anne Ahrendt Bjerregaard,

Steranie N. Hinkle^{*} Steranie N. Hinkle, Shristi Rawai, Anne Anrendi Bjerregaard, Thorhallur Ingi Halldorsson, Sjurdur Olsen, Mengying Li, Sylvia H. Ley, Jing Wu, Yeyi Zhu, Liwei Chen, Cuilin Zhang, (Eunice Kennedy Shriver National Institute of Child Health and Human **D**evelopment, NIH)

Objective: Artificial sweetened beverages (ASB) have been purported as an alternative to sugar sweetened beverages, but the metabolic effects of ASBs are lacking. We aimed to examine associations of ASB intake and liver function among women with prior gestational diabetes (GDM) who are at high risk for liver dysfunction. Methods: We included 566 women from the Danish National Birth Cohort (1996-2002) with GDM at the index pregnancy who completed a clinical exam 9-16 years later for the Diabetes & Women's Health Study (2012-2014). Liver assays included alanine aminotransferase (ALT), aspartate aminotransferase (AST), and gamma-glutamyltransferase (GGT) measured in fasting blood collected at the clinical exam. Calculated liver function scores included fatty liver index (FLI), hepatic steatosis index (HSI), and non-alcoholic fatty liver disease-liver fat score (NAFLD-LFS). A food frequency questionnaire on past year habitual intake was completed at the clinical exam. We estimated adjusted relative risks [RR (95% CI)] for elevated liver scores by ASB quartiles (Q). To investigate reverse causality, we limited the analysis to 'metabolically healthier' women without obesity, prediabetes, diabetes, or elevated triglycerides at follow-up (n=21 I). Results: At follow-up, 43.5%, 54.6%, and 36.6% of women had elevated FLI (≥60), HSI (≥36), and NAFLD-LFS (>-0.64), respectively. Higher ASB intake was associated with increased risk for elevated FLI [RR=2.1 (1.6-2.9); p-trend<0.001], HSI [RR=2.0 (1.5-2.5); p-trend<0.001], and NAFLD-LFS [RR=1.6 (1.1-2.3); p-trend=0.11]. Among 'metabolically healthier' women, 9.5%, 12.9%, and 5.7% had elevated FLI, HSI, and NAFLD-LFS, respectively. Higher ASB intake was associated with elevated FLI [RR=9.7 (1.5-62.0); p-trend<0.001] and HSI [RR=5.1 (1.6-16.4); ptrend=0.008]. Conclusion: In women with prior GDM, past year ASB intake was associated with an increased risk for elevated liver scores reflecting abnormal liver function.

ESSENTIAL METALS AND METABOLIC SYNDROME: RESULTS FROM THE HISPANIC COMMUNITY HEALTH STUDY/STUDY OF LATINOS (HCHS/SOL) Catherine Bulka* Catherine Bulka, Daniela Sotres-Alvarez, Victoria W. Persky, Ramon A. Durazo-Arvizu, Yasmin Mossavar-Rahmani, Martha L. Daviglus, Maria Argos, (University of Illinois at Chicago)

Introduction: Experimental data indicate copper, manganese, selenium, and zinc are required for lipid and carbohydrate metabolism and to defend against oxidative stress. To date, few epidemiologic studies have evaluated the role of these minerals in the development of metabolic syndrome. Methods: Using data from 15,081 U.S. Hispanic/Latino adults (52% women, ages 18-74 years) enrolled in the HCHS/SOL, we assessed cross-sectional and prospective associations of dietary intakes, supplement use, and total intakes (summed supplemental and dietary amounts) of copper, manganese, selenium, and zinc with metabolic syndrome and its individual component conditions. The National Cancer Institute method was used to derive usual intakes of minerals based on up to two 24-hour dietary recalls and a 30-day supplement use interview conducted at baseline. Follow-up visits (~6 years) are ongoing, with preliminary data available for 5,090 individuals. Prevalence and incidence rate ratios were estimated with adjustments for energy intake and other potential confounders, accounting for the complex survey design. Results: The prevalence of metabolic syndrome was 32%. The highest quartiles of usual total manganese and zinc intakes were associated with a lower prevalence of metabolic syndrome (PR=0.84, 95% CI: 0.74-0.96 for manganese; PR=0.89, 95% CI: 0.79-1.00 for zinc) relative to the lowest quartiles. These associations were primarily driven by linear dose-response relationships with low HDL cholesterol and abdominal obesity (all p-trend <0.01). Compared to dietary intakes, estimates for manganese and zinc supplementation (used by 18% and 20%, respectively) were more strongly related to lower metabolic syndrome prevalence. However, the observed associations did not persist prospectively. Conclusions While Hispanics/Latinos may be altering intakes of selected minerals in response to adverse cardiometabolic health, neither supplementation nor dietary amounts correspond with reductions in metabolic syndrome risk.

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LEPTIN CONCENTRATION IN HUMAN BREAST MILK AND INFANT BODY COMPOSITION: RESULTS OF THE ULM BIRTH COHORT STUDY AND THE ULM SPATZ HEALTH STUDY Chad A. Logan* Chad A. Logan, Wolfgang Koenig, Viola Walter, Hermann Brenner, Dietrich Rothenbacher, Jon Genuneit, (Ulm University)

Background: Leptin in human breast milk has been implicated as a potential regulator of early-life metabolic programming. To add to current knowledge, we investigated the influence of breast milk leptin on child body composition up to 2 years within two independent birth cohorts. Methods: The Ulm Birth Cohort Study (UBCS) and the Ulm SPATZ Health Study each consist of approximately 1,000 newborns and their mothers recruited from the general population in the University Medical Center Ulm, Germany from 2000-2001 and 2012-2013, respectively. Leptin concentration was measured in skimmed breast milk collected around 6 weeks postpartum in both cohorts and at 6 months and 1 year among long-term breastfeeding mothers in the SPATZ cohort only. Age adjusted infant weight to length ratio z-scores (WTLz) were calculated from measurements recorded during regular pediatric appointments at about 5 weeks, 4 months, 6 months, 1 year, and 2 years postpartum. Linear regression was used to investigate associations of categorized (quintiles) leptin concentration with WTLz adjusting for maternal prepregnancy BMI, age, breastfeeding frequency, and preceding period WTLz. Results: Breast milk leptin concentrations were available for 754 and 668 mothers of singleton infants in UBCS and SPATZ, respectively. Overall median leptin concentration was lower (p-value <0.001) in UBCS [median (IQR): 175.0 (270.2)] compared to SPATZ [266.5 (346.0)]. In both cohorts, 6 week leptin concentrations were inversely associated (p-trend <0.001) with 5 week WTLz [β comparing 5th to 1st quintile: -0.35, (95% CI -0.57 to -0.12) for UBCS and -0.35 (-0.60 to -0.11) for SPATZ]. No significant associations were observed with WTLz thereafter. Conclusions: We observed strong evidence implicating breast milk leptin as a potential mediator of concurrent early infant growth up to 6 weeks postpartum but not for concentrations in more mature breast milk (preliminary results, data not shown) or with later growth periods.

ASSOCIATION BETWEEN PHASE ANGLE FROM BIOELECTRICAL IMPEDANCE ANALYSIS AND LEVEL OF PHYSICAL ACTIVITY: SYSTEMATIC REVIEW AND META-ANALYSIS Rita Mattiello* Rita Mattiello, Eduardo Mundstock, Marina Azambuja Amaral, Rafael R. Baptista, Edgar E. Sarria, Rejane Rosaria Grecco dos Santos, Carlos Alberto S. Rodrigues, Gabriela Carra Forte, Luciano Castro, Alexandre Padoin, Ricardo Stein, Lisiane Marçal Perez, Victoria Praetzel, Luiza Tweedie Preto, Wilson Cañon Montañez, Patrícia Klarmann Ziegelmann, Rita Mattiello, (Pontifícia Universidade Católica do Rio Grande do Sul/Universidade Federal do Rio Grande do Sul)

Background: physical activity can be associated with bioimpedance phase angle. Methods: We conducted a systematic review and meta-analysis to assess the association between physical activity and bioimpedance phase angle (BPA). MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials, SciELO, LILACS, SPORTDiscus, Scopus and Web of Science were searched in. Two reviewers assessed independently study eligibility and risk of bias. We synthesized study results using a random-effects model. The association between physical activity and BPA was assessed considering study design. Results: Nine studies, counting a total of 575 participants were included in the meta-analysis. Crosssectional studies: the active subjects presented a higher BPA mean value when compared to controls (MD=0.70; 95%CI: 0.48 to 0.92, P<0.001) with low heterogeneity (I2 = 0%; P=0.619). Longitudinal studies (clinical trials or follow-up): the mean of BPA differences from baseline are significantly higher for the active group when compared with the control group (MD=0.30,95%CI: 0.11 to 0.49, P=0.001) with low heterogeneity (12=13%, P = 0.331). No evidence of publication bias was found and the overall risk of bias was moderate to high. Conclusions: Physical activity has a positive association with bioimpedance phase angle; these results reinforce the importance of including exercise routinely in health care, both for disease prevention and for a better prognosis in chronic diseases.

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MEASURES OF OVERALL DIET AS PREDICTORS OF BODY FAT PERCENTAGE AND BMI IN YOUNG ADULT WOMEN Sofija Zagarins* Sofija Zagarins, Alayne Ronnenberg, Elizabeth Bertone-Johnson, (Springfield College)

There is growing awareness of the importance of studying overall diet as a way to address the complex interrelationships between foods and nutrients, especially in the context of chronic conditions like obesity that have many contributing factors. However, existing studies of the relationship between diet and body composition have largely focused on associations with individual nutrients or dietary components. Furthermore, most of these studies focused on body mass index (BMI) rather than the more accurate body fat percentage (BF%) measure, and no studies have been done in young adult women in the US. To determine whether measures of overall diet are associated with BF% and BMI, we assessed diet using a modified version of the Harvard food frequency questionnaire in a cross-sectional study of 288 women aged 18-30. BF% was determined using dual-energy x-ray absorptiometry. Overall diet measures included the Recommended Food Score (RFS) and the Alternate Healthy Eating Index (AHEI) which consists of eight dietary components, such as fruits and vegetables, associated with lower risk for chronic disease. Vegetarian and vegan diet patterns were also examined. Neither the AHEI nor the RFS were associated with BF% in multiple linear regression adjusting for caloric intake and other variables associated with body composition (AHEI: 6±SE: -0.063±0.050, p=0.21; RFS: β±SE: -0.12± 0.09, p=0.18). Vegetarian and vegan diet patterns were also not associated with BF% (vegetarian: $\beta \pm SE$: 1.2±1.5, p=0.42; vegan: $\beta \pm SE$: -2.3±3.9, p=0.56). Results for the AHEI, RFS, and vegetarian and vegan status were similar for BMI. These null findings suggest that established diet index scores and diet patterns defined by meat intake may not predict BF% and BMI in young adult women.

THE SILENT EPIDEMIC OF OBESITY IN THE GAMBIA: EVIDENCE FROM A NATIONWIDE POPULATION-BASED CROSS SECTIONAL HEALTH EXAMINATION SURVEY Bai Cham* Bai Cham, Shaun Scholes, Linda Ng Fat, Nora E Groce, Omar Badjie, Jennifer S Mindell, (University College London(UCL))

Introduction Non-communicable diseases (NCDs) are increasing in Sub-Saharan Africa (SSA). NCDs account for 70% of global deaths; 80% of these occur in low and middle income countries. A great concern is the rapid increase of obesity in SSA. A 1996 study revealed a double burden of over- and under-weight in The Gambia. We recently demonstrated a high prevalence of hypertension in The Gambia with a greater burden in rural areas and the obese. We examined overweight and obesity prevalence and the associated risk factors in Gambian adults. Methods This study is based on a random nationally-representative sample of 4111 adults aged 25-64 years (78% response rate) collected in 2010 using the WHO STEPwise survey methods. We categorised body mass index (BMI) from measured height and weight to determine overweight and obesity (WHO thresholds). Analysis was restricted to non-pregnant participants with valid weight and height measurements (n=3533). All analysis were weighted for non-response and adjusted for complex survey design using STATA14. We conducted multivariate regression analysis to identify factors associated with overweight/obesity. Results Two fifths of adults in The Gambia were overweight or obese with a higher prevalence in women (17.0%, 95%CI 14.7-19.7 vs 8.1% in men, 6.0-11.0), and urban residents. Urban residence (Ad justed Odds Ratio 3.3, 95%CI 1.8-6.0), abdominal obesity (3.7, 2.2-6.1), higher education (1.96, 1.19-3.25), low fruit and vegetable intake (1.8, 1.1-3.0), and age were the most significant predictors of overweight/obesity among men. Similarly, urban residence (4.1, 2.4-6.8), abdominal obesity (2.6, 1.7-3.9), higher education (2.4, 1.2-4.8), hypertension (1.6, 1.1-2.3) and age were significantly associated with overweight/obesity in women. Conclusion Preventive strategies should be directed at raising awareness on the risk factors, discouraging harmful beliefs on weight, and the promotion of healthy diet and physical activity.

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ADIPOCYTOKINES AND INFANT EATING BEHAVIORS Hyojun* Hyojun Park, Rajeshwari Sundaram, Erin M. Bell, Griffith Bell, David A. Lawrence, Edwina Yeung, (NICHD)

Objective Adipocytokines are shown to play a role in regulating food intake, but their role in the development of child eating behaviors is unclear. We examined how adipocytokines are prospectively associated with eating behaviors among infants from a population-based birth cohort. Methods We included 2400 singletons and 1188 twins from the Upstate KIDS Study using punches from newborn dried blood spots to measure biomarkers. Adipocytokines known to be related to food intake include brain-derived neurotrophic factor (BDNF), adiponectin, complement factor D, C-reactive protein (CRP), and resistin. Biomarkers were measured by multiplex technology on a Luminex analyzer and log-transformed. Mothers reported infants' appetite at 12 and 18 months and pickiness at 18 months which were then dichotomized, respectively. Logistic regression for singletons and conditional logistic regression for twins were used to estimate the odds of having poor eating behaviors after adjusting for a priori selected confounders. Results Singletons with higher BDNF were less likely to have poor appetite at 12 months (AOR: 0.75 per log-unit increase, 95%CI: 0.60, 0.93). Higher CRP among singletons was associated with poor appetite at 12 months (1.13; 1.01, 1.26). However, at 18 months, no associations were observed with appetite or pickiness. None of the other adipocytokines were prospectively associated with eating behaviors. In twin models matched on maternal-level characteristics within pairs by design, no differences were detected. Conclusion BDNF has been reported to suppress ad libitum food intake, but we observed that a higher neonatal BDNF level was prospectively associated with better appetite among singletons, while the association was attenuated as infants grew. Higher neonatal CRP was initially associated with lower appetite as expected, but the association was attenuated with age. Our results suggest that adipocytokines may not necessarily predict long-term development of eating behaviors.

PRECONCEPTION AND EARLY PREGNANCY MATERNAL VITAMIN D AND GENOME WIDE CORD BLOOD DNA METHYLATION Sunni L Mumford* Sunni Mumford, Weihua Guan, Keewan Kim, Robert Silver, Michael Y Tsai, Lindsey Sjaarda, Neil Perkins, Lindsay Levine, Enrique F Schisterman, Edwina H Yeung, (Epidemiology Branch, DIPHR, NICHD)

Background: Maternal vitamin D deficiency has been associated with adverse perinatal outcomes and later offspring health problems. DNA methylation has been proposed as a potential mechanism for these associations. Therefore, our objective was to conduct an epigenome wide association study to examine DNA methylation in cord blood and maternal serum 25-hydroxy-vitamin D. Methods: Methylation was examined using the Infinium MethylationEPIC BeadChip in DNA extracted from cord blood of 375 singletons from the EAGeR Trial (2007-2011). Maternal levels of serum vitamin D were measured preconception and at 8 weeks' gestation by ELISA. Linear mixed models were used to test for associations between maternal vitamin D (at preconception and early pregnancy) and methylation $\beta\mbox{-values}$ at each CpG site (>850,000) with adjustment for maternal age, race, infant sex, smoking, and estimated cell count (using a cord blood reference), while correcting for batch effects with random effects. Results: Suggestive associations (p30 ng/mL to insufficient ≤30 concentrations), though none were associated at the Bonferroni corrected genome wide significance level (p<6x10-8). Two CpGs (not near any known functional gene regions) also showed suggestive associations (preconception cg07143468, β=-0.01; early pregnancy cg05902656, β=-0.02). Conclusions: Maternal preconception and early pregnancy vitamin D status were largely not associated with methylation levels in cord blood. Nevertheless, TRAK1 has been previously identified as a vitamin D target gene with vitamin D receptor binding loci upstream of the gene and its expression responsive to incubation with 1,25(OH)D3 in both monocytes and adipocytes. Whether levels could induce methylation differences have yet to be determined.

THE ASSOCIATION OF PROCRASTINATION WITH ADULT WEIGHT GAIN IN JAPANESE MALE WORKERS Akihiko Narisada* Akihiko Narisada, Kohta Suzuki, (Institute for Occupational Health Science, Aichi Medical University)

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Background: Time inconsistency, including procrastination, is related to obesity. However, there are a few studies assessing the relationship between time inconsistency and adult weight gain. Objective: The purpose of this study is to examine the relationship between procrastination and adult weight gain in Japanese male workers. Methods: The study participants were 885 Japanese male workers (515 white-collar workers) in a manufacturing company, aged 35 - 64 years, who had health checkups in 2015. According to response to the question "When did you do homework assignments in the vacation in your school days?", we measured the degrees of procrastination. Procrastination was defined as a participant who did homework at the "very end of the vacation". Weight change during adulthood was calculated as the difference between measured current weight and recalled weight at the age of 20 years. Using multiple logistic regression models, we estimated the odds ratio (OR) for adult weight gain (more than 10kg). Results: There were no significant relationships between procrastination and adult weight gain in whole workers. However, among white-collar workers, procrastination was associated with adult weight gain after adjusting for age, education, long working hours, smoking, drinking and physical activity (OR: 1.85, 95%CI: 1.04-3.29, p=0.037). On the other hand, such significant relationships were not observed among blue-collar workers (OR: 0.73, 95%CI: 0.33-1.64, p=0.447). Conclusion: Japanese male white-collar workers, but not blue-collar workers, who did homework at the very end of the vacation in school days had an increased risk of adult weight gain. Further study is needed to clarify relationships among procrastination, white-collar works and adult weight gain.

COMPETING RISKS SURVIVAL BIAS AMONG U.S. ASTRONAUTS Robert J Reynolds* Robert J Reynolds, Steven Day, (Mortality Research & Consulting, Inc.)

In comparison to the general population, U.S. astronauts have been demonstrated to have greatly reduced risk of death by natural causes. However, astronauts have also historically experienced much greater risk of death from accidental causes. As the broad categories of external and natural causes are mutually exclusive, it is possible that early deaths from external causes are biasing subsequent survival from natural causes such that survival hazards and other related summary measures of astronaut mortality are overly-optimistic. To investigate whether or not such bias is present in the cohort of U.S. astronauts between 1959 and 2017, we first characterized the pattern of mortality among astronauts to determine if it is sufficient to cause a bias. We then looked for systematic differences in baseline covariates between the two groups of astronauts defined by cause of death (external or natural). Finally, we compared survival curves generated using standard Kaplan-Meier analyses to those generated using competing risks methodology. The results show that the pattern of death from the two competing causes have a temporal relationship that could lead to bias. Deaths to astronauts from external causes begin sooner after selection, and the risk is highest during the astronauts' active duty years. Conversely, risk for death by natural causes is highest at old ages. Baseline covariates showed imbalance in ways that could explain a bias. Finally, comparison of conventional Kaplan-Meir curves with competing risk curves shows approximately 7% pessimism after 55 years. We conclude that the extremely low chronic disease mortality observed for U.S. astronauts is not due to hazards biased by deaths from competing risks. Future studies of astronaut mortality should continue to attempt to correct for the healthy worker effect to get the most accurate estimates of survival and comparative mortality.

ANTI-MÜLLERIAN HORMONE LEVELS IN NURSES WORKING NIGHT SHIFTS Candice Y. Johnson* Candice Y. Johnson, Lauren J. Tanz, Christina C. Lawson, Penelope P. Howards, Elizabeth R. Bertone-Johnson, A. Heather Eliassen,

Safety and Health, Centers for Disease Control and Prevention)

Eva S. Schernhammer, Janet W. Rich-Edwards, (National Institute for Occupational

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Background. Associations have been reported between night shift work and women's reproductive health outcomes. We used serum anti-Müllerian hormone (AMH) levels in a cohort of nurses to determine if night shift work is also associated with ovarian reserve (number of eggs remaining in the ovary), a marker of the length of the reproductive lifespan. Methods. Between 1996 and 1999, blood samples were collected from female nurses participating in the Nurses' Health Study II biomarker substudy; 807 samples were later assayed for serum AMH. We used quantile regression to estimate differences and 95% confidence intervals (CI) in serum AMH levels between women working and not working night shifts, accounting for age, body mass index, smoking, and hormone use at the time of blood draw, among women with no missing data on variables of interest. We separately analyzed three measures of night shift work, reported via questionnaire: recent night shifts (shifts worked in the two weeks before blood draw, n = 623), usual night shifts (typical work schedule during the decade of blood draw, n = 507), and history of usual night shifts (typical work schedule before or during the decade of blood draw, n = 543). Results. We found no associations between recent, usual, or history of night shift work and AMH. The difference at the median of the AMH distribution was 0.14 (95% CI: -0.06, 0.26) ng/mL for nurses recently versus not recently working nights, -0.11 (95% CI: -0.28, 0.02) ng/mL for nurses with versus without usual night shifts, and -0.03 (95% CI: -0.19, 0.20) ng/mL for nurses with versus without a history of usual night shifts. Conclusion. Night shift work was not associated with ovarian reserve, as measured by serum AMH. This does not preclude associations between night shift work and fertility operating through other mechanisms.

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MACHINE LEARNING TO AUGMENT DETECTION OF OCCUPATIONAL ACCIDENTS AT EMERGENCY SERVICE WITH NATURAL LANGUAGE PROCESSING OF CHIEF COMPLAINTS Ting-Chia Weng* Ting-Chia Weng, Chung-I Li, Ai-Hua Lai, Jung-Der Wang, Yau-Chang Kuo, (Department of Occupational and Environmental Medicine, National Cheng Kung University Hospital)

Under-reporting of occupational injury and illness is a global public health issue and warrants social awareness. Only about 20% of occupational accidents detected at emergency service in Taiwan registered in National Labor Insurance System. Machine Learning is widely applied in biomedical fields to support clinical decisionmaking. Natural Language Processing (NLP), a subset of Machine Learning algorithm, has specific strengths in non-structural text mining. We hypothesized that analysis of emergency records of chief complaint sentences with NLP algorithm could augment detection for occupational injury and illness. We compared chief complaint sentences from occupational related emergency visits with those of nonoccupational visits using Chinese text segmentation techniques and NLP algorithm. We applied 80% randomly selected events in training and 20% for testing data set. There were 6, 224 events of workplace accidents and 3, 835 events of commuting accidents identified and marked by triage nurses from totally 300, 224 events of emergency visits in National Cheng Kung University Hospital, Tainan, Taiwan from Jan 2015 to Dec 2017. Preliminary results showed high frequencies of specific key words recorded under chief compliant sentences on emergency triage sheets among work-related injuries and commuting accidents ['scooter' was the most frequently mentioned (31.8%), followed by 'work' (31.3%), 'transportation accident' (17.0%), 'car' (9.3%), 'machine' (5.3%), 'burn' (5.0%)]. Machine Learning algorithm showed a promising potential in detecting emergency visits of occupational causes. Integration of artificial intelligence may enhance current healthcare and surveillance program and improve public prevention strategies for total workers' health. Future applications of Machine Learning in extended spectrum of diseases and injuries with electronic medical records shall augment clinical care and global health.

COMMUNICATING RESEARCH FINDINGS TO THE MEDIA AND PUBLIC [A WORKSHOP] Jennifer Loukissas* Jennifer Loukissas, Victoria Fisher, (National Cancer Institute)

Science advances when independent researchers share their findings widely through oral presentations at scientific meetings, and by publishing in the peer-reviewed literature. In addition to the written discourse that takes the form of letters to the editor and author responses, often a parallel discussion of science takes place in traditional and social media environments print, radio, and television; Facebook, Twitter, Reddit, blogs, etc. Coverage of science and scientific advances by the media can bolster financial support from lawmakers and philanthropists, inspire young men and women to the fields of science, inform the public of the miraculous discoveries being made every day, and educate patients on how to extend life, or improve health outcomes when faced with illness. In addition, governmentsupported science is required to be shared with the tax-payers by law. Reporters-the news media-serve as the liaison between the scientific expert and the reader or viewer. Communicating scientific findings to the media requires a different style-and often different language-than what is used with scientific colleagues. In an age of shrinking newsroom budgets, senior science writers with decades of experience are being replaced with junior reporters who are required to cover not only health, but all fields of science, the environment, economics, or other topics. This means scientists must work harder to prepare for interviews in order to ensure that the right story is captured, and that complex information is interpreted correctly. Regular media training, practice with mock interviews, and writing key messages are the tools investigators need to appropriately prepare for the important job of giving a good interview. This workshop will train epidemiologists to effectively communicate their research findings to the media and public. Workshop participants will learn how reporters think and develop skills for successful interviews with journalists.

UTILIZATION AND FELT NEEDS OF ORAL HEALTH CARE SERVICES AMONG WOMEN IN CHENNAI Venkata Abinaya* Venkata Abinaya, Rajan Patil, (bridge2naya@yahoo.com)

Background: Oral health is a window to overall health. Taking good care of mouth, teeth and gums is a worthy goal in and of itself. There is a greatest burden of oral diseases on the disadvantaged group. In developing countries like India the af fordability to oral health care services is very limited. Thereby poor oral health has an effect in chronic diseases and millions suffer intractable toothache and poor quality of life and end up with few teeth. Objective: To assess the utilization level and felt needs of oral health services among women in Chennai. Material and Methods: A cross sectional questionnaire survey was conducted among 200 women in Teynampet Zone in Chennai District, Tamil Nadu. The women were chosen by simple random sampling and were interviewed using the semi-structured questionnaire to assess their utilization level of oral health service during the period of June to July 2016. The data was analyzed by SPSS Version 22. Result: Descriptive statistics and Multivariate analysis were used to analyze the utilization level, felt needs. Majority of the respondents were in the age group of 30-35 years, most of the respondents had oral problem and almost everyone had visited dentist atleast once within 3 years. Multivariate analysis also showed that the Utilization Level were directly influenced by Accessibility, Availability and Affordability and showed statistical significance with (p value < 0.05) and also from multivariate analysis it showed that the respondents who had poor oral hygiene did not utilize oral health care services as the affordability was a problem although accessibility and availability was adequate. Conclusion: Our findings suggest that people who had oral problem had visited Dentist in previous 3 years many has preferred Private clinics because of the quality treatment provided. Cost of the treatment also affected the dental visits. They believed that visiting the Dentist is necessary only for pain relief. Key words Utilization, felt needs, oral health.

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PRE-DONATION EGFR, EARLY POST-DONATION EGFR, AND SUBSEQUENT ESRD RISK IN LIVING KIDNEY DONORS Allan B. Massie* Allan B. Massie, Lara Fahmy, Macey L. Thompson Henderson, Alvin Thomas, Jon Snyder, Dorry L. Segev, (Johns Hopkins University)

Living donor kidney transplantation provides substantial survival benefit and improved quality of life to recipients; however, accurate predonation screening and postdonation medical care for living kidney donors (LKDs) is paramount. The relationship between predonation renal function (estimated glomerular filtration rate, eGFR) and long-term risk of postdonation end-stage renal disease (ESRD) has not been characterized. Moreover, while transplant centers are required to collect postdonation serum creatinine (SCr) in donors, the clinical utility of measuring early post-donation renal function is unknown. Using national registry data from the United States (SRTR), we studied ESRD risk in 66,052 LKDs 1999-2015 who were ESRD-free 9 months post-donation and had at least one SCr reported to the registry between 3 and 9 months post-donation (6m-post eGFR), using Cox regression and ad justing for donor age, sex, race (black vs all other), 1st-degree biological relationship to recipient, and BMI. Predonation eGFR and 6m-post eGFR were calculated using the CKD-EPI equation. Donor eGFR declined from median (IOR) 98 (84-110) mL/min/1.73 m2 predonation to 63 (54-74) mL/min/1.73 m2 6m-post. A 10-unit increase in predonation eGFR was associated with 17% decreased risk of ESRD (aHR=0.83 (0.70-0.99), p=0.04). In a separate model, a 10-unit increase in 6m-post eGFR was associated with 40% decreased risk of ESRD (aHR=0.60 (0.46-0.79), p<0.001). In a combined model, the association between predonation eGFR and ESRD risk disappeared (aHR per 10u=0.98 (0.79-1.21, p=0.9) while the association between 6m-post eGFR and ESRD risk remained the same (aHR per 10u=0.61 (0.44-0.83), p<0.001), suggesting that the association between predonation eGFR and ESRD is fully mediated by 6m-post eGFR. Both predonation and 6m-post eGFR are inversely associated with postdonation ESRD risk in LKDs. Careful monitoring of early postdonation eGFR is essential to provide adequate postdonation care and counseling.

VITAMIN D STATUS AMONG ADOLESCENTS IN KUWAIT Abdullah Al-Taiar* Abdullah Al-Taiar, Abdur Rahman, Reem Al-Sabah, Lemia Shaban, Anwar Al-Harbi, (Faculty of Medicine, Kuwait University)

Background and objectives: In Kuwait as in many Arab states in the gulf region, there are limited data on the prevalence of vitamin D deficiency among healthy adolescents. This study aimed to estimate the prevalence of vitamin D deficiency in a nationally representative sample of adolescents and investigate factors associated with vitamin D status. Methods: Cross-sectional study was conducted on 1416 adolescents who were randomly selected from middle schools in all governorates of Kuwait. Data were collected from parents and adolescents; while vitamin D was measured using liquid chromatography-tandem mass spectrometry (LC-MS/MS). Logistic regression was used to investigate the independent factors associated with vitamin D status. Results: The Prevalence of vitamin D deficiency was 1,150 (81.21%, 95%CI: 71.61-90.81) while severe deficiency was 559 (39.48%). Only 51 (3.60%) were vitamin D sufficient. Prevalence was significantly higher among females compared to males (91.69% vs. 70.32%; p<0.001). There was a significant inverse correlation between vitamin D and PTH (Spearman correlation=-0.35; p<0.001). In the final model, gender, age, governorate, parental education, body mass index, vitamin D supplement and number of times walking to school per week were all significantly related to vitamin D deficiency. Conclusion: High prevalence of vitamin D deficiency was noted among adolescents in Kuwait despite the abundant sunshine which may reflect strong sun avoidance behavior. Adequate outdoor daytime activities should be encouraged especially for females. We call for locally tailored guidelines for supplement in which females should have a higher amount of vitamin D supplement compared to males.

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FIRST-TRIMESTER DEPRESSION IS NOT ASSOCIATED WITH BIRTH OUTCOMES IN A DIVERSE URBAN COHORT: PRELIMINARY RESULTS FROM THE NEW YORK UNIVERSITY CHILDREN'S ENVIRONMENTAL HEALTH STUDY Linda G Kahn* Linda G Kahn, Sara Brubaker, Lisa M Nathan, (New York University School of Medicine)

Objectives: To investigate whether offspring of women who screen positive for depression in early pregnancy are at increased risk of adverse birth outcomes. Background: Prior studies of prenatal depression and perinatal outcomes have been inconclusive. Methods: This analysis uses preliminary data from an ongoing pregnancy cohort in which women are recruited during their first prenatal visits to three socioeconomically diverse hospitals. At enrollment, participants completed the validated Patient Health Questionnaire (PHQ-9) to assess depression risk. Birth outcomes were extracted from medical records. We used linear and logistic regression to estimate associations of PHQ-9 score ≥10 with continuous and dichotomous birth outcomes. Results: Among the first 261 study participants to give birth who had completed PHQ-9s at <18 weeks, Latinas and non-Hispanic Black women had increased risk of depression, as did those without partners and those with less than a bachelor's degree. PHO-9 \geq 10 was not associated with gestational age, weight, length, or head circumference at birth, nor with increased odds of preterm birth (<37 weeks), low birth weight (<2500g), cesarean section, or low Apgar score (<7). Discussion: This preliminary report does not support an association between depression in early pregnancy and adverse perinatal outcomes. We look forward to future analyses in which we can utilize data from more participants and access information on physical activity and antidepressant use.

0832 S/P

SEX HORMONE-BINDING GLOBULIN, CARDIOMETABOLIC BIOMARKERS AND GESTATIONAL DIABETES: A LONGITUDINAL PREGNANCY COHORT STUDY AND A META-ANALYSIS Mengying LI* Mengying Li, Shristi Rawal, Stefanie N. Hinkle, Fasil Tekola-Ayele, Michael Y. Tsai, Cuilin Zhang, (Epidemiology Branch, Division of Intramural Population Health Research, Eunice Kennedy Shriver National Institute of Child Health and Human Development)

Background: Sex hormone-binding globulin (SHBG) has been implicated in glucose metabolism and the development of type 2 diabetes. However, its role in glucose metabolism during pregnancy is unclear. Objectives: This study investigated the prospective associations of SHBG with cardiometabolic biomarkers during pregnancy and gestational diabetes (GDM) risk. Methods: We conducted a nested case-control study of 107 GDM cases and 214 matched controls without GDM in the NICHD Fetal Growth Studies-Singleton Cohort. GDM was ascertained by medical record review. Blood samples were drawn at 10-14, 15-26, 23-31 and 33-39 gestational weeks (GW). Prospective associations of SHBG with cardiometabolic biomarkers were estimated using Spearman's correlation coefficient adjusting for potential confounders. Difference in SHBG levels between GDM and non-GDM women was estimated in the present study cohort and a meta-analysis of existing prospective evidence. Odds ratios (OR) for GDM by SHBG quartiles were estimated using conditional logistic regression. Results: SHBG at GW 10-14 was significantly and inversely related to fasting glucose, fasting insulin, insulin resistance and HbAlc levels, and positively related to high-density lipoprotein and cholesterol levels at GW 15-26. Cases had lower SHBG levels compared to controls at GW 10-14 (mean \pm SD: 204.0 \pm 97.6 vs. 220.9 \pm 102.5 nmol/L) and 15-26 $(305.6 \pm 124.3 \text{ vs. } 322.7 \pm 105.1 \text{ nmol/L})$, yet the differences were not significant. Meta-analysis of 11 prospective studies, including ours, estimated SHBG levels to be 0.50 SD (95% CI: 0.36-0.65) lower among women with than without GDM. Conclusions: Higher SHBG levels in early pregnancy was associated with a favorable glucose metabolic profile among pregnant women. Synthesis of prospective studies supports an inverse association between SHBG levels and GDM nsk.

0833

PARENTAL OBESITY AND OFFSPRING FAILURES ON THE MODIFIED CHECKLIST FOR AUTISM IN TODDLERS (M-CHAT) AT AGES 18 AND 24 MONTHS Edwina H. Yeung* Elise Heisler, Hyojun Park, Edwina H. Yeung, Erin M. Bell, Akhgar Ghassabian, (NIH- NICHD)

Parental obesity may increase autism spectrum disorder (ASD) risk in offspring through epigenetic mechanisms. However, of the existing studies that consider maternal obesity in ASD development, few also consider paternal obesity. The Upstate KIDS Study, originally designed to assess the impact of infertility treatment on child development, prospectively followed children through age 36 months. The current analysis includes 4791 children (3905 singletons and 1066 unrelated twins). Mothers reported paternal weight and height at 4 months postpartum. Pre-pregnancy Body Mass Index (BMI) was collected from birth records. The reference group combined under- and normal-weight parents. The M-CHAT was used to screen ASD risk at 18 and 24 months. Multiple imputations were applied to complete missing data. Logistic regression was used to estimate the odds of M-CHAT fails at 18- and 24-months, and at either 18-/24-months, after adjusting for maternal race, age, education, marital status, insurance, pregnancy smoking and alcohol use, infant sex, and plurality. Of the 4971 infants, 349(7%), 243(5%) and 494(10%) failed the M-CHAT at months 18, 24, and ever, respectively. Parental BMI was not associated with M-CHAT failure at 18 months. Compared to the reference group at 24 months, children of obese (BMI>30 kg/m2) and extremely obese mothers (BMI>35) had no greater risk of failing (BM1>30 adjusted OR=0.81; 95%CI: 0.38-1.72; BMI>35: 1.06; 0.46, 2.45). Children of obese fathers had no greater risk of failing the M-CHAT (1.13; 0.47-2.72). Although children of extremely obese fathers (BMI>35) had an elevated risk (1.71; 0.71-4.10), estimates were imprecise. Children of parents with both BMIs>35 had an increased risk of failing the M-CHAT (2.87, 0.69-11.97), but results were not significant. Our results suggest that offspring ASD risk is not associated with parental obesity. Inconclusive results may also be due to the M-CHAT's disputed ability to detect ASD specifically.

RECENT INCREASE IN MENTAL HEALTH HOSPITALIZATIONS AMONG CHILDREN: AN AGE-PERIOD-COHORT ANALYSIS IN NEW YORK STATE, 1999-2013 Sze Yan Liu* Sze Yan Liu, Sungwoo Lim, (NYC DOHMH)

Currently, one in 10 pediatric hospitalizations in United States are for psychiatric conditions. Adolescent psychiatric hospitalizations have been increasing nationally and locally. To better understand these trends in New York State, we conducted an age-period-cohort analysis of psychiatric hospitalization rates (principal diagnosis with ICD-9 codes 290-316 in ages 3-17), in NYS from 1999-2013. We used data from the Statewide Planning and Research Cooperative System, an administrative database of all hospital discharges reported by New York State hospitals and child population counts from the U.S. Census. We constructed descriptive plots of age by period and age by cohort to visualize trends and ran intrinsic-estimator constraintbased Poisson regression models. All analyses were repeated for 2005-2013 emergency department (ED) utilization rates and analyses restricted to severe psychiatric conditions. Results suggest the increase is attributable to all three dimensions. Differential age rates were noted, with the largest rates among adolescents. Increased period effects were found about two years after the September 11, 2001 attacks and after the Great Recession in 2008-9 (e.g., period effect for 2004 = 0.36, 95% CI= 0.28, 0.45). All birth cohorts born before 2001 showed small elevated effects. The largest cohort effects were noted among children born in 1992-1995, who were aged 6-9 years at the time of the 9/11 attacks and 13-17 years at the start of the Great Recession (e.g., cohort effect for 1994 = 0.29, 95% CI= 0.16, 0.42). Analyses with ED rates from 2005-2013 and restricting hospitalizations to severe mental health conditions showed similar trends. Our results suggest exposure to mass traumatic events during key childhood developmental periods have cascading mental healthcare utilization consequences. Further research is needed to test mechanisms and to see whether these birth cohort continue to experience elevated mental health risk in adulthood.

0836 S/P

DOES SLEEP MODIFY THE RELATIONSHIP BETWEEN HEALTH RISK BEHAVIORS AND CONTRACEPTION NON-USE? FINDINGS FROM A NATIONAL SAMPLE OF ADOLESCENTS Allison R. Casola, MPH* Allison R. Casola, Freda Patterson, PhD, Alicia J. Lozano, MS, (Temple University College of Public Health)

Purpose: Restricted sleep (< 8 hours/night) is common among adolescents and has been shown to moderate the relationship between health-related risk behaviors and outcomes, such that restricted sleepers have poorer outcomes. This study examined the extent to which sleep duration moderates the relationship between risk behaviors and correlates and contraception non-use (CNU) in adolescents. Methods: Using data from wave 1 of the National Longitudinal Study of Adolescent to Adult Health (Add Health), weighted multiple logistic regression models were used to examine the association between health behaviors and correlates (i.e. substance use, selfesteem, mental health, and neighborhood and family factors) and CNU (Weighted N=8,259,923). Analyses were adjusted for sex, race, and age, and subsequently stratified by sleep duration (short [30x in the past month) (adjusted odds ratio [aOR]=2.58, 95% CI=I.43-4.66), perceived overweight body image (aOR=1.30, 95%CI=I.01-1.67), feeling unsafe in neighborhood (aOR=I.41, 95%CI=1.05-1.90), feeling as though parents do not care about you (aOR=2.40, 95%CI=I.09-5.30), and feeling that your family does not pay attention to you (aOR=1.55, 95%CI=I.06-2.27) were found to be significant predictors of CNU. However, in stratified models, short sleep moderated only the relationship between heavy marijuana and CNU (prevalence: <8 hours 3%, ≥8 hours 2%; aOR=4.50, 95%CI=I.62-12.46, p<0.005) and the relationship between feeling as though your family does not pay attention to you and CNU (aOR=1.85, 95%CI=1.07-3.20, p<0.05). Conclusion: Short sleep modified only the relationship between heavy marijuana use and CNU and perceived family attention and CNU. Interventions discussing contraception use should also address sleep duration and marijuana use among adolescents.

0835 S/P

INFLUENCE OF MATERNAL EARLY PREGNANCY SERUM THYROID HORMONES ON CORD SERUM THYROID HORMONES Noelle Kosarek* Noelle Kosarek, Yingying Xu, Kimberly Yolton, Joseph Braun, Megan Romano, Andy Hoofnagle, Bruce Lanphear, (Dartmouth Geisel School of Medicine)

Maternal thyroid hormones play an integral role in fetal neurodevelopment and physical growth. The primary objective of the current study was to assess the influence of maternal thyroid hormones in early pregnancy on cord serum thyroid hormones. We also explored the association between cord serum thyroid hormone concentrations and child thyroid stimulating hormone (TSH) at age three years. TSH, free and total thyroxine (T4), and triiodothyronine (T3) were measured in maternal serum collected at ~16 weeks' gestation, cord serum, and child serum collected at age three years by immunoassay among participants in a prospective pregnancy and birth cohort, the Health Outcomes and Measures of the Environment (HOME) Study. We built multivariable linear regression models adjusting for maternal sociodemographic and perinatal factors collected by survey and medical record abstraction. These include maternal age, race, marital status, parity, body mass index, smoking status, household income, and mode of delivery. There were 151 newborns with mothers for whom thyroid hormone concentrations were available and 120 children for whom delivery thyroid hormone concentrations were available. We observed a 14% increase in cord TSH for each doubling of maternal TSH (95% confidence interval (CI): 4, 27). Maternal thyroid hormones were not associated with other cord serum thyroid hormones. For every 0.2 ng/dL increase in cord free T4, approximately a one standard deviation increase, an 11% decrease in child TSH was observed at age three years (95% CI:-20, -2). These findings may inform future directions in which maternal and cord serum thyroid hormone levels are used to predict child thyroid hormone levels at a later time point.

0837 S/P

AUTISM AND METABOLOMICS IN MATERNAL SERUM Qi Yan* Qi Yan, , (UCLA School of Public Health)

Background: The mechanism of autism, especially the development of autism at early stage remains unclear. Identifying maternal metabolomic features and pathways associated with autism offers an opportunity for understanding this question. Objectives: The aim of this study is to comprehensively profile metabolomics in the blood of women in mid-pregnancy and identify maternal metabolic features and pathways associated with autism in offspring by using highresolution metabolomics (HRM). Methods: We retrieved stored maternal serum samples from the mid-pregnancy alpha-feto protein testing program in California for a largely immigrant Hispanic community of women living in the Central Valley of California. Half of the women had given birth to a child who diagnosed with autism in childhood according the California Department of Developments services records. By using state-of-the-art high-resolution metabolomics (HRM) that can identify nearly half of the metabolites in the KEGG/HMDB/LipidMaps human metabolic databases, we identified metabolomic within 54 children with autism and 65 control children. Statistical methods including univariates analysis, partial least squares discriminant analysis (PLS-DA) and support vector machine (SVM) were used to select significant metabolic features. Pathway and network analysis was done by using WGCNA and mummichog. Results: A set of 3917 metabolic features resulting from high-resolution metabolomics were used for discriminant analysis and pathway analysis. We have identified 34 metabolic biomarkers which can properly classify the autism status with over 90% accuracy. Pathway analysis showed that autism associated with glycosphingolipid metabolism, alanine and aspartate metabolism, pyrimidine and purine metabolism pathways, and arginine and proline metabolism. Conclusions: By identifying metabolomics features and pathways that are associated with autism, we found that differences in phospholipid metabolism, inflammation and oxidative stress which may contribute

EFFECT OF ELECTIVE CESAREAN DELIVERY ON METABOLIC MEASURES IN CHILDREN: A COHORT STUDY IN CHINA Yubo Zhou* Yubo Zhou, Hongtian Li, Jianmeng Liu, (Institute of Reproductive and Child Health, Peking University Health Science Center)

Objective: To prospectively investigate the association of cesarean delivery with childhood MetS and its components in a Chinese birth cohort. Methods: 1467 Chinese children whose mothers had participated in a previous trial of prenatal micronutrient supplementation were followed up at 4-7 years of age in 2013. 737 children were delivered by elective cesarean section (ElCS) and 730 by spontaneous vaginal delivery (SVD). MetS was defined as the presence of ≥ 3 components: high triglyceride, low high-density lipoprotein (HDL) cholesterol, high fasting glucose, abdominal obesity and high blood pressure. Results: 6.4% (N=47) of children delivered by EICS versus 5.5% (N=40) by SVD were determined to have MetS (P=0.467). Children born by ElCS versus SVD were more likely to have abdominal obesity (27.7% vs. 21.4%; P=0.005), high blood pressure (15.1% vs. 11.5%; P = 0.045), ≥1 MetS component (72.9% vs. 68.0%; P=0.039) and ≥2 MetS components (31.6% vs.25.2%; P=0.007). After multivariate adjustment, EICS was not associated with MetS per se (adjusted OR: 1.24; 95% confidence interval [CI]: 0.80, 1.94), but significantly associated with its individual and clustered components. The adjusted ORs were 1.35 (95% CI: 1.06, 1.73) for abdominal obesity, 1.39 (95% CI: 1.01, 1.90) for high blood pressure, 1.26 (95% CI: 1.00, 1.59) for ≥1 MetS component and 1.36 (95% CI: 1.07, 1.72) for ≥2 MetS components. Additionally, the multivariate adjusted mean levels of triglycerides (P=0.042), total cholesterol (P<0.001), low-density lipoprotein (LDL) cholesterol (P=0.002), fasting glucose (P=0.017), systolic/ diastolic blood pressure (P<0.001), and body mass index (P<0.001) were higher in children born by ElCS than in those by SVD. Conclusions EICS is associated with MetS components, suggesting possible changes in postnatal care that might benefit to reduce MetS-related risk in cesarean-delivered children.

0839

DOSE-RESPONSE BETWEEN PRE-PREGNANCY BODY MASS INDEX AND BIRTH DEFECTS Rohit Ojha* Bradford Jackson, Rohit Ojha, Kari Teigen, (Center for Outcomes Research, JPS Health Network)

Background: Maternal pre-pregnancy obesity is reportedly associated with birth defects. Nevertheless, the results of prior studies were based on categorization of body mass index (BMI), which could result in loss of information about doseresponse. We aimed to compare dose-response between BMI and birth defects based on conventional categories and flexibly modeled continuous measures. Methods: We used data from the 2016 United States Natality Files to identify a cohort of nulliparous females with singleton live births. Our outcomes of interest included: neural tube defects, orofacial cleft, cyanotic heart disease, diaphragmatic hernia, gastroschisis, limb reduction defect, and hypospadias. We estimated risk ratios (RRs) for the relation between BMI and birth defects using log-binomial regression, where BMI was defined by conventional categories or using restricted cubic splines with knots at the 5, 35, 65, and 95th percentiles (reference value of BMI=21.7). The models were adjusted for maternal age, race/ethnicity, tobacco use, and maternal educational attainment, which were identified using the back-door criterion in a directed acyclic graph. Results: Our study population comprised 1,410,357 nulliparous females with live births. The median BMI was 25 (interquartile range: 22 - 29) and the incidence proportion of birth defects ranged between 1/10,000 births for spina bifida and 7/10,000 births for orofacial cleft. Some birth defects had monotonically increasing or decreasing risk ratios within categories of BMI. In addition, comparable risk ratios based on splines were achieved at 3-8 BMI units higher than the categorical approach for the birth defects of interest (e.g. spina bifida: RR=I.47 for BMI>30 and RR=I.47 for BMI=38). Conclusion: Our results suggest modest gains in information about the dose-response relation using splines compared with categorization of BMI. The trade-offs of these approaches should be considered when exploring dose-response.

0840

NEW FRONTIERS IN PEDIATRIC NUTRITIONAL AND CARDIOVASCULAR HEALTH: NOVEL METHODS TO IMPROVE THE VALIDITY MEASUREMENTS IN LOW-IN-MIDDLE COUNTRIES – SAYCARE STUDY Augusto Cesar Ferreira De Moraes* Heraclito Barbosa Carvalho, Luis Alberto Moreno, Gabriela Berg, María Isabel Bove, Francisco Leonardo Torres-Leal, Augusto Cesar Ferreira De Moraes, (University of São Paulo, School of Medicine, YCARE (Youth/Child cArdiovascular Risk and Environmental) Research Group, Department of Preventive Medicine, São Paulo, SP, Brazil)

Objectives: This observational multicenter feasibility study, titled South American Youth/Child cARdiovascular and Environmental Study (acronym: SAYCARE Study) that is observational multicenter feasibility study, was held in seven South American cities: Buenos Aires (Argentina), Lima (Peru), Medellin (Colombia), Montevideo (Uruguay), Santiago (Chile), Sao Paulo and Teresina (Brazil). Children and adolescents (3 to 18 years) were studied. Methods: We tested the validity methods for assessing cardiovascular health determinants such as sedentary behaviors (SB), food frequency questionnaire (FFQ) and systolic and diastolic blood pressure (BP) levels. The validity was analyzed by correlation coefficients. In addition, Bland-Altman analysis and a multilevel regression were applied to estimate the limits of agreement of 95% (95% LOA). Results: Data were obtained from 237 preschool and school children and 258 adolescents. The SB questionnaire showed moderate validity in both age groups (children=rho ≥ 0.45 and adolescents=rho \ge 0.30). The validity of FFQ analyses resulted in Spearman's coefficients ranging from 0.17 to 0.37, energy-adjusted Pearson's coefficients ranging from 0.17 to 0.61, kw coefficients ranging from 0.09 to 0.24, and percentages of agreement between 45.79% and 67.06%. The BP measurements demonstrate lower measurement bias [mean difference (95% LOA)]: 1.4 (-9.9; 12.8) mmHg in children and 4.3 (-7.8; 16.5) mmHg in adolescents for SBP. For DBP, it was 2.2 (-7.4; 11.7) mmHg in children and 1.4 (-8.4; 11.1) mmHg in adolescents. Conclusion: The SAYCARE study novel methods showed consistent validity to assess the nutritional and cardiovascular health in pediatric populations from low-in-middle income countries.

0841

NEW FRONTIERS IN PEDIATRIC NUTRITIONAL AND CARDIOVASCULAR HEALTH: NOVEL METHODS TO IMPROVE THE VALIDITY MEASUREMENTS IN LOW-IN-MIDDLE COUNTRIES – SAYCARE STUDY Augusto Cesar Ferreira De Moraes* Heraclito Barbosa Carvalho, Luis Alberto Moreno, Gabriela Berg, María Isabel Bove, Francisco Leonardo Torres-Leal, Tara Rendo-Urteaga, Marcus Vinicius Nascimento-Ferreira, Augusto Cesar Ferreira De Moraes, (University of São Paulo, School of Medicine, YCARE (Youth/Child cArdiovascular Risk and Environmental) Research Group, Department of Preventive Medicine, São Paulo, SP, Brazil.)

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EVIDENCE OF CHRONIC HPA DYSREGULATION IN MOTHERS DELIVERING PRETERM: A NESTED CASE-CONTROL STUDY Bizu Gelaye* Bizu Gelaye, Clemens Clemens Kirschbaum, Qiu-Yue Zhong, Sixto E. Sanchez, Marta B. Rondon, Karestan C. Koenen, Michelle A. Williams, (Harvard T. H. Chan School of Public Health)

Objectives: The role of chronic hypothalamic-pituitary-adrenal axis (HPA) dysregulation in the pathogenesis of preterm birth (PTB) remains unclear. We explored this relationship in a cohort of pregnant women attending prenatal clinics in Lima, Peru. Methods: A total of 137 participants (40 PTB cases and 97 term controls) were interviewed and invited to provide a hair sample from the posterior vertex position of the scalp (mean= 13 weeks gestation). Strands of hair were cut into three 3cm segments with the first 3cm segment closest to the scalp (proximal) representing the first trimester, and the next two 3cm segments (i.e, the intermediate and distal segments) representing 0-3 and 3-6 month preconception periods, respectively. Hair cortisol concentration (HCC) determined using luminescence immunoassay, were natural-log transformed, and case-control differences were assessed using bi-variate and multivariable linear regression procedures. Results: Maternal HCC were 14% (p=0.11), 10% (p=0.22) and 14% (p=0.08) lower for 3-6 months pre-conception, 0-3 months pre-conception, and first trimester, respectively, among PTB cases as compared with controls. Overall, combined pre-conception and first-trimester HCC was 13% lower among cases as compared with controls (p=0.01). After adjusting for putative confounders, a 1-unit increase in HCC was associated with a 55% reduced odds of PTB (aOR=0.45; 95%CI:0.17-1.17). Corresponding odds for PTB were 0.53 (95%CI: 0.19-1.48) and 0.39 (95%CI:0.13-1.13), respectively, for 1-unit increase in HCC in the scalpintermediate and scalp-distal segments representing HCC concentrations in 0-3 months pre-conception and first trimester. Conclusions: Women who deliver preterm, as compared with those who deliver at term, have lower preconception and first trimester HCC. Our findings suggest that HPA axis activation, integral to the adaptive stress-response system, may be chronically dysregulated in women at increased risk of delivering preterm.

0844 S/P

CHILDHOOD PERFLUOROALKYL SUBSTANCE (PFAS) EXPOSURE AND EXECUTIVE FUNCTION IN CHILDREN AT 8 YEARS Ann M Vuong* Ann M Vuong, Kimberly Yolton, Zhiyang Wang, Changchun Xie, Glenys M. Webster, Xiaoyun Ye, Antonia M. Calafat, Joseph M. Braun, Kim N. Dietrich, Bruce P. Lanphear, Aimin Chen, (University of Cincinnati)

Background: Toxicological studies highlight the potential neurotoxicity of perfluoroalkyl substance (PFAS) exposures during fetal development. However, few epidemiological studies have examined the impact of childhood PFASs on neurodevelopment. Methods: We employed data from 208 children in the Health Outcomes and Measures of the Environment Study to examine associations of PFAS concentrations quantified at ages 3 and 8 years with executive function assessed at age 8 years using the validated parent-completed Behavior Rating Inventory of Executive Function (BRIEF) survey. We used multiple informant models to identify susceptible windows of neurotoxicity to PFASs and executive function. We additionally investigated trajectories of childhood PFAS concentrations and whether sex modified these associations. Results: A In-increase in perfluorononanoate acid (PFNA) at 8 years was associated with a 3.4-point increase (95% CI 0.4, 6.3) in metacognition score, indicating poorer function. Children who had PFNA concentrations above the median at age 3 or 8 years had poorer global executive functioning compared with children who had concentrations consistently below median levels. Concurrent PFNA was associated with poorer behavior regulation among males, while associations among females were null (pinteraction=0.018). Children with higher concurrent perfluorooctanoate (PFOA) concentrations had increased odds of being at risk of having clinical impairments in behavior regulation and metacognition. Associations between perfluorooctane sulfonate (PFOS) and perfluorohexane sulfonate (PFHxS) and executive function were mostly null. Conclusions: Concurrent PFNA concentrations, and to a lesser extent PFOA, were associated with poorer executive function in children at age 8 years. The associations with PFOS and PFHXs, however, were not remarkable.

0843 S/P

PRECONCEPTION RISK FACTORS FOR PRETERM DELIVERY: A POPULATION-BASED ASSESSMENT Rachael Hemmert* Rachael Hemmert, Monica McEwan, Karen Schliep, (University of Utah)

Preterm births (PTB), births <37 weeks, in the US have risen 36% since 1984, with currently 1 in 8 babies born preterm, far surpassing other developed countries. Most research has focused on early and mid-trimester pregnancy clinical or biologic indicators to predict PTB. Less research has been done on maternal preconception factors, particularly within different population-based samples using the most recent data. Our objective was to assess preconception risk factors for PTB using the Utah Pregnancy Risk Assessment Monitoring System (UT-PRAMS), 2012-2014, data. A sample of approximately 200 new mothers (2-6 months postpartum) per month was randomly selected from a stratified (low birth weight and education) sample of birth certificates to participate in UT-PRAMS. Women with preterm birth outcome data were included in the analysis (n=4378, 100%). Preconception predictors for PTB among Utah mothers were evaluated via adjusted Poisson regression to generate prevalence ratios (PR) and 95% CIs, taking into account the stratified sampling design. Factors considered included maternal age, race, education, income, insurance, marital status, smoking, drinking, abuse history, life stressors, health conditions, pregnancy intention, and prior pregnancy outcomes. PTB prevalence among UT women 2012-2014 was 7.8%. In the full multivariable regression model, factors positively linked with PTB included having had a prior PTB (PR: 3.79, 95% CI: 2.46, 5.83), depression diagnosis by health care provider (PR: 2.27, 95% CI: 1.42, 3.63), and increased maternal age (PR: 1.04, 95% CI: 1.01, 1.07). Selfreported anxiety 3 months prior to pregnancy was found to be inversely linked with PTB (PR: 0.54, 95% CI 0.34, 0.86). While our findings are largely in line with a recent preconception nomogram created using 2004-2009 national PRAMs data, their exclusion of depression and anxiety within the 21 preconception variables assessed may limit the predictive ability of their nomogram.

0845 S/P

UPDATE FROM THE UNITED STATES ZIKA PREGNANCY AND INFANT REGISTRY Christopher Carr* Christopher Carr, Megan Reynolds, Sascha Ellington, Abbey Jones, Anna Fulton, Suzanne Gilboa, Margaret Honein, Ellen Lee, Amanda Elmore, Juliana Prieto, Esther Ellis, Braeanna Hillman, Scott Anesi, Noemi Borsay Hall, Kamesha Owens, Catherine M. Brown, Similoluwa Sowunmi, Nicole D. Longcore, Nina Ahmad, Amelie Olga Mafotsing Fopoussi, Leah Lind, Dana Perella, Muhammad Farooq Ahmed, Shea Browne, Debbie Freeman, (Centers for Disease Control and Prevention)

To collect information about pregnant women with laboratory evidence of recent possible Zika virus (ZIKV) infection and outcomes in their fetuses/infants, CDC established the United States Zika Pregnancy and Infant Registry (USZPIR) in collaboration with state, local, and territorial health departments. Data on pregnant women and fetal/infant outcomes from pregnancies completed January 2016-October 2017 were analyzed, including a subset of women with positive nucleic acid test confirming ZIKV infection (NAT-confirmed). Data are reported in aggregate for U.S. states and DC (States), and for U.S. territories (Territories). As of October 2017, in the States, USZPIR was following 1,993 completed pregnancies, including 1.878 liveborn infants; in the Territories, USZPIR was following 3,375 completed pregnancies, including 3,260 liveborn infants. Of all completed pregnancies, 107 (5%) fetuses/infants in the States and 145 (4%) fetuses/infants in the Territories had ZIKV-associated birth defects reported. Of 371 pregnancies with NAT-confirmed ZIKV infection in the States and 1,752 pregnancies with NATconfirmed ZIKV infection in the Territories, 43 (12%) and 90 (5%) resulted in ZIKV-associated birth defects, respectively. Among pregnancies with NATconfirmed ZIKV infection in the 1st trimester, 20 (16%) had ZIKV-associated birth defects in the States and 27 (7%) in the Territories. Neuroimaging was reported for 48% and 54% of liveborn infants in the States and Territories, respectively. At least one ZIKV laboratory test result was reported for 66% of liveborn infants in the States and 55% in the Territories. When compared to previously reported data from USZPIR, this analysis uses twice the completed pregnancies in the States and onethird more completed pregnancies in the Territories, and is consistent with previous findings on the frequency of birth defects among NAT-confirmed pregnancies in the States and Territories (10% and 5%, respectively).
USING AGENT-BASED NETWORK MODELS TO EVALUATE AN MRSA SURVEILLANCE PROGRAM IN THE NEONATAL INTENSIVE CARE UNIT Neal D. Goldstein* Neal D. Goldstein, Samuel M. Jenness, David A. Paul, Stephen C. Eppes, (Department of Pediatrics, Christiana Care Health System)

Background: Our group previously constructed a novel agent-based network model reflecting empiric care practices in a neonatal intensive care unit (NICU) to study methicillin-resistant Staphylococcus aureus (MRSA) colonization among infants. In this extension, we replicate our surveillance program, including decolonization and isolation, and evaluate program effectiveness by varying the surveillance frequency. Methods: One hundred NICU networks of 52 infants were simulated over a 6-month period to assess horizontal transmission of MRSA. Unit-wide surveillance occurred every N weeks where $N = \{1, 2, 3, 4\}$, and was compared against the current NICU policy of dynamic surveillance: weekly when at least one positive screen, otherwise every three weeks. At each surveillance period, colonized infants received a decolonization regimen (56% effective) and were moved to isolation rooms if available (max of 4 infants). Results: Dynamic surveillance resulted in an averaged 24 surveillance episodes, similar to a weekly program (26 episodes). Despite the frequent surveillance of the dynamic policy, in terms of detecting colonized infants it performed comparable to a biweekly program. At each surveillance period, an averaged 1.0 infants were screened positive with a mean duration of colonization of 243 hours in the dynamic setting, compared to 1.3 colonized infants with a mean duration of 270 hours in the biweekly setting. Isolation rooms were available 44% of the time in the dynamic setting, and 56% of the time in the biweekly setting. Surveilling every 3 or 4 weeks resulted in a more MRSA colonized infants with longer mean colonization durations, yet increased availability of isolation rooms. Conclusion: An effective MRSA surveillance program needs to balance resource availability with potential for harm to these patients. While more frequent surveilling resulted in more frequent use of a decolonization regimen, it also reduced the likelihood of isolation rooms being available.

0847 S/P

MATERNAL CARDIOMETABOLIC DETERMINANTS OF BREASTFEEDING NONINITIATION IN SOUTH CAROLINA BY MATERNAL RACE AND ETHNICITY Danielle Stevens^{*} Danielle Stevens, Kelly Hunt, (Medical University of South Carolina)

Background: In order to inform targeted clinical interventions, we sought to identify maternal cardiometabolic determinants of breastfeeding noninitiation by race/ethnicity. Methods: Our study population is comprised of 120,771 non-Hispanic whites (NHW), 64,877 non-Hispanic Blacks (NHB), and 20,084 Hispanics with live singleton births in South Carolina delivered at a gestational age between 37-44 weeks from January 2004 to 2008. Logistic regression was used to evaluate the association between maternal cardiometabolic factors and breastfeeding noninitiation by hospital discharge, with stratification by race/ethnicity to examine race/ethnic differences in this population. Results Compared to NHW and Hispanics, NHB were more likely to be overweight or obese, hypertensive, and/or diabetic entering the pregnancy. Breastfeeding noninitiation was also higher among NHB (NHW: 31.5%, NHB: 56.8%, Hispanics 14.6%). In full models, all race/ethnicities were significantly less likely to initiate breastfeeding if they were obese or diabetic prior to pregnancy, or gained inadequate wait during the pregnancy. Hypertension was significantly associated with higher rates of breastfeeding noninitiation among NHW (Odds Ratio [OR]: 1.06, 95% Confidence Interval [95% CI]: 1.01, 1.17) and NHB (OR: 1.07, 95% CI: 1.02, 1.13), but not Hispanics. NHB women were significantly less likely to initiate breastfeeding if impacted by gestational diabetes (OR: 0.92, 95% CI: 0.86, 0.98) or excessive weight gain during pregnancy (OR: 0.93, 95% CI: 0.90, 0.97). Conclusions: Our study shows that breastfeeding noninitiation in South Carolina varies by maternal cardiometabolic factors and race/ethnicity. This study can aid in the development of tailored clinical and public health breastfeeding interventions and improve maternal and child health

0848 S/P

POOR HOUSING QUALITY IN NEW YORK CITY AND ITS ASSOCIATION WITH TODDLER COGNITIVE DEVELOPMENT Arbor J.L. Quist* Arbor J.L. Quist, Maida P. Galvez, Mary S. Wolff, Stephanie S. Engel, (University of North Carolina at Chapel Hill, Epidemiology Department, Chapel Hill,NC)

Background: Child cognitive development is influenced by environment, from chemical to built environment. Few studies have assessed the association between housing quality in early life and cognitive development. Methods: To measure the effect of housing characteristics on child cognition, we used questionnaire data from a multiethnic cohort of mother-toddler pairs in New York City. We created a housing quality index (HOI) from 13 maternally-reported aspects of housing quality (e.g., pests, leaks, and inadequate heat) at 12 and 24 months, with higher index values indicating more adverse housing. Child cognition was assessed at 24 months using the mental development index (MDI) of the Bayley Scale of Toddler Development. We conducted multivariable linear regression of 12-month HQI with 24-month MDI (N=160). We also examined the cross-sectional relationship of 24-month HQI and MDI (N=260) and examined the relationship between each housing variable and MDI. We assessed modification by race/ethnicity. Results: The HQI ranged from 0-34, with blacks, Hispanics, and participants in public housing reporting more adverse housing conditions than whites and people in rental and privately owned housing (median 12-month HQIs blacks=5.0, Hispanics=6.0, whites=4.0, public housing=6.0). For every one point increase in the 12-month HQI, the 24-month MDI decreased by 0.41 (95% CI -0.76, -0.08), although this association was imprecise. No association was observed cross-sectionally at 24 months. Associations differed somewhat by race/ethnicity. Insufficient heat was the housing characteristic most adversely associated with cognitive function. Conclusion: Housing quality may be associated with performance on child cognitive development tests. Individuals residing in public and rental housing lack control over aspects of their housing quality; therefore, housing authorities and homeowners need to be responsive to repair requests to ensure that homes are safe places for child development.

ASSOCIATION BETWEEN SODIUM-GLUCOSE COTRANSPORTER-2 (SGLT-2) INHIBITORS AND LOWER EXTREMITY AMPUTATION: A RETROSPECTIVE COHORT STUDY G Caleb Alexander* G Caleb Alexander, Hsien-Yen Chang, Sheriza Bakst, (Johns Hopkins Bloomberg School of Public Health)

Evidence from clinical trials suggests that canagliflozin, a sodium-glucose cotransporter-2 (SGLT-2) inhibitor for the treatment of Type 2 diabetes, may be associated with lower extremity amputation. We quantified the association between oral Type 2 diabetes medication use, foot and leg amputation, and other vascular outcomes, including peripheral arterial disease, critical limb ischemia, osteomyelitis and ulcer. To do so, we conducted a retrospective, new user design cohort study using Truven MarketScan Commercial Claims and Encounters data from September 2012 and September 2015. We focused on 2.0 million commercially insured individuals and used propensity score weighting to balance baseline differences among groups. Sensitivity analyses varied statistical models, assessed the effect of combining DPP-4 inhibitors and GLP-1 agonists as a single referent group, and adjusted for baseline use of older oral agents. Of 2.0 million potentially eligible individuals, a total of 933,073 were included in the final analyses, including 38,692 (4.2%) new SGLT-2 inhibitorusers, 101,408 (10.9%) new DPP-4 inhibitorusers, and 37,932 (4.1%) new GLP-1 agonist users. After propensity score weighting and ad justment for demographics, severity of diabetes, comorbidities and medications, there was a non-statistically significant increased risk of amputation associated with new use of SGLT-2 inhibitors compared with DPP-4 inhibitors (adjusted hazard ratio [aHR] 1.50, 95% confidence interval [CI] 0.85-2.67) and GLP-1 agonists (aHR 1.47, CI 0.64-3.36). SGLT-2 inhibitor use was associated with amputation compared with sulfonylureas, metformin, or thiazolidinediones (aHR 2.12, CI 1.19-3.78). These results persisted in sensitivity analyses. SGLT-2 inhibitors may be associated with increased risk of amputation compared with some oral Type 2 diabetes treatments. Further observational studies are needed with extended follow-up and larger sample sizes given the importance of the primary outcome of interest.

0862 S/P

COMPARISON OF ADVERSE EVENTS REPORTED IN FDA DOCUMENTS AND JOURNAL ARTICLES FOR RANDOMIZED CONTROLLED TRIALS ON GLAUCOMA DRUGS Jiajun Wen* Jiajun Wen, Lin Wang, Tianjing Li, (Johns Hopkins Bloomberg School of Public Health)

Background In randomized controlled trials (RCTs) conducted for seeking regulatory approval, the Food and Drug Administration (FDA) requires "identify the most commonly occurring adverse reactions". Therefore, adverse events (AEs) data meeting the reporting thresholds are presented in the approval packages. AE data are often under-reported in journal articles. Our objective is to compare the reporting of AEs in RCTs of glaucoma drugs where both a FDA approval package and a corresponding publication are available. Methods We searched the FDA website for RCTs on the first-line medications for open angle glaucoma. We identified matching journal articles of the RCTs through the characteristics of the trials. We extracted AEs from the FDA approval packages and the journal articles. We compared the consistency of reporting thresholds, types and number of AEs reported. Results Of the 31 RCTs we identified, 14 had a matching journal article. A reporting threshold was mentioned in the approval packages for all 14 RCTs, however, in the journal articles, 10/14 reported a different reporting threshold and 3/14 did not mention the threshold. For example, for trial NDA #21-257, the FDA approval package noted that "number (%) of patients with clinical adverse experiences (≥ 1 % in any treatment group)"; in the matching journal article, a different threshold was presented - "ocular and local adverse experiences (incidence $\geq 2\%$ in any treatment group)". Journal articles tend to report only ocular and local AEs instead of reporting all AEs by MedDRA System Organ Class (SOC), as was used in the FDA approval packages. On average, 9.1 types of ocular and local AEs are reported in journal articles compared to 17.8 ocular and local AEs in the FDA approval packages (and a total of 38.8 AEs by SOC). Conclusion Under- and poorreporting of AEs in journal articles may lead to biased conclusions about products' safety. AE reporting should be improved in journal articles to reflect a more precise safety profile.

0861

EFFICACY AND SAFETY OF BIOSIMILAR INSULINS COMPARED TO THEIR REFERENCE PRODUCTS: A SYSTEMATIC REVIEW Carolyn Tieu* G Caleb Alexander, Mindi DePaola, Eleanor Lucas, Lori Rosman, (Johns Hopkins Bloomberg School of Public Health)

For nearly a century, no generic insulin has been available in the United States. However, the first biosimilar insulin, Basaglar, was approved by the U.S. Food and Drug Administration in 2015, and more biosimilar insulins are in late stage clinical development. We summarized the scientific evidence comparing the safety, efficacy, pharmacokinetics, and pharmacodynamics of biosimilar and reference insulin products. To do so, we conducted a systematic review using PubMed, Cochrane, Embase, Latin America and Caribbean Health Sciences (LILACS), South Asian Database of Controlled Clinical Trials (SADCCT), and IndiaMED from inception of biosimilar insulins through September 7, 2016. We included randomized controlled trials (RCTs) comparing safety, clinical efficacy, pharmacokinetics and pharmacodynamics of any biosimilar insulin with a reference product in adults regardless of sample size and location. Two researchers independently reviewed all titles, abstracts and text; extracted data; and performed quality assessments. Of 5886 articles screened, six studies were included in the data synthesis. The trials investigated LY2963016, Basalog and Basalin, all with insulin glargine (Lantus) as a reference product. Two trials included healthy volunteers, three enrolled type 1 diabetics and one enrolled type 2 diabetics. Of the six studies, three examined pharmacokinetic and/or pharmacodynamic parameters and three examined clinical efficacy and immunogenicity. All studies included adverse events. All PK and/or PD studies showed that comparable parameters of biosimilar and reference products were within the pre-specified equivalence margins. Clinical studies suggested similar clinical efficacy and immunogenicity. Adverse events were similar between the groups across all studies. In conclusion, few published studies have compared biosimilar and reference insulins, though those that have suggest that biosimilar glargine has comparable safety and clinical efficacy as its reference product.

0863 S/P

TRENDS IN PRESCRIPTION OPIOID USE AMONG HEMODIALYSIS PATIENTS IN THE UNITED STATES, 2007-2014 Matthew Daubresse* Matthew Daubresse, , (Johns Hopkins School of Public Health- Department of Epidemiology)

Aim: Hemodialysis (HD) patients frequently experience chronic pain and have an elevated risk of opioid-related adverse events. Few studies have examined opioid utilization among these patients. We estimated annual rates of opioid utilization among HD patients. Design: We used individual-level longitudinal data from the United States Renal Data System and Poisson regression to estimate rates of opioid utilization among HD patients from 2007 through 2014. We limited our analysis to HD patients 18 years and older with consistent Medicare part A, B and D coverage. Setting: Continental United States and Hawaii Measurements: Annual rates of opioid (1) prescriptions; (2) pills; (3) days supply; and (4) morphine milligram equivalents (MME) dispensed per 100 person days. Results: Of the 485495 patients who met our inclusion criteria, 47% were female and 50% were over 62 years of age. Our preliminary findings suggest, the percentage of HD patients who received at least one opioid prescription remained stable (57-59%) between 2007 and 2013, then declined substantially in 2014 (50%). Overall rates of opioid prescriptions, pills, days supply and MME increased from 2007 to 2010 then declined until 2014. The incidence of opioid prescription among the entire population of HD patients declined from 1.26 per 100 person days in 2009 to 1.00 per 100 person days in 2014. The incidence of opioid pills dispensed peaked in 2011 at 78 pills per 100 person days. Conclusion: Although opioid utilization among HD patients has declined in recent years, HD patients continue to receive a substantial amount of opioids.

MATERNAL LEVELS OF PERFLUOROALKYL SUBSTANCES DURING PREGNANCY AND GESTATIONAL WEIGHT GAIN IN A CONTEMPORARY BRITISH COHORT Kristin I. Market Kristin I. Market

CONTEMPORARY BRITISH COHORT Kristin J. Marks^{*} Kristin J. Marks, Zuha Jeddy, W. Dana Flanders, Kate Northstone, Abigail Fraser, Terryl J. Hartman, (Emory University, Centers for Disease Control and Prevention)

Perfluoroalkyl substances (PFAS) are commercially synthesized chemicals used in consumer products such as nonstick cookware and textiles. PFAS may act as endocrine disruptors, influencing metabolic pathways and growth trajectories. Our objective was to analyze the associations between maternal serum pregnancy levels of four common PFAS (perfluorooctanoate (PFOA), perfluorooctanesulfonate (PFOS), perfluorohexanesulfanoate (PFHxS), and perfluorononanoate (PFNA)) and gestational weight gain (GWG). We used data from 905 pregnant women in a subsample of the Avon Longitudinal Study of Parents and Children (ALSPAC), a UK prospective pregnancy cohort (baseline: 1991-2). Women were routinely weighed in antenatal check-ups and measures were abstracted from obstetric medical records; the first weight measurement (if before week 18) was subtracted from the last (if after week 28) to determine absolute GWG. PFAS were measured in serum at median 18 weeks (interquartile range (IQR): 11-32). Linear regression was used to explore associations between PFAS concentrations and absolute GWG, stratified by levels of pre-pregnancy body mass index (BMI) and offspring sex (since sampling schemes of mother-child dyads in the subsample differed by sex). Models were adjusted for maternal education, prenatal smoking, maternal age, parity, pre-pregnancy BMI, and gestational age at sample collection. For overweight (n=63) and obese (n=27) mothers of girls, 10% increases in PFOA were associated with a lower GWG of -0.34 kg (95% CI: -0.82, 0.14) and -0.41 kg (95% CI: -0.82, -0.01), respectively, and 10% increases in PFNA were associated with a lower GWG of -0.42 kg (95% CI: -0.73, -0.11) and -0.76 kg (95% CI: -1.69, 0.17), respectively. Associations among mothers of boys and among underweight and normal weight mothers of girls were null. These findings suggest that maternal levels of PFAS during pregnancy are associated with lower absolute GWG primarily among overweight and obese mothers of girls.

REPRODUCTIVE

0871 S/P

THYROID FUNCTION AND IODINE CONCENTRATION AS RISK FACTORS FOR GESTATIONAL DIABETES IN A POPULATION-BASED STUDY Griffith Bell* Griffith Bell, Tui ja Mannisto, Aiyi Liu, Kurunthachalam Kannan, Edwina Yeung, Un-Jung Kim, Eila Suvanto, Heljā-Marja Surcel, Mika Gissler, James Mills, (Eunice Kennedy Shriver National Institute of Child Health and Human Development)

Background: Iodine is essential for thyroid function, and iodine deficiency is common in the US and Europe, particularly during pregnancy when iodine requirements increase. Thyroid hormones are essential for normal glucose metabolism. However, no published studies have examined the potential role of iodine deficiency in the relationship between thyroid function and gestational diabetes mellitus (GDM). Methods: We conducted a population-based, nested casecontrol study within the Finnish Maternity Cohort (FMC) using pregnancy and perinatal outcome data from the Finnish Maternal Birth Register (MBR). We randomly selected 224 GDM cases with singleton pregnancies and 226 controls without GDM from all singleton births occurring in Finland during 2012-2013. Blood was drawn on average at 10-14 weeks' gestation and analyzed for serum iodide, thyroglobulin (Tg), and thyroid stimulating hormone (TSH) concentrations. Logistic regression was used to estimate ORs and 95% confidence intervals of GDM, with adjustment for age, pre-pregnancy BMI, socioeconomic status, smoking during pregnancy, parity and marital status. Results: Very high Tg concentration (>95% percentile; >83 µg/L) was not associated with significantly altered odds of GDM compared to those with normal levels (OR 0.41; 95%CI: 0.12, 1.38). High concentration of TSH (>3.1mIU/L) were also not associated with increased odds of GDM compared to normal levels of TSH (OR 0.45; 95% CI: 0.06, 3.18). The women with the lowest quartile (<6.5 ng/mL) of iodide concentration did not have increased odds of GDM compared to those with iodide in the highest quartile (OR 0.57; 95% CI: 0.32, 1.04), nor did women with the lowest 5th percentile (<1.58ng/mL) of iodine (OR 0.39; 95% CI: 0.11, 1.35). Conclusions: Our study provides reassuring evidence that low levels of iodine and thyroid function in early pregnancy are not associated with increased risk of GDM in this population.

0872

PHYSICAL ACTIVITY IN PREGNANCY AND THE RISK OF CESAREAN DELIVERY AMONG HISPANIC WOMEN Lindsey M. Russo* Lindsey M. Russo, Megan W. Harvey, Penelope Pekow, Lisa Chasan-Taber, (Department of Biostatistics & Epidemiology, University of Massachusetts Amherst, Amherst, MA)

Background: Rates of cesarean delivery in the United States (US) have continued to increase among Hispanics, the largest minority group in the US with the highest birth rates. Prior studies of the relationship between physical activity (PA) and cesarean delivery have been conflicting, limited by use of questionnaires not validated for pregnancy, and conducted primarily among non-Hispanic whites. Methods: We evaluated the association between PA and cesarean delivery among participants (n=1,313) in Proyecto Buena Salud, a prospective cohort study conducted in Massachusetts from 2006-2011. PA in pre, early, mid/late pregnancy was measured via the Pregnancy Physical Activity Questionnaire; meeting PA guidelines was defined as >150 minutes of moderate-intensity sports/exercise per week. Cesarean delivery was abstracted from medical records. Results: A total of 320 (24.4%) participants delivered via cesarean. In multivariable analyses, increasing sedentary activity in mid/late pregnancy was associated with an increased risk of cesarean (4th vs. 1st guartile OR=1.54, 95% CI 1.02-3.33, ptrend = 0.05) however there were no clear patterns between PA and cesarean. We then repeated the analysis excluding planned cesareans (n=126). Increasing sedentary activity in pre, early, and mid/late pregnancy was associated with a 2-fold increased risk of unplanned cesarean (ptrend <0.05). High levels of moderate-intensity activity in prepregnancy (OR=0.61, 95% CI 0.38-0.99) and increasing moderate-intensity PA in mid/late pregnancy (ptrend =0.03) were associated with reduction in risk. Increasing levels of household/caregiving activity in pre and mid/late pregnancy were associated with a 50% reduction in risk (ptrend<0.05). Meeting PA guidelines was not associated with unplanned cesarean. Conclusion: In this prospective cohort of Hispanic women, moderate-intensity and household/caregiving PA were associated with a reduction in risk of unplanned cesarean delivery.

0873

MOTHER'S AGE AT BIRTH AND DAUGHTER'S RISK OF PREECLAMPSIA IN FIRST PREGNANCY Olga Basso* Olga Basso, Clarice R Weinberg, Aimee A D'Aloisio, Dale P Sandler, (McGill University)

Background. Being born to an older mother has been associated with higher body mass index and blood pressure, which may predispose adult women to preeclampsia/eclampsia (PE). Here, we examined whether mother's age at delivery predicted the daughter's risk of PE in her 1st birth. Methods. We studied 39,482 Sister Study participants with at least one birth and complete information on maternal age and reproductive history. We estimated RRs (95% CI) of PE as a function of maternal age at birth (5 categories), using log-binomial regression models, including the participant's age at 1st pregnancy, number of older siblings, highest household education in childhood, race/ethnicity, and 5-year birth cohort. Results Daughters of older mothers were more likely to have been heavier than their peers at age 10 [e.g., RR: 1.39 (95% CI: 1.29-1.51) in women whose mother was ≥35 years, compared with 20-24]. PE in 1st birth was reported by 6.2% of participants, and was more frequent in women with a higher relative weight as children (8.2% vs. 5.7%). In multivariable models, PE risk was highest in daughters of teenage mothers [RR: 1.24 (1.04-1.48), compared with those whose mother had been 20-24 years old]; women born to mothers ≥25 had an approximately 10% lower risk. After stratifying by relative weight at age 10, mother's age at birth was not consistently associated with PE in the women who reported having been heavier as children. In women who did not report being heavier, risk of PE declined as mother's age at birth increased [compared with daughters of 20-24-year-olds, RRs were 1.33 (1.10-1.61) in daughters of mothers <20 years and 0.78 (0.66-0.93) in daughters of mothers 35+]. Conclusions. Having been born to an older mother predicted higher relative weight at age 10, but was not associated with PE in 1st pregnancy. Among women who, as girls, were not heavier than their peers, risk of preeclampsia unexpectedly declined with increasing maternal age at birth.

URINARY PHYTOESTROGENS AND MENSTRUAL CYCLE LENGTH Lindsay Levine* Lindsay Levine, Keewan Kim, Germaine Buck Louis, Raji Sundaram, Enrique Schisterman, Matthew Connell, Elizabeth De Vilbiss, Mohammad Rahman, Sunni Mumford, (NICHD, NIH)

Background: Phytoestrogens, found in soy products, seeds, and whole grains, are known to have estrogenic and antiestrogenic activity. However, their impact on menstrual cycle length, a proxy for the hormonal milieu, remains unclear. Therefore, we investigated associations between urinary phytoestrogens and menstrual cycle length in healthy women attempting pregnancy. Design: This was a population-based prospective cohort study using data from the Longitudinal Investigation of Fertility and the Environment (LIFE) Study. 501 women ages 18-44 with self-reported cycles 21-42 days and no hormonal contraception injections in the past year were followed until pregnant or for 12 months of trying. Methods: Genistein, daidzein, Odesmethylangolensin, equol, enterodiol, and enterolactone were measured in urine at baseline and categorized into quartiles Cycle length was determined from daily journals that captured menses and fertility monitor data and categorized as 35 days. Average cycle length was considered, as well as length of the first cycle only, given the short half-life of phytoestrogens. Logistic regression models were used to assess odds ratios (ORs) and 95% confidence intervals (CIs) of cycles 35 days, compared to 26-35 days. Models were adjusted for age, BMI, race, creatinine, exercise, supplement use, lipids, cotinine, parity, and alcohol. Results: Genistein levels in the 3rd quartile, compared to the 1st quartile, were associated with increased odds of a cycle length <26 days on average (OR 2.64; 95% CI 1.16, 6.21) and for the first cycle only (OR 2.39; 95% CI 1.02, 5.55). No associations were observed for the highest quartile of genistein and cycle length, or for other phytoestrogens Conclusion: Our results suggest that unnary genistein levels are associated with cycles <26 days, though the associations appear to be non-linear. These findings highlight the potential importance of phytoestrogens for reproductive health.

0876 S/P

ENDOGENOUS STEROID HORMONE CONCENTRATIONS AND RISK OF ENDOMETRIOSIS IN THE NURSES' HEALTH STUDY II Amy Shafrir* Amy Shafrir, Fan Mu, A. Heather Eliassen, Susan E. Hankinson, Stacey A. Missmer, (Division of Adolescent and Young Adult Medicine, Department of Medicine, Boston Children's Hospital and Harvard Medical School, Boston, MA)

Background Estrogen is a potent mitogen for the endometrium and endometriosis whereas progesterone exerts an antiproliferative effect on the endometrium. However, data are sparse on associations between endogenous steroid hormone levels and endometriosis risk. We prospectively evaluated associations between plasma sex hormones and risk of laparoscopically-confirmed endometriosis. Methods In a Nurses' Health Study II nested case-control study, we ascertained 509 women with incident endometriosis between blood collection (1996-1999) and 2009. Controls (n=1041) were matched 2:1 to cases. Blood samples were collected in the early follicular and mid-luteal menstrual cycle phases. We conducted multivariable conditional logistic regression accounting for matching and adjusting for demographic, anthropometric, reproductive, dietary and lifestyle factors to estimate relative risks and 95% CIs. Results Women with higher follicular total or free estradiol levels had a significant non-linear increased risk of endometriosis (follicular total: 2nd quartile vs 1st RR=2.21 (CI=1.43-3.42); 3rd quartile RR=1.78 (CI=1.13-2.81); 4th quartile RR=1.67 (CI=1.05-2.66); follicular free: 2nd quartile vs 1st RR=1.55 (CI=0.97-2.35); 3rd quartile RR=1.92 (CI=1.25-2.95); 4th quartile RR=0.96 (CI=0.61-1.51)). Among women with ovulatory cycles, a higher progesterone level was associated with lower risk of endometriosis (2nd quartile vs Ist RR=0.47 (CI=0.26-0.84); 3rd quartile RR=0.60 (CI=0.33-1.07); 4th quartile RR=0.43 (CI=0.23-0.79)). We observed a significant threshold effect between total and free testosterone and endometriosis risk. Conclusion Higher plasma follicular total and free estradiol levels were associated with a non-linear increased risk of endometriosis. Higher progesterone levels were associated with decreased endometriosis risk in ovulatory cycles. Testosterone levels appeared to have threshold effect with the highest endometricsis risk observed for the highest endogenous levels.

0875 S/P

RACE/ETHNICITY, INCOME, EDUCATION AND FECUNDABILITY IN A NORTH AMERICAN PRECONCEPTION COHORT Nira Schrager* Nira L. Schrager, Elizabeth E. Hatch, Arnelia K. Wesselink, Kenneth J. Rothman, Ellen M. Mikklesen, Lauren A. Wise, (Department of Epidemiology, Boston University School of Public Health)

In the US, there are documented socioeconomic status (SES) and racial/ethnic disparities in morbidity and mortality. Few studies have examined the extent to which such disparities exist for fecundability. Pregnancy Study Online (PRESTO) is a North American preconception cohort study (2013-17) within which we followed 4,830 female pregnancy planners age 21-45 years who had been trying to conceive for ≤6 cycles at enrollment, for up to 12 months or until pregnancy, whichever came first. Women completed a baseline question naire on demographic and lifestyle data, and bimonthly follow-up questionnaires to ascertain pregnancy status. We fit proportional probabilities regression models to estimate fecundability ratios (FR) and 95% CIs, controlling for potential confounders including age, medical and lifestyle factors, and mutually adjusting for other personal SES variables. Relative to a household income of ≥\$150K, FRs for \$100-\$149K, \$50-\$99K, and <\$50K were 0.94 (95% CI: 0.84-1.04), 0.90 (95% CI: 0.81-0.99), and 0.79 (95% CI: 0.68-0.92), respectively. Relative to ≥17 years of education, FRs for <12 years, 13-15 years, and 16 years of education were 0.87 (95% CI: 0.66-1.14), 0.90 (95% CI: 0.90-1.02), and 0.91 (95% CI: 0.84-0.99), respectively. Relative to non-Hispanic (NH) White women, FRs for Hispanic women, NH mixed/other race women, NH Black women, and NH Asian women were 0.95 (95% CI: 0.81-1.11), 0.95 (95% CI: 0.78-1.15), 1.03 (95% CI: 0.78-1.38), and 0.87 (95% CI: 0.69-1.11), respectively. Among women <30 years, there were no appreciable associations with fecundability; however, stronger associations, especially for income, were seen among women ≥ 30 years. In summary, we observed a weak, monotonic positive association between education and fecundability, but little association with race/ethnicity. Lower income was associated with reduced fecundability, especially among women ≥30 years.

0877

DIFFERENCES IN PLASMA CONCENTRATIONS OF ENDOCRINE DISRUPTING CHEMICALS BY PREGNANCY TRYING INTENTIONS Melissa M Smarr* Melissa M Smarr, Kurunthachalam Kannan, Mohammad Rahman, Katherine L. Grantz, Germaine M. Buck Louis, (Department of Environmental Health, Rollins School of Public Health of Emory University)

Pregnancy planning status and exposure to endocrine disrupting chemicals (EDCs) are independently associated with reproductive outcomes, but with little understanding of their relatedness for understanding whether women with planned pregnancies are more/less exposed than women with unplanned pregnancies. We compared first trimester plasma concentrations of 44 polychlorinated biphenyls (PCBs), 11 organochlorine pesticides (OCPs) and poly-and-perfluorinated alkyl substances (PFASs), 9 polybrominated diphenyl ethers (PBDE) congeners and 1 polybrominated biphenyl (PBB 153), among 2,282 racially/ethnically diverse pregnant women. Women reporting that they wanted to have a baby, were not using contraceptives and were trying at the time they became pregnant were considered planners, all others were considered non-planners. Plasma EDC concentrations were quantified using high-resolution gas chromatography/high resolution mass spectrometry and liquid chromatography/tandem mass spectrometry. Comparisons of women and their median (Md) and interquartile ranges (IQR) of lipid-adjusted EDC concentrations (ng/g, except PFASs, (ng/mL) by planning status were performed using ANOVA, Chi-Square and Wilcoxon-Mann-Whitney significance tests, respectively (two-sided p

PREDICTORS OF 30-DAY POSTPARTUM READMISSION IN THE UNITED STATES Jenifer E. Allsworth, PhD* Jenifer Allsworth, (University of Missouri-Kansas City School of Medicine)

Background: Postpartum readmission is an important measure of quality of care, yet recent evidence indicates readmission rates may be increasing. In this study, we examine institutional and clinical predictors of postpartum readmission within 30 days Methods We examined data from the 2013 and 2014 Nationwide Readmission Databases (NRD). The NRD is a nationally representative survey of discharges that includes data from approximately 70 million discharges (weighted) from 21-22 states. Postpartum women were identified using International Classification of Diseases, 9th Revision(Clinical Modification) diagnosis and procedure codes and All Patients Refined Diagnosis Related Groups (APR DRG). Eligible patients included women 18-50 years who delivered in the first 9 months of the year who were not missing length of stay. Clinical characteristics included APR DRG severity of illness, number of diagnoses, procedures, external cause and chronic conditions, and 10 specific comorbidities. Odds ratios were estimated using SAS survey procedures to adjust for survey design. Results: Facilities in non-urban areas had lower readmission rates, while teaching hospitals and those in lower income zip codes had higher readmission rates. Multiple comorbidities, including obesity, psychiatric diagnoses, hypertension, and diabetes were associated with a twofold or larger increase in the odds of readmission. Each medical diagnosis was associated with a 12% increased odds of readmission (OR=1.12, 95% CI 1.12, 1.13) and each diagnosis of a chronic medical condition was associated with a 32% increase in odds (OR=1.32, 95% CI 1.30, 1.33). Risk of readmission increased from 1.7 fold to a 7.0 fold increase as APR DRG severity of illness increased from moderate to extreme. Conclusion: Facility characteristics and patient medical status predict postpartum readmission within 30 days. Hospital referral practices may increase admissions to teaching and urban facilities.

VITAMIN D INSUFFICIENCY, TH2 CYTOKINES, AND ASTHMA OUTCOMES IN PUERTO RICAN CHILDREN Yuch-Ying Han* Yuch-Ying Han, Erick Forno, Juan C. Celedón, (University of Pittsburgh)

Background: T helper type 2 (Th2) cytokines, including interleukin (IL)-5 and IL-13, are key to the development of atopy and asthma. Increasing evidence also suggests that vitamin D plays a role in asthma pathogenesis. Methods: In a casecontrol study of asthma, 523 Puerto Rican children (ages 6-14 years) in San Juan, Puerto Rico, completed a respiratory health questionnaire and spirometry testing, and had data on plasma cytokines (IL-5 and IL-13) and atopy markers (total IgE and eosinophils). Asthma was defined as physician-diagnosed asthma and ≥1 episode of wheeze in the previous year. Atopy was defined as ≥1 positive IgE to five common allergens. Multivariate regression was used to evaluate the relation between IL-5 or IL-13 and asthma, lung function, or atopy markers. On the basis of our prior studies, we also conducted an analysis stratified by vitamin D insufficiency (25-hydroxyvitmain D ≤30 ng/ml vs >30 ng/ml). Results: After adjusting for covariates and potential confounders, higher IL-5 (each log10-unit increment) was associated with 1.88 times higher odds of asthma (95% C1=1.01-3.40). Among asthma cases, each log10-unit increment in IL-5 or IL-13 was associated with 136-180ml lower FEV1. 4.8%-6.3% lower FEV1/FVC, and lower vitamin D levels. IL-5 and IL-13 were associated with total IgE and eosinophils in children with atopic asthma. Moreover, higher IL-5 and IL-13 were associated with increased total IgE and eosinophils among asthmatic children with vitamin D insufficiency, but not among those with sufficient vitamin D. Conclusion: Among children with asthma, IL-5 and IL-13 were associated with total IgE and eosinophils in those with vitamin D insufficiency, but not in those with vitamin D sufficiency. Our results further suggest that vitamin D insufficiency has detrimental effects on atopic asthma.

NOVEL FRAILTY SCREENING QUESTIONNAIRE (FSQ) PREDICTS 8-YEAR MORTALITY IN OLDER ADULTS IN CHINA Lina Ma* Lina Ma, Zhe Tang, Piu Chan, Jeremy Walston, (Johns Hopkins University; Xuanwu Hospital of Capital Medical University)

Background: Although frailty status greatly impacts health care in countries with rapidly aging populations, little is known about the frailty status in Chinese older adults. Given the increased health care needs associated with frailty, we sought to develop an easily applied self-report screening tool based on four of the syndromic frailty components and sought to validate it in a population of older adults in China. Methods: Data were obtained from the Beijing Longitudinal Study of Aging, comprising 1865 community-dwelling adults aged ≥60 years in 2004 with an 8-year follow up. We developed a simple self-reported frailty screening tool-the Frailty Screening Questionnaire (FSQ)-based on the modified Fried frailty components (slowness, weakness, inactivity, and exhaustion). In all, 1724 participants completed the FSQ. An FSQ score of ≥3 indicated frailty; a score of 1 or 2 signified prefrailty, and 0 indicated robust. We calculated the kappa coefficient to determine the agreement between the FSQ and Frailty index (FI). The predictive ability for outcome was assessed by age and sex using the adjusted Cox proportional hazards model. Results: According to FSQ criteria, 7.1% of the participants were frail. Frailty was associated with poor physical function, fractures, falls, and mortality. Both frailty and pre-frailty were associated with a higher mortality rate: frailty-hazards ratio (HR), 3.94, 95% confidence interval (CI), 3.16-4.92, P<0.001; pre-frailty-HR, 1.89; 95% CI, 1.57-2.27, P<0.001; ad justed models for this variable did not affect the estimates of the association. Among the four frailty components, slowness was the strongest predictor of mortality. The combination of the four components provided the best risk prediction. Conclusions The selfreported FSQ has a good capacity to identify frailty as measured by the frailty index and predict mortality. This indicates that it could be a useful frailty screening tool for elderly community-living Chinese people.

0891 S/P

ASSOCIATION BETWEEN CERVICAL CANCER SCREENING AND HUMAN PAPILLOMAVIRUS VACCINE STATUS AMONG KOREAN WOMEN Nguyen Thi Ngoc Phuong* Nguyen Thi Ngoc Phuong, Kui Son Choi, Kim Yeol, Boyoung Park, Yoon Young Lee, Mina Suh, Jae Kwan Jun, (National Cancer Center - Graduate school of Cancer science and Policy, Republic of Korea)

Backgrounds: This study aimed to examine the cervical cancer screening according to Human papillomavirus (HPV) status. We additionally investigated the factors associated with the screening of cervical cancer according to HPV vaccination status. Methods: Data from the Korean National Cancer Screening Survey (KNCSS) in 2014 and 2016, an annual nationwide cross-sectional survey, were utilized. A total of 5,386 women were finally included for analysis Participants who got at least 1 dose of HPV vaccination were considered in the vaccinated group. Screening status was defined as 'screened' for women who underwent Pap smear screening within 2 years for cervical cancer. Logistic regression analysis was employed to identify factors associated with cervical cancer screening by HPV vaccination status. Results: Only 6.9% of women took HPV vaccine. More than half of women (56.2%) received Pap smear within 2 years. Women who received HPV vaccine were 1.53 (95% CI: 1.20 - 1.94) times more likely to undergo Pap test than those did not. Among women who had had HPV vaccine, those had regular healthcare provider were significantly more likely to have the recent cervical cancer screening than those had not (aOR=2.22, 95% CI: 1.22 - 4.05). Among women who had not been vaccinated, those living with spouse (aOR=1.70, 95% CI: 1.40 - 2.05), reporting good health status (aOR=1.17, 95% CI: 1.01 - 1.34), having private insurance (aOR=I.34, 95% CI: 1.13 - 1.58), having regular healthcare physicians (aOR=I.40, 95% CI: 1.22 - 1.62) and frequent health check-up (aOR=I.44, 95% CI: 1.25 -1.66) were more likely to undergo cervical cancer screening. Conclusions: Women who had taken HPV vaccines were more likely to receive a recent cervical cancer screening. Efforts will be needed to ensure that unvaccinated women understand the importance of cervical screening.

OCCUPATIONAL CLASS AND C-REACTIVE PROTEIN: AU-SHAPED ASSOCIATION FOUND FROM A KOREAN WORKING-AGE BOBLI ATION Version King Version Kim Menurchi Zeiten Kommi Tenne

POPULATION Yongjoo Kim* Yongjoo Kim, Masayoshi Zaitsu, Kanami Tsuno, Xiaoyu Li, Ichiro Kawachi, (Department of Social and Behavioral Sciences, Harvard T.H. Chan School of Public Health)

While research in Western settings finds lower risk of cardiovascular disease in white-collar workers compared to lower occupational groups, the same pattern is not consistently found in Asian contexts. We examined the association between occupational class and C-reactive protein (CRP), a marker of systemic inflammation in a Korean working-age population. We used a nationally representative sample of Korean adults (n=3,518) aged 19-65 years from the 2015 Korea National Health and Nutrition Examination Survey. CRP (mg/L) was assessed by immunoturbidimetric assay with serum samples collected after overnight fasting. Based on the Korean Standard Classification of Occupations, each individual's primary lifetime occupation was categorized as: white-collar (managers/professionals/clerks), pinkcollar (service/sales), blue-collar (craft/equipment/machine-assembling), agribusiness and other (agricultural/forestry/fishery/elementary), and unemployed status. Our cross-sectional models adjusted for sociodemographic factors, shift work, working hours, chronic conditions (Model 1), and further added smoking, alcohol drinking, physical activity, and sleep hours (Model 2). Overall, a U-shaped association was found. Compared with pink-collar workers, white-collar workers (β=0.11, 95% CI: 0.001, 0.23) and the unemployed (β=0.13, 95% CI: 0.01, 0.24) had, on average, higher levels of CRP, whereas the association was not significant for blue-collar workers (β =0.09, 95% CI: -0.06, 0.24). Among the subtypes of whitecollar occupations, professionals had a particularly elevated level of CRP (B=0.18, 95% CI: 0.05, 0.32) compared with pink-collar workers. These associations were consistent after adjusting for behavioral factors (Model 2) with 11%-18% increased magnitudes for white-collar workers (\beta=0.13, 95% CI: 0.02, 0.25) and professionals (B=0.20, 95% CI: 0.07, 0.33). This suggests that white-collar workers, particularly professionals, may have an elevated risk of cardiovascular disease.

0902 S/P

A NOVEL MEASURE OF ECONOMIC INSECURITY IS ASSOCIATED WITH MORTALITY IN US COUNTIES Emily A. Knapp* Emily A. Knapp, Lorraine T. Dean, Mariana Lazo, Brian S. Schwartz, David D. Celentano, (Johns Hopkins School of Public Health)

Economic insecurity, or the degree of instability in underlying economic conditions in a community, may affect health through material and psychosocial pathways. However, there are currently no established measures of economic insecurity at the community level; the unemployment rate is often used as a proxy measure. Our goal was to create a measure of county economic insecurity for 320 counties in 7 states in the mid-Atlantic region. Using a theoretical framework drawn from existing literature, we obtained indicators of county economic insecurity in 2000 from the US Census and the Federal Reserve. Mortality data were obtained from the CDC WONDER database for 2005. We conducted a confirmatory factor analysis using MPLUS and STATA to test our measurement theory. In preliminary validation analyses, we estimated the correlation between county economic insecurity and both traditional measures of community socioeconomic status (education, income) and demographic variables (age, racial composition, population). A measurement model at the county level containing the percent of people not in the labor force, unemployed, with jobs in the service sector, and with subprime credit ratings, as well as percent of income spent on rent, fit the observed data well (standardized root mean square residual = 0.033, comparative fit index = 0.961). Factor scores were estimated from this model for all 320 counties. County economic insecurity had a low correlation with median age (r=0.14), population density (r=0.14), and percent black (r=0.16). It was moderately correlated with having a high school (r= -0.60) or college degree (r=-0.34) and median income (r=-0.68). County economic insecurity was moderately correlated with all-cause mortality (r=0.43), while unemployment alone had a lower correlation with mortality (r=0.26). Our findings suggest that this theory-driven, multidimensional measure of county economic insecurity is a novel and potentially important risk factor for mortality.

NEIGHBORHOOD TAX FORECLOSURES AND PRETERM BIRTH AMONG URBAN BLACK WOMEN: EFFECT MODIFICATION BY EDUCATIONAL ATTAINMENT Shawnita Sealy-Jefferson, PhD, MPH* Shawnita Sealy-Jefferson, Dawn P. Misra, PhD, (Virginia Commonwealth University)

No studies have examined the contextual effect of neighborhood tax foreclosures on preterm birth (PTB) risk among Black women. We assessed whether living in a neighborhood with high tax foreclosures is associated with preterm birth risk, and whether educational attainment modified the association. Data from the Life Influences on Fetal Environments Study (2009-2011, n=1410) of postpartum Black women were used; data from the subsample of participants residing in Detroit, Michigan (n=662, 47%), were linked to archival tax foreclosure data from the Wayne County Treasurer. A count variable enumerated the tax foreclosed homes across 380 block groups, and was rescaled by the interquartile range (75th versus 25th percentile). Educational attainment was self-reported, and dichotomized a s≤ 12, > 12 years. PTB was defined as birth before 37 completed weeks of gestation, and occurred in 16.3% of the sample. Log binomial regression models, adjusted for predictors of residential selection, estimated prevalence ratios (PR) and 95% confidence intervals (CI), and included a foreclosure X education interaction term (p < 0.10 was considered statistically significant). 13.4% (n=89) of block groups experienced no tax foreclosures, and 'high' tax foreclosures ranged from 13-69/block group. In the overall sample, neighborhood tax foreclosures did not predict PTB (aPR: 0.95, CI 0.77, 1.18), but the association was modified by educational attainment (interaction p=0.01). In women with low education (n=171), neighborhood tax foreclosures was positively associated with PTB risk (aPR: 1.42, CI: 1.00, 2.01). The association in women with high education (n=401) was in the opposite direction (aPR: 0.76, CI: 0.56, 1.04). Results were robust to sensitivity analyses which excluded women who themselves experienced a home foreclosure. Future studies should examine women's experiences of living in neighborhoods with high tax foreclosures to understand the mechanisms of the reported associations.

0903

DOCUMENTATION STATUS AND ADVERSE PREGNANCY OUTCOMES AMONG HISPANIC WOMEN Lynne Messer* Lynne Messer, Dawn Richardson, Sarah Andrea, Amber Ziring, Betty Izumi, (OHSU-PSU School of Public Health)

Background: Latinas in the United States (US) have more favorable birth outcomes (preterm birth, low birth weight, infant mortality) than would be predicted given their educational and income status, referred to as the Latina Paradox. Being undocumented in the US may offset these protective effects by limiting access to prenatal care or increasing stress related to fear of deportation or discrimination. Methods We used 2007-2008 data representing 20,151 women delivering in one US county, a portion of whom were eligible for a program providing emergency medical coverage for non-citizens not meeting Medicaid immigration status requirements; >95% of pregnant Latinas delivering under this program are undocumented. Using logistic regression, we will model pregnancy outcomes (preterm birth (PTB), low birth weight (LBW) and gestational diabetes (GDM) as a function of race/ethnicity (white and Black non-Hispanic and Hispanic) and confounders (nativity, maternal age, education, marital status). We will further examine and present effect modification by insurance type (undocumented, other non-private, private, self-pay). We provide sample proportions below. Results: Almost 3 percent(%) of births were undocumented (2.6), of which 88% were to Hispanic women. Undocumented women were more likely to deliver PTB (11.1%), LBW (7.7%), and GDM (7.5%) compared to women using other non-private (8.4%, 7.3%, 5.6%), private (8.2%, 6.9%, 5.3%) and self-pay (6.8%, 6.0%, 2.8%) insurance types, respectively. Among only Hispanic women, those who were undocumented more likely to deliver PTB (10.0%), LBW (7.5%) and GDM (8.3%) than documented Hispanic women (7.8%, 6.8%, and 7.7%, respectively). Conclusion: Findings suggest not all Latina women are equally benefitted by the Latina Paradox, with undocumented women at increased risk of adverse pregnancy outcomes Addressing documentation status is an actionable public health intervention with important maternal and child health implications.

THE EFFECT OF STATE-LEVEL EARNED INCOME TAX CREDIT LAWS IN THE U.S. ON INFANT MORTALITY Roman Pabayo* Roman Pabayo, Daniel Cook, Guy Harling, Amy Ehntholt, Natalie Rosenquist, Peter Muennig, (University of Alberta, School of Public Health)

Introduction: The U.S. Federal Earned Income Tax Credit (EITC) is a refundable tax credit for low-to moderate-income working individuals and couples, and is augmented for those with children. The EITC is designed to supplement incomes of low-wage workers and to reduce tax burdens. In addition to the federal program available to all, states may also add a tax credit. From 1988 to 2017, 29 states and Washington DC adopted or expanded an EITC. Previous work has indicated that infants born in states with EITC showed small improvements in infant birth weight and gestation time in comparison to those born in states with no EITC. To our knowledge, there has been no studies that investigate the relationship between EITC and infant mortality risk. Methods: We used data on 25,027,040 infants and their mothers from the 2006-2010 United States Statistics Linked Infant Birth and Death Records, and linked this to measures of the generosity of state EITCs in the year of conception. We used a logistic regression model with fixed effects for year and state to account for unobserved confounders, allowing us to isolate the effect of changes in EITC generosity within states. We also adjusted for maternal characteristics from the birth certificate and whether EITCs were refundable. Results: Between 2006 and 2010, there were 98,002 infant deaths resulting in an infant mortality rate of 6.07 infant deaths per 1000 live births. During this time, only four states implemented a new EITC. A state EITC payment of 20% of the federal amount was associated with 9% lower odds of infant mortality (OR=0.91, 95% CI=0.83, 0.99). Conclusions: These findings indicate that the state EITC might provide health benefits for US newborn infants. However, results should be interpreted with caution since only four states implemented the EITC during the study period. Further studies using more rigorous study designs over a longer time period.

0906

QUANTIFYING MORTALITY DUE TO SOCIAL DETERMINANTS OF HEALTH IN BALTIMORE CITY Brionna Hair* Brionna Hair, Darcy Phelan-Emrick, (Baltimore City Health Department)

Social factors are closely linked with health inequities in the U.S. Reducing health disparities requires interventions that target these drivers of health. The purpose of this analysis was to quantify the contribution of social determinants of health to allcause mortality in Baltimore City. Population attributable fractions were calculated to determine the number of deaths attributable to social factors in Baltimore City according to the methods of Galea et al. Prevalence of area-level social factors (living in census tracts with high poverty, income inequality, or racial segregation) and individual-level factors (percentage of residents with low educational attainment, living in household poverty, or experiencing social isolation) were obtained from the American Community Survey and the Baltimore Community Health Survey. The number of deaths was provided by the Maryland Department of Health. In Baltimore City, there were 30,161 deaths in those aged 25 and older in 2011-2015. An estimated 3,396 of those deaths (11%) were attributed to living in census tracts with high poverty. Living in census tracts with high income inequality and high racial segregation also impacted mortality (n=777 deaths (3%) and n=1.245 deaths (4%), respectively). In those aged 25 to 64 years, 1,212 deaths (11%) were attributed to low education status, 1,004 (9%) to household poverty, and 408 (4%) to low social support. In those aged 65 years and older, 1,237 deaths (7%) were attributed to low education status, 835 (5%) to household poverty, and 372 (2%) to low social support. There is likely overlap among these social factors affecting mortality, so these estimates should not be considered mutually exclusive. Area-level poverty and individual-level low education status were the largest contributors to mortality in Baltimore City, suggesting that interventions aimed at reducing these factors could have greater impact on all-cause mortality than interventions targeting other social factors.

THE TIPPING POINT: DOES INCREASING THE SUBMINIMUM WAGE DECREASE THE PREVALENCE OF ANTENATAL STRESSORS IN U.S. WOMEN? Sarah B. Andrea* Sarah B. Andrea, Lynne Messer, Julia Goodman, Miguel Marino, Janne Boone-Heinonen, (OHSU-PSU School of Public Health)

Background: Tipped workers, comprised primarily of reproductive-aged women, can be paid a "subminimum wage" that is 71% lower than the federal minimum wage, contributing to financial hardship. Financial stress experienced during pregnancy may be detrimental to the health of both women and their children. We tested the hypothesis that increases in the subminimum wage would be associated with reduced prevalence of antenatal financial stress. Methods: We used data from 382,392 women residing in 38 states participating in the Pregnancy Risk Assessment Monitoring System between 2004-2014. Data were linked to time-varying state-level wage and other antipoverty policies (e.g. maximum annual earned income tax credit) and sociodemographic composition. Using interrupted time series analyses, we modeled the proportion of women experiencing financial stress - classified based on reported experiences (e.g. difficulty paying bills) 12 months prior to their infant's birth as a function of subminimum wage and confounders. Analyses accounted for survey design and state-level factors and were stratified by education level. Results: Increases in subminimum wage were associated with a decrease in the prevalence of antenatal financial stress in the year following the revised wage policy; for example, -1.1% [95% CI -0.1,-2.4] when New York increased their subminimum wage but not their minimum wage in 2011. Decreases in subminimum wage were similarly associated with an increase in the prevalence of antenatal financial stress (+5.2% [95% CI: 0.1, 9.4%]) when New Jersey decreased their subminimum wage in 2006. These shifts in prevalence were maintained in subsequent years. Conclusion: Findings support the hypothesis that increasing the subminimum wage can reduce the prevalence of financial stress during pregnancy. Increasing subminimum wage may be an actionable strategy to reduce poor health outcomes in low-income women and their children.

0907 S/P

INCOME INEQUALITY AND INFANT AND NEONATAL MORTALITY: EVIDENCE FROM THE 2010 COHORT LINKED BIRTH/INFANT DATA SET Amy Ehntholt* Amy Ehntholt, Daniel Cook, Peter Meunnig, Natalie Rosenquist, Roman Pabayo, (University of Nevada Reno)

Background: Ecological studies have provided evidence of an association between income inequality and infant mortality rates (IMR) in the US, but little work has used individual-level data. The combined influence of inequality at county and state levels also remains understudied, and little is known about mechanisms through which inequality might lead to increased risk of infant mortality. Hypothesized pathways include erosion of social capital and decreased healthcare access due to higher income inequality, damaging maternal and infant health. We sought to identify the relationship between income inequality at both county and state level and individual risk of infant and neonatal mortality, and to determine whether social capital and access to healthcare act as mediators. Methods: We linked county- and state-level measures to the CDC's 2010 Cohort Linked Birth/Infant Data Set. We used multilevel logistic regression models to test whether income inequality (Gini coefficient) at each level was associated with likelihood of infant mortality (death before age 1) or neonatal mortality (death within first 28 days of life). Possible mediation by social capital and physician-to-patient ratio was evaluated using Baron-Kenny. Further mediation analyses using structural equation modeling are underway. Results: Models adjusting for individual- and area-level covariates indicated that county-level-but not state-level-income inequality was associated with increased odds of both infant (OR: 1.14, 95% CI: 1.10, 1.18) and neonatal (OR: 1.17, 95% CI: 1.12, 1.23) mortality. County-level physician-to-patient ratio and social capital acted as partial mediators. Conclusions: Income inequality at the county level appears more powerful than at the state level in influencing risk of infant and neonatal mortality. Social capital and physician-to-patient ratio may have a protective mediating effect on this association, and may therefore be worthy targets for intervention.

CHANGE IN BINGE DRINKING AFTER HURRICANE SANDY Sean Locke* Sean Locke, Lisa M. Gargano, (NYC Department of Health and Mental Hygiene)

Several studies have examined the association of post traumatic exposures and excessive drinking, very few are prospective studies. The objective of this study was to examine changes in drinking behavior after Hurricane Sandy among the World Trade Center Health Registry (Registry) enrollees whose drinking habits were captured before and after Hurricane Sandy prospectively. The Registry is a longitudinal cohort study of over 71,000 individuals exposed to the 9/11 terrorist attacks in the New York City. Hurricane Sandy and the related survey occurred between Wave 3 (2011-12) and Wave 4 data collection (2015-16), the study sample included enrollees who completed all three of these surveys. The 4-level composite Sandy exposure scale included Sandy traumatic experiences measure, financial and other Sandy impacts (none, low, medium and high). Sandy-related posttraumatic stress disorder (PTSD) was assessed with Sandy-specific PTSD checklist-Civilian Version (PCL-17) with a score of 44 or greater indicating probable PTSD. An episode of binge drinking was defined as having ≥ 5 (for men) or ≥ 4 (for women) drinks on a single occasion in the last 30 days. Change in binge drinking was categorized into a 4-level scale (never, new, former, and continued). Of the 4,026 enrollees, 6.1% (n=234) were not binge drinkers pre-Sandy, but had one binge episode or more post-Sandy (new), and 18% (n=687) had at least one binge episode pre and post-Sandy (continued). In the adjusted analyses, enrollees with high Sandy exposure were 1.9 (95% CI: 1.4-2.7) times more likely to continue to be binge drinkers compared to those with no Sandy exposure. Enrollees with probable Sandyrelated PTSD were 2 times more likely (95% CI: 1.2-3.3) to become binge drinkers (new) after Sandy compared to enrollees without PTSD. These results suggest that Sandy exposure was associated with an increased risk of binge drinking among 9/11 survivors. Sandy-related PTSD was associated with change in binge drinking.

IMPACT OF MARIJUANA LEGALIZATION IN URUGUAY AMONG ADOLESCENT STUDENTS Ariadne Rivera-Aguirre* Ariadne Rivera-Aguirre, Alvaro Castillo-Carniglia, Aaron Shev, Hannah Laqueur, Kara E. Rudolph, Silva S. Martins, Magdalena Cerdá, (Violence Prevention Research Program, Department of Emergency Medicine, UC Davis School of Medicine)

Background: In December 2013, Uruguay became the first country in the world to remove the prohibition on production and supply of cannabis for recreational use. Uruguayan residents above 18 years old may access marijuana by registering as a self-grower, as a cannabis club member or to purchase in pharmacies. Although people under 18 are not allowed to legally access marijuana, this new regulation may pose new challenges for prevention of marijuana use by youth. The objective of this study was to evaluate whether national recreational marijuana legalization in Uruguay is associated with short-term changes in the prevalence of use in the past year and past month among adolescents (ages 12-18). Methods: We used a quasiexperimental comparative case study design using the synthetic control method. To create the synthetic control group for Montevideo, Uruguay we used data for comparable cities in Chile (n= 11), and Argentina (n= 5) on demographic characteristics, substance use prevalence, risk perceptions of marijuana use and ease of access of marijuana from each country's national statistics office and crosssectional high school student surveys on drug use for years 2001-2015. Results: Past year and past month adolescent marijuana use in Montevideo were 8.1 and 4.4 percentage points lower, respectively, than in its synthetic control in the two years following the enactment of marijuana legalization in Uruguay. For both outcomes, 0/16 of the placebo tests experienced a decline as large as the decline observed in Montevideo. These findings were robust to alternative specifications of the synthetic control method. Conclusion: Legalization of marijuana is associated with a shortterm reduction in marijuana use among adolescents in Uruguay. However, since the new regulation is still in its implementation phase, more evidence is needed to determine the effect of marijuana legalization on adolescent marijuana use once the law is fully implemented.

0911 S/P

INJECTION ACTIVITY SPACES AND BINGE DRUG INJECTION IN A PROSPECTIVE COHORT OF PEOPLE WHO INJECT DRUGS IN MONTREAL, CANADA Nanor Minoyan* Nanor Minoyan, Stine Bordier Høj, Brendan Jacka, Andreea Adelina Artenie, Didier Jutras-Aswad, Julie Bruneau, (School of Public Health, Universite de Montréal / Research Centre of the Centre Hospitalier de l'Universite de Montréal)

Background: Situating substance use within geographic and social contexts may improve understanding of consumption patterns and inform interventions among people who inject drugs (PWID). Aims: To examine the relationship between injecting activity spaces and binge injection. We posit that PWID who travel to inject with others engage in binge injection more frequently than those injecting with others at home, or alone. Methods: Data were drawn from a longitudinal cohort of PWID in Montreal. Every 3 months, eligible PWID (past-month injection, ≥18 yrs old) provide sociodemographic and behavioral data, dwelling postcode, and event-level data on the most recent injection episode with others present. Dwelling and injection locations were geocoded and distance between them calculated. Activity spaces were defined as 1) injecting with others at the dwelling; 2) injecting with others elsewhere; 3) injecting alone. A binary measure defined binge use as injecting large quantities of drugs for a sustained period until no longer able to continue, in the past 3 months. Associations between injecting context and binge use were estimated using GEE models adjusted for age, gender, stable housing, incarceration and cocaine injection. Results: 670 individuals contributed 3976 visits. PWID who injected with others in a location other than their dwelling ('travelers') were more likely to be male, unstably housed, reside outside the inner city, in ject prescription opioids and inject in public. Traveling to inject with others was associated with 40% (aOR=1.42, 95%CI 1.04-1.93) and 70% (aOR=1.69, 95%CI 1.29-2.21) greater odds of binge compared to injecting with others at home and injecting alone, respectively. Travelers covered a median distance of 4.1km. Conclusion: PWID who travel to inject with others exhibit heightened risk of binge injection and markers of vulnerability to drug-related morbidity. Future analyses may assess specific characteristics of high-risk injecting environments.

0913 S/P

ADOLESCENT PERCEPTIONS OF PARENTAL WARMTH AND MONITORING, DEVIANT BEHAVIOR, AND MARIJUANA USE Shadiya L. Moss* Shadiya L. Moss, Silvia S. Martins, Katherine M. Keyes, Pia M. Mauro, (Columbia University)

Aim: Poor parenting practices and deviant behaviors are associated with adolescent marijuana use. To 1) assess the association of parental warmth and monitoring, and adolescent deviant behavior with marijuana use in the past year, and 2) test the moderating effect of deviant behavior, gender, age, and race/ethnicity on these associations. Methods: Respondents included 12-17 year-olds (N=14,272) from the 2016 National Survey on Drug Use and Health, a nationally representative crosssectional study. Three dichotomous exposures were past-year youth-reported: 1) parental warmth (e.g., parent told youth they had done a good job), 2) parental monitoring (e.g., made youth do chores), and 3) deviant behavior (e.g., youth got into a serious fight alone or with friends). Any past-year marijuana use was the outcome of interest. Separate logistic regression models were used to assess our aims. Models were adjusted for age (12-13, 14-15, 16-17), race/ethnicity, gender, and income. Results Eighty-three percent of adolescents reported high parental warmth, 58% perceived high parental monitoring, 24% reported engaging in deviant behaviors, and 12% reported any marijuana use in the past year. High parental warmth (odds ratio [OR]=57, p<.01) and high parental monitoring (OR=59, p<.01) were negatively associated with marijuana use, whereas deviant behavior (OR=3.95, p<.01) was positively associated with past year marijuana use. We did not find that gender, race/ethnicity or deviant behavior moderated these associations. Age did moderate the association of parental monitoring (OR=25.8, p<.01) and warmth (OR=19.9, p<.01) on marijuana use among 16-17 year olds. Conclusions Past year marijuana use is higher among adolescent who engage in deviant behavior, and lower among adolescents who self-report perceived high parental warmth and high parental monitoring. Family-based interventions that focus on both parental involvement and youth deviant behavior may reduce adolescent marijuana use.

ESTIMATING THE PREVALENCE OF OPIOID DIVERSION AMONG PLWH USING INDIRECT QUESTIONING Chelsea Canan* Chelsea Canan, Geetanjali Chander, Jeanne Keruly, Richard Moore, G. Caleb Alexander, Bryan Lau, (University of Virginia)

Background. Research suggests that over 70% of abused prescription painkillers are obtained illegally. However, the prevalence of diversion is difficult to measure because of social desirability bias; as a result there is a dearth of information on opioid diversion. We applied a method designed to provide a more accurate estimate of sensitive behaviors to assess the prevalence of opioid diversion among patients in a longitudinal cohort of people living with HIV (PLWH). Methods. From October 2016 to November 2017, we randomized opioid recipients in the Johns Hopkins HIV Clinical Cohort to answer either a direct or indirect question about opioid diversion. Indirect questioning is an approach to ask a sensitive question that allows for valid population estimates while the participant is protected from revealing their true status. We estimated the prevalence of diversion under each method. We further estimated diversion prevalence in subsets of the sample by sex, race, HIV risk group, illicit drug use, smoking status, depressive symptoms, and anxiety. Results Of 1.745 patients screened, 829 (47.5%) reported that they had ever received an opioid prescription. Of these, 523 answered the indirect question and 288 directly answered whether they had ever diverted opioids. The prevalence of opioid diversion using the indirect and direct questioning methods were 14.5% (95% CI 10.6%-18.3%) and 6.3% (95% CI 3.7%-9.7%), respectively. Males, non-African Americans, and patients with a history of any illicit drug use had a higher prevalence of opioid diversion. Conclusions. We found a high rate of opioid diversion in an HIV clinical practice under indirect questioning, with over twice the estimated prevalence compared to direct questioning. Following strict prescribing practices may reduce the abundance of opioids and decrease the likelihood of diversion, which is a main contributor to the opioid epidemic.

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INCREASES IN OVERDOSE FATALITIES IN THE BEGINNING OF THE MONTH: REVISITING THE "CHECK EFFECT" THROUGH A SPATIAL LENS William C. Goedel* William C. Goedel, BA, Traci C. Green, PhD, MSc, Josiah D. Rich, MD, MPH, Brandon D.L. Marshall, PhD, (Brown University School of Public Health Department of Epidemiology)

Previous research has suggested that social service benefit issuance on the first day of a month is associated with increased overdose fatalities. However, the extent to which this excess mortality is spatially clustered in communities with higher levels of social service benefit receipt has not been studied. We sought to examine if public assistance receipt, among other social and structural factors at the census block group level, were associated with the spatiotemporal patterns of overdose fatalities in Rhode Island, a state with the fifth highest overdose mortality rate in 2015. We conducted a retrospective review of all overdose deaths recorded from 2014 to 2016 (n = 838). Overdose incident locations were geocoded to the census block group level. Clusters of census block groups with excess overdose-related mortality at the beginning and end of a month were identified using spatial scan methods. Logistic regression analyses were performed to assess social and structural characteristics associated cluster memberships. Increased numbers of overdose fatalities were observed at the beginning of a month relative to the end of a month (Ratio: 1.08; 95% CI: 1.03, 1.12). Fatal overdose at the beginning and end of a month clustered in distinct, non-overlapping areas, but no significant association was observed between the proportion of residents receiving cash public assistance and cluster membership. Increasing proportions of households paying more than 30% of their income towards housing costs were associated with increased odds of a census block group being included within a cluster (OR: 1.04; 95% SI: 1.01, 1.07). Future research should seek to elucidate the temporal ordering of the association between housing costs, psychological distress due to housing-related financial obligations, the intensity of substance use, and risk of fatal overdose.

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TEACHING CLINICAL TRIALS AND SYSTEMATIC REVIEWS TO A MASSIVE, OPEN, AND ONLINE AUDIENCE Jimmy Toan Le* Jimmy Toan Le, Ira Gooding, Sukon Kanchanaraksa, Kay Dickersin, Janet T. Holbrook, Tianjing Li, (Center for Clinical Trials and Evidence Synthesis, Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health)

Background: Clinical trials and systematic reviews are cornerstone methodology for clinical epidemiology and public health. Massive open online courses (MOOCs) can provide a new and transformative model for teaching a global community on the foundational methods of evidence-based healthcare. Objective: To describe our experience teaching "Design and Interpretation of Clinical Trials" (CT) and "Introduction to Systematic Review and Meta-analysis" (SRMA) as MOOCs. Methods: Faculty at the Johns Hopkins Center for Clinical Trials and Evidence Synthesis offer two MOOCs through Coursera. Both courses are open-access and free of charge. Alternatively, participants may opt-in to earning a Coursera certificate (\$49). The MOOCs comprise six to nine 1-hour video modules, which participants viewed and completed at their own pace over a 6-week period. Participants are evaluated based on multiple-choice quizzes and peer-graded assignments. Teaching assistants (TAs) facilitated the online discussion forums. Results: As of January 12, 2018, 43,300 participants (21,081 and 21,949 CT and SRMA, respectively) from over 170 unique countries had enrolled in the two courses. Of these, 4201 (20%) and 2660 (12%) participants had completed each course; 80% connected from outside of the United States (e.g. India, Egypt, the United Kingdom, Brazil, and China); 88% hold a Bachelor's degree or higher; and 60% were employed full-time. Participants used the discussion forums to discuss reading materials and find research collaborators. Discussion: MOOCs provide benefits to a wide range of participants. Students globally have open learning and collaborative opportunities. Faculty and schools benefit from making their products more widely accessible. TAs benefit from personal and academic discussions with students. The field benefits from increases in the numbers of individuals who will contribute to the generation, synthesis, critical appraisal, and application of research to health and healthcare.

LEFT VENTRICULAR MASS INCREASE IN WOMEN DURING CHILDBEARING YEARS IS ASSOCIATED WITH PARITY: THE CARDIA STUDY Gabrielle G. Snyder* Gabrielle G. Snyder, Erica P. Gunderson, Cora E. Lewis, João A. C. Lima, Donald Lloyd-Jones, Marnie Bertolet, Janet M. Catov, (Department of Epidemiology, Graduate School of Public Health, University of Pittsburgh)

Objective: Increased left ventricular (LV) mass is a marker of vascular remodeling and is consistently greater in black versus white women. The reproductive years are a critical period for weight changes in women, yet it is unknown if pregnancy history is related to changes in LV mass. We examined total parity at exam year 25 and 20-year change in LV mass in white and black women in the Coronary Artery Risk Development in Young Adults (CARDIA) Study. Methods: We studied 1373 women (50.3% black) with echocardiograms at baseline (1990-91, ages 23-35 years) and again 20 years later and direct measures of visceral and subcutaneous adipose tissue at exam year 25. Parity categories were: 385 (28.0%) nulliparous (no live births >20 weeks), 284 (20.7%) primiparous (parity=1), and 704 (51.3%) multiparous (parity≥2). Nulliparous was the referent. LV mass change was calculated between baseline and year 25 and indexed for height2.7. Results: Linear regression models controlled for baseline age, race, systolic blood pressure, body mass index, physical activity, education, and 20-year changes in systolic blood pressure and weight. Primiparity was associated with a 20-year increase in LV mass (2.15 g/m2.7, p=0.01) but multiparity was not (0.79 g/m2.7, p=0.26). Separately controlling for visceral (2.00 g/m2.7, p=0.02) and subcutaneous adipose tissue (2.11 g/m2.7, p=0.01) produced similar results among primiparas. While race interaction was nonsignificant (p=0.23), greater change in LV mass was associated with primiparity in black women (3.59 g/m2.7, $p \le 0.01$) but not in white women (0.81 g/m2.7, p=0.45). Conclusions: Primiparity is associated with greater change in LV mass versus nulliparity, particularly among black women. Higher parity was not associated with change in LV mass and adjustment for weight gain and direct measures of fat did not explain the association.

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ASSOCIATION BETWEEN DIETARY INTAKE AND THE COMPOSITION OF THE VAGINAL MICROBIOTA Rupak Shivakoti* Rupak Shivakoti, Susan Tuddenham, Laura Caulfield, Courtney Robinson, Jacques Ravel, Khalil Ghanem, Rebecca Brotman, (Johns Hopkins University)

Objective: Based on the composition of their vaginal microbiota, women can broadly be classified into five community state types (CST). Women with CST-IV, a low-Lactobacillus state, have a higher risk of various adverse health outcomes including bacterial vaginosis. Our objective was to determine the association between dietary intake and the composition and structure of the vaginal microbiota. Methods: From a cohort study of 125 non-pregnant reproductive-age women recruited from Gynecology clinics within the Johns Hopkins Hospital, we studied the association between dietary intake and the composition/structure of the vaginal microbiota at enrollment. Dietary intake data were obtained using the Block Brief 2000 food frequency questionnaire. Vaginal microbiota composition was characterized by sequencing and analysis of the V3-V4 regions of 16S rRNA gene and clustering into CST. Logistic regression analyses were used to determine the association of dietary intake, as assessed by nutrient variables (total energy, protein, carbohydrate, fat; types of fat, fiber; and food group intakes), with the structure of vaginal microbiota (CST IV vs. Lactobacillus-dominated CSTs). Results: Characteristics of 101 women with available data were a median age of 25 (interquartile range: 22-30), 57% white (31% black), 52% overweight/obese and 51% on hormonal contraception. Only cholesterol (adjusted OR: 2.13 per standard deviation increase, 95% CI: 1.004-4.53; p=0.049) was associated with vaginal CST-IV in multivariable models adjusting for total energy, race, age, body mass index, income, education, hormonal contraception use and vitamin supplement use. Conclusions: Our results indicate that cholesterol intake is associated with a less optimal low-Lactobacillus vaginal microbiota. Further studies are needed to replicate this finding and to test whether altering dietary cholesterol would influence the structure of vaginal microbiota and health outcomes.

HPV VACCINE ACCEPTABILITY AMONG PARENTS OF ADOLESCENT GIRLS IN A RURAL AREA MYSORE, INDIA Abraham Degarege Mengist* Abraham Degarege Mengist, Karl Krupp, Vijaya Srinivas, Kristopher Fennie, Tan Li, Dionne P. Stephens, Laura A.V. Marlow, Anjali Arun, Purnima Madhivanan, (Department of Epidemiology, Robert Stempel College of Public Health & Social Work, Florida International University, Miami, USA)

The purpose of this study was to examine factors predicting HPV vaccine acceptability among parents of adolescent girls in a rural area in Mysore district, India. A cross-sectional study was conducted among a random sample of 831 parents of adolescent girls (ages 11 to 15 years) attending schools in rural Mysore between September and October, 2011. A validated questionnaire in Kannada was used to measure factors affecting willingness of parents to vaccinate their daughters with HPV vaccine. Of the 831 parents, 79.9% were willing to vaccinate their daughter with HPV vaccine sometime soon if they were invited to receive it. Higher odds of parental willingness to vaccinate their daughters with HPV vaccine was observed among those who believed that HPV vaccine is safe (Adjusted Odds Ratio [aOR] 2.11; 95%CI: 1.01, 4.45); daughter may become sexually active (aOR 1.84, 95%CI: 1.08, 3.13); they have support of other family members to vaccinate their daughter (aOR 2.86, 95%CI: 1.47, 5.57); HPV infection causes severe health problems (aOR 1.64, 95%CI: 1.04, 2.57). On the other hand, parents who believed that there is low risk that daughter will get cervical cancer (aOR 0.52, 95%CI 0.29, 0.95); family will disapprove of getting daughter vaccinated (aOR 0.45, 95%CI: 0.22, 0.76); the injection may cause pain (aOR 0.53, 95% CI: 0.31, 0.89) and were older age (aOR 0.96, 95%CI: 0.93,0.99) had lower odds of willingness to vaccinate daughters with HPV vaccine. In conclusion, acceptance of HPV vaccination for daughters was high among rural parents in Mysore, India. However, public health education to reduce the belief that injection is painful and daughters are at low risk to get cervical cancer is important to reduce cervical cancer rates in Mysore and further improve parental acceptability of HPV vaccine in the district. The public health education should target older aged parents and extended family members. Key words: HPV, vaccine, acceptability, India, Mysore, Parents, Rural

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THE VAGINAL MICROBIOTA, HIGH-RISK HUMAN PAPILLOMAVIRUS INFECTION, AND CERVICAL INTRAEPITHELIAL NEOPLASIA IN A POPULATION-BASED STUDY Kayla Carter* Kayla Carter, Kimberly McKee, Christine Bassis, Jason Bell, Vincent Young, Barbara Reed, Mack Ruffin, (School of Public Health, University of Michigan)

Background: While there is epidemiologic evidence of an association between bacterial vaginosis and human papillomavirus (HPV) infection, the potential relationship between the vaginal microbiota, HPV, and cervical intraepithelial neoplasia (CIN) has not been well characterized. Our objective was to examine the vaginal microbiota structure and diversity in a stratified random sample of women from a population-based study in Appalachia, which has the highest annual rate of cervical cancer mortality in the United States. Methods: We analyzed cervicovaginal samples from 358 women in the Community Access, Resources and Education (CARE): Project 3 study across 16 clinics in Ohio. Using Illumina MiSeq sequencing of 16S rRNA gene amplicons, we characterized the vaginal microbiota among women with a) CIN, b) high-risk HPV only, and c) a random sample of healthy controls. Results: 94.4% of women were non-Hispanic White, and the mean age was 31.4 years (SD=12.7, range 18-83). Women with CIN or high-risk HPV were more likely to have a diverse vaginal community characterized by higher Gardnerella vaginalis abundance, compared to controls whose communities were more likely to be Lactobacillus spp. dominant (p<0.03). Specifically, all women were similarly likely to have L. crispatus dominated communities, but controls were more likely to have L iners dominated communities than women with CIN or highrisk HPV (p<0.03). Both L iners and L gasseri were found at significantly greater relative abundances in controls than in women with CIN or high-risk HPV by LDA effect size (LEfSe)(p= 0.027 and 0.0014, respectively). Conclusion: Compared to healthy controls, the vaginal microbiota of women with CIN or high-risk HPV was characterized by a diverse community with increased relative abundance of G. vaginalis and reduced relative abundance of L iners and L gasseri. Further study and validation of these differences for prognostic use is warranted.

INTAKE OF RED AND PROCESSED MEAT AND LIVER FUNCTION INDICES AMONG WOMEN WITH A HISTORY OF GESTATIONAL DIABETES Shristi Rawal* Shristi Rawal, Sjurdur F. Olsen, Stefanie N. Hinkle, Jing Wu, Anne Ahrendt Bjerregaard, Mengying Li, Sylvia H. Ley, Louise G. Grunnet, Yeyi Zhu, Liwei Chen, Cuilin Zhang, (Department of Nutritional Sciences, Rutgers School of Health Professions, Newark, NJ)

Objective: Red and processed meat intake are known to be dietary risk factors for cardiometabolic diseases, but little is known about their associations with liver function. We aimed to examine associations of red and processed meat intake with liver function indices in a high-risk population of women with a history of gestational diabetes (GDM). Methods: We included 550 women who had GDMcomplicated pregnancies in the Danish National Birth Cohort (1996-2002), and were followed up 9-16 years later in the Diabetes & Women's Health Study (2012-2014). At follow-up, alanine aminotransferase (ALT), aspartate aminotransferase (AST), and gamma-glutamyltransferase (GGT) were measured from fasting blood samples Derived liver function scores included hepatic steatosis index (HSI), fatty liver index (FLI), and non-alcoholic fatty liver disease liver fat score (NAFLD-LFS). Dietary intake in the past year was assessed with a food frequency questionnaire. We estimated RR (95% CI) for elevated liver scores by quartiles of red and processed meat intake, adjusting for sociodemographics, physical activity, and other dietary factors. Results: At follow-up, 54.0%, 43.5%, and 36.7% of women had elevated HSI(\geq 36), FLI (\geq 60), and NAFLD-LFS (> -0.64) respectively. Compared to women in the lowest quartile (≤47.6 g/day) of red meat intake, women in the highest quartile (≥80.7 g/day) had an increased risk of elevated HSI [aRR=I.49 (1.17-1.89); p-trend=0.002], elevated FLI [aRR=I.43(1.05-1.94); p-trend=0.01], and elevated NAFLD-LFS [aRR=I.48(1.09-2.01); p-trend=0.01]. Compared to women in the lowest quartile (≤4.8 g/day) of processed meat intake, women in the highest quartile (≥11.5 g/day) had an increased risk of elevated HSI [aRR=I.32(1.05-1.67); ptrend=0.06]; no significant associations were observed with other liver function indices. Conclusion: In a high-risk population of women with GDM history, greater red meat intake may be related to increased risk for liver dysfunction.

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POST-PREGNANCY BODY MASS INDEX IN THE PROGRESSION FROM HYPERTENSIVE DISORDERS OF PREGNANCY TO TYPE 2 DIABETES Simon Timpka* Simon Timpka, Jennifer J. Stuart, Lauren J. Tanz, Frank B. Hu, Paul W. Franks, Janet W. Rich-Edwards, (Genetic and Molecular Epidemiology, Lund University Diabetes Centre, Clinical Sciences Malmö, Lund University, Malmö, Sweden)

Background Women with a history of hypertensive disorders of pregnancy (HDP; preeclampsia or gestational hypertension) are at elevated risk of type 2 diabetes (T2D) after pregnancy. In this study we examined the extent to which postpregnancy body mass index (BMI) adds to the elevated risk of T2D in women with HDP compared to women with only normotensive pregnancies. Methods We utilized data from the Nurses' Health Study II, a prospective cohort study initiated in 1989. In women aged 45 to 54 years without prior gestational diabetes mellitus, we investigated the additive interaction between BMI after pregnancy and history of HDP on the risk of T2D. Main outcome measures were the relative excess risk due to interaction (RERI) and the attributable proportion of risk due to the interaction, which we calculated from multivariable Cox regression models. The main model was adjusted for race/ethnicity, age, parity, BMI at age 18 years menopausal status, parental history of diabetes mellitus, diet quality, physical activity, alcohol intake, and smoking. Results In total, 6,563 (11.7%) of 56,159 participants had a history of HDP and 1,341 women developed T2D during 436,333 person-years of follow-up. BMI was a risk factor for T2D regardless of HDP history. For example, obesity class I (BMI 30.0-34.9) was associated with a hazard ratio of 14.4 for T2D compared to normal weight (BMI 18.5-24.9) in women with a history of HDP. However, there was evidence of an additive interaction between BMI and HDP history for the risk of T2D (p=0.004 across categories of BMI). The attributable proportion of risk due to the interaction ranged from 0.12 (95% CI: -0.22, 0.46) in women with overweight (BMI 25.0-29.9) to 0.36 (95% CI: 0.13, 0.59) in women with obesity class I. Conclusions Maintaining a healthy weight may be of even greater importance in middle-aged women with a history of HDP, compared to parous women without history of HDP, to reduce the risk of T2D.

LONGER PAID MATERNITY LEAVE INCREASES BREASTFEEDING DURATION: LONGITUDINAL EVIDENCE FROM 41 LOW- AND MIDDLE-INCOME COUNTRIES Yan Chai* Yan Chai, (University of California, Los Angeles)

Maternity leave's impacts on breastfeeding practice have not been studied extensively in low- and middle-income countries due to limited comparative data at the global level. In this study, we applied the difference-in-differences approach to examine how more paid maternity leave policy in place prior to birth affects breastfeeding duration in low- and middle-income countries. We merged newly developed longitudinal data quantitatively measuring maternity leave policy with breastfeeding information from Demographic and Health Surveys in 41 low- and middle-income countries to construct a multilevel panel of national policies and breastfeeding data on 798,531 children born between 1996 and 2014. We used linear regression models to compare changes in breastfeeding duration among countries that lengthened their paid maternity leave between 1995 and 2013 (i.e., Bangladesh, Kenya, Lesotho, Malawi, Uganda, Zambia, and Zimbabwe) to the remaining 34 countries did not change their paid maternity leave. Country and year were included as fixed effects to account for, respectively, unobserved timeinvariant confounders across countries and shared trends over time in breastfeeding duration. Covariates, including individual- and household-level characteristics as well as country-level confounders, were adjusted. All models incorporated robust standard errors and respondent-level sampling weights. For paid maternity leave measured in weeks, an extended breastfeeding duration of 4.1 months (95% CI: 0.8-7.4), 5.3 months (95% CI: 0.7-9.9), 10.2 months (95% CI: 5.0-15.4), and 10.7 months (95% CI: 6.3-15.2) was observed when comparing, respectively, 4-8 weeks of paid maternity leave, 8-12 weeks of paid maternity leave, 12-16 weeks of paid maternity leave, and 16-20 weeks of paid maternity leave to 0-4 weeks of paid maternity leave. Sensitivity analyses using exposures with different lag and lead times provided the robustness of our main estimates.

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DECOMPOSITION OF MATERNAL EDUCATION AND WEALTH INEQUALITIES IN CHILD MORTALITY AND ACCESS TO SAFE WATER AND SANITATION AND HYGIENE IN ETHIOPIA Sara McElroy* Sara McElroy, Tarik Benmarhnia, Georgia Kayser, (University of California, San Diego)

Diarrheal disease is one of the primary causes of child mortality in low to middleincome countries, such as Ethiopia. Access to safe water and sanitation and hygiene (WaSH) has been recognized as a significant way to mitigate diarrhea disease and thus reduce child mortality. In addition, there are important inequalities in child mortality associated with socioeconomic factors such as maternal education and wealth. This study aims to elucidate these socioeconomic inequalities in child mortality by quantifying the relative contribution of individual maternal and household characteristics and WaSH indicators. A regression-based decomposition of a concentration index of child mortality for both maternal education and household wealth was used to explain these inequalities. First, a concentration index was calculated using a cumulative distribution of the 2011 Ethiopia Demographic Health Survey sample ranked by the years of maternal education. Second, a decomposition of this index, which measured the extent to which access to water and sanitation and other individual and household characteristics contribute to both educational and economic inequalities in child mortality. We found child mortality is concentrated among less educated mothers and within the bottom 40% of the distribution of wealth within Ethiopia. A significant amount of these disparities can be explained by access to WaSH, 21% of maternal education inequalities in child mortality can be attributed to unimproved sources of drinking water and sanitation. Households that have unsafe drinking water and sanitation in addition to mothers with low or no education describe a disproportionally large amount of child mortality. Furthermore, maternal education predicts a greater portion of WaSHassociated child mortality than household wealth status. Thus, interventions should be focused on education and improving access to safe drinking water and sanitation to increase child survival in Ethiopia.

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DEPRESSIVE SYMPTOMS AMONG MARRIED WOMEN IN RURAL BANGLADESH: IMPACT OF INTIMATE PARTNER VIOLENCE EXPOSURE AND SEVERITY Precious Esie* Precious Esie, Lisa Bates, (Mailman School of Public Health, Columbia University)

Recent high-profile calls for greater attention to global mental health are not currently matched by sufficient community-based prevalence estimates and etiologic research in low- and middle-income countries. In many of these settings the prevalence of intimate partner violence (IPV) is high yet understudied as a factor associated with depression among women. Within the context of rural Bangladesh, this study aims to examine the relationship between women's experiences of marital IPV and depressive symptoms, and how the severity of IPV is related to depressive symptoms. Data were drawn from a nationally-representative study focused on individual and contextual determinants of IPV risk among women in rural Bangladesh. Primary data were collected among a multistage, stratified sample of female respondents in 77 villages in 2014. This study used data from the subsample of women married in the prior 4-12 years. Multivariable logistic regression models were used to estimate the association between various types of recent IPV (physical, sexual, psychological), as well as IPV severity (combining severity of act and frequency) and depressive symptoms. Measures were adapted from the Revised Conflict Tactics Scale and the Edinburgh Postnatal Depression Scale. 17% of women reported depressive symptoms. Adjusting for potential confounders, depressive symptoms were associated with physical (OR=1.57; 95% CI: 1.25-1.98) and psychological (OR=1.51; 95% CI: 1.05-2.16) but not sexual IPV. Furthermore, there was a clear dose-response in the severity-none, low, medium, high-of each type of IPV (including sexual) and depressive symptoms. In the context of rural Bangladesh, marital IPV and, in particular, the severity of various forms of IPV, are positively related to women's risk of depressive symptoms. Results underscore the importance of IPV prevention interventions and attention to IPV as a risk factor for depression, especially in low-income settings.

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DROUGHT AND UNDERNUTRITION AMONG CHILDREN UNDER 5 IN UGANDA Adrienne Epstein* Adrienne Epstein, Jacqueline Torres, Maria Glymour, (University of California, San Francisco)

The health effects of changes in rainfall are uncertain but may be large in regions that rely on agriculture. To better understand potential consequences of increasing variation in rainfall or reduced rainfall, we evaluated the link between exposure to drought and child physical development in Uganda. This analysis used three waves of data from the Uganda National Panel Survey (2009-2012). We estimated the effects of reduced rainfall (whether the adult interviewed reported experiencing drought in the past year and geolocated mean monthly rainfall at the household location over the 12 months prior to survey date) on under-5 malnutrition (underweight, wasting, and stunting for 4,934 assessments of 3,301 children aged 6-59 months). Multi-level logistic regression models included random effects for enumeration area, household, and individual plus fixed effects for calendar month. Models using interview-reported exposure also controlled for household socioeconomic status and urban/rural. Underweight (13%), wasting (4%), and stunting (33%) were common. Self-reported drought was associated with a 39% higher odds of underweight (OR=1.39, 95% CI 1.01-1.96) and 55% higher odds of wasting (OR= 1.55, 95% CI 1.07-2.26), but not with stunting (OR= 0.99, 95% CI 0.78-1.24). An additional millimeter of rainfall per month over the previous year resulted in 9% lower odds of underweight (OR = 0.91, 95% CI 0.86-0.96) and 7% lower odds of wasting (OR= 0.93, 95% CI 0.88-0.98); but was unassociated with stunting (OR=1.01 per millimeter, 95% CI 0.99-1.03). Underweight and wasting reflect acute malnutrition, while stunting measures chronic malnutrition; this may account for the lack of association between drought exposure and stunting. Erratic rainfall is likely to have major adverse effects on child growth.

GENDER DIFFERENCES IN NONMEDICAL PRESCRIPTION DRUG USE TRENDS AMONG ADOLESCENTS IN THREE SOUTH AMERICAN COUNTRIES FROM 2007-2015 Alexander Perlmutter* Alexander S. Perlmutter, Ariadne E. Rivera-Aguirre, Pia M. Mauro, Alvaro Castillo-Carniglia, Magdalena Cerda, Silvia S. Martins, (Columbia University)

Aim Little is known about nonmedical use of prescription drugs in South America. We evaluated trends in past year (PY) nonmedical prescription stimulant (NMPS) and tranquilizer (NMPT) use among adolescents in three South American countries overall and by gender. Methods We used separate nationally representative complex weighted data from school-based surveys conducted in Argentina, Chile and Uruguay. We estimated the prevalence of PY NMPS and NMPT use among students in 8th to 12th grades from 2007-2015. Logistic regression models estimated the log odds (back-transformed to prevalence) of NMPS and NMPT use by gender, adjusting for school type (private, public, subsidized in Chile only) and year. Results Argentinian students' overall PY NMPT use prevalence was stable from 2007-2014 (2.6%-2.5%); females had a slightly higher average prevalence than males (diff: +0.5% pts; 95% CI: [0.4-0.7]). Uruguay's PY NMPT use decreased overall (4.2%-3.2%) and for females only (5.4%-4.1%) from 2007-2014; females had a higher average prevalence than males (diff: +2.4% pts; 95% CI: [1.5-3.0]). Chilean students' PY NMPT use prevalence increased (3.6%-8.5%), for males (2.9%-6.9%) and females (4.3%-10.0%) from 2007-2015; females had a higher average prevalence than males (diff: +1.8% pts; 95% CI: [1.5-2.1]). Argentinian (1.8%-1.4%) and Uruguayan (1.8%-0.5%) students' PY NMPS use decreased from 2007-2014, with no gender differences. From 2007-2009, Chilean students' PY NMPS prevalence decreased from 2007 to 2009 (1.8%-1.2%), then increased in 2015 (1.6%); females used marginally less than males. Conclusion PY NMPT use did not change in Argentina, decreased in Uruguay and more than doubled in Chile. NMPT use was higher among females in all countries, which widened over time in Chile. PY NMPS use decreased in Argentina, Uruguay and Chile, but recovered in Chile to early levels. Gender differences are an important aspect of the nonmedical prescription drug use problem in these populations.

0945 S/P

QUESTIONING THE GOLD STANDARD: METHODOLOGICAL CONCERNS IN CLUSTER RANDOMIZED TRIALS OF PUBLIC HEALTH INTERVENTIONS IN LOW- AND MIDDLE-INCOME COUNTRIES Nanor Minoyan* Nanor Minoyan, Myriam Cielo Perez, Valéry Ridde, Marie-Pierre Sylvestre, Mira Johri, (School of Public Health, Universite de Montréal / Centre de recherche du Centre Hospitalier de l'Universite de Montréal)

Background: Cluster-randomized controlled trials (CRTs), which involve allocation of groups of individuals to treatment arms, are increasingly used to evaluate public health interventions in low and middle-income countries (LMIC). Though frequently perceived as analogs of clinical trials, CRTs have unique features that may call into question their common perception as gold-standard designs. Aim: To synthesize the methodological issues threatening internal validity in CRTs, with a view to improve their design and reporting. Methods: We conducted a systematic review of CRTs of public health interventions in LMIC (published Jan 2012-May 2016, indexed in MEDLINE/PubMed, CINAHL, EMBASE). Two reviewers assessed risk of bias using the Cochrane collaboration tool, adding domains specific to CRTs identified from additional guidelines (e.g. CONSORT). The assessment was repeated for certain domains using a recent tool developed for observational studies (ROBINS-I). We present judgement results in a frequency table and narratively contrast the tools, providing examples. Results/Discussion: 90 studies were included. 7/10 bias domains were judged at high or unclear risk for ≥20% of studies using the Cochrane tool. Domains prone to bias in CRTs included recruitment bias and individual-level attrition (27% and 58% of studies judged at high or unclear risk, respectively). ROBINS-I clarifies several conceptual issues absent from previous guidelines. Bias from attrition, typically high in CRTs, remains ill-addressed, particularly for intention-to-treat analyses. Complications include the need to consider bias at two levels (cluster, individual) and in distinct, complex designs (e.g. repeat crosssectional survey, follow-up cohort). Conclusion: Several issues render CRTs vulnerable to biases traditionally associated with observational designs. Current reporting and risk of bias guidelines poorly address these methodological limitations; improvements to domains proposed above are warranted.

LIFE-COURSE IMPACT OF CHILDHOOD MALTREATMENT ON MIDLIFE HEALTH-RELATED QUALITY OF LIFE IN WOMEN: LONGITUDINAL MEDIATION ANALYSIS FOR POTENTIAL PATHWAYS Hsing-Hua S. Lin* Hsing-Hua S. Lin, Ashley I. Naimi, Maria M. Brooks, Gale A. Richardson, Jessica G. Burke, Joyce T. Bromberger, (Department of Epidemiology, Graduate School of Public Health, University of Pittsburgh, PA)

Background: Few studies have assessed the life-course impact of childhood maltreatment (CM) on health-related quality of life (HRQoL) or quality-ad justed life years (QALY) in women during midlife. We evaluated 1) if CM is associated with lower midlife HRQoL/QALY over a 9-year follow-up, and 2) if these associations are explained by adulthood psychosocial mediators over time. Methods: A community sample of 443 black and white women ages 42-52 were enrolled in the Pittsburgh site of the longitudinal Study of Women's Health Across the Nation-Mental Health Study in 1996-97. The analyses included 342 women who completed Childhood Trauma Questionnaire and Short Form-36 (SF-36) from 2002-12. The mental (MCS) and physical (PCS) component scores of SF-36 were the two primary longitudinal HRQoL outcomes QALY was based on SF-6D. Generalized estimating equations were used to assess the association between CM and HROoL/OALY over time. The mediating role of each psychosocial factor in the relationship between CM and QALY was investigated by a series of sequential structural nested mean models estimated via doubly robust g-estimation. Missing data were addressed using multiple imputations by chained equations. Results: Thirty-eight percent of women reported any CM type and 20% reported multiple CM types. Any CM was associated with both reduced midlife mental and physical HRQoL in women over 9 years. Women with multiple CM types had 28.3 fewer healthy days per year than those without CM. In separate mediation analyses, low levels of optimism, timevarying sleep problems, and time-varying low social support partially explained the relation between multiple CM types and HRQoL/QALY over time. Conclusions: CM is a life-course social determinant of HRQoL and QALY in women throughout midlife. Several partial mediators are potentially modifiable and could be targets of interventions to mitigate the negative impact of CM on midlife HRQoL/QALY in women.

0952 S/P

POLICE USE OF FORCE TRAINING REFORMS AND INJURIES AND DEATHS DUE TO LEGAL INTERVENTION IN RICHMOND, CALIFORNIA Kriszta Farkas* Kriszta Farkas, Ellicott C. Matthay, Jennifer Ahern, (Division of Epidemiology, University of California, Berkeley School of Public Health)

In recent years police use of force (legal intervention) has been highlighted as a critical public health challenge in the US. In 2015 there were an estimated 1,093 deaths and 75,564 nonfatal injuries requiring hospital-based care due to legal intervention in the US. A variety of interventions at the individual and organizational levels have been proposed to reduce legal intervention injuries and deaths. These include community policing, improved officer training, and use of body cameras, among others. However, research to date on the effects of these kinds of police reforms is limited. We aim to address this gap by examining the relationship between an in-service use of force training program implemented in 2008 by the Richmond, California (CA) Police Department and legal intervention injuries and deaths in Richmond. The program exceeded the CA once per year training requirement, with monthly firearm trainings and quarterly role-playing scenarios for disarming suspects. Using population-based data on all CA deaths, hospitalizations, and emergency department visits due to legal intervention between 2005 and 2015, we constructed rates of combined fatal and nonfatal injuries due to legal intervention. We used the Synthetic Control Method to compare the observed legal intervention injury rates in Richmond to an estimate of the expected rates in the absence of the intervention, during the 2009-2015 post-intervention period. The synthetic control was constructed as the optimal weighted average of rates from all non-intervention cities and towns in CA. In preliminary analyses we did not detect a relationship between the use of force training program and lower legal intervention injury rates in Richmond. Further research should assess whether there were improvements in outcomes not captured in our data (e.g., police-community relations). Further research is also needed to identify police reforms that are effective at reducing legal intervention injuries and deaths.

0951 S/P

EXPOSURE TO COMMUNITY VIOLENCE AND RISK OF SELF-HARM IN CALIFORNIA: A MULTI-LEVEL POPULATION-BASED CASE-CONTROL STUDY Ellicott Matthay* Ellicott Matthay, Kriszta Farkas, Jennifer Skeem, Jennifer Ahern, (Division of Epidemiology, University of California-Berkeley School of Public Health)

Background: Self-harm is a leading cause of morbidity and mortality. Community violence is an important and potentially modifiable feature of the social environment that may affect self-harm, but studies to date are limited in the samples and outcomes examined. Methods: We conducted a population-based nested case-control study, leveraging a novel approach that integrates record-based cases and surveybased controls. Cases were all deaths and hospital visits due to self-harm in California, 2006-2013 (N=358,230). California resident population-based controls from the American Community Survey were frequency matched to cases on age, gender, race/ethnicity, and year of survey/injury. Past-year community violence was assessed using deaths and hospital visits due to interpersonal violence in the community of residence. We estimated easily-interpretable marginal risk difference parameters that were defined to avoid extrapolation and capture associations between changes in the distribution of community violence and the population-level risk of self-harm. Results: After adjustment for confounders, reducing community violence to the lowest monthly levels observed within each community over the study period was associated with a 12.8% (95% CI: 12.6, 13.0) lower risk of nonfatal self-harm, but no difference in fatal self-harm. Associations for a parameter corresponding to a hypothetical violence prevention intervention targeting high-violence communities indicated meaningful decreases in self-harm at the population level. Bias analyses indicated results were mildly sensitive to unmeasured confounding. Conclusions: This study strengthens the evidence on the relationship between community violence and self-harm. The methodology may serve as a model for future research integrating diverse data sources and examining social contextual determinants of health Future research should investigate whether community violence prevention programs have meaningful impacts on self-harm.

0953 S/P

CONDITIONAL CASH TRANSFERS AND VIOLENCE: A QUASI-EXPERIMENTAL STUDY OF MEXICO'S OPORTUNIDADES PROGRAM Rose Kagawa* Rose Kagawa, Evangeline Reynolds, Ariadne Rivera, (UC Davis)

Background: Globally, violence is a leading cause of death, and effective approaches to preventing violence are urgently needed. Conditional cash transfers (CCT) offer a promising means to prevent violence by reducing poverty and developing capacity to achieve long term economic stability. CCT programs provide cash to poor households to reduce immediate economic challenges and condition the transfers on family investments in human capital development. Evidence from Mexico and the United States suggests that among children and adolescents, these CCTs are associated with reductions in known risk factors for violence, including aggressive behavior and substance use. However, the impact of CCTs on violence remains poorly understood. Methods: We used national survey data combined with administrative records from Mexico's CCT, Oportunidades to estimate the effect of community availability of Oportunidades on incident violence in rural Mexican communities. We employed a retrospective matched cohort design to match treated communities to control communities. The sample included 375 Oportunidades communities and 127 control communities that participated in the National Survey of Health in 2000, prior to program expansion. To reduce bias, we restricted to control communities that were later enrolled in Oportunidades, and we used the genetic matching algorithm, an extension of Mahalanobis matching, to optimize covariate balance. The average treatment effect on the treated was estimated using weighted Poisson models. Initial Results: Initial results show no significant differences in the probability of community violence by treatment status comparing treated communities to matched control communities. Next Steps: We will test whether these results are sensitive to the matching method, the year of program enrollment, and the level of analysis. We will also test whether a dose response curve exists with time in the program.

FATAL AND NON-FATAL FIREARM INJURIES AMONG POST-9/11 VETERANS IN OREGON Tess A. Gilbert* Tess A. Gilbert, Lawrence J. Cook, Dagan A. Wright, Craig Newgard, Lauren Denneson, Jason Chen, Kathleen F. Carlson, (VA Portland Health Care System)

Firearms are a leading cause of fatal and nonfatal injuries in the United States. Military Veterans are at increased risk of injury after combat deployment. The combined impact (fatal and nonfatal; violent and unintentional) of firearm injuries among Veterans has not been examined. This study uses multiple administrative databases to enumerate fatal and nonfatal firearm injuries among post-9/11 Veterans in Oregon. We probabilistically linked a roster of all post-9/11 Veterans (n=2.7 million) to three Oregon statewide databases - Vital Records, Trauma Registry, and Hospital Discharge Index - spanning 2007 through 2016. International Classification of Diseases codes were used to identify firearm injury events and to categorize intent. Events were categorized as those involving a Veteran versus non-Veteran. We examined frequencies of fatal and non-fatal injury events by Veteran status and intent. We identified 93 firearm-related events in Oregon between 2007 and 2016 among Veterans. More than half of the events were nonfatal (56%) and 32% were self-inflicted. While differences in intent were noted between Veterans and non-Veterans firearm fatalities (p=0.06), most were self-inflicted for both groups (76% and 82%, respectively). Differences in nonfatal injury intent were identified in Trauma Registry (p=0.06) and Hospital Discharge Index (p=0.12) data; unintentional injuries were more common among Veterans (49% and 55%, respectively) than non-Veterans (32% and 39%). Assaults were less common among Veterans (26% and 27%) than non-Veterans (36% and 43%). Results suggest systematic differences in the intent of firearm injuries between post-9/11 Veterans and non-Veterans in Oregon. Prevention efforts should address risk of unintentional firearm injuries in addition to the established programs focused on suicide prevention. Future research will compare rates of, and examine potential risk factors for, firearm injury events among Veterans and non-Veterans.

0955

HOW COULD FIREARM DISQUALIFICATION AMONG THOSE WITH A HISTORY OF INTIMATE PARTNER VIOLENCE AFFECT POPULATION AND FEMALE-SPECIFIC RATES OF HOMICIDE? AN AGENT-BASED MODELING APPROACH Ava Hamilton* Ava Hamilton, Katherine Keyes, Magdalena Cerdá, (Columbia University)

Intimate partner homicides account for approximately 50% of female homicides in the US, with an increase in risk if the perpetrator has access to a firearm. Although federal and several state laws prohibit the possession of firearms by anyone convicted of an intimate partner violent (IPV) felony or misdemeanor, enforcement is a challenge in most jurisdictions. Furthermore, although possession of firearms is prohibited, many of the laws do not require the surrender of existing firearms. We used an agent-based model to attempt to estimate how many individuals with a history of IPV would need to be disqualified from purchasing firearms and would need to surrender existing firearms to have an influence on population and femalespecific rates of homicide. The model was calibrated using 260,000 agents with demographics of New York City. In each time step, agents could interact, purchase or illegally obtain firearms, and engage in violence. The model incorporated extensive national and city-level data on IPV. We estimated two disgualifications: 1) anyone who has been issued a domestic violence restraining order (DVRO) and 2) any IPV perpetrator. The simulations assumed complete enforcement of purchase prohibitions, and removal of existing firearms from prohibited persons. Results over 30 years of simulation indicated that disqualification based on having a DVRO would reduce overall gun-related homicide by 1.92% (95% C.L -6.41% to 6.72%) and decrease female gun-related homicide by 2.43% (95% C.L -14.46% to 19.25%). Disqualification based on IPV perpetration would reduce gun-related homicide by 3.09% (95% C.I. -5.04% to 8.69%) and gun-related homicide among women by 8.49% (95% C.I. -17.15% to 19.25%). In summary, removing firearms from IPV perpetrators has the potential to produce a small reduction in the overall gun-related homicide rate for women.

DO ROUTINELY COLLECTED ELECTRONIC MEDICAL RECORDS ACCURATELY MEASURE ALZHEIMER DISEASE AND RELATED DEMENTIA DIAGNOSES? Shinyoung Ju* Shinyoung Ju, Norman L. Foster, Ken R. Smith, Michael W. Varner, James A. VanDerslice, Karen C. Schliep, JoAnn T. Tschanz, (University of Utah)

Effects of early life conditions on Alzheimer's disease (AD) and related dementia (RD) risk have been hypothesized. However, prospective assessment is potentially cost prohibitive. Retrospective studies using routinely collected medical records in large cohorts may be an ideal way to assess early risk factors for later AD/RD. We aim to determine accuracy of AD/RD diagnoses in electronic medical records (EMR) (inpatient and ambulatory surgery) and death certificates (DC) compared to gold standard assessments. The Cache County Study on Memory in Aging (CACHE, 1995–2008) enrolled 90% of the county's residents age ≥ 65 years (N=5092). Over the course of 12 years and 4 triennial waves of thorough dementia ascertainment, 546 persons (10.7%) were identified with AD and 396 (7.8%) with RD. We used the Utah Population Database, which had linked EMR/DCs (1995-2008) to CACHE diagnoses for 97% of the participants. The prevalence of AD and RD in EMR/DCs was 7.1% and 13.4%. Among linked CACHE participants diagnosed with AD (n=521), 283 (54%) were captured by EMR/DCs as having AD and/or RD (Kappa [\kappa]=0.35) and 56 (11%) with AD (ĸ=0.33). Among those with RD (n=396), 148 (37%) were captured by EMR/DCs as having AD and/or RD ($\kappa{=}0.16)$ and 84 (21%) with RD (κ =0.15). Sensitivity, specificity, and positive predictive values were 32%, 96%, and 48% for AD; 31%, 88%, and 19% for RD. Our results show that EMR/DCs tend to under-diagnose AD and over-diagnose RD, with only fair agreement compared to gold standard. Additionally, while EMR/DCs are well able to classify individuals as AD or RD-free, they are poor at classifying individuals as AD or RD-diseased. We conclude that EMR/DCs alone are insufficient at capturing AD/RD. Expanding beyond inpatient and ambulatory surgery records to include full Medicare claims (with prescription drug data) are warranted as is determining additional features of a person's medical record that may be predictive of AD/RD via formal classification modeling.

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EARLY-LIFE SOCIOECONOMIC STATUS AND LATE-LIFE DISPARITIES IN MEMORY FUNCTIONING AMONG US MILITARY VETERANS AND NON-VETERANS. Anusha Vable* Anusha Vable, Elizabeth Rose Mayeda, Jessica Marden, Sanjay Basu, Maria Glymour, (UCSF)

Background: Childhood socioeconimc status (cSES) predicts memory impairment and dementia risk. Early and late-life interventions that improve SES may improve memory function and reduce dementia risk. Veterans of US wars are eligible for educational and economic benefits which may offset cSES disadvantage. We test whether cSES disparities in late-life memory and dementia risk are smaller among veterans than non-veterans. Methods: Data came from 8,110 US-born men in the Health and Retirement Study interviewed approximately biennially from 1995 -2014 (n = 41,908 cognitive assessments). Childhood SES (mother's education) was categorized as low (<8 years/missing, N=1,333), middle (8≤years<12, N=2,819), or high cSES (≥12years, N=3,958). Outcomes were imputed memory (standardized) based on word list recall and proxy reports. Military service (non-veteran/Korean War veteran/Vietnam War veteran determined by service years) was evaluated as a modifier of the effect of cSES on memory. Generalized estimating equation models, used to account for repeated measures, were adjusted for age, race, birthplace, and childhood health. Effect modification was assessed with a cSES by military service interaction term. Results: High cSES (high vs. low 2=0.08SD, 95%C1:(0.06,0.09)), and veteran status (Korea veteran 2=0.04SD, 95%CI:(0.02,0.05); Vietnam veteran D=0.03SD, 95%CI:(0.01,0.04)) independently predicted better memory. In interaction analyses, cSES disparities were smaller among Vietnam veterans than non-veterans (difference in disparities=-0.08, 95%CI:(-0.12,-0.04)); associations for Korea veterans were similar but smaller (2=-0.03SD, 95%C1:(-0.07,0.00)). Conclusions: Socioeconomic disparities in memory were smaller among veterans than non-veterans. Although confounding must be evaluated with alternative designs, our results suggest that military service and benefits may partially offset the adverse consequences of early-life socioeconomic adversity on late-life cognitive health.

0961

DO PEOPLE WITH ALZHEIMER'S DISEASE IMPROVE WITH REPEATED TESTING? UNPACKING THE ROLE OF CONTENT AND CONTEXT IN RETEST EFFECTS Alden Lawrence Gross* Alden Lawrence Gross, Nadia Chu, Loretta Anderson, M. Maria Glymour, Richard N. Jones, (Johns Hopkins Bloomberg School of Public Health)

Objective: Retest effects may be attributed to repeated content in neuropsychological tests such as words in word list-learning tests, or the testing context which involves procedural memory and reduced test anxiety following repeated administration. Alzheimer's Disease (AD) severely impairs episodic memory, so longitudinal cognitive testing among people with AD may reveal the relative contributions of content versus context to retest effects in neuropsychological testing. Method: We used data from the Critical Path Institute's repository of placebo arm data from randomized controlled trials (RCTs) of AD conducted by participating pharmaceutical companies (N=990 people, 4,170 study visits, up to 2.4 years of follow-up). To estimate retest effects on the Mini-Mental State Examination (MMSE), we used linear regressions with random effects for people and time, adjusting for age, sex, and race, and longitudinal quantile regressions. Results: Average MMSE score (16.6 points, SD=5.5, range 1, 27) declined by 2.0 points/year (95% confidence interval, CI: -2.3, -1.8). Mean retest effect was 0.6 points (95% CI 0.4, 0.8) at second assessment (average 4 months after baseline). Retest effects were similar among participants with and without any recall on the short delay word recall subscale score at baseline, and at the 30th, 50th, and 70th percentiles of the MMSE distribution, suggesting similar retest effects across the spectrum from mild to severe cases of AD. Conclusions: Retest effects are robust in people with AD despite reduced episodic memory, suggesting a prominent role of the testing context in RCTs and cohort studies.

0963 S/P

INCOME VOLATILITY IN YOUNG ADULTHOOD IS ASSOCIATED WITH INCIDENT CARDIOVASCULAR DISEASE AND ALL-CAUSE MORTALITY: THE CARDIA STUDY. Tali Elfassy* Tali Elfassy, Samuel L. Swift, M. Maria Glymour, Sebastian Calonico, David R. Jacobs, Elizabeth R. Mayeda, Kiarri N. Kershaw, Catarina Kiefe, Adina Zeki Al Hazzouri, (University of Miami)

Background: Income volatility has risen in the US since the 1980s. However, its association with incident cardiovascular disease (CVD) and mortality has not been explored recently. Methods: We examined associations of income volatility with incident CVD and all-cause mortality in 3,977 black or white adults of the Coronary Artery Risk Development In Young Adult study. Income volatility was defined as the intra-individual standard deviation of the percent change in inflation-adjusted income across five exams between 1990 and 2005. An income drop was defined as dropping more than 25% from the previous period and lower than the respondent's average income. CVD events (fatal and non-fatal) and all-cause mortality between 2005 and 2015 were assessed using medical records and adjudicated by the study endpoints committee. CVD events included acute events related to heart disease and stroke. Results: Mean participant age was 30 years in 1990, 47.5% were black and 56.4% female. During 2005-2015, 106 CVD events and 164 deaths occurred (incidence rates: 2.76 and 3.66/1,000 person years, respectively). Income volatility ranged from 0% to 242% (mean: 45%). From Cox proportional hazards (HR) models adjusted for socio-demographic, CVD, and behavioral characteristics including baseline income and unemployment, HRs (95% confidence intervals) for CVD incidence were 1.93 (1.08, 3.46) for highest vs. lowest tertile of volatility and 2.80 (1.49, 5.26) for 2+ vs. O income drops. For all-cause mortality, HRs (95% confidence intervals) were 1.70 (1.05, 2.76) for highest vs lowest tertile of volatility and 2.07 (1.25, 3.41) for 2+ vs. O income drops. Conclusion: In a cohort of black or white young adults, income volatility and drops over 15 formative earning years were associated with near doubled risk of CVD and total death. In light of increasing economic instability, these findings may be useful in anticipating the health impact of economic policies which influence income security.

0964 S/P

ASSOCIATION BETWEEN UNCONVENTIONAL NATURAL GAS DEVELOPMENT (UNGD) ACTIVITY AND HOSPITALIZATION AMONG HEART FAILURE PATIENTS IN NORTHEASTERN PENNSYLVANIA, 2008-2015 Tara McAlexander* Tara McAlexander, Jonathan Pollak, Karen Bandeen-Roche, Brian Schwartz, (Johns Hopkins Bloomberg School of Public Health)

Heart failure (HF) has a large public health burden; persons with HF are at risk for recurrent hospitalization and are susceptible to negative health impacts from environmental exposures. In Pennsylvania, UNGD has increased since 2005 with potential community, environmental, and population health impacts. To evaluate if UNGD activity was associated with HF hospitalization, we conducted a nested casecontrol study of hospitalization among persons with HF seen at a Geisinger (an integrated health system with many inpatient and outpatient sites serving 40 counties) facility between 2008-2015. We obtained information for hospitalization, comorbidities, medications, body mass index, smoking status, and demographics from electronic health records. We linked subject residential address with metrics of proximity (inverse distance-squared) and intensity (number and size of wells) for four phases of UNGD activity: pad preparation, well drilling, well stimulation, and natural gas production. We frequency-matched control encounters to case events 1:1 by sex, year, and age at HF diagnosis. We identified 9,143 persons with HF, 5,845 of whom were hospitalized at least once. We evaluated adjusted associations between UNGD activity metrics and hospitalization for 30-day periods at 1-day lags prior to hospitalization using mixed effects logistic regression. We evaluated model fit and stability with several sensitivity analyses and goodness of fit tests. Comparing subjects in the 4th to the 1st quartile of UNGD activity for each metric, we found associations (OR [95% CI]) of 1.59 (1.32-1.78), 0.75 (0.64-0.87), 1.61 (1.38-1.89), and 1.76 (1.50-2.08) for pad preparation, well drilling, well stimulation, and natural gas production, respectively; several of the metrics evidenced exposure-effect relations. Our findings suggest that UNGD in Pennsylvania is associated with increased odds of HF hospitalization among HF patients.

ASSOCIATION BETWEEN MATERNAL ACETAMINOPHEN USE AND ADVERSE BIRTH OUTCOMES IN A PREGNANCY AND BIRTH COHORT Jasleen S. Arneja* Jasleen S. Arneja, Rayjean J. Hungh, Ryan A. Seeto, Sheryl L. Hewko, Kellie E. Murphy, Jennifer D. Brooks, (Dalla Lana School of Public Health, University of Toronto)

Acetaminophen is the most common non-prescription pain medication taken during pregnancy. While considered safer than aspirin and ibuprofen, its use has been associated with the development of attention deficit hyperactivity disorder, autism spectrum disorder, asthma, and male fertility issues in offspring. Adverse birth outcomes including low birthweight, preterm birth, and small-for-gestational-age are leading causes of neonatal morbidity and mortality, and have been associated with an increased risk for developmental disorders. These indicators can serve as intermediary outcomes predictive of later negative developmental outcomes. The relationship between acetaminophen use prior to and during pregnancy, and the aforementioned adverse birth outcomes has not been explored in a Canadian population. The Ontario Birth Study is an ongoing pregnancy and birth cohort study in Toronto. Baseline and antenatal clinical data, and lifestyle factor data, was gathered from 1,011 women who delivered between January 2013 and June 2017. RRs and 95% CIs for the relationship between acetaminophen use at three time points (three months before pregnancy, early-pregnancy, and mid-late pregnancy) and birth outcomes (low birthweight, preterm birth, and small for gestational age) were estimated using modified Poisson regression, adjusting for maternal age, body mass index, smoking, education, fever during pregnancy, comorbidities, and paternal smoking. Pre-pregnancy acetaminophen use was associated with a higher risk of the baby being small for gestational age; RR=I.54, 95% CI 1.11, 2.15. No significant associations were found between acetaminophen use at any time prior to or during pregnancy and low birthweight or preterm birth. Overall, we found no significant association between maternal use of acetaminophen during pregnancy and adverse birth outcomes in the Ontario Birth Study. Future analyses will examine the impact of maternal acetaminophen use on early childhood neurodevelopment.

0972 S/P

PRENATAL ANTIBIOTICS EXPOSURE AND THE RISK OF AUTISM SPECTRUM DISORDERS: A POPULATION-BASED COHORT STUDY Amani Hamad* Amani Hamad, Silvia Alessi-Severini, Salah Mahmud, Marni Brownell, I fan Kuo, (University of Manitoba)

Background: Prenatal antibiotic exposure induces changes in infants' gut microbiota composition and is suggested as a possible contributor in the development of autism spectrum disorders (ASD). In this study, we examined the association between prenatal antibiotic exposure and the risk of ASD. Methods: This was a populationbased cohort study of all live births born in Manitoba, Canada between April 1, 1998 and March 31, 2016. We utilized administrative health data from the Manitoba Population Research Data Repository, which captures all encounters with the health system by the provincial population under a universal health system. Exposure was defined as having filled one or more antibiotic prescriptions during pregnancy. The main outcome was ASD diagnosis identified at least once in hospital, physician claims or education special needs funding data. Cox proportional hazards regression, adjusted for potential confounders, was used to estimate the risk of ASD in the overall population and in a discordant siblings' cohort. Results: Out of the study cohort (n=214,834), 80,750 (37.6%) were exposed to antibiotics prenatally. During a follow-up period of 1,943,612 person-years, 2,965 children received a diagnosis with ASD. Prenatal exposure to antibiotics was associated with a small increase in the risk of ASD (adjusted hazard ratio [aHR] 1.10, 95% CI 1.01 - 1.19). ASD risk estimate did not change significantly in the discordant siblings' cohort (aHR 1.08, 95% CI 0.90 - 1.30), except it was no longer statistically significant. Conclusions: Our findings indicate that prenatal antibiotic exposure is associated with a small, but probably clinically non-significant increase in the risk of ASD.

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MATERNAL ACETAMINOPHEN USE AND PROBLEM BEHAVIOR IN CHILDHOOD AND ADOLESCENSE Samantha E Parker* Samantha E Parker, Martha M. Werler, (Boston University School of Public Health)

An accumulating body of evidence suggests that acetaminophen use during pregnancy is associated with behavioral outcomes among offspring, specifically problems related to attention and hyperactivity. The aim of this study was to investigate the association between maternal acetaminophen use and behavior during childhood and adolescence. Participants were mother-child dyads (n=560) that served as controls in a previously conducted case-control study of prenatal exposures and a malformation. Information on maternal demographics, illnesses during pregnancy, and medication use was collected by interview on average one year after delivery. Acetaminophen use was categorized as no use (referent), any use, and among any use, chronic use, defined as >28 days during pregnancy. Behavior at ages 5-12 years (childhood) and 13-18 years (adolescence) were measured by mother's report (Child Behavior Checklist) and teacher's report (Teacher Report Form). Stratification by indication (headache and non-headache, such as pain and respiratory infection) and weighting by the inverse-probability of participation were also employed. Linear regression models adjusting for maternal age, race, and education, were used to calculate mean differences in scores. Any and chronic acetaminophen use during pregnancy were reported by 63% and 17% of mothers. Any acetaminophen use was associated with slightly higher mean scores on scales of anxiety, somatic, rule-breaking, and aggressive behavior in childhood, which were attenuated at the adolescent assessment. Mean scores for anxiety and somatic problems were higher for chronic users. No differences in behavior were reported based on teacher's report. Results from our study suggest that acetaminophen use during pregnancy is not associated with behavioral problems and that some previously reported associations may be partially explained by differential misclassification, as evidenced by associations according to mother's report only, or selection bias.

0973 S/P

PATERNAL PRECONCEPTION CANNABIS USE AND RISK OF BIRTH DEFECTS IN THE NATIONAL BIRTH DEFECTS PREVENTION STUDY Devika Chawla* Devika Chawla, Tania Desrosiers, Julie Daniels, Daniel Westreich, Yang Claire Yang, Alex Keil, Suzanne Gilboa, Jennita Reefhuis, Marleen van Gelder, Andrew Olshan, National Birth Defects Prevention Study, (University of North Carolina at Chapel Hill)

Introduction: The potential for paternal cannabis use to adversely affect fetal development remains understudied. We investigated the association between paternal cannabis use during the 3-months prior to conception and 21 types of structural birth defects in the National Birth Defects Prevention Study (1997-2011). Methods: Logistic regression was used to estimate crude (cOR) and adjusted odds ratios (aORs) and 95% confidence intervals (CIs) using 22,522 cases and 11,798 population-based controls without major birth defects. Mothers reported paternal cannabis use and lifestyle factors retrospectively through computer-assisted telephone interviews. Results: Cannabis use was reported for 8.8% of controlfathers. Paternal cannabis use was associated with anencephaly (cOR: 1.43, 95% CI: 1.11, 1.84), cleft lip and palate (cOR: 1.21, 95% CI: 1.04, 1.43), cleft lip alone (cOR: 1.34, 95% CI: 1.09, 1.63), transverse limb deficiency (cOR: 1.41, 95% CI: 1.11, 1.79), diaphragmatic hernia (cOR: 1.28, 95% CI: 1.02, 1.61), and gastroschisis (cOR: 3.07, 95% CI: 2.66, 3.54). After adjustment for confounders (study site; study year; household income; maternal: age, education, cannabis, cigarette, other drug use; paternal: age, education, other drug use), paternal cannabis use was associated with diaphragmatic hernia (aOR: 1.33, 95% CI: 0.99, 1.80), cleft lip alone (aOR: 1.23, 95% CI: 0.95, 1.60), gastroschisis (aOR: 1.26, 95% CI: 1.00, 1.52), and hypoplastic left heart syndrome (aOR: 1.38, 95% CI: 0.99, 1.24). Next steps include probabilistic bias analyses to assess potential impacts of exposure misclassification. Conclusions: Results are consistent with slightly increased risk of some structural birth defects following paternal cannabis use. Future research is needed to understand how paternal cannabis use affects fetal development, especially in light of changing cannabis policies and documented increases in the prevalence of use.

TRENDS IN OPIOID USE DISORDER REPORTED AT DELIVERY HOSPITALIZATION, 1999-2014 Sarah C. Haight* Sarah C. Haight, Jean Y. Ko, Van T. Tong, Michele K. Bohm, William M. Callaghan, (Division of Reproductive Health, Centers for Disease Control and Prevention)

Introduction: The increasing number of pregnant women with opioid use disorder presents a significant public health concern given the adverse maternal outcomes (e.g. maternal mortality) and neonatal outcomes (e.g. neonatal abstinence syndrome) associated with opioid exposure. We update U.S. national trends and describe previously undocumented state-specific trends of opioid use disorder present at delivery hospitalization. Methods: Data from the Healthcare Cost and Utilization Project's State Inpatient Databases and Nationwide Inpatient Sample, 1999-2014, were analyzed. International Classification of Diseases, Ninth Revision, Clinical Modification diagnostic and procedure codes were used to identify opioid use disorder diagnoses and delivery hospitalizations. We estimated national and statespecific prevalence rates of opioid use disorder during delivery hospitalization. We calculated linear trends across time and the average annual percentage point change of the prevalence rate (APC) nationally and among 28 states with at least 3 years of data. Results: Nationally, the prevalence rate per 1,000 delivery hospitalizations increased from 1.5 in 1999 to 6.5 in 2014 with an APC of 0.41% (p20 diagnoses per 1,000 delivery hospitalizations. During 1999-2014, the APC significantly increased in all states, with Maine, New Mexico, Vermont, and West Virginia APCs >2%. Conclusion: Opioid use disorder observed at delivery hospitalization has increased significantly nationally and in the 28 states with data. States with high prevalence of opioid use disorder during delivery hospitalization mirror those highly impacted by the opioid epidemic in the general population These data indicate a continued need for national and state efforts to prevent and monitor opioid use disorders among reproductive age women.

0975 S/P

AGE VARIATIONS IN THE PREVALENCE OF OPIOID USE DISORDERS, TREATMENT, AND TREATMENT TYPES IN A COMMERCIALLY INSURED POPULATION OF PREGNANT WOMEN IN THE UNITED STATES Laura Gressler* Laura Gressler, Fadia Shaya, (University of Maryland)

Objective: To evaluate the age variations in prevalence of opioid use disorder (OUD), treatment, and treatment types in commercially insured pregnant women in the US. Methods: The study was a retrospective cohort analysis using the IMS Lifelink database which contains electronic records for the commercially insured population from 2007 to 2015. Pregnant women with an ICD-9 code of V22.2 were identified and classified as having an OUD (ICD9 304.00) if they had a diagnosis before or during their pregnancy. Women were grouped into the following two categories based on their age during pregnancy: between 18 and 30 and between 31 and 45. Receipt of treatment was recorded if an NDC code for the following medications was present during pregnancy: methadone, buprenorphine, or a combination of buprenorphine and naloxone. Results: Of 310861 pregnant women, 174037 (55.98%) women were between the ages of 18 and 30 and 136284 were between the ages of 31 and 45. The prevalence of OUD was significantly higher in women between 18 and 30 compared to women between 31 and 45 (0.51% vs. 0.13%;p<0.0001). The overall prevalence of treatment was similar overall between the two age groups (0.12% vs. 0.09%; p<0.0001) The proportion of women among those with OUD, however, was higher among the older age group than among the younger age group (30.30% vs. 24.58%;p<.0001). Methadone use in both groups was 0.2%. Buprenorphine and buprenorphine/naloxone use was slightly higher among the younger age group (0.08% vs. 0.05%; p=0.0019 and 0.07% vs. 0.04%;p=0.0067). Conclusion: The prevalence of OUD is significantly higher among younger pregnant women, yet the prevalence of treatment is significantly lower among this age group compared to older pregnant women. The distributions of treatment types are similar. Such age variations in the prevalence of OUD but not in treatment types, calls for further studies to inform targeted interventions.

IMPACT OF MARIJUANA LEGALIZATION IN URUGUAY ON ADOLESCENT USE OF OTHER SUBSTANCES Hannah Laqueur* Hannah Laqueur, Aaron Shev, Ariadne Rivera-Aguirre, Kara Rudolph, Magdalena Cerdá, (Violence Prevention Research Program, Department of Emergency Medicine, UC Davis School of Medicine.)

Background: In 2013, Uruguay became the first country in the world to legalize the production, supply, and use of recreational marijuana. Legalization-driven changes in pricing, availability, and/or perceived riskiness may affect adolescent marijuana use, and in turn, this may impact use of other substances, depending on whether marijuana is a substitute or complement. Methods We use the synthetic control method to examine the impact of legalization on past year and month adolescent use of tobacco, alcohol, and cocaine. We use biennial national student survey data (grades 8-12) to compare self-reported use among adolescents in Montevideo, Uruguay to a synthetic control group calibrated by data from 16 metropolitan areas of Argentina and Chile. The synthetic control municipalities are weighted based on their pre-legalization (2001-2013) trends in the outcome variable and covariates (e.g. demographic characteristics and marijuana use). Results In 2014-15, after the enactment of marijuana legalization, adolescent use of tobacco, cocaine, and alcohol were all lower in Montevideo than in the synthetic control. We estimate an absolute difference of 10% in the prevalence of past year and month tobacco use, a 2% difference in past year cocaine prevalence, and a difference of 8% and 7% in the prevalence of alcohol use within the past year and month, respectively. Using permutation-based inference, in which the synthetic control method is applied to each of the 16 comparison regions, we find the reductions in tobacco use are significant at the 5% level, as is the reduction in past year alcohol use. The difference in past month alcohol use is significant at the 10% level. Conclusion: Legalization of marijuana is associated with short-term reductions in tobacco and alcohol use among adolescents. In related work, we also find reductions in marijuana use. These results comport with studies showing adolescent use of marijuana, alcohol, and cigarettes are positively associated.

0982 S/P

USING LINKED PUBLIC HEALTH DATA SYSTEMS TO INVESTIGATE THE RELATIONSHIP BETWEEN EARLY INTERVENTION SERVICES AND 3RD GRADE STANDARDIZED TEST SCORES AMONG LEAD-EXPOSED CHILDREN Jeanette A Stingone* Jeanette A Stingone, Slavenka Sedlar, Sungwoo Lim, Katharine H McVeigh, (Icahn School of Medicine at Mount Sinai)

Research has shown that early intervention programs can improve academic outcomes of children with developmental delays. It has been suggested that similar programs may combat the deleterious effects of lead on children's neurodevelopment. However, to our knowledge, there are no published studies examining this possibility. The objective of this research was to investigate the association between early intervention services and 3rd grade standardized test scores among children exposed to lead before age 3. We used linked data from Vital Statistics, childhood lead poisoning surveillance, the Early Intervention Program, and the Department of Education for children born in New York City from 1994 to 1998. There were 97,541 children with blood lead levels greater than 3 mcg/dL. Of these, 4,281 children received early intervention services after their elevated blood lead measurement. Missing covariate data were imputed using multivariate imputation by chained equations. Propensity scores were constructed within each imputed dataset using random forest. Children who received early intervention were randomly matched by propensity score to three children who did not receive services and had the same special education status. Propensity score matching improved covariate balance, reducing the average standardized absolute mean difference to below 0.10. Differences in test scores were assessed using a linear regression. Leadexposed children who received early intervention services scored 7% (95% CI 3%, 11%) and 9% (95% CI 5%, 13%) of a standard deviation higher on math and English language tests than those who did not receive services. Among children with blood lead levels of 10 mcg/dL or greater, the estimated effect of early intervention on test scores was larger (math: 9% 95% CI -2%, 20%; English: 15% 95% CI 4%, 26%). By leveraging existing public health data, this study found evidence that early intervention programs can benefit lead-exposed children.

0981 S/P

LONG-TERM IMPACT OF DISASTER EXPERIENCES ON CARDIOMETABOLIC RISK: A NATURAL EXPERIMENT FROM THE 2011 GREAT EAST JAPAN EARTHQUAKE AND TSUNAMI Koichiro Shiba* Koichiro Shiba, Ichiro Kawachi, (Harvard Graduate School of Arts and Sciences)

Background: Limited evidence exists on whether experiences of natural disaster can worsen the cardiometabolic risk profile of survivors. We investigated this association using natural experiment data from the 2011 Great East Japan Earthquake and Tsunami in Japan. Methods: We used longitudinal data from a cohort of community-dwelling older adults aged 65 years or older living in Iwanuma city (Miyagi Prefecture) located 80 km west of the earthquake epicenter. The baseline survey was completed seven months before the disaster, and the follow-up survey among survivors was performed approximately 2.5 years after. Subjects in the study were linked to medical record data, including systolic and diastolic blood pressure, body mass index, waist circumference, and serum triglyceride, HDL and LDL cholesterol levels. We estimated the causal effect of disaster experiences (housing damage, loss of loved ones) on cardiometabolic risks using fixed-effects regression adjusting for all time-invariant confounders as well as observed timevarying confounders. Results: Our results showed that the most severe level of housing damage (i.e., complete destruction) was significantly associated with a 0.65 kg/m2 increase in BMI (95% CI: 0.12 to 1.19), 2.8 cm increase in waist circumference (95% CI: 0.17 to 5.33), and 3.59 mg/dL decrease in HDL cholesterol (95% CI: -6.40 to -0.78). Less severe housing damage and loss of relatives, friends, and pets were not associated with cardiometabolic outcomes. Discussion: Loss of homes is associated with a persistent adverse impact on survivors' cardiometabolic risk profiles several years after the disaster. Changes in the living environment following post-disaster relocation may explain the association.

0983 S/P

UNDERSTANDING THE EFFECT OF A PUBLIC HEALTH DETAILING CAMPAIGN ON INITIAL EXPOSURE TO OPIOID ANALGESIC PRESCRIPTIONS Michelle L. Nolan, Hillary V. Kunins, Denise Paone, (New York City Department of Health and Mental Hygiene)

Background: In response to increasing opioid analgesic (OA) involved overdose deaths, the New York City (NYC) Department of Health and Mental Hygiene conducted a public health detailing campaign with over 1,000 Staten Island (SI) prescribers. The campaign's goal was to reduce exposure to risky prescribing. An initial population-level evaluation identified a greater decrease in rates of high dose prescriptions among SI prescribers compared to the other four NYC counties. We present an individual-level analysis examining the campaign's impact on reducing initial exposure to OAs and the number of patients initiating high dose OA prescriptions. Methods: Data were obtained from the New York State Prescription Monitoring Program. For each month March 2013 - December 2014, we calculated the number of "new starts" (defined as patients without an OA prescription in the prior two calendar months), the percent of "new starts" who received one prescription in a calendar month for less than eight days, and the number of new "high dose" patients (defined as patients without an OA prescription for 100 or more daily morphine milligram equivalents in the prior two months). Changes in the prescribing indicators for SI prescribers and the rest of NYC were compared before and after the intervention using a difference-in-difference approach. Results: Following the intervention, the number of "new starts" increased among SI prescribers, although decreased among prescribers in the rest of NYC. Difference-indifference analysis showed no significant differences in trends in the number of patients receiving an initial OA prescription for less than eight days or the number of new "high dose" OA patients between SI prescribers and prescribers in the rest of NYC. Conclusion: Although decreases in high dose prescription rates were observed at the population-level, the campaign was not associated with a decrease in initial exposure to opioid analgesics or initial exposure to high dose prescriptions.

0984 S/P

THE EFFECT OF THE AFFORDABLE CARE ACT ON HUMAN PAPILLOMAVIRUS VACCINE UPTAKE AMONG YOUNG WOMEN: FINDINGS FROM NHANES, 2007-2014 Samantha Raymond* Samantha Raymond, Bian Liu, Denis Nash, (Department of Epidemiology and Biostatistics, CUNY School of Public Health)

Background Human papillomavirus (HPV) serotypes 16 and 18 cause cervical cancer, and there is an HPV vaccine that protects against these oncogenic serotypes. The Affordable Care Act (ACA) significantly expanded dependent coverage and preventative services. This study assessed trends in HPV vaccination initiation among young women, as well as HPV vaccine completion, HPV infection status, and health insurance coverage, including before and after the implementation of the (ACA). Methods Using 2007-2014 data from the National Health and Nutrition Examination Survey (NHANES), 1,970 female participants were examined. The four outcomes were examined over time before (2007-2010) and after (2011-2014) ACA implementation. ACA exposure was operationalized by age, with the age group expected to be most affected (ages 19-25) serving as the intervention group and those similar in age and expected to be unaffected (ages 18 and 26) serving as the control group. Difference-in-difference analyses with multivariable logistic regressions, controlling for survey year, race/ethnicity, age, income, education, and family employment, were used to examine the four outcomes, taking into account NHANES's complex survey design. Results Health insurance coverage remained stable, while HPV vaccination initiation and completion increased over time. HPV infection with types 16 and 18 decreased. Among those ages 19-25, HPV vaccine initiation increased from 7.1% in 2007-2008 to 48.2% in 2013-2014, and completion increased from 0.0% to 31.6%. HPV infection decreased from 13.4% to 6.8%. After taking secular trends into account, ACA exposure was not associated with any of the four outcomes in adjusted models. Conclusions ACA implementation was not related to an increase in HPV vaccination initiation, completion or insurance coverage, or a decrease in HPV infection among females aged 19-25. Future research should continue to explore novel ways to evaluate the ACA and its effect on preventative services.

DIFFERENTIAL SEX EFFECTS OF X CHROMOSOME METHYLATION ON DEVELOPMENT OF TYPE 1 DIABETES: THE DIABETES AUTOIMMUNITY STUDY IN THE YOUNG Randi K Johnson* Randi K Johnson, Fran Dong, Lauren A Vanderlinden, Patrick Carry, Jennifer Seifert, Tasha Fingerlin, Brigitte I Frohnert, Ivana Yang, Katerina Kechris, Marian Rewers, Jill M Norris, (Colorado School of Public Health)

DNA methylation may serve as a mechanistic link between genetic susceptibility and environmental exposures in the development of autoimmune type 1 diabetes (T1D). Previous studies have not focused on sex chromosomes due to interpretation challenges-females have higher methylation levels due to X chromosome inactivation. While incidence of early-onset T1D does not differ by sex, offspring risk of T1D is greater in affected fathers than mothers. Therefore, we investigated whether the association between X chromosome DNA methylation and T1D differed by sex using data from the Illumina 450K platform in a nested case-control study from the Diabetes Autoimmunity Study in the Young prospective cohort. In linear growth curve models adjusted for age and repeated measures, we identified 65 regions on the X chromosome where the differential methylation between 42 cases and 42 controls differed by sex (interaction q-value<0.05). For one region in the PDZD4 gene, male cases had 3% more methylation on average compared to male controls, while female cases had 1% less methylation compared to female controls (interaction q-value=0.016). All other 64 regions were characterized by average hypermethylation in female cases compared to controls, and slight hypomethylation or no difference between male cases and controls. Several differentially methylated regions mapped to genes involved in regulating MAPK pathways that can lead to cytokine-induced beta-cell apoptosis, including DUSP9, MIR223, and NRK. There are sex-specific X chromosome methylation differences between T1D cases and controls, with greater effects in females than males. These differences are apparent prior to diagnosis of T1D, and therefore may reflect or contribute to different disease processes in females and males. Given the sexspecific risk factors for familial transmission of T1D across generations, future work should examine how these sex-effects on the X chromosome may be related to sex of T1D-affected parents.

0992 S/P

PLASMA LEVELS OF PROLACTIN AND PROGESTERONE IN ASSOCIATION WITH GESTATIONAL DIABETES RISK AND CARDIOMETABOLIC PROFILE IN A PROSPECTIVE MULTI-RACIAL PREGNANCY COHORT Mengying Li* Mengying Li, Shristi Rawal, Stefanie N. Hinkle, Fasil Tekola-Ayele, Michael Y. Tsai, Cuilin Zhang, (Epidemiology Branch, Division of Intramural Population Health Research, Eunice Kennedy Shriver National Institute of Child Health and Human Development)

Background: Prolactin and progesterone are implicated in the physiologic adaptation of glucose metabolism to pregnancy. However, it is unclear if they play a role in the development of gestational diabetes (GDM). Objectives: This study examines the prospective associations of prolactin and progesterone with GDM risk and cardiometabolic profile during pregnancy. Methods: This was a nested case-control study of 107 GDM cases and 214 matched controls without GDM from the NICHD Fetal Growth Studies-Singleton Cohort. GDM was ascertained by medical record review. Blood samples were drawn at gestational weeks (GW) 10-14, 15-26, 23-31 and 33-39. Odds ratios (OR) for GDM by quartiles (Q) of the hormones were estimated using conditional logistic regression adjusting for major risk factors of GDM including pre-pregnancy BML Associations between the hormones and cardiometabolic biomarkers (i.e., CRP, insulin, glucose, c-peptide and HOMA-IR) were estimated using Spearman's partial correlation. Results Women who later developed GDM had significantly higher levels of prolactin than controls during both GW 10-14 (mean \pm SD: 56.9 \pm 29.9 vs. 50.0 \pm 28.7 ng/mL) and 15-26 (mean \pm SD: 136.6 \pm 64.5 vs. 124.0 \pm 57.0 ng/mL). Moreover, prolactin levels at weeks 10-14 was positively and significantly associated with GDM risk (adjusted OR [95%CI] lowest vs. highest Q: 0.42 [0.19, 0.94], p-for-trend = 0.03). Similar associations were observed at GW 15-26. In addition, prolactin levels at GW 10-14 were positively associated with fasting insulin and insulin resistance. Progesterone levels were not significantly associated with GDM risk, but higher levels were inversely associated with fasting glucose, fasting insulin and insulin resistance. Conclusions: Prolactin levels in early and mid- pregnancy were significantly and positively associated with GDM risk, and might play a role in the development of GDM.

0991

THE ASSOCIATION BETWEEN GESTATIONAL WEIGHT PATTERNS IN EARLY PREGNANCY AND LARGE-FOR-GESTATIONAL AGE INFANTS AMONG WOMEN WITH TYPE I INSULIN-DEPENDENT DIABETES Ketrell L McWhorter* Ketrell L McWhorter, Katherine Bowers, Lawrence M Dolan, Ranjan Deka, Chandra L Jackson, Jane C Khoury, (Epidemiology Branch, National Institute of Environmental Health Sciences, National Institutes of Health, Department of Health and Human Services)

Objective: Variability in gestational weight gain (GWG) may be an independent predictor of large-for-gestational age (LGA). Therefore, we aimed to determine the association between GWG patterns in the first 20 weeks of gestation and odds of delivering an LGA infant among women with Type 1 Insulin-Dependent Diabetes (T1DM). Research Design and Methods: We conducted a longitudinal cohort study of women with T1DM enrolled in the Diabetes in Pregnancy Program Project. Sparse functional principal component analysis (FPCA) was used to identify clusters (or phenotypes) based on degree of variation in GWG in the first 20 weeks of gestation. Generalized estimating equations were used to examine the association between maternal cluster membership and odds of LGA in the infant, adjusting for age, race, parity, insulin dose per kilogram weight over gestation, mean pre- and postprandial glucose, preeclampsia and pre-pregnancy body mass index (BMI). Results: Relative to the overall mean response, 3 distinct phenotypes, characterized by tertiles from the FPCA, were classified as low (cluster 3, n=87), moderate (cluster 2, n=167) and high (cluster 1, n=78) mean weight and variability in GWG. Phenotype variability was positively associated with pre-pregnancy BMI (p< 0001) and exceeding Institute of Medicine guidelines (p<.0001). Membership to cluster 1 [aOR 6.09 95%CI (1.95-19.0)] and cluster 2 [aOR 2.70, 95%CI [1.27-5.77)] was significantly associated with increased odds of delivering an LGA infant, compared to cluster 3. GWG in the first 20 weeks as a continuous variable [aOR 1.01, 95%CI [0.97-1.05)] was not significantly associated with increased odds of LGA. Conclusions: Medium to high variability in GWG in the first 20 weeks of gestation was associated with increased odds of delivering an LGA infant. Future studies should consider GWG patterns in early pregnancy instead of using a single measure to represent GWG when examining the likelihood of LGA infants in women with T1DM.

0993 S/P

PERSISTENT ORGANIC POLLUTANTS AND GESTATIONAL DIABETES AMONG HEALTHY NON-OBESE WOMEN IN NICHD FETAL GROWTH STUDIES, SINGLETONS Mohammad L. Rahman* Mohammad L. Rahman, Cuiling Zhang, Melissa M. Smarr, Kurunthachalam Kannan, Sunmi Lee, Fasil Tekola Ayele, Germaine M. Buck Louis, (Eunice Kennedy Shriver National Institute of Child Health and Human Development)

Background: Persistent organic pollutants (POPs) are ubiquitously detected in the environment and in humans. Exposure to POPs has been linked with impaired glucose tolerance. However, epidemiological evidence for an association between POPs and gestational diabetes (GDM) is limited. Methods: In prospectively followed NICHD Fetal Growth Study, plasma levels of 11 organochlorine pesticides (OCPs), 9 polybrominated diphenyl ethers (PBDEs), 44 polychlorinated biphenyls (PCBs), and 11 perfluorochemicals (PFCs) were measured at enrolment (8w0d to 13w6d) among 2,334 healthy non-obese women with low-risk, singleton pregnancies. Seventy-four GDM cases were identified by Carpenter and Coustan criteria based on medical records review. Adjusted risk ratios (RRs) and 95% confidence intervals (CIs) were estimated using multivariate Poisson regression with robust variance adjusted for maternal age, education, body mass index, parity, race/ethnicity, serum cotinine, and serum lipids (except for PFCs). Results: Among women with a history of type 2 diabetes (n = 446), significantly elevated GDM risk (range of corresponding RRs: 1.08 - 3.18; false discovery rate [FDR]< 0.05) was related to per 1-SD increment in maternal plasma concentrations of PCB congeners with \geq 6 chlorine atoms (138_158, 146_161, 153, 156, 170, 180, 182_187, 183, 194, 196_203, 202) and four PFCs (perfluorononanoic, perfluorooctanoic, perfluoroheptanoic, and perfluorododecanoic acids). Among women without a history of type 2 diabetes (n = 1,787), plasma concentrations of PBDEs (47, 154) were significantly associated with higher GDM risk (range of RRs 1.18-1.23 per SD increment; FDR < 0.05). No significant associations were observed for other measured chemicals. Conclusions: Our results suggest that first trimester exposure to POPs at environmentally relevant levels may be related to increased risk of GDM and the associations were modified by women's family history of type 2 diabetes.

DO SUPPORTIVE FAMILY BEHAVIORS PROMOTE DIABETES SELF-MANAGEMENT IN RESOURCE LIMITED URBAN SETTINGS? – A CROSS SECTIONAL STUDY. Saranya Ravi* Saranya Ravi, Vijayaprasad Gopichandran, Swetha K, (ESIC Medical College and PGIMSR)

Background: Self-management is an essential component of prevention and treatment of type 2 diabetes. Social and family support has been shown to influence self-management behaviors as well as glycemic control and complications. Objectives To assess whether diabetes family support improves diabetes selfmanagement and glycemic control in a typical urban population in India. Methods: A cross-sectional study using a questionnaire that had items from the Summary of Diabetes Self Care Activities Scale (SDSCA), the Diabetes Family Behavior Checklist (DFBC) and some sociodemographic and diabetes related clinical data. The participants were consecutively sampled from the diabetes outpatient department in a tertiary care hospital in Chennai, south India. Results: A total of 200 consecutive patients from the diabetes outpatient department were interviewed. Diabetes self-management practices were good with respect to avoiding fatty foods and carbohydrates and undergoing regular blood testing for glucose. But the selfmanagement with respect to exercise and foot related care was rare. It was observed that a vast majority of the patients did not report receiving any support from their families. However, in the small proportion who did receive good family support, there is an association between diabetes self-management and diabetes family support. ($\beta = 0.527$; p=0.015) Further, the path model showed that there is a positive statistically significant association between family support score and the diabetes self-management score ($\beta = 0.254$, p<0.001). However, the negative association between the diabetes self-management score and the mean plasma glucose did not reach statistical significance ($\beta = -46.378$, p=0.082). Conclusions: In the urban south Indian setting, family support was significantly associated with better selfmanagement activities, but better self-management did not translate to better glycemic control

0995

GENTRIFICATION, NEIGHBORHOOD DISPLACEMENT, AND INCIDENT DIABETES AMONG WORLD TRADE CENTER HEALTH REGISTRY ENROLLEES, 2003–2016 Melanie Jacobson* Melanie Jacobson, Aldo Crossa, Sze Yan Liu, Sean Locke, Cheryl Stein, Sungwoo Lim, Eugenie Poirot, (New York City Department of Health and Mental Hygiene)

Gentrification is characterized by rapid socioeconomic change in lower income neighborhoods, which can displace long-term residents to more disadvantaged areas. Little has been studied on this residential movement in relation to health impacts using longitudinal data. This study examined enrollees from the World Trade Center Health Registry, a longitudinal cohort study of first responders, residents, area workers, and others present in lower Manhattan on September 11, 2001 (9/11). Enrollees that completed ≥ 2 health surveys between 2003 and 2016, had ≥ 2 annual geocoded addresses in the New York City (NYC) metropolitan area, and did not have prevalent diabetes at the start of follow-up were included (N=45,394). Using a composite measure of neighborhood disadvantage based on U.S. Census Bureau and American Community Survey data, we categorized all 156 New York metropolitan area Public Use Microdata Areas (PUMAs) as gentrifying, non-deprived, deprived, or declining. Using address history, we defined displaced persons (n=855) as those who moved from gentrifying or non-deprived PUMAs to deprived or declining PUMAs. The comparison group were persons who never moved from gentrifying or non-deprived PUMAs (n=24,024). We fit adjusted Cox proportional hazards models to evaluate associations between neighborhood displacement as well as any moving to a different PUMA, and incident diabetes. Although 17.4% of enrollees ever lived in a gentrifying neighborhood, displacement was rare (1.9%), and primarily constituted moves from non-deprived to deprived (47.4%) or declining PUMAs (25.7%). Displacement was positively associated with diabetes (hazard ratio [HR]=1.30; 95% CI: 0.9, 1.5). Additionally, those who ever moved were more likely to report diabetes compared with those who never moved (HR=1.11; 95% CI: 1.0, 1.2). Neighborhood displacement, and moving more generally, were associated with diabetes among persons in the World Trade Center Health Registry.

THE INFLUENCE OF BREAST CANCER DIAGNOSIS ON CHANGES IN SERUM 25-HYDROXYVITAMIN DOVER TIME Katie O'Brien* Katie M. O'Brien, Dale P. Sandler, Clarice R. Weinberg, (National Institute of Environmental Health Sciences)

Results of prospective and retrospective studies of vitamin D and breast cancer have been somewhat conflicting. This may be explained by variations in serum 25-hydroxyvitamin D [25(OH)D] concentrations over time and as a consequence of breast cancer diagnosis or treatment. We investigated the relationship between 25(OH)D concentrations measured before and after breast cancer diagnosis. We conducted these analyses in a nested case-control sample of women from the Sister Study, a prospective cohort of women who were breast cancer-free at baseline, but had a sister previously diagnosed with the disease. The included women (829 cases, 769 controls) provided two serum samples- one at baseline (2003-09) and one 4-10 years later (2013-14). Total serum 25(OH)D was assessed using liquid chromatography tandem mass spectrometry. 25(OH)D concentrations were correlated over time (Spearman R=0.42, p4 times/week) were greater in cases (56% to 81%) than controls (56% to 72%). Decreased hormonal birth control use also predicted changes in 25(OH)D. Our results do not explain the previously observed differences between retrospective and prospective studies of 25(OH)D and breast cancer, but do demonstrate how reverse causation and temporal trends in exposure can hugely bias effect estimates in retrospective studies.

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A COMPARISON OF METHODOLOGICAL APPROACHES ON THE ASSOCIATION BETWEEN DE NOVO VITAMIN D SUPPLEMENT USE POST-DIAGNOSIS AND BREAST CANCER MORTALITY Jamie Madden* Jamie Madden, Lina Zgaga, Finbar Leacy, Kathleen Bennett, (RCSI, Population Health Sciences Division, Dublin, Ireland)

Pharmacy claims data offers a unique opportunity for non-randomized comparative effectiveness research but studies can be inherently biased due to confounding by indication. This study investigates different methodological approaches to overcome inherent bias while examining the association between vitamin D supplements initiated after breast cancer incident diagnosis on survival. Women aged 50-80 years with a record of invasive breast cancer were identified on the National Cancer Registry Ireland database (n=5417). Initiation of de novo vitamin D post-diagnosis was identified from linked prescription data (n=2581, 49%). We first implemented a standard multivariate Cox proportional hazards (PH) model to estimate adjusted HRs (95% CIs) for breast cancer-specific mortality. We compared these findings to a propensity score analysis approach. We subsequently sought to account for the time-varying nature of vitamin Duse and time-varying confounding by bisphosphonate use using inverse probability of treatment weighted marginal structural models (MSMs), exploring the impact various weight trimming approaches have on the effect estimates. Using the standard Cox PH models we found a 20% reduction in breast cancer-specific mortality in de novo vitamin D users compared to non-users (HR, 0.80; 95% CI, 0.64-0.99). A similar point estimate was observed, but larger CIs, for the association between vitamin D use and breast cancer-specific mortality (HR: 0.80; 95% CI: 0.60-1.06) when correcting for covariate imbalance between treatment groups at baseline using propensity score analysis (1:1 exact matching). Using truncated stabilized weights (truncation fraction=0.01) in a MSM, we obtained a similar result (HR: 0.76; 95% CI: 0.47-1.24): however, point estimates of treatment effects varied greatly depending on weight trimming. Our results highlight the importance of treatment model specification on MSM estimates.

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SURVIVOR BIAS, SELECTIVE ATTRITION, AND REVERSE

CAUSALITY, OH MY Hailey Banack* Hailey Banack, Andrew Stokes, Jennifer W. Bea, Kathleen M. Hovey, Jean Wactawski-Wende, (University at Buffalo)

The nature of the relationship between body weight and mortality in older adults remains unclear. The objective of this presentation is to examine the impact of differential survival to cohort entry (survivor bias), selective attrition, and reverse causality on the relationship between body mass index (BMI) and mortality in postmenopausal women. In this context, reverse causality refers to the notion that pre-existing disease causes weight loss and is similar to the concept of confounding by pre-existing disease. Selective attrition refers to informative censoring. In this analysis, we used data from the Women's Health Initiative clinical trial (n=68132). The exposure is a time-varying categorical BMI variable (kg/m2) and the outcome is all-cause mortality. We examined potential survivor bias by stratifying analyses by age at entry (50-59, 60-69, 70-79). We fit inverse probability of treatment and censoring weights to account for reverse causality and selective attrition and used the weights to estimate a binomial marginal structural model. We compared risk ratios (RR) and 95% CI from an adjusted binomial generalized linear model with results from the marginal structural model. Results indicated that across all BMI categories, effect estimates were attenuated among women who were older at cohort entry. As well, among women with high BMI values, results from weighted models were lower than unweighted models. For example, using BMI 25-29.9 as the referent group, the weighted mortality RR for women with BMI 35-39.9 was 1.17 (1.01, 1.36) for women aged 50-59 and 1.04 (0.92, 1.19) for women 70-79 while corresponding unweighted RRs were 1.45 (1.29, 1.63) and 1.24 (1.13, 1.37) for women aged 50-59 and 70-79. These findings demonstrate the influence of survivor bias, selective attrition, and reverse causality on estimates of the BMI-mortality relationship in postmenopausal women and highlight the methodological techniques that can be used to account for these forms of bias.

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OBESITY AND PROSTATE CANCER RECURRENCE FOLLOWING RADICAL PROSTATECTOMY Crystal S. Langlais* Crystal S. Langlais, Janet E. Cowan, Jenny M. Broering, Stacey A. Kenfield, Erin L. Van Blarigan, Matthew R. Cooperberg, Peter R. Carroll, June M. Chan, (Department of Epidemiology and Biostatistics, University of California, San Francisco)

Purpose: To examine the association between obesity and risk of prostate cancer recurrence in the CaPSURETM (Cancer of the Prostate Strategic Urologic Research Endeavor) study. Methods: We included 3,491 men with prostate cancer from CaPSURE who underwent radical prostatectomy (RP) between 1998-2017 and had body mass index (BMI) available at baseline. BMI was examined continuously and categorically (<25, 25-29.9, 30-34.9, ≥35 kg/m2). Cancer recurrence was defined as two consecutive prostate-specific antigen (PSA) levels ≥0.2ng/mL after RP or any second treatment. We used Cox proportional hazard models to estimate hazard ratios (HR) and 95% CI for BMI, with adjustment for ethnicity, age, clinical site of recruitment, and diagnostic PSA level, Gleason grade, and T stage. Results: Patients were followed for a median of 4.7 years [IQR: 2.3, 8.1] after RP. Recurrence occurred in 452 (13%) patients a median of 21 months [IQR: 10.4, 41.4] after RP (66% due to PSA rise). There was a positive association between continuous BMI and risk of recurrence (multivariate HR 1.16, CI: 1.04, 1.29, per 5-unit increase in BMI). Men who were very obese had a higher hazard of recurrence (multivariate HR 1.93, CI: 1.27, 2.92) compared to those with normal BMI. Other BMI categories were associated positively, but not statistically significantly, with recurrence (overweight HR: 1.13, CI: 0.87, 1.46; obese HR: 1.26, CI: 0.92, 1.71). Conclusions: Extreme obesity was associated with a higher risk of prostate cancer recurrence, after adjustment for baseline demographic and clinical factors. These results are consistent with prior reports on BMI and post-diagnostic clinical outcomes. Our findings support careful follow-up among obese patients following RP. Additional research is needed to determine if this association is independent of lifestyle behaviors (diet, physical activity) or if losing weight after prostate cancer diagnosis is associated with improved outcomes after RP.

RECONSTRUCTING CAREGIVING FAMILY NETWORKS AMONG CANCER DECEDENTS USING DANISH POPULATION-BASED REGISTRIES Katherine Ornstein* Katherine Ornstein, Marie Kristensen, Melissa Aldridge, Mogens Groenvold, Lau Caspar Thygesen, (Icahn School of Medicine at Mount Sinai)

Caregiving for individuals with cancer at the end of life can be very burdensome impacting the health and well-being of the entire family. Yet existing studies limit our ability to understand the family caregiver experience with serious illness and bereavement by focusing on the spouse or one "primary" caregiver. We used population registry data to evaluate the complete composition of family caregiving networks at the time of death to assess the potential for bias in bereavement and caregiver outcome research. We conducted a prospective cohort study of adult Danish decedents 2009-2015 who died from cancer. Using registry linkages we constructed family network linkages for decedents by identifying all parents, spouses, cohabiting partners and adult children, grandchildren, and great grandchildren living in Denmark at the time of death. We identified 107,762 decedents with cancer as cause of death (mean age 72.7). Among these decedents, 13.8% had no living family at the time of death. This group was more likely to be female and older and less likely to receive supportive specialized palliative care services than those with identified family members. While almost half of cancer decedents lived alone at the time of death, each decedent was linked on average to 5.1 relatives (range= 0-63). Among those with living family members, the vast majority (89.2%) had multiple family members at the time of their death. Furthermore, cancer deaths did not occur in isolation within families- 5% of family members bereaved by cancer experienced >=2 deaths over two years. Using complete population registries we have determined that dyadic research on end-oflife caregiving and bereavement in cancer that is limited to spouses or even primary caregivers does not fully capture the end-of-life experience for most caregiving families. Research on family caregiving networks that link multiple family members and decedents may substantially expand our knowledge of key caregiving outcomes.

LOCAL IMMIGRATION ENFORCEMENT AND PRETERM BIRTH IN CALIFORNIA COUNTIES Jacqueline M. Torres* Jacqueline M. Torres, Joan A. Casey, Maria-Elena DeTrinidad Young, Ralph A. Catalano, Rachel Morello-Frosch, (University of California, San Francisco)

There is growing interest in the health effects of immigration enforcement, although little is known about the relationship between the intensity of immigration enforcement enacted over longer periods and health. We examine the relationship in California between immigration enforcement intensity and preterm birth (PTB) during the "Secure Communities" (SCOMM) program (2009-2014). We linked data on county-level immigration enforcement for each month of SCOMM to birth records for Latina and non-Latina white women in 11 of California's most populous counties. Preliminary analyses use over 4 million birth records from 2009-2011. We separately estimated associations between immigration enforcement (as measured by number of deportations and submissions to federal immigration authorities) during the months just prior to birth and the odds of PTB for each county. We tested for interactions between maternal ethnicity and exposure measures. Models controlled for maternal age and education, infant sex, and accounted for temporal trends in preterm birth. Exposure measures were mean-centered and standardized. Each standard deviation above the county-specific mean number of deportations in the months just prior to birth was associated with greater odds of PTB for both Latina and non-Latina white women in five California counties (e.g. San Bernardino OR: 1.07, 95% CI: 1.05, 1.09). In five counties, the odds of PTB were significantly higher for Latina women at each standard deviation above the county mean level of exposure (e.g. Fresno County, OR for interaction term: 1.08, 95% CI: 1.04, 1.13) compared to the reference group of non-Latina white women experiencing the mean number of deportations in the months just before birth. Patterns were similar, albeit with some cross-county variation, in models that used submissions as the exposure of interest. Greater immigration enforcement intensity may contribute to higher risk of PTB among women in many California counties.

INCOME INEQUITIES IN WOMEN'S MENTAL HEALTH: EXPLORING THE ROLE OF UNPAID FAMILY WORK Bonnie Janzen* Bonnie Janzen, Laurie-ann M. Hellsten, (University of Saskatchewan)

Background. The psychosocial hazards associated with unpaid family work have not been a prominent focus in epidemiological research aimed at understanding socioeconomic inequities in women's health. Research attention has been further impeded by a scarcity of psychometrically sound instruments available to measure family work. Using a newly developed family work measure with evidence of validity and reliability, the goal of this study was to determine whether psychosocial qualities of unpaid family work contribute to income inequities in women's mental health. Methods. Study participants in this on-line, cross-sectional study were 512 employed partnered mothers living in a Canadian province. The dependent variable was psychological distress. In addition to a 28-item measure assessing five dimensions of unpaid family work quality (i.e., Demands, Autonomy, Equity, Social Resources, Caregiving Rewards), independent variables included material deprivation, job control, job demands and several measures of the work-family interface. A series of linear regression models were performed to meet study goals. Results. Higher household income was associated with lower psychological distress. Although all dimensions of unpaid family work quality were significantly associated with distress (with the exception of caregiving rewards), only equity was also related to income; that is, women with higher income reported higher levels of equity in responsibility for unpaid family work compared to those with lower income. Material deprivation made the largest contribution to the income disparity in psychological distress, followed by work-family conflict, equity in family work and job control. Conclusion. Equity in responsibility for unpaid family work may contribute to income-related disparities in women's mental health. Longitudinal research with diverse populations of women and in other countries with varying gender policy regimes are required to confirm these findings.

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A LONGITUDINAL STUDY OF THE ASSOCIATION BETWEEN CHILDHOOD FAMILY FOOD INSECURITY AND YOUNG ADULTHOOD MENTAL HEALTH. Laura Pryor* Laura Pryor,, Maria Melchior, Mauricio Avendano, Pamela Surkan, (Department of International Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA)

Introduction: Food insecurity affects nearly 10% of US homes with children and has been associated with increased mental health problems. This study will examine the association between growing up in households affected by food insecurity and young adult mental health. Methods: Data was drawn from the Panel Study of Income Dynamics (PSID). Participants were children in PSID households from 1997-2003 (n=3365, ages 1-13 years at baseline). Household food insecurity was measured using the past-year USDA 18-item questionnaire and considered as a continuous measure of affirmative items. Group-based developmental trajectories of household food insecurity from 1997-2003 were modeled using a semiparametric, group-based multinomial modelling approach (Proc Traj program in SAS). Outcomes measured in young adulthood (from 2005 until 2015) include non-specific psychological distress, measured by the Kessler (K6) scale (≥13=serious psychological distress). Interactions between trajectory group and parent mental health and food assistance are being examined. Results: A three group trajectory of food insecurity across time was identified: 1) High food security (no/very few affirmative food insecurity items across time: 70%); 2) Moderate (some affirmative items: 25.5%), and; 3) Low food security (high number of affirmative items indicative of chronic food insecurity across childhood: 5.14%). Significant associations were found between being in the moderate and low food security groups during childhood with high levels of psychological distress in young adulthood, which remained significant when controlling for parents' educational attainment, child's sex and age: [ORs (95% CI's]= 1.8 (1.3; 2.5) and 2.7 (1.6; 4.7), respectively). Conclusion: Growing up in a household affected by food insecurity was associated with higher risk of young adult mental health problems. Policies that aim to improve food insecurity may help reduce the risk of mental health problems in young adulthood.

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CERVICAL CANCER SCREENING, IMMIGRANT STATUS, AND ACCESS TO PRIMARY CARE PHYSICIANS IN MONTREAL, CANADA: A CAUSAL MEDIATION ANALYSIS Geetanjali D Datta* Geetanjali D Datta, Samia Qureshi, Alexandra Blair, Marie-Pierre Sylvestre, Lise Gauvin, Marie-Helene Mayrand, (CRCHUM/Université de Montréal)

Background: Social inequalities in cervical cancer screening have been documented in many contexts, including Canada. Increased access to primary care is one potential avenue through which inequalities could be mitigated. Objectives: To examine the mediating effect of having a primary care physician (PCP) on the association between immigrant status and cervical cancer screening in Montreal, Quebec. Methods: Four waves of the population-based Canadian Community Health Survey (2003, 2005, 2008, 2012) were utilized (N=6,393) and analyses were limited to women aged 18-65 years residing in the Montreal Metropolitan Area who had not had a hysterectomy. The outcome of interest was never having been screened for cervical cancer and immigrant status was categorized dichotomously. Information on all variables were self-reported by survey participants. A counterfactual approach for assessing mediation was used to calculate controlled direct effects, natural direct effects, and natural indirect effects. Access to a PCP was treated both as a mediator and an effect modifier. Age, marital status, educational attainment, and income were considered confounding factors. Results: Twenty-seven percent of women reported not having a PCP. The odds of never having been screened was 3 times greater among immigrants than non-immigrants (OR: 3.2, 95% CI: 2.6-3.8). The controlled direct effect, the association that is not mediated by having a PCP, was nearly equivalent (OR: 3.0, 95% CI: 2.6-3.4). Similar results were observed for the natural direct effect. Conclusion: Solely increasing primary care access among immigrants is not likely to appreciably decrease immigrant-related inequalities in cervical cancer screening among women in Montreal. Other types of interventions, such as integrating self-sampling modalities or implementing elements of organized screening, should be investigated for their potential to mitigate screening inequalities. Funding: CIHR and CCSRI.

NEIGHBORHOOD SOCIOECONOMIC STATUS TRAJECTORY AND COLORECTAL CANCER Dong Zhang* Dong Zhang, Qian Xiao, (University of Iowa)

A growing body of research has shown that people living in neighborhoods with more severe socioeconomic deprivation tend to have higher risks for colorectal cancer. However, most previous studies have only examined neighborhood socioeconomic status (SES) factors at one point in time, so it is unclear whether longterm trajectories in neighborhood SES can also influence health outcomes. We examined the 10-year change in neighborhood SES in relation to the incidence of colorectal cancer among 266,362 participants (age 51-70) in the NIH-AARP Diet and Health Study who reported living in the same neighborhood in baseline (1995-1996) and in 2004 follow-up. To measure long-term trajectories in neighborhood SES, we derived an index using census data for 1990 and 2000 separately, and further grouped neighborhoods into four categories based on the median of the SES index in 1990 and 2000 (low-low, low-high, high-low, highhigh). We found that compared to residents whose neighborhoods were in the high SES groups in both 1990 and 2000 (reference), those whose neighborhoods were consistently in the low SES groups in both years had a 11% [HR (95% CI), 1.11 (1.04, 1.18)] increase in the risk of developing colorectal cancer. Moreover, we also found an increase in colorectal cancer risk among those whose neighborhoods changed from the high SES group in 1990 to the low SES group in 2000 [1.16 (1.04, 1.30)]. Our findings suggest that exposure to consistently low SES neighborhoods and/or a decrease in neighborhood SES over a period of time may be associated with higher risks of colorectal cancer.

OPIOID PRESCRIPTIONS AND SUICIDAL OVERDOSE Anita Spiess* Anita Spiess, Nkechinyere Nweke Gibson, Maisha N. Toussaint, Raina D. Brooks, Elizabeth R. Corrigan, (U.S. Army Public Health Center Behavioral and Social Health Outcomes Practice Division)

Suicide overdoses involving opioids doubled among U.S. civilians from 1999 to 2014. Veterans with opioid prescriptions were twice as likely to suffer adverse outcomes including overdose and suicide attempt as those without opioid prescriptions. To our knowledge, connections between suicidal behavior and opioid prescriptions in the U.S. Army have not been investigated previously. This study evaluated the association between prescription opioids and overdose among U.S. Army Soldiers who died by suicide or attempted suicide from 2007 through 2016. Logistic regression was used to calculate the odds of suicide or attempt by overdose compared to other methods, as predicted by opioid prescription status. Potential confounders that were considered included sex, age, rank, substance use disorders (alcohol, opioid, and other drug), other mental disorders, recent history of positive drug test for opioids or other drugs, and screening for entry in the Army Substance Abuse Program. Of 1,498 suicide cases, 5% overdosed and 25% had received an opioid prescription in the 6 months preceding their death. Of 4,927 attempt cases, 56% overdosed and 34% received an opioid prescription in the previous 6 months. Opioid prescriptions were independently associated with overdose for both suicide cases (AOR: 2.29, 95% CI: 1.40-3.76) and attempt cases (AOR: 1.39, 95% CI: 1.23-1.58), after adjustment for sex, rank, substance use and other mental disorders. These results are in line with the findings among veterans, suggesting that Soldiers with opioid prescriptions might benefit from targeted suicide prevention efforts and regular suicide screening.

PREDICTORS OF ADOLESCENT EMERGENCY DEPARTMENT VISITS FOR SELF-INJURY: A CASE-CONTROL STUDY USING STATEWIDE DATA FROM CALIFORNIA Sidra Goldman-Mellor* Sidra Goldman-Mellor, Kevin Kwan, Jonathan Boyajian, Paul Brown, Deborah Wiebe, Paul Gruenewald, Magdalena Cerda, (University of California, Merced)

Suicide is now the second leading cause of death among U.S. adolescents, and their rates of emergency department (ED) visits for self-harm increased 45% between 2010-2015. National suicide prevention efforts need large-scale, longitudinal ED data to identify adolescents at elevated risk of self-harm, but such research remains scarce. We conducted a case-control study using statewide, all-payer ED data from California, examining associations between adolescent self-harm and multiple individual- and area-level risk factors. Cases comprised all patients aged 10-19 years who presented to a California ED in 2010 and received an ICD-9 in jury code of E950-E959 (n=5,488); controls were randomly selected from all other patients and matched 3:1 to cases on age, sex, visit month, and county (n=16,450). Exposure factors included adolescent race/ethnicity, insurance status, and zip-level urbanicity and median household income at index visit; we also examined patients' prior ED visits from 2006-2009, which were linked to their index visits using unique identifiers. Conditional logistic regression results showed that self-harm patients (mean age=16.6 years (SD=2.0); 64.0% female) were substantially more likely than controls to have a history of prior ED visits for self-harm (OR=9.65 95% CI [7.80, 11.93]), mental health problems (OR=4.51 [3.96, 5.14]), substance use (OR=2.72 [2.22, 3.74]), and assault injury (OR=1.53 [1.30, 1.81]), even when controlling for patient race, insurance, and total number of prior visits. Cases were also more likely than controls to live in wealthy zip codes, and to have lived at multiple zip codes during 2006-2009, but their urbanicity did not differ. Findings from our large, population-based study suggest that most self-harming adolescents who present to the ED already have substantial histories of ED utilization, especially for psychiatric and injury-related complaints, of fering a potentially valuable intervention opportunity in this vulnerable group.

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USE OF NATURAL LANGUAGE PROCESSING IN ELECTRONIC MEDICAL RECORDS TO IDENTIFY PREGNANT WOMEN WITH SUICIDAL BEHAVIOR: TOWARDS A SOLUTION TO THE COMPLEX CLASSIFICATION PROBLEM Qiu-Yue Zhong* Qiu-Yue Zhong, Leena P. Mittal, Margo D. Nathan, Kara M. Brown, Deborah Knudson González, Tianrun Cai, Sean Finan, Bizu Gelaye, Paul Avillach, Jordan W. Smoller, Elizabeth W. Karlson, Tianxi Cai, Michelle A. Williams, (Harvard)

Objective: Suicide, one of the leading cause of maternal deaths, may be prevented if prompt action and immediate interventions are taken to mitigate risk as part of prenatal care. We sought to develop algorithms to identify pregnant women with suicidal behavior using information extracted from clinical notes by natural language processing (NLP) in electronic medical records (EMRs). Methods: Using both codified data and NLP applied to unstructured clinical notes, we first screened pregnant women enrolled in Partners HealthCare for suicidal behavior. Psychiatrists and a trained researcher manually reviewed clinical charts to identify relevant features for suicidal behavior and to obtain gold-standard labels in training and validation datasets. Using the adaptive elastic net, we developed an algorithm to classify suicidal behavior. We then validated the algorithm in an independent validation dataset, and applied it to the dataset including women who screened positive for suicidal behavior to confirm the presence of with suicidal behavior. Results: From 275,843 women with at least one diagnostic code related to pregnancy or delivery in the Partners HealthCare EMRs, 9,331 women (3.38%) were screened positive for suicidal behavior by either codified data (N=196) or NLP (N=9,145). Using expert-curated features, our algorithm achieved an area under the receiver operating characteristic curve of 0.83. By setting the specificity level at 0.90, we obtained a sensitivity of 0.58, a positive predictive value (PPV) of 0.63, and a negative predictive value (NPV) of 0.88. The algorithm was used to identify 2,146 pregnant women with suicidal behavior among the 9,331 patients who screened positive for suicidal behavior. The estimated prevalence of suicidal behavior in Partners HealthCare EMRs was 777.98 per 100,000 pregnant women. Conclusions: Mining unstructured clinical notes using NLP resulted in a more than 10-fold increase in the number of pregnant women identified with suicidal behavior. Extracting i

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LONG-TERM OCCUPATIONAL TRAJECTORIES AND SUICIDE: A 22-YEAR FOLLOW-UP OF THE GAZEL COHORT STUDY Marine Azevedo Da Silva* Marine Azevedo Da Silva, Nadia Younes, Ariane Leroyer, Laurent Plancke, Cedric Lemogne, Mathieu Riviere, Marcel Goldberg, Maria Melchior, (Columbia University, Mailman School of Public Health, Department of Epidemiology, New York, NY, USA)

Background Most suicides occur among individuals of working age. Risk is elevated in some occupational groups, however relations between long-term occupational trajectories and suicide are not well known. We examined longitudinal associations between career-long occupational trajectories and suicide. Methods We used data from GAZEL, a cohort study based in France, which recruited 20,452 employees of a large national utilities company, aged 39-54 years at baseline in 1993. Occupational grade was obtained from company records from the time of hiring until 1993. Group-based trajectory models were used to define occupational trajectories. Causes of mortality, coded by the International Classification of Diseases, were recorded from 1993 to 2014. Cox regression models were used to estimate the risk of suicide mortality during follow-up. Statistical analyses took into account participants' socio-demographic characteristics, health behaviors and psychosocial characteristics, including depressive symptoms. Results Of the 20,452 participants, 73 died by suicide between 1993 and 2014. Results suggested an increased risk of suicide (hazard ratio=2.58, 95% confidence interval: 1.08-6.15) in participants with persistently low occupational grade compared to those with higher occupational grade and career development. After adjustment for all covariates, especially psychological factors, the association was reduced and no longer statistically significant. Conclusions Persistent low occupational grade appears associated with an elevated risk of death by suicide. This is partly due to psychological and health characteristics which can influence occupational trajectories. The role of work conditions specific to low grade occupations in relation to suicide risk should be further investigated.

EXAMINING TRENDS IN FATAL AND NONFATAL SUICIDE ATTEMPTS TO UNDERSTAND INCREASING SUICIDE RATES, UNITED STATES, 2006-2014 Jing Wang* Jing Wang, Steven A Sumner, Thomas Simon, Alex E Crosby, Francis Annor, Kristin M Holland, (CDC)

Objective: The suicide rate in the United States increased 18% between 2006 and 2014. However, it is unclear whether the increase is due to more individuals attempting suicide, increases in fatal suicide attempts, or both. This study examined national trends in the incidence of suicides and medically treated suicide attempts among persons aged 10 years or older from 2006-2014. Methods: Non-fatal suicide attempts were identified from the National Inpatient Sample and National Emergency Department Sample. Suicides were identified from the National Vital Statistics System. Census population estimates served as denominators to calculate incidence of all suicide attempts. Case fatality rates were calculated by dividing the number of suicides by all fatal and non-fatal suicide attempts. Results: Overall suicide attempt incidence rates were stable from 166.5 per 100,000 in 2006 to 172.4 per 100,000 in 2014 (p=0.5), while the case fatality rates increased 14% from 2006 to 2014 (p<0.01). However, the trends varied by sex and age subgroups. Adolescents showed upward trends in both suicides and suicide attempts. Persons aged 20-64 years showed 3.1% - 7.1% annual relative increase (all p<0.01) in case fatality rates after 2010 except for men aged 45-64 years who did not show a change. Suicide attempt rates were stable for all subgroups after 2010. Persons aged 65 years or older had 2.0% -3.3% annual relative increases in suicide attempts (p<0.01) but stable case fatality rates. Conclusion: This study reveals how trends in suicide attempts and case fatality rates vary across subgroups. These results underscore the importance of comprehensive suicide prevention strategies that include upstream approaches to prevention, such as those that promote social connections and teach coping and problem-solving skills, as well as more proximal strategies that provide support and reduce access to lethal means among persons at risk for suicide.

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DRUGS AND DESPAIR: AN ANALYSIS OF COMMUNITY-LEVEL OPIOID OVERDOSES AND SUICIDE Veronica A. Pear* Veronica A. Pear, Julian Santaella-Tenorio, Katherine M. Keyes, Silvia S. Martins, Ariadne Rivera, Garen J. Wintemute, Magdalena Cerdá, (Violence Prevention Research Program, University of California Davis School of Medicine)

Background: Findings from previous studies suggest that opioid abuse is a risk factor for suicide at the individual level, but less is known about the impact that recent increases in opioid abuse in the community have had on rates of suicide. In this study, we examined whether spikes in community-level opioid overdose rates were associated with community-level spikes in suicide rates. Methods: We used county-level hospital discharge data and Multiple Cause of Death Mortality Files to identify all nonfatal opioid overdoses and suicides in 14 states from 2003-2014. Heroin and prescription opioid overdoses (HOD and POD, respectively) were analyzed separately, and suicide was analyzed overall and by method (firearm, poisoning, and other). To identify spikes, we fit ARIMA models and calculated the residuals and their standard deviations (SD); county-years with residuals greater than twice the SD of the model residuals were spikes. We used random intercept logistic regression models to account for clustering at the county level, while controlling for time-varying confounders (i.e., yearly county-level demographic and socioeconomic characteristics) and for time-fixed, between-state confounding (via state fixed effects). Models with and without a 1-year distributed lag for opioid overdose were tested. Results: Spikes in POD were significantly associated with same-year spikes in firearm-related suicides (OR: 1.69, 95% CI: 1.04, 2.74), but this association fell from significance when a 1-year lag was added to the model. No other association reached statistical significance. Conclusions: Spikes in community-level opioid overdose rates were not generally associated with later spikes in community suicide rates, suggesting that recent increases in opioid abuse may not be contributing to the recent increase in suicide rates. Given that spikes in POD were only associated with concurrent spikes in firearm suicide, the possibility of reverse causation cannot be excluded.

CAFFEINE AND ISCHEMIC HEART DISEASE: A MENDELIAN RANDOMIZATION STUDY Madeline Travers* Madeline Travers, Priscilla Lopez, (CUNY School of Public Health)

Background Caffeine is a central nervous system stimulant of the methylxanthine class and is the world's most widely consumed psychoactive drug. Many observational studies have been conducted to assess for a direct link between caffeine consumption and cardiovascular disease (CVD), producing conflicting results. To date, more rigorous studies, such as randomized control trials, are lacking on this topic. This study aimed to investigate the causal relationship behind this association using a Mendelian Randomization (MR). Methods Twenty-four SNPs predicting blood caffeine were obtained from a publically available genome-wide association study of 1,960 adults with blood metabolites. Genetic associations with ischemic heart disease (IHD) were obtained from CARDIoGRAMplusC4D 1000 Genomes meta-analyzed with the UK Biobank SOFT CAD GWAS (cases=10,801, controls=137,371) and the Myocardial Infarction Genetics and CARDIoGRAM Exome (UK Biobank meta-analyses), with validation in an independent sample of 4,412 cases and 3,910 controls, giving up to 340,799 individuals in total. Wald estimates were calculated for each SNP, and overall estimates were obtained using inverse weighting with random effects, a weighted median, and MR-Egger. Results No association was found between caffeine and IHD using inverse variance weighting (odds ratio (OR)= 0.98 (95% confidence interval (Cl) 0.96, 1.01) p=0.29), weighted median (OR =0.99 (95% CI 0.96, 1.02) p=0.49), or MR-Egger (OR=0.99 (95% CI 0.94, 1.04) p=.71) methods. Conclusion Findings from this study suggest no causal association between caffeine and IHD. Observational studies that found an association may have been subject to unmeasured or uncontrolled confounding. Alternatively, many of the observational studies assessing the association between caffeine and IHD have specifically tested for a link between coffee drinking and IHD; perhaps other ingredients in coffee should be tested more rigorously as potential causal factors.

A COMPARISON OF TWO-STAGE LEAST SQUARES INSTRUMENTAL VARIABLE METHODS FOR ESTIMATING CAUSAL EXPOSURE EFFECTS IN SOCIAL EPIDEMIOLOGY Jerzy Eisenberg-Guyot* Jerzy Eisenberg-Guyot, Anjum Hajat, (University of Washington Department of Epidemiology)

Background: Unbiased causal estimation of the effects of certain exposures can be difficult given the potential for unmeasured confounding and reverse causation that frequently plagues social epidemiologic research. Though instrumental variable (IV) methods are often used in such settings to improve estimation, they often have poor precision. In this study, we compare traditional two-stage least squares (2SLS) with two 2SLS-based methods aimed at improving precision. We illustrate the comparison using the following study question: does fringe borrowing cause poor/fair self-rated health (SRH)? Methods Exposure, outcome, and confounder data came from the Current Population Survey from 2011-2016. We defined fringe borrowing as past-year pawnshop, payday, or car title loan use. SRH was measured 9 months after exposure. First, we assessed the validity of the instruments, which were state payday, pawn, and check-cashing regulations. Next, to estimate the difference in prevalence (PD) of poor/fair SRH between fringe borrowers and non-fringe borrowers, we used three approaches: 1) 2SLS; 2) 2SLS after near-far matching, which makes respondents similar on confounders and different on the instruments and 3) 2SLS after propensity-score matching (PSM). We used robust standard errors for approaches 1-2 and bootstrapping for approach 3. Results All 2SLS analyses found that fringe borrowing was associated with worse SRH. Although point estimates were similar across analyses (PD range: 0.33, 0.44), precision varied substantially. PSM prior to 2SLS improved precision (confidence limit difference (CLD): 0.77) over traditional 2SLS (CLD: 1.23), while near/far matching worsened precision (CLD: 2.55). Discussion: In settings with rare exposures, PSM prior to 2SLS can improve precision by restricting the outcome analysis to those whose exposure is affected by the instrument. Near-far matching, however, can worsen precision by reducing the number of exposed used in the outcome analysis.

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COGNITION, EDUCATION AND HEALTH: EVIDENCE FROM BIVARIATE MENDELIAN RANDOMIZATION AND THE UK BIOBANK Neil Davies* Neil Davies, Matt Dickson, Frank Windmeijer, Gerard J van den Berg, George Davey Smith, (University of Bristol)

Background: Cognitive ability and education attainment associate with health outcomes On average people with more education and higher cognitive ability are healthier and have lower mortality. However, cognitive ability strongly associates with education, which complicates determining the relative causal effects of cognition and education. Here, we provide new evidence on this topic using bivariate Mendelian randomization (MR) and data from the UK Biobank. Methods: We used MR to estimate the bidirectional effects of cognitive ability and educational attainment, and the direct effects of cognitive ability and educational attainment on a range of health and socioeconomic outcomes in the UK Biobank (Nmax=155,393). We used 186 and 149 SNPs that robustly associated with cognitive ability and educational attainment in large genome-wide association studies respectively. These genetic variants overlap, but provide sufficient variation to identify the independent effects of each phenotype. We use a range of sensitivity analyses for MR including MR-Egger, weighted median and mode estimators. Results: Each year of education increased cognitive ability (mean difference (MD)= 1.14 95% CI: 0.83 to 1.45). Each unit increase in cognition caused 1.28 (95% CI: 1.18 to 1.37) additional years of education. The total effects of cognitive ability and educational attainment were generally protective and consistent in direction. The direct effects estimated by bivariate MR indicated that an additional year of education caused a 5.8 (95%CI: 2.9 to 8.7) percentage point reduction in risk of smoking, whereas there was little evidence that cognitive ability had a direct effect on risk of smoking. The bivariate results for BMI, current smoking, sedentary behaviour and exercise had similar directions. Conclusions: Education had a direct causal effect on health outcomes and the effects of cognition may be mediated via educational attainment.

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ESTIMATION OF DIRECT EFFECTS IN AN INSTRUMENTAL VARIABLE SETTING: A PROPOSED METHOD AND EXAMPLE ESTIMATING EFFECTS OF A RANDOMIZED HOUSING TRIAL ON ADOLESCENT SUBSTANCE USE Kara E Rudolph* Kara E Rudolph, Oleg Sofrygin, Mark J. van der Laan, (University of California, Davis)

Estimation of mediation effects in instrumental variable scenarios has been largely ignored. We consider an estimand that we call the complier direct effect, which is the effect of an exposure (Z) on outcome (Y) that does not operate through mediator (M), using instrument (A) to address confounding. We know of only one previous approach for estimating such an effect, but it is limited by the potentially restrictive assumptions of linear models and no interaction between Zand Mon Y. We address this research gap by proposing and evaluating several estimators for this estimand: 1) an inverse-probability-of-treatment weighted estimator (IPTW), 2) an estimator that solves the estimating equation (EE), and 3) a targeted minimum loss-based estimator (TMLE). The EE and TMLE estimators are doubly robust, and the TMLE estimator is a substitution estimator, thereby guaranteeing that the resulting estimates will lie within the parameter space. Estimates outside the parameter space are a particular risk in instrumental variable settings, especially when incorporating machine learning. We demonstrate the finite sample properties of each estimator using a simple simulation. Lastly, we apply each of our proposed estimators to a large randomized housing trial to estimate complier total and direct effects of moving to a low-poverty neighborhood (Z) on subsequent adolescent substance use (Y) not mediated by changes in parental mental health, employment, and parent-child closeness (M), using randomization of housing voucher receipt as the instrument (A). In terms of complier total effects, use of the voucher to move to a low-poverty neighborhood reduced risk of marijuana use by 7% (RD: -0.07, 95%CI: -0.13, -0.01) among girls and increased risk of cigarette use among boys by 8% (RD: 0.08, 95%CI: -0.00, 0.17). However, direct effects not operating through the examined mediators were null, likely due to wide confidence intervals

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CHALLENGES TO THE INTERPRETATION OF MENDELIAN RANDOMIZATION ESTIMATES WITH TIME-VARYING EXPOSURES Jeremy A Labrecque* Jeremy A Labrecque, Sonja A Swanson, (Erasmus MC)

Mendelian randomization (MR) continues to increase in popularity and is being applied in many different settings. However, while many MR study results are interpreted as vaguely-defined "lifetime effects" of sustained exposures, instrumental variable analysis, which is at the heart of MR, has historically been developed for and focused on the estimation of the effect of point exposures. This has led to some confusion about how to interpret MR estimates. We begin by providing one possible definition of a lifetime effect: the average change in outcome measured at time t when the entire exposure trajectory from conception to time t is shifted by one unit. Using simulations and an empirical example from a Rotterdam cohort, we demonstrate that MR analyses will only validly estimate this effect in certain settings: e.g., when the relationship between the genetic variant and the exposure is not a function of age and the effect of exposure on the outcome is linear. This is important because most MR studies use time-varying exposures and never investigate whether the relationship between the genetic variant and exposure varies with age. Previous studies have shown this type of age-dependent relationship in genetic variant/exposure pairs commonly used in MR. Finally, we explore cases in which valid estimation of the effect of a point intervention on the exposure could be achievable. We demonstrate with causal graphs and a derived bias formula that detailed substantive knowledge of the relevant exposure window for the outcome and of the longitudinal effects of the genetic variant on the exposure are required to determine whether valid estimation of the effect of a point intervention is possible. In sum, by using causal graphs, bias derivations, simulations, and empirical examples, we sought to bring clarity to different potential interpretations of MR effect estimates and the situations in which such estimates are particularly susceptible to misinterpretation or bias.

THE VAGINAL MICROBIOTA AND BEHAVIORAL FACTORS ASSOCIATED WITH GENITAL CANDIDA ALBICANS DETECTION IN REPRODUCTIVE-AGE WOMEN Sarah Brown* Sarah Brown, Vincent Bruno, Jennifer A. Schwartz, L. Latey Bradford, Jacques Ravel, Rebecca M. Brotman, (Institute for Genome Sciences, University of Maryland School of Medicine; Department of Epidemiology and Public Health, University of Maryland School of Medicine)

Background: Vulvovaginal candidiasis is common with 5-8% of women experiencing multiple episodes per year. Presence of C. albicans in the vagina has been associated with HIV acquisition and preterm delivery. Little data is available on how the composition of the vaginal microbiota, along with other risk factors, are associated with molecular detection of C. albicans. Methods: Self-collected vaginal swabs were obtained cross-sectionally from 394 and 135 reproductive-age women in two studies. Exclusion criteria for the first study included self-report of vaginal discharge and pregnancy. The second study excluded women who had vaginal infections or were pregnant. C. albicans was detected by PCR targeting the 18S rRNA gene. Vaginal microbiota was characterized by 16S rRNA gene sequencing of the V3-V4 hypervariable regions and clustered into community state types (CSTs). We used multiple logistic regression, adjusted for study site, to identify factors associated with C. albicans detection. Results: Twenty-one percent of participants (n=112) had C. albicans detected. There was a significant 2-fold increase in C. albicans if a woman was L crispatus-dominated compared to samples that had low-Lactobacillus spp. levels (aOR: 1.90, 95% CI: 1.05-3.44). L. gasseri, L. iners and L. jensenii-dominated samples were positively associated with C. albicans but were not statistically significant. Receptive oral sex once or more per week (aOR: 2.74, 95% CI: 1.51-4.97) compared to no reported practice and prior antifungal use (aOR: 1.71, 95% CI 0.99-2.95) were associated with C. albicans detection. Conclusions: L. crispatus-dominated vaginal microbiotas are thought to protect women from development of bacterial vaginosis and sexually transmitted infections, however, our data reflect that the L crispatus-dominated CST was significantly associated with C. albicans detection compared to the low-Lactobacillus state. Receptive oral sex may also be a significant risk factor for C. albicans.

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PREVALENCE OF PREEXISTING MENTAL ILLNESS IN SEER-MEDICARE ER+ BREAST CANCER PATIENTS Cole Haskins* Cole Haskins, Bradley McDowell, Ryan Carnahan, Jess Fiedorowicz, Robert Wallace, Brian Smith, Elizabeth Chrischilles, (Department of Epidemiology, College of Public Health, University of Iowa; Medical Scientist Training Program, University of Iowa)

Objectives: Determine the effect of length of lookback period on pre-cancer mental illness (MI) prevalence and describe MI prevalence prior to breast cancer (BC) diagnosis. Methods: Included women were part of a study about preexisting MI and influence on endocrine therapy use, aged 66+ at their first estrogen receptor positive (ER+) BC diagnosed 2007-2013. All had continuous Medicare parts A and B for 12+ months prior and 18+ months after BC diagnosis, 18+ months of continuous part D after BC diagnosis, and a record of surgery. MI was identified using one inpatient or two outpatient ICD-9 diagnoses occurring 30+ days apart. Results: Increasing lookback periods resulted in cohorts with 37905, 34955 (7.8% fewer) and 32336 (15% fewer) patients for 12, 24, and 36 month periods, respectively. Estimates of any MI prevalence increased with longer lookback periods 5,066 (13.4%), 7.012 (20.1%), and 7.971 (24.7%). Mood (11.3% at 36 months, 5.0% at 12 months), anxiety (9.5%, 4.2%), and psychoses (5.3%, 3.1%) were the most prevalent disorders, followed by dementias (4.4%, 2.5%), drug use (4.3%, 1.9%), and bipolar disorders (1.3%, 0.8%). Less common were delirium (1.2%, 0.5%), adjustment disorders (0.4%, 0.1%), alcohol disorders (0.3%, 0.1%), and personality disorders (0.3%, 0.1%). Mood, anxiety, and drug use disorder prevalence increased in more recent diagnosis years. Mood disorder and dementia prevalence increased with age, whereas psychoses, drug use, and bipolar decreased; no age association was observed with anxiety. Any MI prevalence was highest in black, white, and Hispanic women (12-month prevalence 13.4%, 16.6%, 14.6%, respectively) and less common among Asian (8.3%) and other race (8.4%) women. Conclusions: As many as one-fourth of women have evidence of MI preceding BC diagnosis. A 36 month lookback identified more diagnoses but resulted in a 15% smaller cohort. However, the remaining sample size is sufficiently robust to test relevant, specific MI hypotheses.

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FEMALE SLEEP PATTERNS AND FECUNDABILITY IN A NORTH AMERICAN PRECONCEPTION COHORT Sydney Willis* Sydney Willis, Lauren Wise, Elizabeth Hatch, Kenneth Rothman, Amelia Wesselink, (Boston University)

Sleep quantity and quality have not been well studied among women with no known fertility problems. Sleep dysregulation may adversely affect circadian rhythms and the hypothalamic-pituitary-adrenal axis, which in turn may influence reproductive hormone secretion and fecundity. We evaluated the association between duration and quality of sleep with fecundability among female participants in Pregnancy Online Study (PRESTO), a web-based preconception cohort study. Eligible women (n=4,595) were aged 21-45, residents of the U.S. or Canada, not using fertility treatments, and attempting pregnancy for ≤6 months at study entry. Selfadministered baseline questionnaires elicited data on demographic and lifestyle factors, average duration of sleep per night, and frequency of trouble sleeping at night (via the Major Depression Inventory). Women were followed via bimonthly follow-up questionnaires until reported pregnancy, initiation of fertility treatment, loss-to-follow-up, or twelve cycles of attempt time, whichever came first. A proportional probabilities regression model estimated fecundability ratios (FR) and 95% confidence intervals (CI), adjusted for age, lifestyle factors, and medical history. Relative to 8 hours of sleep, FRs for <6, 6, 7, and \geq 9 hours of sleep were 1.12 (C1: 0.90-1.37), 0.93 (C1: 0.83-1.04), 0.96 (C1: 0.88-1.04), and 0.85 (CI: 0.71-1.01), respectively. Compared with women who had no trouble sleeping, FRs for women who had trouble sleeping "sometimes, or less than half of the time" or "more than half of the time, or all the time" were 0.94 (CI 0.87-1.01) and 0.80 (CI 0.71-0.89), respectively. Similar results were found when stratifying by levels of stress, depression, and anxiety. Our results indicate that longer sleep durations (≥9 hours) and trouble sleeping may be associated with reduced fecundability in women.

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LEUKOCYTES AND EXPOSURE TO AMBIENT PARTICULATE MATTER AIR POLLUTION IN THE WOMEN'S HEALTH INITIATIVE Rahul Gondalia, Rahul Gondalia, James D. Stewart, Jeff D. Yanosky, Duanping Liao, Eric A. Whitsel, , (Department of Epidemiology, University of North Carolina)

Ambient particulate matter (PM) air pollution exposures can trigger inflammatory responses associated with increased cardiovascular disease risk and mortality, although evidence of PM-associated leukocytosis is inconsistent and largely based on small or cross-sectional studies conducted in specialized populations. We therefore examined longitudinal PM-leukocyte associations in the Women's Health Initiative clinical trials and observational study of post-menopausal U.S. women (1993-2001). The analysis included women without established causes of leukocytosis or leukopenia, among whom peripheral blood leukocyte concentrations and geocoded address-specific concentrations of PM<10, <2.5, and 2.5-10 µmin diameter (PM10; PM2.5; PM2.5-10) were available at baseline (n=153,869; mean age: 63 years; 17.5% non-white) and the third annual visit in a subset of participants (n = 78,943). We multiply imputed missing data using chained equations, then used multi-level, mixed, longitudinal models weighted for attrition and adjusted for sociodemographic, behavioral, meteorological, and geographic covariates to estimate PM-leukocyte associations over daily to yearly exposure averaging periods. Longer-duration PM10 and PM2.5-10 exposures were associated with increased leukocyte concentrations. For example, we found increases of 48 (95% confidence interval: 28, 69) and 69 (49, 88) cells/uL per 10 µg/m3 increase in annual mean PM10 and PM2.5-10. Associations with PM2.5 and shorter-duration exposures were generally null. Findings suggest that long-duration ambient exposure to coarse PM may induce subclinical, but epidemiologically important inflammatory responses on par with those previously related to a one cigarette/day increase in smoking among racially, ethnically, and environmentally diverse U.S. populations of postmenopausal women.

ASSOCIATION OF BACK PAIN WITH ALL-CAUSE AND CAUSE-SPECIFIC MORTALITY AMONG OLDER WHITE WOMEN IN THE STUDY OF OSTEOPOROTIC FRACTURES Eric J. Roseen* Eric J. Roseen, Michael P. LaValley, Shanshan Li, Robert B. Saper, David T. Felson, Lisa Fredman, (Department of Family Medicine, Boston Medical Center)

BACKGROUND: While the impact of back pain on disability in older women is well-understood, the influence of back pain on mortality is unclear. We hypothesized that compared to older women without back pain, those with frequent persistent pain would have a higher risk of mortality and those with less frequent pain would have an intermediate risk, and that disability would mediate these associations. METHODS: The sample included 8321 women (mean age 71.5, SD=5.1) participating in the Study of Osteoporotic Fractures who answered back pain questions at visit 1 (1986-88) and visit 2 (1989-90). Self-reported back pain frequency from the first 2 visits was used to create a 4-category back pain exposure: 1) no back pain; 2) non-persistent; and 3) infrequent or 4) frequent persistent back pain. All-cause and cause-specific mortality was measured by hazard ratios (HR) ad justed for sociodemographic and health variables. Three measures of disability (Instrumental Activities of Daily Living [IADL], walking speed, chair stand) at visit 3 (1991) were considered a priori potential mediators of back pain and subsequent mortality. RESULTS: Between Visit 2 and Visit 9 (2006-08), 4975 (56%) women died. A higher proportion of women with frequent persistent back pain died (66%) than those without back pain (54%) (aHR=1.24; 95%CI: 1.11-1.39). No association was observed for other back pain groups. Increased risks were also observed for cardiovascular (HR=1.34, 95%CI: 1.12-1.62) and cancer (HR=1.33, 95%CI: 1.03-1.71) mortality. In mediation analyses, IADL limitations explained 47% (95%CI: 36-100%) of the association between frequent persistent back pain and mortality; slow walking and chair stand speed explained 25% (95%CI: 19-100%) and 28% (95%CI: 22-100%), respectively. CONCLUSION: Compared to older women with no back pain, those with frequent persistent back pain had an increased risk of all-cause, cardiovascular and cancer mortality. Much of the association was mediated by disability.
A PROPENSITY SCORE WEIGHTED DIFFERENCE-IN-DIFFERENCES ANALYSIS TO TEST BEVERAGE TAX IMPACTS ON BEVERAGE CONSUMPTION Yichen Zhong* Yichen Zhong, Amy H. Auchincloss, Brian K Lee, Genevieve P. Kanter, (Drexel University School of Public Health)

On January 1, 2017, Philadelphia implemented a beverage tax of \$0.015/ounce on sugar-sweetened and diet beverages. A repeat cross-sectional study was conducted to evaluate the short term impact of the tax on residents' consumption of soda, fruit drinks, energy drinks, and bottled water. This study utilizes data from a random digit dialing phone survey during a no-tax period (December 6-31, 2016) and a tax period (January 15-February 31, 2017) among 899 respondents in Philadelphia, PA, and 878 respondents in three nearby comparison cities (Trenton, NJ; Camden, NJ; and Wilmington, DE). Difference-in-differences analysis was conducted to account for secular time trends by estimating the change in beverage consumption in Philadelphia relative to the comparison cities. Propensity score weighting was used to adjust for confounding due to compositional differences in groups over time in the repeat cross-sectional setting. Outcomes were daily consumption, and 30-day consumption frequency and volume of beverages and bottled water. After propensity score weighting, the groups were balanced in socio-demographics, BMI, health status, smoking and alcohol use. Regression analyses also adjusted for these covariates to be doubly robust. Within the first two months of tax implementation, the odds of daily consumption of regular soda was 40% lower (OR: 0.6, 95% CI: 0.37, 0.97), energy drink was 64% lower (OR: 0.36, CI: 0.17, 0.76), bottled water was 58% higher (OR: 1.58, CI: 1.13, 2.20), and the 30-day regular-soda consumption frequency was 38% lower (ratio of consumption frequency: 0.62, 95% CI: 0.40, 0.98) in Philadelphia relative to comparison cities. Early results suggest that the tax influenced daily consumption of regular soda, energy drinks and bottled water. Future studies are needed to evaluate longer term impact of the tax on sugared beverage consumption and substitutions.

CLASSIFYING PREGNANCY WEIGHT GAIN TRAJECTORIES IN THE NICHD FETAL GROWTH STUDIES Elizabeth Widen* Elizabeth Widen Ciara Nugent, Jagteshwar Grewal, Chia-Ling Nhan-Chang, Radek Bukowski, Michael Daniels, (Department of Nutritional Sciences, University of Texas at Austin)

The pattern of gestational weight gain (GWG) is clinically important for maternal and child health and potentially modifiable. We sought to describe pregnancy weight gain trajectories and examine racial/ethnic differences. We conducted a secondary analysis of a prospective cohort of singleton pregnancies (n=2,530) enrolled from 12 US prenatal centers from 2009 to 2013, including 27.3% Non-Hispanic White, 27.8% Non-Hispanic Black, 28.5% Hispanic and 16.4% Asian/Pacific Islander. Prepregnancy weight was self-reported, and prenatal weight was measured at 6 visits and abstracted from medical records. Using the R package lcmm, we fit a latentclass trajectory model with splines and individual random slopes, prepregnancy BMI was used to predict class membership. Overall, 6 trajectory classes were identified. Four groups had different patterns, but similar total GWG (estimated GWG within 16±1 kg at 40 wk gestation): 1) Low-High-Stable (37.2%) gained 0.2 kg/wk in the 1st Trimester (T), 0.7 kg/wk in 2nd T and 0.4 kg/wk in 3rd T; 2) Steady-High-Low (27.9%) gained 0.4 kg/wk in 1st T, 0.6 kg/wk in 2nd T, and 0.2 kg/wk in 3rd T; 3) High-Stable-Low (12.1%) gained 0.8 kg/wk in 1st T, 0.3 kg/wk in 2nd T, and 0.2 kg/wk in 3rd T; and 4) Loss-High-Medium (7.8%) had weight loss in the 1st T (-0.1 kg/wk), and gain of 0.8 kg/wk in 2nd T and 0.5 kg/wk in 3rd T. The 5) EarlyHigh-Stable (1.2%; estimated 22 kg total GWG at 40 wk) gained 1.7 kg/wk in the 1st T, and then showed minimal gain thereafter, while the 6) SteadyGain group (13.8%; estimated 14 kg total GWG at 40 wk) gained 0.4, 0.4 and 0.3 kg/wk in the 1st, 2nd and 3rd T, respectively. When stratified by race/ethnicity some minor differences in trajectories were observed; but, overall the classes were similar to the full sample. Our findings suggest semiparametric methods can allow for a detailed understanding of pregnancy weight gain trajectories with potential to identify patterns associated with adverse pregnancy outcomes.

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THE ASSOCIATION BETWEEN NON-STANDARD WORK SCHEDULES AND OVERWEIGHT Vanessa M. Oddo* Vanessa M. Oddo, Jessica C. Jones-Smith, (University of Washington School of Public Health)

Work schedule unpredictability may increase body mass index (BMI) through multiple mechanisms including, stress, consumption of processed foods due to time constraints, and changing eligibility for safety-net programs. This study investigated the association between work schedules and overweight, as the regulation of work schedules is modifiable through policy-level changes, making this a critical topic for study. Analyses utilized cross-sectional data (2015) from the National Longitudinal Survey of Youth 1997 Cohort, a representative sample of early-career adults (N=4,298). We employed separate adjusted logistic regression models to investigate the association between three work schedule dimensions and overweight/obesity (BMI >= 25): schedule control (e.g. hours decided by employer), work schedule type (e.g. regular day shift), and advance notice of schedule (e.g. 0-2 weeks notice). Models adjusted for age, marital status, race/ethnicity, education, sex, geography, and employment industry. A majority of respondents had limited (51%) or very limited (42%) control of their hours and 10% and 20% worked a regular night shift or an irregular shift, respectively. One-third of respondents received their work schedule 0-2 weeks in advance. There was no association between having limited control (OR=1.1; 95% CI: 0.65, 1.7) or very limited control (OR=I.3, 95% CI: 0.77, 2.2) over one's work schedule, compared to having full control, and overweight. Working an irregular shift (OR=1.I; 95% CI: 0.88, 1.3), compared to a regular day shift, was not associated with overweight. However, working a regular night shift, compared to a day shift, was associated with higher odds of overweight (OR=1.3; 95% CI: 1.1, 1.7). People who received 0-2 weeks notice (OR=0.68; 95% CI: 0.45, 1.0; p=0.06) had lower odds of overweight compared to adults with fixed schedules. Only selected aspects of work schedules were associated with overweight, the direction of which varied by schedule characteristic.

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RESIDENTIAL RELOCATION AND RISK OF OBESITY: A NATURAL EXPERIMENT FROM THE 2011 GREAT EAST JAPAN EARTHQUAKE AND TSUNAMI Hiroyuki Hikichi* Hiroyuki Hikichi, Ichiro Kawachi, (Harvard T. H. CHAN School of Public Health)

Objective: Studies have attempted to identify the causal effect of local food environment on body weight by studying residents who move. However, most studies have examined voluntary moves, which is subject to endogeneity. We examined prospectively whether change in proximity to food outlets/bars due to involuntary residential relocation affected body mass index over pre- and postdating the 2011 Great East Japan Earthquake and Tsunami. Methods: The baseline data of our natural experiment came from a nationwide cohort study of older community-dwelling adults conducted 7 months prior to the disaster. By chance, one of the field sites (Iwanuma city, Miyagi prefecture) was directly in the line of the tsunami. Approximately 2.5 years after the disaster, we ascertained the residential addresses and health status of 3,594 survivors (82.1% follow-up rate) including 179 displaced respondents. The outcome was categorized body mass index (BMI) on the basis of World Health Organization classification for Asian populations:< 18.5 (underweight), 18.5–22.9 (normal weight), 23.0–24.9 (overweight), and ≥ 25.0 (obese). Results: Displaced residents had a marked increase in the prevalence of obesity after the disaster (35.8%) compared to non-displaced residents (26.7%). Fixed effects multinomial logistic regression showed that shortened distances to food outlets/bars due to involuntary (forced) relocation increased the risks of transitioning from BMI in the normal range (18.5-22.9) to obesity (≥ 25.0) (OR = 2.08, 95% CI: 1.18, 3.69, for moving closer to super markets; OR = 1.53, 95% CI: 1.13, 2.06, for bars; OR = 1.54, 95% CI: 1.15, 2.05, for fast food outlets). Conclusions: Shortened nearest distances to food outlets due to involuntary relocation increased the risk of obesity among older adults. Policy planners should take into consideration the unintended consequence of improved local service accesses from the public health point of view.

ASSOCIATION OF BISPHENOL A AND ITS SUBSTITUTES, BISPHENOL F AND BISPHENOL S, WITH OBESITY IN U.S. CHILDREN AND ADOLESCENTS: A NATIONALLY REPRESENTATIVE POPULATION-BASED STUDY Buyun Liu* Buyun Liu, Hans-Joachim Lehmler, Yangbo Sun, Guifeng Xu, Qi Sun, Linda G. Snetselaar, Robert B. Wallace, Wei Bao, (University of Iowa)

Background: Bisphenol F (BPF) and bisphenol S (BPS) are increasingly used as substitutes for bisphenol A (BPA) in plastic containers or other consumer products. Previous studies have linked BPA exposure to obesity and obesity-related disorders. Although BPF and BPS are structurally and functionally similar to BPA, little is known about the effects of BPF and BPS in humans. In this study, we evaluated the associations of BPA, BPF, and BPS exposure with obesity in a nationally representative sample of U.S. children and adolescents. Methods: We included 745 children and adolescents aged 6-17 years old from the National Health and Nutrition Examination Survey (NHANES) 2013-2014. Urinary levels of BPA, BPF, and BPS (ng/ml) were measured by on-line solid phase extraction coupled to high performance liquid chromatography and tandem mass spectrometry. Obesity was defined based on the 2000 CDC BMI-for-age growth charts for the United States. Results: The median levels of bisphenols were higher in obese children compared with non-obese children: 1.34 vs 1.21 ng/ml for BPA, 0.32 vs 0.30 ng/ml for BPF, and 0.30 vs 0.27 ng/ml for BPS, respectively. After adjustment for demographic, socioeconomic and lifestyle factors, and urinary creatinine levels, the odds ratio (OR) of obesity comparing the highest with lowest quartile of urinary bisphenol levels was 1.74 (95% CI, 0.92-3.31) for BPA, 1.54 (95% CI, 1.02-2.32) for BPF, and 1.36 (95% CI, 0.53-3.51) for BPS. Moreover, the associations were stronger in boys than in girls for BPA (OR [95% CI], 2.78 [1.07-7.27] in boys vs 1.10 [0.42-2.91] in girls; P for interaction 0.02) and BPF (3.35 [2.02-5.53] in boys vs 0.55 [0.25-1.25] in girls; P for interaction <0.001). Conclusion and Relevance: This study for the first time showed that exposure to BPF, a commonly used substitute for BPA, was significantly associated with obesity in humans. Further investigations on the underlying mechanisms are needed.

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DISENTANGLING THE CONTRIBUTION OF COMMUNITY-LEVEL FACTORS TO CHILD BODY MASS INDEX ACROSS DIVERSE GEOGRAPHIES Melissa N. Poulsen* Melissa N. Poulsen, Jonathan Pollak, Karen Bandeen-Roche, Annemarie G. Hirsch, Lisa Bailey-Davis, Brian S. Schwartz, (Geisinger, Department of Epidemiology and Health Services Research)

Background: To understand contextual effects on health, heterogeneous communities must be compared to capture a range of community conditions. We assessed community-level factors theorized to influence obesity risk across a large, diverse geography. Methods: Using confirmatory factor analysis, we developed 4 community-level factors-socioeconomic deprivation, food outlet abundance, fitness assets, and utilitarian physical activity favorability-and assigned them to communities (sociologically-relevant divisions: townships, boroughs, city census tracts). We used medical record data to evaluate factors in their associations with body mass index (BMI) trajectories among youth aged 3-18 years in a 38-county region of Pennsylvania, using multilevel linear regression with a cross product of factor quartiles with age (linear, quadratic, and cubic terms) to allow for nonlinearity in BMI trajectories. Models controlled for sex, age, race/ethnicity, and Medical Assistance. Results: We identified 163,820 youth with 524,862 BMI measurements in 1288 communities. Factor scores were lowest in townships, indicating less deprivation and fewer food and physical activity outlets. BMI at average age and BMI growth over time were lower in townships (vs. boroughs and cities, p<0.001). Factor distributions across community type did not overlap, requiring stratified analyses to avoid regression extrapolation. Models showed complex relations between community-level factors and BMI trajectories that differed in townships, boroughs, and cities. Conclusion: Although community type was a strong predictor of average BMI and BMI trajectory, determining obesogenic or obesoprotective aspects of communities that explain this observation was challenging, as individual- and place-level measure distributions differed so markedly across community type as to constrain comparability. This study highlights a methodological hurdle to studying contextual effects on health across large, diverse geographies.

FINANCIAL RESOURCES PREDICT INCIDENT DEMENTIA INDEPENDENT OF EDUCATION IN A NATIONALLY REPRESENTATIVE COHORT OF U.S. OLDER ADULTS Laura J. Samuel* Laura J. Samuel, Sarah L. Szanton, Jennifer L. Wolff, Lauren Parker, Laura N. Gitlin, (Johns Hopkins University School of Nursing)

Low education consistently predicts higher risk of incident dementia but other socioeconomic measures do not. The education effect is attributed to cognitive reserve rather than financial resources. This study tested the effect of five socioeconomic measures on four-year incident dementia. The National Health and Aging Trends Study classified dementia status annually in a nationally representative sample of adults aged ≥65 years based on diagnosis, cognitive test scores ≤1.5 standard deviations below mean in ≥ 2 domains, or ≥ 2 of 8 proxy-reported cognitive changes. Baseline socioeconomic measures (2011 or 2012) included income to poverty ratio with a spline knot at 500% poverty threshold, financial strain (lack of money for housing, utilities, health care, or food), education (< high school, high school, some college, and ≥ Bachelor's degree), employment for participant and/or partner, and history of professional occupation. A discrete survival model tested hypothesized associations with incident dementia (2013 to 2016) among those dementia-free in 2012 (n=5053), adjusting for demographics, socioeconomic measures and known risk factors (heart disease, high blood pressure, diabetes, stroke, smoking, BMI, and depressive symptoms). Baseline sample weights accounted for sampling design and nonresponse. Coefficients were standardized to allow effect comparison. Annual incidence rates ranged from 3.5% to 4.6% over four years. In the adjusted model, higher income, if <500% poverty (β =-0.172, p=0.012), employment (β =-0.216, p=0.018) and higher education (β =-0.174, p=0.005) were associated with lower odds, and financial strain with higher odds $(\beta=0.114, p=0.013)$, of incident dementia. These results show that lack of financial resources, including low income, financial strain and unemployment, predict higher risk of incident dementia and have comparable effects to that of education. Greater attention should be given to the links between financial resources and incident dementia.

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HEARING IMPAIRMENT AND DEMENTIA RISK: EVALUATING REVERSE CAUSATION USING A GENETIC RISK SCORE FOR ALZHEIMER'S DISEASE Willa D. Brenowitz* Willa Brenowitz, Teresa J. Filshtein, Stefan Walter, Thomas J. Hoffmann, Eric Jorgenson, Rachel A. Whitmer, Kristine Yaffe, M. Maria Glymour, (willa.brenowitz@ucsf.edu)

Background: Hearing loss is posited to be a major modifiable risk factor for dementia, with a population attributable risk of 9%. However, the association between hearing impairment and dementia may be due to reverse causation or shared biological mechanisms, e.g., neurodegeneration or vascular disease. If the association is due to such biases, genetic risk factors for dementia are likely to influence hearing loss. Methods: Health and Retirement Study participants (whites aged 50+) who participated in the 2008 wave rated hearing as poor, fair, good, very good, or excellent. A genetic risk score (GRS) for Alzheimer's disease (AD) was calculated as a weighted sum of 10 single nucleotide polymorphisms previously confirmed to be genome-wide significant predictors of AD. Neuropsychological assessments and proxy reports for impaired respondents were used to calculate a memory score and estimate probability of dementia in 2008. We confirmed that selfrated hearing was associated with memory and dementia probability and evaluated whether the GRS for AD predicted self-rated hearing (evidence of reverse causation), using age-, sex-, and genetic ancestry- adjusted logistic and linear regression models. Results: Lower rated hearing was associated with a lower memory score (n= 8,837; b=-0.27; 95% CI -0.33, -0.20) and higher dementia probability (n= 6,506; b=0.34; 95% CI 0.52, 0.16). Despite strong associations with both memory (F-statistic=54) and dementia probability (F-statistic=118), the GRS did not predict self-rated hearing (b= 0.01; 95% CI -0.05, 0.07). Conclusion: We found no evidence for reverse causation from dementia risk to hearing loss using a novel methodological approach. There are two important caveats. First, effect estimates for the GRS and hearing association were imprecise. Second, we cannot rule out mechanisms other than those influenced by our GRS. Future research will examine the link between cognition and hearing using a GRS for hearing loss.

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HISTORY OF CANCER AND MEMORY DECLINE: RESULTS FROM THE HEALTH AND RETIREMENT STUDY Monica Ospina-Romero* Monica Ospina-Romero, Ekland Abdiwahab, Willa D. Brenowitz, Teresa Filshtein, Lindsay C. Kobayashi, Elizabeth Rose Mayeda, M. Maria Glymour, (University of California San Francisco)

Many observational studies report a lower incidence of dementia among cancer survivors compared to individuals with no cancer history. Inverse genetic regulation of neurodegeneration and oncogenesis is a potential underlying mechanism linking cancer and dementia, although survival bias and detection bias are also possible. Further, some cancer treatments are linked to short-term cognitive decline. Few prior studies have evaluated history of cancer and long-term cognitive decline. We evaluated whether prior cancer diagnosis predicted slower memory decline. Data were from adults aged >50 years from the U.S. Health and Retirement Study who completed the 1998 interview (n=18,803), which included self-reported cancer history (all-cause cancer excluding non-melanoma skin cancer). The outcome was a Z-scored composite memory score which combined immediate and delayed word list recall with informant assessments at biennial interviews from 1998 to 2014. We estimated the association of history of cancer with the level and slope of the subsequent memory trajectory using linear-mixed effects models, with random intercepts and slopes, adjusted for age, sex, race, and ethnicity. Median baseline age was 65 and 2,124 (10%) respondents reported having prior diagnosis of cancer at baseline. History of cancer was associated with higher average baseline levels of composite memory score (b=0.057; 95% CI 0.038 to 0.076). Annual rate of memory decline for people with no cancer history was 0.051 (95% CI: -0.052 to -0.050). Annual memory decline was 0.011 units faster for the group with history of cancer compared to those without a cancer history (95% CI -0.013 to -0.008). Cancer survivors had better baseline memory than those without cancer, consistent with prior evidence of lower risk of dementia, but rate of memory decline was faster in cancer survivors. Further research is needed to evaluate survival bias and short-term trajectories after incident cancer.

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CAN TREATMENTS FOR HYPERTENSION BE REPURPOSED FOR THE TREATMENT OF DEMENTIA? Venexia Walker* Venexia Walker, Venexia Walker, Neil Davies, Patrick Kehoe, Richard Martin, (Bristol Medical School, University of Bristol)

Introduction: There is evidence that hypertension in midlife can increase the risk of Alzheimer's disease and vascular dementia in late life. In addition, some treatments for hypertension have been proposed to have cognitive benefits, independent of their effect on hypertension. Consequently, there is potential to repurpose treatments for hypertension for dementia. This study systematically assessed ten antihypertensive drug classes for this purpose, using data on over 940,000 patients from the UK Clinical Practice Research Datalink. Methods: Treatments for hypertension were assessed in an instrumental variable (IV) analysis to address potential confounding by indication. Physicians' prescribing preference was used as a categorical instrument, defined by the physicians' last seven prescriptions, and the analysis was adjusted for prescription year. A multivariable logistic regression analysis was also conducted to compare biases. Beta-adrenoceptor blockers were used as the control drug throughout. Results: Treatments for hypertension had little effect reducing the risk of Alzheimer's disease, vascular dementia, and other dementias. These results differ from existing studies considering specific antihypertensive drug classes. For example, we estimated angiotensin converting enzyme inhibitors to result in 2.2 per 1000 (95% CI -8.1 to 3.6) fewer cases of Alzheimer's disease - a much smaller reduction than previously reported. Comparison of our IV and logistic regression analyses suggests that this is likely due to confounding in non-IV studies. Conclusions: This study is the first to systematically assess all the major antihypertensive drug classes. The contradiction with previous studies suggests that continued research into the repurposing of these treatments for dementia is required. It also highlights the need for further research into the biological mechanisms that link hypertension and dementia so that we can better understand the confounding in such analyses.

MEMORY CHANGE AFTER STROKE: HAS THE RELATIONSHIP WEAKENED IN RECENT YEARS? Chlor W. Eng* Chlor W. Eng, Elizabeth Rose Mayeda, Maria Glymour, (UCSF)

Introduction: Recent research in the Framingham Heart Study suggested that changes in dementia incidence rates over the last 4 decades may be partially attributable to attenuation of the relationship between stroke and dementia risk, with stroke only modestly increasing risk of dementia in recent epochs. We investigated evidence for this trend before and after event of first stroke in an independent cohort. Methods: We examined trajectories of memory functioning before and after first stroke in adults age 50+ in the Health and Retirement Study (HRS) across two non-overlapping six-year epochs (1999-2005, 2006-2012). Annual rates of change in a composite memory score before and after stroke were compared using demographic-adjusted linear regression models for 3 groups: 1,389 stroke survivors, 486 stroke decedents, and 16,486 participants who remained stroke-free throughout follow-up. Results: Memory deterioration prior to stroke onset was slower in the first epoch [-0.04 points per year (95% CI:-0.04, -0.03)] than the second epoch [-0.10 points per year (95% CI:-0.13, -0.08)], but was faster than the rate of decline for non-stroke participants in both the first [-0.03 points per year (95% CI:-0.03, -0.03)] and second [-0.05 points per year (95% CI:-0.05, -0.05)] epochs At stroke onset, memory declined slower in the first [-0.04 (95% CI: -0.10, 0.02)] epoch than second [-0.07 (95% CI: -0.15, 0.02)]. Similarly, post-stroke rate of memory decline was slower in the first [-0.04 points per year (95% CI:-0.06, -0.02)] epoch than in the second [-0.08 points per year (95% CI:-0.11, -0.05)]. Conclusion: Trajectories for memory decline in stroke survivors and decedents differed across epochs, but the impact of stroke on memory decline did not appear to be attenuated in more recent years. Further research with additional cognitive outcomes and in independent samples is needed to investigate the potential period effects on the relationship between memory functioning and stroke.

QUALITY OF LIFE SCORES ARE ASSOCIATED WITH INCIDENCE OF COGNITIVE IMPAIRMENTS: RESULTS FROM PREADVISE Xiuhua Ding* Xiuhua Ding, Erin Abner, Frederick Schmitt, Richard Kryscio, (Western Kentucky University)

The purpose of this study is to determine how quality of life (QOL) as measured by the total score on the short form of the general health survey of the Medical Outcomes Study (SF-36) varies over time and how baseline scores associated with the occurrence of future cognitive impairment. We analyzed data from the Prevention of Alzheimer's Disease (AD) by Vitamin E and Selenium (PREAViSE) trial, which recruited 7,547 non-demented men who were enrolled between 2002 and 2009 and randomized into 4 groups: placebo, vitamin E, selenium, vitamin E plus selenium combination. A subset of 2,746 PREADViSE participants who completed up to 5 SF-36 assessments at annual visits were included in the current study. SF-36 total scores were recorded as standardized Z scores at each assessment. Linear mixed models (LMM) were applied to determine if mean SF-36 Z score varied over time. Cox proportional hazards regression was used to determine if the baseline SF-36 score was associated with incidence of dementia with adjustments for baseline age, black race, APOE-4 status, diabetes, and memory complaint at baseline. A LMM analysis showed significant effect for dementia and time on SF-36 Z scores. SF-36 Z scores given at the same visit for participants who developed dementia were on average 0.28 standard deviations (SD) lower than those without eventual dementia. Furthermore, SF-36 Z scores remained relatively stable over time, and declined at the rate of 0.02 SD per year over the 8 year follow-up period. The participants who developed dementia tended to decline faster over time on average, but this was not statistically significant. Given adjustments for other risk factors, results from the Cox model showed one standard deviation increase in the SF-36 Z score decreases the hazard of a future dementia by 32%. QOL may be a modifiable risk factor for dementia.

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THE FRAILTY PHENOTYPE IN VISUAL IMPAIRMENT: AN NHANES ANALYSIS Moon Jeong Lee* Moon Jeong Lee, Varshini Varadaraj, MD, MPH, Jing Tian, MS, Karen Bandeen-Roche, PhD, Bonnielin K. Swenor, MPH, PhD, (Wilmer Eye Institute, The Johns Hopkins University School of Medicine, Baltimore, MD, USA)

Purpose Prior research indicates that older adults with visual impairment (VI) have worse health outcomes than those without VI; however, there is limited research examining the relationship between VI and frailty - an important geriatric syndrome, in which individuals have reduced capacity to overcome stressors. Here, we examine the cross-sectional association between VI and frailty using National Health and Nutrition Examination Survey (NHANES) data. Methods We analyzed NHANES data from 1999-2002 to assess the association between corrected visual acuity (VA) worse than 20/40 in the better-seeing eye and the frailty phenotype (shrinking, weakness, poor endurance and energy, slowness and low physical activity level) among participants ≥60 years. Frail and prefrail individuals were defined as meeting ≥3 and 1-2 criteria, respectively. Chi square and t-tests were used to compare demographic characteristics and frailty components by group (VI vs. non-VI) and multinomial logistic regression was used to determine the odds of prefrailty and frailty by VI status after adjusting for age, sex, race, smoking status, diabetes status and total number of co-morbidities. Results This sample includes 2690 participants, of which 4.2% had VI (n=150). The VI group was older (77.3 \pm 0.9 vs. 70.0 \pm 0.3, p=0.001) and less likely to be white than the non-VI group (75% vs. 84% white, p=0.009). In adjusted models, individuals with VI were greater than three times more likely to be prefrail and 4 times more likely to be frail (OR: 3.30, 4.08 respectively, p<0.05) than those without VI. Conclusions In this population-based sample, older adults with VI were substantially more likely to be frail than those without VI, suggesting that VI may be an important risk factor for frailty. Further research is needed to investigate the underlying mechanism and establish the temporality of the VI-frailty relationship.

ASSESSING THE ROLE OF SELECTION BIAS IN THE PROTECTIVE RELATIONSHIP BETWEEN CAREGIVING AND MORTALITY Meghan L. Smith* Meghan L. Smith, Timothy C. Heeren, Lynsie R. Ranker, Lisa Fredman, (Boston University School of Public Health)

Selection bias is a concern in prospective studies, particularly studies of caregiving outcomes. In contrast to what theories of stress would predict, most populationbased studies have found lower rates of mortality in caregivers than non-caregivers. We examined the potential role of selection bias due to 1) study design and 2) selective participation in Caregiver-SOF (CG-SOF), an ancillary study to the Study of Osteoporotic Fractures (SOF), which comprises the source population. CG-SOF includes 1069 SOF participants (375 caregivers, each matched to 1-2 noncaregivers) identified in 2 phases: screening all SOF participants for caregiver status at SOF Visit 6 (1997-99, n=4036 women, 23% caregivers) and rescreening all caregivers and a subset of non-caregivers matched on SOF site, age, race, and ZIP code 1-2 years later. Mean age at initial screening was 79 years. Women who were older or who had poorer physical or cognitive functioning were less likely to participate; caregivers had better functioning than non-caregivers at each screening. We used Cox proportional hazards models to assess associations between caregiving and 10-year mortality in all 4036 initially screened women, women invited to participate (all caregivers and selected matched non-caregivers, n=1449), and the CG-SOF sample (74% of those invited). Adjusting for functioning and matching variables, the association between caregiving and mortality in invited women (48% died; aHR=0.79; 95% CI: 0.65-0.97) was similar to that in initially screened women (37% died; aHR=0.84; 95% CI: 0.73-0.96), indicating minimal bias due to study design, and to that in CG-SOF (48% died; aHR=0.80, 95% CI: 0.63-1.03), indicating nearly no participation bias. We also repeated analyses using a propensity score matched subsample of SOF, and observed a similar aHR. Our results lend validity to findings that caregivers have lower risk of mortality, and show the value of ancillary studies for analyses of hard-to-measure biases.

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SECULAR TRENDS OF MORTALITY AND DEMENTIA-FREE LIFE EXPECTANCY OVER A 10-YEAR PERIOD IN FRANCE Leslie Grasset* Leslie Grasset, Karine Pérès, Pierre Joly, Camille Sabathe, Alexandra Samier-Foubert, Jean-François Dartigues, Catherine Helmer, (University of Bordeaux)

Whether the increase of life expectancy is associated to greater years of life spent without dementia has been poorly investigated. The aims of this work were to investigate the evolution of mortality and life expectancies according to dementia status between two French populations 10 years apart. We examined two populations of subjects aged 65 years or older who were dementia-free at baseline and followed up over 10 years. These included 1,342 participants from the Personnes-Agees OUID (PAQUID) study who were enrolled in 1988-1989 (90's population) and 1,996 participants from the Three-City (3C) study who were enrolled in 1999-2000 (2000's population). Dementia was assessed using an algorithmic approach to apply an objective diagnosis process, stable over time: participants were considered as having dementia if they had a score 1. Multi-states illness-death models were used to compare mortality with and without dementia, and to provide total Life Expectancy (LE), Dementia-Free Life Expectancy (DemFLE), Life Expectancy with dementia (DemLE), as well as duration of life with dementia. Mortality without dementia has decreased between the two populations among men (HR= 0.63 (0.49-0.81)) and women (HR=0.67 (0.50-0.90)), whereas mortality with dementia has decreased for women only (HR=0.59 (0.41-0.87)). Total LE and DemFLE have increased between the 90's and the 2000's population (total LE:+ 2.5 years; DemFLE: + 2.2 years); DemLE remained relatively stable between populations (DemLE: +0.3 years). For duration of life with dementia, a nonsignificant trend toward an increase of survival has been evidenced (duration:+ 1.3 years). These increases were higher for women and lower educated individuals. The improvement of DemFLE is promising. However, as duration of life with dementia tends to increase for women, efforts to delay dementia onset should be reinforced.

COMMUNITY SOCIAL CAPITAL AND THE IMPROVEMENT OF FUNCTIONAL ABILITY AMONG OLDER PEOPLE IN JAPAN Airi Amemiya* Airi Amemiya, Naoki Kondo, Katsunori Kondo, (National Research Institute for Child Health and Development)

Background: The aim of this study was to investigate the contextual effects of community social capital on the improvement of functional ability among older people in Japan. Methods: We performed a multilevel survival analysis on 1936 men and 2207 women nested within 320 communities included in Japan Gerontological Evaluation Study in 2010. We used the objective data of the functional ability trajectories based on national long-term care insurance systems. We used multilevel Weibull survival models including a community-level random intercept. We stratified the analyses by gender. We used a validated measure of community social capital that captured three components: the levels of civic participation, social cohesion, and reciprocity. Results: In a community with high social cohesion, older men with the low perception of community social cohesion were less likely to improve their functional ability than older men with the high perception of community social cohesion (p for interaction = 0.007). Among women, community social cohesion was inversely associated with the improvement of functional ability regardless of the individual perception of community social cohesion. In a community with high civic participation, women who did not participate in any group in the community were less likely to improve their functional ability than women who participate in some groups (p for interaction = 0.008), whereas such cross-level interaction was not found among older men. Community reciprocity was not associated with the improvement in functional ability in men and women. Conclusion: The effect of community social capital on the improvement of functional ability might differ between individuals depending on their psychosocial components in the same community. There might be older people who do not benefit from and excluded from community social capital.

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COGNITIVE CHANGE AND CANCER INCIDENCE IN THE HEALTH AND RETIREMENT STUDY Ekland Abdiwahab* Ekland Abdiwahab, Monica Ospina-Romero, Teresa Filshtein, Willa D. Brenowitz, Lindsay C. Kobayashi, Elizabeth Rose Mayeda, M. Maria Glymour, (UC San Francisco)

Neurodegenerative diseases, including Alzheimer's dementia, predict lower risk of certain cancers, although diagnostic bias could explain these associations. No prior research has evaluated associations of cognitive decline and cancer incidence, which could help circumvent potential diagnostic bias. We aimed to investigate the relationship between cognitive change and cancer incidence using longitudinal data from the nationally representative U.S. Health and Retirement Study of men and women aged 50 years Individuals who were cancer free in 1998 interview were included (n=14,046) in analyses. Cognitive change was defined as the difference in total word recall (immediate+ delayed) between 1998 and 2000. Incident cancer was defined as a new self-reported cancer diagnosis (other than non-melanoma skin cancer) from 2002 to 2014. Cox proportional hazards models, adjusted for sex, race/ethnicity, age at baseline, years of education, and smoking status, were used to estimate the association between cognitive change and incident cancer diagnosis; age was used as the time scale. Mean baseline age was 65.7(SD 9.98) and the majority of participants were women (58%), had >12 years of education (39%), and were White (82%). Mean cognitive change between 1998 and 2000 was -0.597 units. There were 1,961 incident cases of cancer over 163,802 person-years. In adjusted model, memory change between 1998 and 2000 did not predict incident cancer [HR=1.00, 95% CI: 0.99, 1.02]. In this large cohort, cognitive change was not associated with cancer incidence. This result suggests diagnostic bias may influence previous reports of lower cancer risk among people with dementia.

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INCIDENCE, RISK FACTORS, AND SEQUELAE OF POST-KIDNEY TRANSPLANT DELIRIUM Mara McAdams DeMarco* Mara McAdams-DeMarco, Christine Haugen, Fatima Warsame, Alvin Thomas, Charles Brown IV, Karin Neufeld, Michelle Carlson, Dorry Segev, (JHU)

Delirium is an acute decline and fluctuation in cognitive function following a stressor like surgery. Frail kidney transplant (KT) recipients may be particularly vulnerable to the stressor of surgery resulting in delirium and subsequent adverse outcomes. The goal of this study was to identify the incidence, risk factors, and sequelae of post-KT delirium. First, we identified delirium claims (ICD-9.780.09) among KT recipients using national registry data linked to Medicare claims. Next, we studied 893 KT recipients (2009-2017) enrolled in a prospective cohort study. At admission, frailty and cognitive function were measured. We used a validated chartabstraction algorithm to identify delirium. Delirium risk factors were identified using logistic regression and the sequelae of delirium using adjusted logistic regression (length of stay [LOS] ≥2weeks and discharge location-home versus institution such as skilled nursing facility or rehabilitation facility) and Cox proportional hazards models (graft loss and mortality). Nationally, 31 of 43,606 (0.07%) recipients had a claim for delirium. In the cohort, delirium incidence increased with age (18-49:2.0%; 50-65:4.6%; 65-75:9.2%; and ≥75:13.8%) and frailty (9.0% vs. 3.9%); 20.0% of frail recipients aged ≥75 experienced delirium. Frailty was independently associated with delirium (OR=2.05; 95%CI:1.02-4.13) but pre-morbid global cognitive function was not. Recipients with delirium were at a 5.42-fold (95%CI 2.76-10.66) increased odds of ≥2 week LOS, 22.41-fold (95%CI:7.85-63.98) increased odds of institutional discharge, 2.73-fold (95% CI:1.14-6.53) increased risk of death-censored graft loss and 3.12-fold (95%CI:1.76-5.54) increased risk of mortality after adjustment. Post-KT delirium is not captured in claims but can be identified in the medical record; it is associated with subsequent adverse outcomes. Older and frail recipients are uniquely vulnerable to delirium. Transplant centers should implement interventions to reduce delirium risk.

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SEX DIFFERENCES IN THE ASSOCIATION BETWEEN PENTRAXIN 3 (PTX3) AND COGNITIVE DECLINE: THE CARDIOVASCULAR HEALTH STUDY Lindsay M. Miller* Lindsay M. Miller, Nancy S. Jenny, Andreea M. Rawlings, Alice M. Arnold, Annette L. Fitzpatrick, Oscar L. Lopez, Michelle C. Odden, (School of Biological and Population Health Sciences, Oregon State University, Corvallis, OR, USA)

Abstract Background: The importance of systemic inflammation, measured by Creactive protein, in cognitive decline has been demonstrated; however, the role of vascular inflammation is less understood. We investigated the association between pentraxin 3 (PTX3), a novel marker of vascular inflammation, and changes in cognitive function. Methods: We followed adults 65 and older, free of cardiovascular disease (CVD) for up to 9 years (n = 1,547) in the Cardiovascular Health Study. We used adjusted linear mixed effects models to evaluate the relationship between PTX3 and cognitive function, measured using the Modified Mini Mental State Exam (3MSE). We adjusted for demographic, behavioral, and clinical characteristics. Mediation by CVD events and effect modification by sex and apolipoprotein E £4 allele (APOE) was also examined, Results: Among the participants, 63% were women, and the mean age was 72. Over an average of 4.5 years of follow-up, the mean annual decline in 3MSE was 0.14 points. The association between PTX3 and change in 3MSE differed between women and men (p = 0.02). In the adjusted model, each standard deviation higher in ln(PTX3) was associated with a 0.20 decrease in 3MSE score per year in women over follow-up (95% CI: -0.37, -0.03; p = 0.02), compared no decline in men (0.07; 95% CI: -0.08, 0.22). Adjustment for mediating CVD events had a minor effect on the associations. No effect modification by APOE was found. Conclusions: In this population-based prospective cohort study of older adults, we found that vascular inflammation was significantly associated with cognitive decline in women. Identifying subgroups affected by higher levels of vascular inflammation could give rise to more informed clinical interventions.

THE ASSOCIATIONS BETWEEN HEARING LOSS AND TINNITUS AND QUALITY OF LIFE AT AGE 60 IN THE NEWCASTLE THOUSAND FAMILIES STUDY Mark Pearce* Mark Pearce, Balnur Iskakova, Kay Mann, Morven Brown, Adrian Rees, (Newcastle University)

Hearing loss is one of the most common conditions facing older people in modern society and can have far reaching consequences for individuals, especially if combined with tinnitus, In this study, we measured hearing function in 61-63 yearold members of the Thousand Families Birth cohort and assessed associations between hearing function and quality of life, with further assessments of the impacts of tinnitus and hearing aid use. The Newcastle Thousand Families Study is a birth cohort from the north of England, established when the cohort members were born in May and June 1947. Hearing data were based on self-reported and clinical measures (353 study members had clinical data). Quality of life and psychological well-being were measured by the CASP-19 and General Health-28 questionnaires (psychological wellbeing). Linear regression was used to examine associations between hearing loss and quality of life (both overall, and for sub-domains). A range of socio-demographic covariates were included as potential confounders with interaction analysis used to test the potential effect modifying effects of tinnitus and hearing aid use. Significant positive associations found between: self-reported hearing loss and psychological wellbeing (p<0.001); high-frequency clinical hearing loss and GHQ-28 scores (p=0.006); and tinnitus and depressive symptoms (p<0.05). No interaction effects were seen for hearing aid use or tinnitus. Hearing loss (including tinnitus) may result in poor psychological health in older age and this should be considered in its clinical management. High frequency hearing loss (common in age-related hearing loss) may reduce speech understanding and result in social isolation. Tinnitus may lead to increased anxiety and emotional distress. The number of hearing aid users was low. This meant the interaction analysis was likely underpowered, but suggests that more needs to be done to ensure an increase in appropriate hearing aid use.

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CROSS-SECTIONAL AND LONGITUDINAL ASSOCIATIONS BETWEEN ACTIGRAPH AND SELF-REPORTED SLEEP CHARACTERISTICS AND COGNITIVE FUNCTION AMONG OLDER ADULTS. V. Eloesa McSorley* V. Eloesa McSorley, Diane Lauderdale, (University of Chicago)

A high proportion of older adults report poor sleep, and are concerned that it may have health consequences. Lab-based experimental studies find that sleep deprivation of younger adults impairs memory, but there is limited and inconsistent evidence about whether variation in sleep duration or disruption outside a sleep lab influences cognitive decline among the higher risk population of older adults. Most previous studies have only had subjective sleep measures. The National Social Health, Life, and Aging Project is a nationally-representative cohort study of community dwelling older adults with in-home interviews. In Wave 2 (2010), a randomly-selected substudy (n=785) collected three nights of actigraphy sleep data, and 545 surviving cohort members participated in Wave 3 (2015). Survey sleep questions include average duration and insomnia symptoms (scale: 0-8). Actigraph sleep characteristics are average duration and two disruption measures: wake after sleep onset (WASO) and fragmentation. Cognition was measured with a survey adaptation of the Montreal Cognitive Assessment (MoCA-SA), which is sensitive to mild impairment (range: 0-20). We use linear regression models to examine crosssectional associations between sleep and Wave 2 MoCA-SA score and longitudinal associations between Wave 3 MoCA-SA, controlling for Wave 2 score. Models are adjusted for age, race, gender, and education. We find that all actigraph sleep measures are cross-sectionally associated with the MoCA-SA score. More disruption was associated with worse cognition, and both short and long sleep durations were associated with worse cognition compared to 6-7 hours. Subjective duration and insomnia were not associated with cognition. However, there was no evidence of any longitudinal relationships. Therefore, these data do not suggest that worse sleep leads to cognitive decline. The reverse causal direction or a common cause for both worse sleep and worse cognition are both plausible.

EDUCATION MODIFIES THE RELATIONSHIP BETWEEN HEIGHT AND COGNITIVE FUNCTION IN A POPULATION-BASED STUDY OF OLDER ADULTS IN RURAL SOUTH AFRICA Lindsay Kobayashi* Lindsay Kobayashi, Lisa Berkman, Ryan Wagner, Kathleen Kahn, Stephen Tollman, S V Subramanian, (Georgetown University)

Adult height is an indicator of early-life health and nutrition, which may have longreaching consequences for later-life health. We aimed to estimate the relationship between adult height and later-life cognitive function among older rural South Africans, and if education modified this relationship. Data were from baseline interviews with 5059 adults aged ≥40 in the population-based "Health and Aging in Africa: A Longitudinal Study of an INDEPTH Community in South Africa" (HAALSI) in 2015. Linear regression was used to estimate the relationship between height quintile and cognitive function z-score (memory, time orientation, and numeracy), adjusted for age, sex, country of birth, household wealth, marital status, number of close social contacts, self-rated health, and limitations to activities of daily living, and a multiplicative interaction between height and education. Mean (SD) height was 162.7 (8.9) cm. Nearly half the sample had no formal education (46%; 2307/5059). Mean age- and sex-adjusted cognitive z-scores varied from -0.68 (95% CI: -0.76 to -0.61) in those with no education in the shortest height quintile (most disadvantaged) to 0.62 (95% CI: 0.52 to 0.71) in those with at least eight years of education in the tallest height quintile (most advantaged). In older adults with no formal education, there was a linear height disparity in cognitive z-scores (adjusted β =0.10; 95% CI: 0.08 to 0.13 per height quintile), but there was no height disparity in cognitive z-scores in those with any education. Short stature is associated with poor cognitive function and may be a risk factor for cognitive impairment among older adults living in rural South Africa. However, the risk associated with short stature was negated for older adults who had any formal education. Findings also have implications for younger generations in South Africa, as one in five children suffer from stunted growth and problems remain around equal access to quality education in the country.

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UNDERESTIMATION OF EPIGENETIC AGE ON THE NEW METHYLATIONEPIC MICROARRAY Radhika Dhingra* Radhika Dhingra, Lydia C. Kwee, David Diaz-Sanchez, Robert B. Devlin, Wayne Cascio, Carol Haynes, Elizabeth R. Hauser, Simon Gregory, Svati Shah, Ken Olden, William Kraus, Cavin Ward-Caviness, (US EPA)

DNA methylation can be used as an aging biomarker to estimate age. Differences between methylation-based "epigenetic age" and chronological age are associated with adverse outcomes including mortality. A commonly-used method of epigenetic age estimation requires measurement of methylation at 353 loci. Developed for Illumina's 450k and 27k DNA methylation microarrays, this method has yet been to be evaluated on the MethylationEPIC (850k) microarray. Of the required 353 loci available on 450k and 27k microarrays, 17 are missing from the 850k microarray. To evaluate consequent alterations in epigenetic age estimation, we obtained 15 publicly available datasets with 27k or 450k data, and two additional datasets, one 450k and one 850k data (with no repeated measures), drawn from one cohort. We calculated each sample's epigenetic age using all 353 loci included (full clock), and using only the 336 loci present on 450k and 850k arrays (reduced clock). Linear regression models (epigenetic age \sim age+ categorical variable for data platform) were used to compare full (353 loci) and reduced 450k (336 loci) epigenetic age, separately, to 850k data epigenetic age (336 loci). In 450k/27k data, missing loci caused the reduced 450k clock to underestimate epigenetic age as compared to the full 450k clock. The underestimation grew from ages 0 to 20, and remained stable thereafter with an average bias of -3.14 (SD =1.3) years for individuals ≥ 20 years. Platform had a negligible effect on underestimation of epigenetic age (-0.14 95%CI: -0.98, 0.70), supporting the hypothesis that missing loci rather than platform technology are the source of observed systematic underestimation. Researchers are cautioned against using the present clock in 850k data as observed biases were substantial and would impact interpretation of epigenetic age estimates. This abstract does not reflect EPA policy.

UTILITY OF THE BEHAVIORAL ASSESSMENT AND RESEARCH SYSTEMS (BARS) IN MEASURING ATTENTION AMONG CHILDREN RESIDING NEAR COAL ASH STORAGE SITES Chisom Odoh* Chisom Odoh, Lonnie Sears, Barbara Polivka, Guy Brock, Kristina Zierold, (University of Louisville)

Purpose: Inattention is indicative of disorders such as ADHD. The Behavioral Assessment and Research Systems (BARS) can be used to measure sustained attention in children exposed to toxic pollutants, such as coal ash. Coal ash, a waste product generated from the combustion of coal, has been identified as a potential health hazard, because it contains toxic metals. Children residing near coal-burning power plants may experience more inattention behaviors. The purpose of this study was to assess differences between BARS scales that measure attention among children exposed to coal ash and children not exposed to coal ash. Methods: A community-based study assessing neurobehavior in children aged 6-14 years old, who may be exposed to coal ash is on-going. BARS is a series of computer based tests used to assess neurobehavioral performance among children. BARS tests such as the continuous performance test (CPT), selective attention test (SAT), and the simple digit span (SDS) are commonly administered measures of attention relevant in identifying ADHD. Exposure to coal ash was measured in the homes of children using air samplers and lift tape samplers. Results 28% of children were diagnosed with ADHD and 76% of children were exposed to coal ash. BARS scores were poorer in children exposed to coal ash for the CPT and the SAT. On the CPT, exposed children had an average latency time of 461 millisecondswhile nonexposed children had a latency time of 459 milliseconds. Results from SAT also showed slower times for children exposed to coal ash. Conclusions: Children not exposed to coal ash responded faster than exposed children. Children with faster response times are more likely to have better attention than children with slower response time. Pollutants such as coal ash, may affect the behavior of children and need to be further understood.

1102 S/P

SOCIOECONOMIC STATUS AND CHRONIC DISEASE RISK BEHAVIORS AMONG OLDER ADULTS IN RURAL SOUTH AFRICA Sarah M Frank* Lindsay Kobayashi, Sarah M Frank, Carlos Riumallo-Herl, David Canning, Lisa Berkman, (Harvard Center for Population & Development Studies)

Little research has studied the socioeconomic drivers of chronic disease risk behaviors in older populations in sub-Saharan Africa. We investigated the relationships between household wealth and consumption with three risk behaviors (physical activity, smoking, and drinking). Data were from interviews with 5059 men and women aged ≥40 in the population-based "Health and Aging in Africa: A Longitudinal Study of an INDEPTH Community in Rural South Africa" (HAALSI). Adjusted logistic regression was used to estimate the associations between household wealth and consumption quintiles with low moderate-to-vigorous physical activity (MVPA) (<210 minutes/week), current smoking, and frequent alcohol intake (≥5 days/week). Models were adjusted for age, sex, country of birth, selfrated health in childhood, education, literacy, and employment. Household wealth quintile was derived from wealth, assets, and living conditions. Consumption quintile was derived from total expenditure on food, goods, and food production. The overall prevalence of low MVPA, current smoking, and frequent alcohol consumption were 57%, 9%, and 23%, respectively. Relative to the lowest household wealth quintile, being in the highest quintile was associated with higher odds of low MVPA (adj. OR=1.29; 95% CI: 1.06-1.56). Greater wealth was associated with lower odds of current smoking (adj. OR=0.25; 95% CI: 0.17-0.37 highest vs. lowest wealth quintile) and lower odds of frequent alcohol intake (adj. OR=0.29; 95% CI:0.18-0.46; highest vs. lowest wealth quintile). Older adults in the highest consumption quintile were less likely to be physically inactive than those in the lowest quintile (adj. OR=0.75; 95% CI: 0.62-0.91). However, consumption was not associated with current smoking or alcohol behaviors. Socioeconomic inequalities in chronic disease risk behaviors persist among older adults in rural South Africa, although the associations depend on which socioeconomic indicator is used.

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LEISURE-TIME PHYSICAL ACTIVITY, BUT NOT OCCUPATIONAL PHYSICAL ACTIVITY, IS ASSOCIATED WITH LOWER INSULIN RESISTANCE: A CROSS-SECTIONAL STUDY OF KOREAN ADULTS Yongjoo Kim* Yongjoo Kim, Masamitsu Kamada, Ichiro Kawachi, (Department of Social and Behavioral Sciences, Harvard T.H. Chan School of Public Health)

Emerging evidence points to "physical activity paradox" in which occupational physical activity (PA) is detrimental to cardiovascular health. The present study examined the associations of occupational PA and leisure-time PA with insulin resistance among Koreans. We used cross-sectional data from the 2015 Korea National Health and Nutrition Examination Survey, including 3,515 participants aged 19-65 years. The Korean version of the Global Physical Activity Questionnaire was used to assess occupational, leisure-time, and transportation-related PAs. Insulin resistance was measured by HOMA-IR (fasting glucose × fasting insulin ÷ 405), which was log-transformed. Statistical models included the three PA types independently and simultaneously, adjusting for age, sex, education, income, occupational class, shift work, working hours, medical conditions, smoking, and alcohol drinking. Overall, the proportion of participants who reported to have at least 1min/week of PA was 35% for leisure-time PA and 13% for occupational PA. While leisure-time PA (>=1min/week vs. none) was associated with lower HOMA-IR (β =-0.06, 95% CI: -0.11, -0.01), the association was not significant for occupational PA (β =-0.01, 95% CI: -0.09, 0.06). However, among those with a history of cancer/stroke/coronary heart disease, occupational PA (>=lmin/week vs. none) was associated with higher HOMA-IR (\beta=0.34, 95% CI: 0.10, 0.59). The same pattern was observed when using a linear term for each PA type. While leisuretime PA was associated with lower HOMA-IR (for every additional 60min/week: β =-0.01, 95% CI: -0.01, -0.00), the association for occupational PA was not significant. However, among those with a history of cancer/stroke/coronary heart disease, occupational PA was associated with higher HOMA-IR (ß=0.02, 95% CI: 0.01, 0.03). Our findings suggest that occupational PA may be harmful to glycemic control among those with chronic conditions. Prospective studies are necessary to confirm this association.

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EPIDEMIOLOGICAL CHARACTERISTICS OF SUICIDE INPATIENTS IN TAIWAN Fu-Huang Lin* Fu-Huang Lin, Bang-Guo Jheng, Daphne Ng Yih, Yu-Ching Chou, Chi-Hsiang Chung, Wu-Chien Chien, (School of Public Health, National Defense Medical Center, Taipei, Taiwan)

Suicide has been the 14th cause of death in the world. According to WHO's classification, Taiwan is at a higher risk of suicide (suicide rate is higher than 13 per 100,000). However, the factors that affect suicide are quite complex and include gender, age, mental illness, physical illness, accessibility to life, and the accessibility of suicide patterns, and vary from country to country. Therefore, it is important to identify the factors affecting suicide. Data from the National Health Insurance Research Database in 2013 is used and selected the ICD-9-CM E code 950-958 with patients above the age of 10 was analyzed using SPSS 21.0 statistical software. In 2013, 3,324 people were hospitalized for suicide in Taiwan (51.17% forfemales). The proportion of hospitalization aged 25-44 (43.44%) is much higher than other age groups. Suicide methods mainly based on suicide and self-inflicted poisoning by solid or liquid substances (56.98%), cutting or piercing (17.54%), inhaling gases (14.29%). 2.98% of suicide hospitalized patients were low-income population, and 50.18% have history of mental illness. 56.89% were hospitalized in regional hospitals,10.02% seeking medical treatment in psychiatric department, 80.84% of them underwent surgical treatment, 8.33% dead while hospitalized. After controlling the gender, income, seasons, urbanization and medical treatment, factors affecting the suicide hospitalized patients were age, suicide methods, major injuries, hospital accreditation level, surgical treatment and days of hospitalization. Hanging has the risk of hospitalized death about 9.70 times higher than those with other suicide methods. Suicide patients had highest risk of mortality when hospitalized in medical center (OR= 2.66, 95% CI: 1.54-4.80), with surgical treatment (OR= 5.77, 95% CI: 3.82-8.74) and less hospitalization days (OR= 0.94, 95% CI: 0.92-0.96). In conclusion, proper preventions should be made for high-risk suicide group.

TRENDS IN INCIDENCE OF COLORECTAL CANCER WITH OBSTRUCTIVE SLEEP APNEA IN TAIWAN: A 14-YEAR LONG TERM DESCRIPTIVE STUDY Chang-Jung Shen* Chang-Jung Shen, Yu-Ching Chou, Chien-An Sun, (School of Public Health, National Defense Medical Center)

Background: Colorectal cancer (CRC) is the first leading cancer in Taiwan. Obstructive sleep apnea (OSA) has been recognized as potential risk factor in developing cancer. However, secular trend studies of CRC with OSA are limited. This descriptive study examined the incidence and prevalence of CRC with OSA in a large-scale, population-based Chinese cohort. Methods: From 2000 to 2013, about 4180 new cases with OSA were identified in Taiwan's National Health Insurance Research Database (NHIRD). Chi-square test was used for evaluating incidence rates in different sex, age groups and periods. For long term trends, we assessed the change in the incidence rates over 14 years by linear trend analysis. Results: The incidence of OSA rose from 1.82 in 2000 to 5.61 in 2013 among men per 10,000 individuals, and from 0.63 to 1.86 among women. Prevalence of OSA more than tripled from 2.45% in 2000 to 7.47% in 2013. Overall, incidence of CRC per 1000 individuals in 2013 was 24.10 significantly higher than 8.16 in 2000, and increased 27% per year in men and 8.7% per year in women from 2000 to 2013. On the other hand, the incidence of CRC per 100 individuals among OSA patients increased for both men and women in each 10-year age grouping (30-39, 40-49, 50-59, and >60 years) from 0.52 to 2.96 (P trend<0.001). In addition, patients have more higher incidence rate of CRC when their OSA visiting records is increasing (incidence rate was 1.15 and 1.37 for visits =1 and ≥ 2 , respectively, P trend<0.001). Conclusion: In the past 14 years, the incidence and prevalence of OSA had a profound impact on our life. By means of the big data, our finding suggested incidence of CRC with OSA is steadily rising. Thus, the study to indicate a positive correlation between OSA and CRC is needed.

TRENDS IN THE INCIDENCE AND MORTALITY RATES OF PROSTATE CANCER FOLLOWING CHANGES IN THE PROSTATE-SPECIFIC ANTIGEN SCREENING GUIDELINES Jeffrey M Slezak* Stephanie R Reading, Jeffrey M Slezak, Steven J Jacobsen, (Kaiser Permanente Southern California)

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Introduction: In August 2008 and May 2012, the United States Preventive Service Task Force issued a recommendation against prostate-specific antigen (PSA)-based screening for the early detection of prostate cancer. Conflicting data on prostate cancer incidence and mortality trends have since been presented. Therefore, we sought to explore the most recent trends within a large integrated healthcare delivery system. Methods: Male members of the Kaiser Permanente Southern California (KPSC) health plan, newly-diagnosed with prostate cancer between January 1st, 2005 and October 31st, 2016 were identified as incident prostate cancer cases (n=28,950). Prostate cancer deaths were identified in the same timeframe using death certificate data (n=3,979). Incidence and mortality rates were calculated as the number of cases per 100,000 person-years of the KPSC population each calendar year, with the total rate directly age-adjusted to the 2010 US male population. Poisson regression models were used to test trends. Results: The overall age-adjusted incidence rates per 100,000 person-years of prostate cancer declined from 2005-2016 (362.4 to 230.9 cases), with slight rate increases from 2005-2007 (362.4 to 419.2 cases), 2008-2009 (382.4 to 388.4 cases) and 2014-2015 (242.3 to 253.5 cases). Incidence rates per 100,000 person-years of localized prostate cancer also declined from 2007-2016 (350.2 to 173.7 cases), however, distant-stage prostate cancer cases increased from 2011-2016 (14.7 to 24.2 cases). Whereas, prostate cancer mortality rates declined 8% per year from 2005-2012 (IRR=0.98, CI=(0.97, 1.00)) they then increased 4% per year from 2012-2016 (IRR=1.04, CI=(1.01-1.08)). Conclusions: These data suggest that decreasing potential treatment harms, using a one-size fits all approach to PSA screening, has had a negative effect in-terms of mortality. Moreover, these data suggest that a personalized approach to

screening, based on known risk factors, may prove more effective.

ASSOCIATIONS OF HERPESVIRUS SEROREACTIVITY WITH AIDS-RELATED NON-HODGKIN LYMPHOMA Minkyo Song* Minkyo Song, Noemi Bender, James J. Goedert, Cheryl A. Winkler, Nicole Brenner, Tim Waterboer, Charles S. Rabkin, (National Cancer Institute)

Latent and/or reactivated infection with human herpesviruses (HHV), particularly Epstein-Barr virus (EBV) and HHV8, is a suspected cause of non-Hodgkin lymphoma (NHL). We therefore measured antibodies for all 8 HHVs in blood samples from 2 prospective cohorts of HIV infection, a condition with high NHL risk even in the HIV treatment era. Patients with incident (n=28) and prevalent (n=38) AIDS-related NHL were matched by age, sex, and CD4 count to 67 HIVpositive AIDS-free controls Seroreactivity to a total of 17 viral proteins was measured by fluorescent bead-based multiplex serology. NHL odds ratios (ORs) and 95% confidence intervals (95% CIs) were adjusted for age, sex, CD4 count, race/ethnicity and study by logistic regression. Based on quantitative values for 15 masked duplicates, estimated coefficients of variation (CV) were ≤10% and intraclass correlation coefficients (ICC) were ≥0.9 for all antibodies except HHV6-IE1A (CV 24%, ICC 0.5), HHV6-IE1B (14%, 0.4), HHV8-LANA (16%, 0.9) and HHV8-K8.1 (10%, 0.6). Seropositivity to herpes simplex virus 2 (HSV2) was significantly lower in both incident (43%) and prevalent (45%) cases than lymphoma-free controls (61%), with OR 0.48 (95% CI 0.23-0.98) for cases overall. Cases had non-significantly lower prevalence of antibodies to HHV6, EBV-Zebra and -EAD (ORs 0.42-0.73); similar prevalence of antibodies to HSV1, Varicella Zoster virus (VZV) -gE, HHV8-LANA and -vCyclin (ORs 0.98-1.17); and nonsignificantly higher prevalence of antibodies to EBV-EBNA1, cytomegalovirus (CMV) -pp28, HHV7 and HHV8-K8.1 (ORs 1.20-1.97). Antibodies to CMV-pp52 and two EBV proteins, EBNA and VCAp18, were present in all or almost all samples. Our data may reflect confounding or disease effect. Alternatively, exposure to HSV2 or a similarly transmitted infection may be inversely associated with development of AIDS-related NHL. Further studies are warranted to replicate and possibly extend this unexpected finding.

1122 S/P

BODY MASS INDEX TRAJECTORIES ACROSS THE LIFESPAN AND PROSTATE CANCER RISK Eric Vallieres* Eric Vallières, Marie-Hélène Roy-Gagnon, Marie-Élise Parent, (École de Santé Publique, Université de Montréal, Montréal, QC. INRS – Institut Armand-Frappier, Université du Québec, Laval, QC)

Prostate cancer (PCa) is the most common cancer among Canadian men. Few risks factors have been clearly identified to date, i.e., age, ethnicity and family history. In 2014, the World Cancer Research Fund concluded that greater body fatness is a probable cause of advanced PCa. Given the long latency of the disease, considering the role of body size across the lifespan is of particular relevance. The present study aimed at examining trajectories of adult body size, starting at age 20, in relation to total and high-grade PCa. Subjects were participants in a population-based casecontrol study conducted in Montreal, Canada. Cases (n=1931), aged ≤75 years, were diagnosed with PCa in one of the French hospitals between 2005 and 2009. Concomitantly, 1994 controls were selected from the electoral list of Frenchspeaking men and frequency-matched by age (±5 years). Interviews were conducted to obtain data on BMI and a validated body silhouette scale at 5 time points (ages 20, 40, 50, 60 years, before interview), along with other potential confounders (socioeconomic characteristics, physical activity, energy intake, screening, etc.). We defined 5 latent BMI trajectories normal weight-stable, normal weight-upward, normal weight-obese, overweight-stable, overweight-obese. Compared to those in the normal weight-stable trajectory, men in the normal weight-obese and overweightobese trajectories had reduced risks of PCa (OR=0.58, 95%CI 0.45-0.74 and OR=0.39, 95%CI 0.23-0.64, respectively). This relationship was less pronounced when restricting to men with high-grade PCa. There were not clear associations with other trajectories. These results concord with other studies of body shape across life span and PCa risk, whereas men who gain weight over time show reduced risks of PCa. Disease detection discrepancies by screening between obese and non-obese, delayed puberty and prostate maturation might potentially explain these results.

POSTMENOPAUSAL ANDROGEN METABOLISM AND RISK OF ENDOMETRIAL CANCER IN THE WHI-OS COHORT Kara A. Michels* Kara A. Michels, Garnet L. Anderson, Louise A. Brinton, Chu Chen, Kathy Pan, Ruth M. Pfeiffer, Nicolas Wentzensen, Xia Xu, Britton Trabert, (Division of Cancer Epidemiology and Genetics, National Cancer Institute, NIH)

Although an hormonal etiology for most endometrial cancers is accepted, changes in hormone metabolite levels associated with this cancer are poorly understood. Existing studies report on only a few hormones, often measured with outdated assays Methods We used data from a nested-case control study in the prospective Women's Health Initiative Observational Study, which enrolled women aged 50-79 between 1993-1998 (313 cases and 354 non-cases not using hormone therapy at enrollment). Using high performance liquid chromatography-tandem mass spectrometry, we measured concentrations of twelve androgens in sera taken at recruitment, before cancer diagnosis. We previously assayed unconjugated estrone and estradiol. We used conditional logistic regression to estimate odds ratios (OR) and 95% confidence intervals (CI) for endometrial cancer with further adjustment for potential confounders. We stratified models by body mass index (BMI) to explore effect modification, as increases in adipose tissue may lead to greater aromatization of parent androgens Results We identified elevated endometrial cancer risk with high concentrations of androstenedione (A4) [OR 2.36, CI 1.34-4.16; 5th versus 1st quintile], testosterone (T) (OR 1.91, CI 1.12-3.24), and dehydroepiandrosterone (DHEA) (OR 1.85, CI 1.06-3.25). These associations were attenuated after adjustment for estradiol (A4: OR 2.01, CI 1.12-3.60; T: OR 1.55, CI 0.89-2.69; and DHEA: OR 1.67, CI 0.94-2.96). Increasing estrone relative to A4 and increasing estradiol relative to both A4 and T were associated with increased risk. Glucuronidated androgen metabolites were not associated with endometrial cancer. High concentrations of A4, T, and DHEA were associated with risk among lean (BMI <25 kg/m2), but not obese women (BMI ≥30). Conclusions: Our noting associations only with parent androgens suggests these hormones may primarily influence endometrial cancer through their downstream effects on estrogens.

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DECLINING INCIDENCE OF HEAD AND NECK CANCERS, ESPECIALLY AMONG BLACKS Gypsyamber D'Souza* Gypsyamber D'Souza, Carole Fakhry, David Eisele, (JHSPH)

Background: The increasing incidence of oropharynx squamous cell cancer (OPSCC) is well established. However, current incidence estimates and trends for head and neck squamous cell cancers (HNSCC) overall, by major anatomic sites, by sex, race and age in the United States (US) are not well described. Methods: Retrospective analysis of incident HNSCCs during 1992-2014 using Surveillance, Epidemiology, and End Results (SEER) database was used to evaluate incidence of HNSCCs overall, OPSCC and non-OP HNSCC (larynx, oral cavity, hypopharynx, nasopharynx, nasal cavity). Incidence rates were calculated overall and by subgroups of interest, and incidence rate ratios (IRR) were used to compare rates between groups. Annual percent change (APC) was modeled with and without joint-points Results: Incidence of HNSCC overall declined (average APC [aAPC] -0.8, p<0.001) in spite of significant increases in incidence of OPSCCs, most notably between 2000-2014 (APC=2.1, p<0.001). Indeed, significant declines in incidence were observed for all non-OP HNSCC sites, for both women and men (each p<0.001). Among women, risk of OPSCC also significantly decreased (aAPC -0.8, p=0.002). while among men OPSCC risk was stable during 1992-2001 (APC 0.4, p=0.42), then significantly increased during 2001-2014 (APC 2.7, p<0.001). Decreases in non-OP HNSCC risk were especially large for Black women (aAPC -2.6, p<0.001) and men (aAPC -3.0, p<0.001). While incidence of HNSCC used to be highest among Blacks, since 2009 HNSCC incidence is higher among Whites than Blacks. Conclusions: Incidence of HNSCC is declining, especially for non-OP HNSCC and Blacks.

PARENTAL AGE AND RISK OF NON-HODGKIN'S LYMPHOMA IN A QUEBEC BIRTH COHORT Marie-Claude Rousseau* Marie-Claude Rousseau, Florence Conus, Marie-Elise Parent, (Institut National de la Recherche Scientifique)

It has been hypothesized that advanced parental age could increase lymphoma risk of the offspring, but results have been inconsistent across studies. We aimed to assess the association between parental age and risk of non-Hodgkin's lymphoma (NHL) in a cohort of persons born between 1970 and 1974 in the province of Quebec, Canada. The Quebec Birth Cohort on Immunity and Health was established by linkage of provincial administrative sociodemographic and health databases, and includes 400,611 persons born in Quebec from 1970 to 1974. Data were obtained from the birth registry, healthcare registration file, medical services claims, and hospitalization databases until 2014. Maternal and paternal age at child birth were extracted from the birth registry and categorized into 5-year age groups. Subjects were considered as having NHL if they had ≥ 2 physician claims or hospitalizations for NHL within 2 months. Logistic regression was used to estimate ORs and 95% CIs, adjusted for sex, birth weight for gestational age, number of older siblings, single/multiple birth, parental place of birth, rural/urban place of residence, and income. Individuals with complete information on parental age were considered in analyses (n=382,127; 95.4%). Median maternal and paternal age at child birth were 26 and 28 years old, respectively. A total of 1246 NHL cases were identified. For maternal age, the adjusted ORs ranged from 0.84 (95% CI: 0.54-1.29) for ≥40 years old to 1.13 (95% CI: 0.90-1.42) for 35-39 years old, vs. 25-29 years old. For paternal age, the ORs varied between 0.80 (95% CI: 0.59-1.09) for 40-44 years old and 1.11 (95% CI: 0.92-1.35) for 35-39 years old vs. 25-29 years old. Results remained unchanged upon mutual adjustment for maternal and paternal age, and there was no multiplicative interaction between these factors. No association was observed between either maternal or paternal age at birth and occurrence of NHL in their offspring in a Quebec birth cohort.

1126 S/P

THE ROLE OF CELLULAR IMMUNE RESPONSES IN CERVICAL CARCINOGENESIS: A SYSTEMATIC REVIEW AND PRIMARY TISSUE ANALYSIS Tamara Litwin* Tamara Litwin, Nicolas Wentzensen, Sarah Irvin, Niels Grabe, Vikrant Sahasrabuddhe, Rebecca Chornock, (Division of Cancer Epidemiology and Genetics, National Cancer Institute, Rockville, MD)

Immune response to cervical human papillomavirus (HPV) infection helps determine whether a given infection persists and ultimately progresses to cervical precancer and invasive cancer, but cellular immune response pathways involved in the progression from HPV infection to invasive cancer are not well understood. We performed a systematic review and meta-analysis of infiltrating immune cells in cervical tissue at all stages of carcinogenesis, including normal uninfected epithelium, HPV infected epithelium, precancer, and cancer. The meta-analysis showed increased cytotoxic T cell (CD8), T helper cell (CD4), Langerhans cell (S100), and macrophage (CD68) infiltration with each stage in the carcinogenesis process, with stronger infiltration in stromal cells for CD8 and CD4 and stronger infiltration in epithelial cells for CD68 and SI00. Regulatory T cells (FoxP3) increased only in stroma. However, the high heterogeneity of the studies and findings emphasize the need for more systematic studies of cellular immune infiltrates in cervical carcinogenesis. Therefore, in the Study to Understand Cervical Cancer Early Endpoints and Determinants (SUCCEED), we stained slides from 50 subjects with invasive cervical cancer, 75 with cervical intraepithelial neoplasia grade 3 (CIN3) lesions, 50 with CIN2 lesions, 50 with CIN1 lesions, 50 with normal lesions (all HPV-positive), and 25 with HPV-negative normal lesions for p16 and CD3 to evaluate T cell infiltration in cervical carcinogenesis. Automated analysis to quantify these markers is currently underway and will be reported at the meeting. Additional markers are also being stained and quantified (CD4, CD8, SI00, CD68, and FoxP3). Evaluating cellular immune infiltrates at all stages of cervical carcinogenesis in a large epidemiological study combined with the use of automated image analysis will provide a clearer picture of the immune response to cervical HPV infection and persistence.

DIFFERENCES IN QUALITY OF LIFE BETWEEN SURGICAL AND RADIOTHERAPY NON-SMALL CELL LUNG CANCER PATIENTS USING THE SEER MEDICAL HEALTH OUTCOMES SURVEY (SEER-MHOS) Rebecca Schwartz* Rebecca Schwartz, Naomi Alpert, Raja Flores, Kenneth Rosenzweig, Emanuela Taioli, (Department of Occupational Medicine Epidemiology and Prevention, Zucker School of Medicine at Hofstra/Northwell)

Background: Surgical resection has been considered the standard of care for early stage non-small cell lung cancer (NSCLC), however, approximately 25% early stage NSCLC patients do not undergo surgery due preexisting comorbidities, older age, or refusal. Stereotactic Body Radiation Therapy (SBRT) has been proposed in order to provide a minimally invasive alternative treatment . Objective: To examine differences in quality of life (QoL) between SBRT and surgery in early stage NSCLC patients. Method: SEER-MHOS (1998-2014) was used to examine early stage lung cancer patients who underwent surgery only or radiotherapy only to assess changes in Physical QoL score (PCS) and Mental Health QoL score (MCS) from baseline (prior to cancer diagnosis and treatment) to follow up after treatment. QoL was measured using the 36-item Short Form Health Survey (SF-36) until 2006, when it was replaced by the Veterans RAND 12-Item Health Survey (VR-12) instrument. Repeated measures ANOVAs were used to assess differences in QoL change between the groups. Results: Data from 184 patients (28 radiotherapy, 156 surgery) was included. The time between baseline and follow up ranged from 0.8-2.3 years (M=I.96, SD=0.34). Surgical patients had higher baseline PCS (p=0.0061) and MCS (p=0.0056) than radiotherapy patients. There was a significant decline in PCS score from baseline to follow up (surgery: -4.81; 95% CI: -6.31, -3.30; p<0.0001; radiotherapy: -5.6; 95% CI -9.96, -1.24). Similarly, MCS scores declined for both groups although the change was not significant for radiotherapy patients (surgery: -2.96; 95% CI: -4.55, -1.37; radiotherapy: -1.86; 95% CI: -5.4, 1.68). There was no significant difference in the change over time between the 2 treatment options for PCS or MCS. Conclusions: Although baseline QoL is higher in surgical patients, both treatments confer a comparable, slight decrease in QoL indicating that post-treatment QoL concerns should be considered in treatment decision making.

1127 S/P

SEGMENTING LEARNING WITH CONVOLUTIONAL NEURAL NETWORK TO EXTRACT FEATURES AND BUILD THE CLASSIFIER: AN APPLICATION TO ENDOSCOPE IMAGE CLASSIFICATION FOR TREATMENT PLANNING OF CERVICAL PRE-CANCEROUS LESIONS Chia-En Chung* Chia-En Chung, Sheng-Hsuan Lin, Heng-Cheng Hsu, Henry Horng-Shing Lu,, (Institute of Statistics, National Chiao Tung University, Hsinchu, Taiwan)

With the rise of artificial intelligence, many types of research applied deep learning technique in different fields such as e-commerce, finance, engineering, science, healthcare etc. In the medical field, scientists developed a system of computer-aided diagnosis with the deep neural network (DNN-CAD) in image analysis to assist medical staff in the diagnosis of disease. However, while DNN-CAD can obtain much higher accuracy than other algorithms, it cannot be explained why such a diagnosis is given. In this study, we hope to utilize DNN as a supplementary method to learn specific features and calculate the probability which may be seen in the image. Finally, we use these extracted features as predictable factors to build logits regression. The model achieved an accuracy of 84.28% (+/- 3.1%) and the area under the curve (AUC) of 86.05% (+/- 2.3%) whereas the Convolutional Neural Network (CNN) model which train with origin image directly only achieved an accuracy of 46.85% (+/- 9.62%) and AUC of 62.33% (+/- 7.29%) with the same CNN model structure through 20 cross-validations. The approach provided in this study, not only evidence that the performer of the model with purposeful learning step by step is better than the CNN model which trained without any tutor but also can be explained by medical background knowledge. Furthermore, this classifier takes into account the probability of that squamous cells may be seen in the transformation zone (T-zone), as the chance of seeing squamous cells after being examined through the Cervical_screening. In this way, we can consider assist diagnose, or even determine the method of Loop electrosurgical excision procedure (LEEP) without more examine.

17β-HYDROXYSTEROID DEHYDROGENASE 1 AND 2 AS POTENTIAL MARKERS FOR TAMOXIFEN RESISTANCE MANIFESTED BY BREAST CANCER RECURRENCE Lindsay Collin* Lindsay Collin, Deirdre P Cronin-Fenton, Thomas P Ahern, Kristina Christensen, Kristina Lauridsen, Stephen Hamilton-Dutoit, Anders Kjærsgaard, Henrik Toft Sørensen, Timothy L Lash, (aDepartment of Epidemiology, Rollins School of Public Health, Emory University, Atlanta, GA)

Background: Nearly 1.7 million women are diagnosed with breast cancer annually worldwide, 65% with estrogen receptor a (ERa) positive disease so are eligible for ad juvant endocrine therapy. Despite significant advancements in treatment, nearly 30% of women diagnosed with breast cancer will experience a recurrence. Identifying biomarkers that predict treatment failure is of immense importance. 17β-Hydroxysteroid Dehydrogenase 1 and 2 (17β-HSD 1 and 2) regulate estradiol and estrone expression, which may provide insight into treatment resistance among women treated with tamoxifen due to competitive binding to the estrogen receptor. We aim to assess the prognostic value of intertumoral 17β-HSD 1 and 2 expression on breast cancer recurrence. Methods: This study leverages resources from a population-based case control study, nested in a population of 11,251 females residing in the Jutland Peninsula of Denmark. Participants were aged 35-69, diagnosed with stage I-III breast cancer between 1985 and 2001, and were registered with the Danish Breast Cancer Group. Cases of recurrence included 541 participants with ER+ positive disease treated with tamoxifen for at least 1 year (ER+/TAM+) and 300 cases with ER- disease never treated with tamoxifen (ER-/TAM-). Cases were matched to controls on ER/TAM status, date of surgery, menopausal status, stage and county. Cytoplasmic expression of 17β-HSD 1 and 2 were assessed using immunohistochemistry on tissue microarrays. We will compute conditional odds ratios (OR) and 95% confidence intervals associating quartiles of 176-HSD 1 and 2 expression and breast cancer recurrence. Results Preliminary results for the association between cytoplasmic expression of 17β-HSD 1 with breast cancer recurrence indicate an OR of 1.4 (95%CI 0.8-2.5) although this includes only a subset of the population with available staining. Conclusion: We expect the complete study will provide insight to treatment resistance among women treated with tamoxifen.

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ESTIMATING THE CANCER BURDEN DUE TO LIFESTYLE FACTORS AMONG ADULTS IN CANADA Darren R. Brenner* Darren Brenner, Christine M. Friedenreich, Yibing Ruan, Abbey E. Poirier, Xin Grevers, Stephen D. Walter, on behalf of the ComPARe Study Team, (University of Calgary)

Background: Despite established associations between modifiable risk factors and cancer, sufficient reductions in the prevalence of these risk factors have not been achieved in Canada. Resistance to change and cancer prevention strategies based on outdated information (e.g. outdated risk estimates and poor study designs) contribute to the slow progress in Canada. Objective: The Canadian Population Attributable Risk of Cancer (ComPARe) project estimated the proportion of current cancer incidence attributable to modifiable risk factors in Canada. Methods: We identified lifestyle-cancer risk factors from the literature and obtained risk estimates from collaborative panels and meta-analyses. Age-sex-specific incidence data from the Canadian Cancer Registry were combined with prevalence data from national population-based surveys. We estimated the cancer burden attributable to tobacco smoking, alcohol, excess body weight, physical inactivity, sedentary behavior, hormone use and unhealthy eating habits (i.e. insufficient fruit, vegetable, fibre, vitamin D, and calcium intake, and excess red and processed meat intake). Results: Estimates of population attributable risk were 31.0% and 2.6% for active and passive tobacco smoking (14 and 4 cancer sites, respectively), 4.4% for alcohol intake (8 sites), 10.8% for excess body weight (14 sites), 10.3% for physical inactivity (15 sites), 5.4% for sedentary behavior (4 sites), 9.9% and 5.9% for insufficient fruit and vegetable intake (7 and 8 sites, respectively) and 9.6% and 1.1% for red and processed meat (4 sites each). In 2012, 82.8%, 61.8%, and 30.2% of incident lung, colorectal, and breast cancers, respectively, were attributable to these lifestyle factors. Conclusion: A considerable proportion of the cancer burden in Canada is attributable to modifiable risk factors. These results will inform and prioritize interventions targeting the risk factors that can achieve the greatest reduction in the cancer burden in Canada.

ANATOMICAL SUBSITE CAN MODIFY THE ASSOCIATION BETWEEN MEAT AND MEAT COMPOUNDS AND RISK OF COLORECTAL ADENOCARCINOMA: FINDINGS FROM THREE LARGE US COHORTS Arash Etemadi * Arash Etemadi, Christian Abnet, Barry Graubard, Laura Beane-Freeman, Neal Freedman, Linda Liao, Sanford Dawsey, Rashmi Sinha, (National Cancer Institute, NIH)

Background: Distal and proximal colon tumors have distinct incidence trends and embryonic and pathophysiologic origins, however whether these sub-sites have distinct etiologies is unclear. Methods: We used pooled data from 407,270 participants in three US-based studies, with overall median follow-up of 13.8 years. We analyzed the association between dietary intakes of total, processed and unprocessed red meat; total white meat, poultry and fish; and meat-related compounds: heme iron, nitrate, nitrite, the heterocyclic amines (HCAs), and benzo(a)pyrene (B(a)P) and incidence of colorectal cancer subsites Results: During the follow-up, a total of 6,640 cases of colorectal cancer occurred in the three studies. For each 50 g/1000 kcal increase in daily intake of total red meat, colorectal cancer risk increased by 35%, with a significant right-to-left trend from proximal colon (HR:1.24; 95%CI:1.09-1.39) to distal colon (HR:1.34; 95%CI:1.13-1.55) and rectum (HR:1.53; 95%CI:1.28-1.79). Only unprocessed red meat showed a significant right-to-left trend. Each 50 g/1000 kcal increase in white meat intake was associated with a 26% reduction in total colorectal cancer risk (HR: 0.74; 95%CI: 0.68-0.80), with a significant inverse right-to-left trend. The highest quintile of heme iron was associated with increased cancer risk only in the distal colon (HR:1.20; 95%CI: 1.02-1.42) and rectum (HR:1.27; 95%CI: 1.07-1.52). The highest quintile of HCAs, and nitrate/nitrite were associated with increased the risk of total colorectal cancer, but these associations did not vary across anatomical subsites. We found no association between B(a)P and colorectal cancer risk. Conclusion: Right and left subsites of the colon may have distinct susceptibilities to meat and possibly other dietary risk factors, suggesting that the causes of colorectal cancer vary across subsite.

1131 S/P

PATIENT REPORTED OUTCOMES AMONG MOLECULAR SUBSETS OF METASTATIC COLORECTAL CANCER PATIENTS Shailesh dvani* Shailesh Advani, Quiling Shi, Michael Overman, Xin Shelley Wang, Scott Kopetz, (Georgetown University Lombardi Comprehensive Cancer Center; Division of Gastrointestinal Medical Oncology, MD Anderson Cancer Center)

Background: Approximately 20% of CRC cases present with distant metastases. Despite improvements in surgical techniques and use of adjuvant chemotherapy, the 5-year survival rate for patients is about 10% for late-stage disease in which the cancer has metastasized to distant sites. In these patients, palliative care is key to improving overall quality of life. Additionally, CRC is characterized by multiple genetic and epigenetic changes conferring different survival among CRC patients. However, till date, no studies have compared association of patient reported outcomes with these changes among CRC patients. Methods: Stage IV CRC patients enrolled in the Assessment of Targeted Therapies Against Colorectal Cancer (ATTACC) trial at the MD Anderson Cancer Center completed a baseline symptom inventory termed as the MD Anderson Symptom Inventory for Gastrointestinal Cancer Patients (MDASI-GI) at enrollment. Association of individual symptoms with genetic and epigenetic changes was compared using Chi-Square tests. These included mutations in APC, BRAF, KRAS, NRAS, PIK3CA and Tp53, as well as microsatellite instability (MSI) and CpG Island Methylator Phenotype (CIMP). Results: Key patient reported outcomes included pain, fatigue, sleep, distress and drowsy. MSI-H patients reported increased symptoms burden related to pain (OR=3.06 (1.60, 5.84)), fatigue (OR=1.27 (1.40, 5.49)), sleep (2.52 (1.32, 4.80)); and drowsy (2.50 (1.31, 4.77)). In addition, MSI-H status was associated with increased frequency of overall symptom burden (OR=2.47 (1.29, 4.72)). CIMP-H patients reported higher odds of pain as compared to CIMP-0 patients. (OR=1.82 (1.12, 2.95), p=0.014). In addition, higher scores on overall symptom burden were associated with poor overall survival. (HR=1.22, 95% C1=1.01, 1.48). Discussion: Our results highlight the possible impact of MSI-H associated immune infiltrates in increasing symptom burden among mCRC patients. These need to be explored in further studies.

INVERSE ASSOCIATION OF ACUTE LYMPHOCYTIC LEUKEMIA INCIDENCE AND COUNTY ELEVATION AMONG PRESCHOOL CHILDREN IN THE UNITED STATES Frank Groves* Frank Groves, (University of Louisville)

It has been postulated that the iron-replete state may be favorable to leukemogenesis, and, conversely, that the iron-depleted state may be unfavorable to leukemogenesis, possibly due to inhibition of lymphopoiesis by elevated erythropoietin, as occurs among persons residing at high altitude. To test the hypothesis that high erythropoietin inhibits the development of acute lymphoblastic leukemia among preschool children, the association between leukemia incidence and county elevation was studied using data from eight of the nine SEER areas during 1973-2014. Counties (N=198) were stratified into tertiles according to elevation (999 feet) as given in the Area Health Resource File from the Health Resources and Services Administration. Leukemia incidence among white children between one and four years of age was inversely associated with elevation, declining from 77.2 per million (95% CI: [72.6, 82.0]) in lower-altitude counties and 77.2 per million (95% CI: [72.8, 81.8]) in medium-altitude counties to 67.7 per million (95% CI: [63.6, 71.9]) in higher-altitude counties. This finding lends support to the erythropoietin-suppression hypothesis.

IDENTIFYING LUNG CANCER CASES IN THE NATIONAL HEALTH AND AGING TRENDS STUDY (NHATS) LINKED WITH MEDICARE CLAIMS DATA Bian Liu* Bian Liu, Naomi Alpert, Emanuela Taioli, Katherine Ornstein, (Icahn School of Medicine at Mount Sinai)

Linkages of survey data with administrative data provide an unprecedented opportunity for expanding epidemiological research particularly around long term consequences of disease treatment and diagnosis. This study developed algorithms to identify incident lung cancer cases, utilizing the National Health and Aging Trends Study (NHATS), a national survey of older Medicare beneficiaries, linked with Medicare claims data. We included all community -dwelling NHATS patients at Wave 1 (2011) who had no self-reported cancers identifiable as lung and no lung cancer diagnosis in their claims data prior to their interview date. Incident cases were identified if participants self-reported a new cancer diagnosis in Wave 2-4 surveys, or if lung cancer diagnosis or cancer treatment codes appeared in Medicare claims. We reviewed and compared the accuracy and consistency of incidence cases across the available data files with varied degrees of selection and matching criteria. Out of 7270 eligible participants, we identified 99 patients with new lung cancer cases from the Medicare data over the 3-year follow-up with at least 1 diagnosis code. Limiting to at least 2 diagnosis codes resulted in 72 patients with new cases; the addition of treatment codes within 3 months confirmed 33 patients with new cases. In each study wave only 23-30% of incidence cases based on claims were also identified via self-report as a new cancer. Case identification based on treatment codes increased the rate identified via self-report to 50%. Using a claims-based approach, we successfully identified new lung cancer cases among older adults. Under-estimates via self-report were significant due to misclassification and loss to follow up. Linked data may provide a measure of correction for survey data. Our future work will focus on optimizing matching algorithms and their applications for other health outcomes.

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IN UTERO EXPOSURE TO IODINE-131 IN CHERNOBYL FALLOUT AND RISK OF MALIGNANT AND BENIGN THYROID NODULES Maureen Hatch* Maureen Hatch, Alina Brenner, Kiyohiko Mabuchi, (National Cancer Institute)

Children and adolescents exposed to radioactive Iodine-131 (I-131) in fallout from the 1986 Chernobyl nuclear accident in Ukraine are at increased risk of thyroid cancer and benign thyroid nodules. The prenatal period is also considered radiosensitive, and the fetal thyroid can accumulate I-131 from the maternal circulation. To estimate the risk of thyroid disease in those exposed prenatally, we studied a well-established cohort of ~1,800 in utero-exposed subjects in Ukraine, with individual estimates of 1-131 thyroid dose (mean = 72.6 milliGray) and two standardized thyroid screening examinations. We found - both at screening cycle 1 in 2003-2006 and cycle 2 in 2012-2015 - a markedly elevated but not statistically significant dose-related Excess Relative Risk of thyroid cancer (ERR/Gray = 11.66 and 4.33), based on a small number of cases (seven at cycle 1, nine at cycle 2). We found no increase in radiation risk for benign thyroid nodules at the initial screening. However, analysis of cycle 2 data showed a strong and significant association between I-131 thyroid dose and screen-detected large benign nodules (≥ 10 mm) (EOR)/Gray = 4.19, but no increase in risk for small nodules(< 10 mm) (EOR/Gray = 0.34). The pattern of radiation risk by nodule size is similar to that observed in exposed children and adolescents, although the magnitude of I-131 risk for large thyroid nodules appears higher for the in utero-exposed. The results for large nodules are also consistent with findings for in utero-survivors of the atomic bombings in Japan exposed to external radiation.

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PARENTAL OCCUPATIONAL EXPOSURE TO PESTICIDES, FARM ANIMALS, AND ORGANIC DUST AND CHILDHOOD CANCER RISK: FINDINGS FROM THE INTERNATIONAL CHILDHOOD CANCER COHORT CONSORTIUM (14C) Deven Patel* Deven M. Patel, Benjamin J. Booth, Leslie T. Stayner, Rena R. Jones, Ann C. Olsson, Kurt Straif, Hans Kromhout, Roel Vermeulen, Gabriella Tikellis, Joachim Schuz, Ora Paltiel, Jean Golding, Camilla Stoltenberg, Siri E Håberg, Per Magnus, Jørn Olsen, Sjurdur F. Olsen, Anne-Louise Ponsonby, Terence Dwyer, Mary H. Ward, (Occupational and Environmental Epidemiology Branch, Division of Cancer Epidemiology and Genetics, National Cancer Institute, National Institutes of Health, Rockville, MD)

Background: Parental occupations involving exposure to pesticides, farm animals, and organic dust have been associated with an increased risk of childhood cancer based mainly on case-control studies. Aims: Using data from the International Childhood Cancer Cohort Consortium (I4C), we evaluated whether parental occupational exposures to pesticides, farm animals, and organic dust were associated with risk of childhood cancer. Methods: We pooled data from five birth cohorts participating in the I4C. Job codes for parental occupations during the pregnancy were harmonized to International Standard Classification of Occupations-1988 (ISCO-88) codes. The probabilities of parental occupational exposures (none, low, high) to pesticides and organic dust during pregnancy were estimated using the ALOHA+ job exposure matrix. Animal exposure on the job was classified as any or none. The risk for acute lymphoblastic leukemia (ALL), acute myeloid leukemia (AML), and childhood brain tumors (CBT) diagnosed before age 15 years was assessed by generating hazard ratios (HR) using Cox proportional hazards models. Results: A total of 589 childhood cancer cases were identified from 329,658 participants Maternal occupational exposure to organic dust was associated with increased risk of ALL (HR=1.6, 95% CI=I.0-2.5). Maternal exposure to farm animals and organic dust were each associated with a higher risk of CBT; however, these findings were not statistically significant. High probability of paternal occupational exposure to pesticides was associated with an increased risk of AML (HR= 4.8, 95% CI=1.4-16), while no association was seen with organic dust. Any exposure to farm animals was also associated with AML (HR=4.9, 95% CI=1.5-16.7). Significance: This is the first prospective study using birth cohort data to evaluate these parental occupational exposures in relation to childhood cancer risk and provides additional evidence for agricultural exposures as childhood leukemia risk factors.

1136 S/P

RELATIONSHIPS OF CIRCULATING INSULIN-LIKE GROWTH FACTOR-I AND BINDING PROTEINS 1-7 WITH TERMINAL DUCT LOBULAR INVOLUTION OF THE BREAST AMONG WOMEN UNDERGOING IMAGE-GUIDED DIAGNOSTIC BREAST BIOPSY IN THE BREAST STAMP PROJECT Manila Hada* Manila Hada, Hannah Oh, Ruth M. Pfeiffer, Roni T. Falk, Sharon Fan, Maeve Mullooly, Michael Pollak, Berta Geller, Pamela Vacek, Donald Weaver, John Shepherd, Jeff Wang, Bo Fan, Amir Pasha Mahmoudzadeh, Serghei Malkov, Sally Herschorn, Stephen M. Hewitt, Louise A. Brinton, Mark E. Sherman, Gretchen L. Gierach, (National Cancer Institute, National Institutes of Health, Bethesda, MD, USA)

Background: Lesser degrees of age-related involution of the breast, as reflected in a greater number of terminal duct lobular units (TDLUs), is a strong breast cancer risk factor. Insulin-like growth factor (IGF)-I and its binding proteins (IGFBPs), which limit IGF-I bioavailability, may also play an important role in breast cancer etiology. Prior studies have found positive associations between circulating IGF-I, the IGF-I: IGFBP-3 ratio, and TDLU number, particularly among postmenopausal women. To build upon these findings, we evaluated associations of six other IGFBPs with the number of TDLUs observed in breast biopsy specimens. Methods: Serum IGF-I and IGFBPs-1-7 were measured using enzyme-linked immunosorbent assay in 191 preand 103 post-menopausal women, ages 40-65, undergoing image-guided diagnostic breast biopsy. Normal TDLUs per unit of biopsy tissue area were enumerated by a study pathologist. Factor analysis with rotation was used to evaluate covariation among IGF-measures. Relationships between IGF and TDLU measures were assessed with Spearman's partial rank correlations (r) adjusting for age. Results: Factor analysis of IGF-measures revealed two independent factors: factor 1 was positively correlated with IGF-I and IGFBP-3 and inversely correlated with IGFBP-1, and IGFBP-2; factor 2 was positively correlated with IGFBP-4, IGFBP-5, and IGFBP-7 (factor loading p<0.05 for each IGF analyte). Among premenopausal women, neither factor was significantly associated with TDLU number. Among postmenopausal women, only factor 2 was inversely correlated with TDLU number (r= -0.20, p=0.04). Conclusions: These results suggest complex relationships between serum IGF levels and measures of TDLU involution among women undergoing a diagnostic breast biopsy. Ongoing efforts to study relationships between serum IGFs, their binding proteins, and TDLU involution may be valuable in understanding the role of the IGF-system in breast cancer etiology.

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SURVIVAL IN HEAD AND NECK CANCER STRATIFIED BY HPV STATUS IN SEER Rebecca Ehrenkranz* Rebecca Ehrenkranz, Serban Negoita, Clara Lam, (National Institutes of Health/National Cancer Institute, Division of Cancer Control and Population Sciences, Surveillance Research Program)

Background: Evidence indicates HPV infection plays a causal role in certain head and neck cancers. Our analysis describes SEER HPV data, and reports populationbased relative survival outcomes. This is the first time HPV-specific survival estimates for these cancers were calculated per Surveillance, Epidemiology, and End-Results (SEER) data. Methods: We used SEER*Stat software to select head and neck cancers by anatomic location between 2010 - 2014. HPV status was collected via Collaborative Stage Site Specific Factor 10, and recoded as positive, negative, or unknown Relative survival estimates were calculated via the Kaplan-Meier method and stratified by HPV status, sex, and race. Results: Completeness of HPV data rose from 1071 (20.4%) cases with known HPV status in 2010 to 3137 (51.6%) cases with known status in 2014. Of those with known status, percent HPV positive rose from 640 (59.8%) in 2010 to 2101 (67.0%) in 2014. Survival analysis showed ~20% lower 3-year overall survival in HPV-negative patients (62.2% 3-year OS) or those with unknown HPV status (62.8% 3-year OS) relative to HPV positive patients (83.2% 3-year OS). The 3-year OS percent change between HPV-unknown and HPV-negative patients ranged from 0.2% - 3.8% stratified by race. Comparatively, 3-year OS percent change between HPV-positive and HPV-unknown patients ranged from 4.9-25.9% stratified by race. HPV-positive whites had the highest observed 3-year survival (84.6%), while HPV-negative and HPV-unknown blacks had the lowest 3-year OS (51.1 and 51.2%). Conclusion: SEER collection of HPV data improved over time, collecting more cases overall while reducing the proportion of unknown cases. Survival in HPV-unknown patients closely resembled survival in HPV-negative patients. Relative survival in SEER mirrored cause-specific survival rates found in the literature. Racial survival disparities remained even after stratifying by HPV status.

1137 S/P

CLINICALLY OCCULT PROSTATE CANCER (PCA) CASES MAY DISTORT THE EFFECT OF TESTOSTERONE REPLACEMENT THERAPY ON RISK OF PCA Xiao Zhang* Xiao Zhang, , (Texas A&M University)

Background: Although PCa screening is conducted before testosterone replacement therapy (TRT), clinically occult PCa cases may exist. Objective: To evaluate whether the possible inclusion of occult PCa cases distorts the effect of TRT on the risk of PCa. Design, Setting, and Participants. We followed 776 hypogonadal males aged 33-74 (TRT=400, non-TRT=376) from a urology center in Germany from 2004-2016, with a mean follow-up period of 7 yr. Methods: We assumed occult cases might take 1-2 yr (latency period) to become clinically detectable after receiving TRT. We selected several possible latency periods (12/18/24 mo) and compared the effects of TRT on the risk of PCa during the full follow-up period, within latency periods, and during the full follow-up period with the exclusion of cases occurring within latency periods. We applied propensity score matching (PSM) to balance demographic characteristics and baseline health condition between TRT and non-TRT groups. Results: Overall, 26 PCa cases occurred in the non-TRT group VS 9 cases in the TRT group. Within 18 mo of follow-up, 9 cases occurred in the TRT group VS 0 cases in the non-TRT group; during the full follow-up period with the exclusion of cases occurring within 18 mo, 26 cases occurred in the non-TRT group VS 0 cases in the TRT group. The adjusted table showed a seemingly adverse effect of TRT on PCa development within 18 mo (p=0.0301) and beneficial effect during the full follow-up period after excluding cases occurring within a latency period of 18 mo (p=0.0069). Similar patterns were observed for 12 or 24 mo as the latency period. Conclusions: TRT may make occult PCa cases detectable within early phase of treatment and present a beneficial effect in the long run. Improved sensitive screening techniques are needed to identify early-stage PCa and prevent the possible contributing effect of TRT on PCa progression among occult PCa cases.

THE ASSOCIATION OF OBJECTIVELY MEASURED SLEEP QUALITY WITH RETINAL MICROVASCULATURE IN POLICE OFFICERS Claudia C. Ma* Claudia C. Ma, Ja K. Gu, Michael E. Andrew, John M. Violanti, Desta Fekedulegn, Cathy Tinney-Zara, Luenda E. Charles, (Health Effects Laboratory Devision, National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention)

Objective: Literature examining associations of sleep quality with changes in the retina is limited. We examined cross-sectional associations of several parameters of sleep quality with central retinal artery equivalent (CRAE), a measure of retinal arteriolar width, and central retinal vein equivalent (CRVE), a measure of venular width in 210 police officers. Methods: Participants were from the Buffalo Cardiometabolic Occupational Police Stress Study (2011-2016). The sleep parameters including activity during sleep, sleep efficiency, sleep latency, duration of longest wake episode, and sleep-to-wake ratio were derived from actigraphy data. CRAE and CRVE were derived from retinal photography data. Age, sex, race/ethnicity, smoking status, alcohol intake, physical activity, blood glucose, low-density lipoprotein (LDL), LDL lowering medication, high-density lipoprotein, triglyceride, and hypertension status were selected as potential confounders. Linear regression models were used to assess associations. Results: Sleep-to-wake ratio was negatively and significantly associated with CRAE after adjustment for confounders (β =-17.5, p=0.024). Prior to adjustment, duration of longest wake episode was positively and significantly associated with CRVE (\beta=0.27, p=0.026). After adjustment, the association was slightly attenuated (β =0.23, p=0.077). Sleep-to-wake ratio was negatively associated with CRVE (β =-35.29, p=0.001) and remained significant after adjustment (\beta=-28.41, p=0.014). Conclusion: The results indicate that a greater activity during sleep, lower sleep efficiency, or longer sleep latency was associated with wider venules, although some of the results were not statistically significant. The data suggest that higher values of poor sleep quality are associated with smaller CRAE (i.e., arteriolar narrowing) and larger CRVE (i.e., venular widening). Future epidemiological studies with a prospective design and larger sample sizes are warranted to confirm our findings.

1142 S/P

METABOLIC MEDIATORS OF THE RELATIONSHIP BETWEEN ADIPOSITY AND CARDIAC STRUCTURE AND FUNCTION IN UK ADOLESCENTS Alice R. Carter* Alice R. Carter, Diana L. Santos Ferreira, Amy E. Taylor, Debbie A. Lawlor, George Davey Smith, Nishi Chaturvedi, Alun D. Hughes, Laura D. Howe, (MRC Integrative Epidemiology Unit, Population Health Sciences, University of Bristol, Bristol, UK)

Introduction: Strong evidence shows that adiposity increases cardiovascular disease (CVD) risk, explained in part by blood pressure (BP), glucose, triglycerides and cholesterol. Metabolomics offers the potential to identify novel intermediate pathways. Methods: Body mass index (BMI) was measured at age 11 in the Avon Longitudinal Study of Parents and Children. Measures of cardiac structure (precursors of CVD; age 17) were left atrial size indexed to height (LAI), left ventricular mass indexed to height2.7 (LVMI), relative wall thickness (RWT) and left ventricular internal diameter (LVIDD). Metabolic traits (mostly lipid and lipoprotein related) were quantified via high-throughput 1H -nuclear magnetic resonance spectroscopy (NMR) at age 15. Complete data was available for all exposures, mediators and outcomes (N=772). Multiple imputation was used to deal with missing data in covariates. Multivariable linear regression was used to estimate associations of BMI with measures of cardiac structure. Mediation was assessed via controlled direct and natural indirect effects, firstly, considering 156 metabolic measures individually, and secondly considering all metabolites jointly (as principle components, Npc=17). Bootstrapping was used to calculate robust standard errors. Results: A one-unit higher BMI was associated with 0.74 (0.54,0.94) higher LVMI in males; 0.68 (0.52,0.84) in females. Individually, each metabolite explained little of this association. Jointly, the PCs of the metabolites explained 8% of the association in males and 0.8% in females. Similar results were seen for LAI and LVIDD. There was weak evidence of an association of BMI on RWT. Conclusion: In this adolescent population, individual metabolites measured by NMR contribute a small amount to the pathway from adiposity to cardiac structure. Considering them jointly indicates they may play a role in the pathway, particularly in males; further work is warranted to assess causality.

AN INVERSE ASSOCIATION OF PROTEINURIA WITH MORTALITY IN INCIDENT HEMODIALYSIS PATIENTS Manabu Hishida* Manabu Hishida, Tariq Shafi, Daijo Inaguma, Kunihiro Matsushita, (Johns Hopkins Bloomberg School of Public Health)

Proteinuria is a potent predictor of mortality. However, in patients with severely reduced kidney function, a few studies showed a J-shaped association between proteinuria and mortality. No studies have explored this association in incident dialysis patients. We examined data from 1382 Japanese incident dialysis patients (mean age 67 years) from 17 institutions. Baseline data were collected just prior to or during the hospitalization for dialysis initiation. The associations of dipstick proteinuria (-/±, 1+, 2+ and \geq 3+) with all-cause mortality and cardiovascular disease (CVD) mortality were quantified by Cox models. Most patients (n=1334 [96.5%]) had \geq 1+ proteinuria; 48(3.5%) had no proteinuria. Patients with no proteinuria were likely to be older (75 vs. 67 years) and have a history of coronary disease (56% vs. 36%), compared to the others. During a mean follow-up of 3.3 years, there were 352 deaths (129 due to CVD). Patients with no proteinuria had a worse prognosis than those with \geq 1+ (p3+ proteinuria independently of potential confounders. Our study highlights the prognostic value of predialysis data and suggests that absence of proteinuria as a potential indicator of the highest postdialysis mortality risk.

1143 S/P

1141 S/P

THE ROLE OF CARDIOVASCULAR DISEASE RISK FACTOR SURVEILLANCE IN WOMEN'S HEALTHCARE SETTINGS: INCORPORATING PREVENTATIVE CARE INTO REPRODUCTIVE HEALTH SERVICES Jessica M. Madrigal* Jessica M. Madrigal, Ashlesha Patel, Camille Johnson, (University of Illinois at Chicago, School of Public Health, Division of Epidemiology and Biostatistics)

Background: Preventative care is underutilized by minority women of reproductive age, despite recommendations. Abortion care settings offer a chance for cardiovascular disease (CVD) risk factor screening in addition to standard reproductive health and contraceptive services. Our aim was to examine the prevalence of CVD risk factors among women presenting for reproductive health services in an urban public healthcare system. Methods: Chart review was done for 740 women who presented for a first trimester abortion or to obtain contraceptive methods over three months. We abstracted information on demographics, body mass index (BMI), systolic and diastolic blood pressure, and smoking. BMI ≥ 25 or 30 kg/m2 was categorized as overweight or obese, respectively, and hypertension was defined as blood pressure \geq 130/80 mmHg. Prevalence estimates were calculated and log-binomial regression was used to identify factors associated with CVD risk. Results: On average, women were 26 (SD=6) years old, 85% African American, and 52% were eligible for food stamps. Overall, 29% were categorized as overweight; 42% as obese. 10% had elevated blood pressure, and 21% were in the hypertensive range. 18% reported current smoking. 44% of women had one CVD risk factor, and 35% had two or three. Half of the women desired children in the next one to five years Prevalence of risk factors varied by age, number of births, and insurance status. Women aged 25-34 (PR=3.2, 95% CI 1.1 to 9.1) or older than 35 (PR=3.5, 95% CI 1.2 to 10.4) had increased prevalence of two or more risk factors when compared to women under 18. Conclusions: The reproductive healthcare setting provides an opportunity to monitor, counsel, and refer at risk women for further screening and care. This encounter may be the only opportunity women have for health screening. Furthermore, CVD risk factors limit contraceptive options, and weight, smoking, and blood pressure counseling may result in healthier pregnancies for those that desire future children.

THE RELATIONSHIP BETWEEN LIFESTYLE FACTORS AND THE RESOLUTION OF ADOLESCENT METABOLIC SYNDROME Yi-Wen Lai* Yi-Wen Lai, Chun-Ying Lee, Sharon Tsai, Wei-Ting Lin, Pei-Wen Wu, Yu-Ting Chin, Hsiao-Ling Huang, Chien-Hung Lee, (Department of Public Health College of Health Science Kaohsiung Medical University)

Pediatric metabolic syndrome (MetS) is a predictor of high carotid intima-media thickness, type 2 diabetes mellitus and cardiovascular disease in adults. Previous studies have reported that the resolution from MetS between youth and adult life could reduce the risk of diabetes and cardiometabolic disorders. The occurrence of MetS has been linked to lifestyle parameters, however, how lifestyle factors in childhood affect the resolution of adolescent MetS is not well understood. We used a 3-year follow-up study to investigate the effect of the change in lifestyle factors on the resolution of pediatric MetS and its components. Participants were 661 adolescents aged 12 to 14 years who were randomly selected from 14 junior high schools in Taiwan, using a multistage stratified cluster selecting strategy. Comprehensive demographic factors, dietary, physical, anthropometric, and clinical parameters were collected. The modified criteria of NCEP/ATP-III for adolescents was used to determine MetS. Compared to baseline MetS condition, adolescents who had reducing number of MetS components after 3-year follow-up were defined as the resolution of MetS component. Logistic regression models were used to evaluate the related effects after adjusted for covariates. We found that adolescents with high physical activity (>97.7 MET-minutes/day) had a 2.1-fold higher likelihood of MetS resolution than those with low physical activity (≤97.7 METminutes/day). Reading time, screen time and the intake of sugar-sweetened beverages were not associated with the resolution of MetS. Our finding emphasizes the role of physical activity on the resolution of adolescent MetS.

1145 S/P

INTERACTION BETWEEN ANEMIA AND HIGH-IMPACT COMORBIDITIES IN HEART FAILURE: A POPULATION- BASED COHORT STUDY Johnbosco Umejiego* Johnbosco Umejiego, , (Cook Children's Health Care System)

Background Previous studies have demonstrated that anemia and comorbidities, predominantly coronary heart disease (CHD), chronic kidney disease (CKD), Diabetes, Hypertension and chronic obstructive pulmonary disease (COPD) have a significant effect on mortality in heart failure. However, the interaction between anemia and specific comorbidities have not been determined using a nationally representative sample. The aim of this study was to determine the direction and magnitude of the interaction between anemia and highly-prevalent comorbidities and their effects on mortality in HF. Methods The study was a population-based survey using the National Health and Nutrition Examination Survey (NHANES) data from 1999-2010. Demographic-adjusted hazard ratios and 95% confidence intervals were calculated using Cox regression model. Further analysis examined the direction and magnitude of interaction between anemia and specific-comorbidities and was assessed on an additive and multiplicative scales. Results The study population comprised of 926 subjects. The joint effects of anemia and CHD or COPD suggest sub-additive and sub-multiplicative effects on mortality. The interaction between anemia and CKD showed a perfect fit on the additive scale. The result of the multiplicative interaction indicates a sub-multiplicative effect. Also, the analysis of the joint effects of anemia and Diabetes support a supra-additive and submultiplicative interaction. Conclusion These findings indicate that joint effects of anemia and specific comorbidities diverge or are the same in HF. The joint effects of anemia and CHD or COPD show a modest association with mortality in HF while anemia and CKD or Diabetes are strong risk factors for mortality.

1146 S/P

THE ASSOCIATION OF RENAL URIC ACID REABSORPTION AND EXCRETION GENES WITH ADOLESCENT HYPERURICEMIA Tun-Min Yang* Tun-Min Yang, Chien-Hung Lee, (Kaohsiung Medical University)

Increased serum uric acid (SUA) levels or hyperuricemia have been associated with an increased risk of gout, type 2 diabetes, cardiovascular disease and kidney disease. Epidemiological studies have found that genetic factors have noticeable contribution to the inter-individual disparity in SUA levels. SLC2A9, SLC22A12 and ABCG2 are 3 urate transporter-related genes, which have been linked to the regulation of SUA and urate transport disorders. In Taiwan, the prevalence of hyperuricemia for male and female adolescents was reported to be as high as 59.8% and 30.3%, respectively, according to data from nationwide survey. This study was conducted to evaluate the association of adolescent hyperuricemia with the single-nucleotide polymorphisms (SNPs) of renal uric acid reabsorption genes SLC2A9 (rs3733591, rs3733589, rs737267, rs1014290, rs7442295 and rs16890979) and SLC22A12 (rs475688 and rs505802), and the SNPs of renal uric acid excretion gene ABCG2 (rs2231137 and rs2231142). We studied 700 adolescents aged 12 to 14 years who were randomly selected from 18 junior high schools in Taiwan, using a multistage stratified cluster selecting strategy. Comprehensive demographic factors, and anthropometric and clinical parameters of each adolescent were obtained. Hyperuricemia was defined as SUA ≥7.0 mg/dL in boys and SUA ≥6.0 mg/dL in women. Multivariable logistic regression models were used to evaluate the association. Adjusting for covariates, we found that the SNPs rs1014290 (OR, 1.8; 95% CI: 1.0-3.3), rs3733591 (OR, 1.5; 95% CI: 1.0-2.3), rs3733589 (OR, 2.3; 95% CI: 1.4-3.7) and rs16890979 (OR, 3.5; 95% CI: 1.0-11.8) of SLC2A9 gene, and the SNP rs2231142 (OR, 2.5, 95% CI: 1.5-4.3) of ABCG2 gene were associated with a higher risk of hyperuricemia. Our findings show that SLC2A9 and ABCG2 genes might have a physiologic role in adolescents with a high prevalence of hyperuricemia in Taiwan.

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LATE MIDLIFE WOMEN WITH HIGHER ARTERIAL STIFFNESS ARE MORE LIKELY TO HAVE GREATER PLAQUE BURDEN: STUDY OF WOMEN'S HEALTH ACROSS THE NATION (SWAN) PITTSBURGH SITE Mindy L. Columbus* Mindy L. Columbus, Karen A. Matthews, Samar El Khoudary, Jared Magnani, Imke Janssen, Yamnia Cortes, Akira Sekikawa, Emma Barinas-Mitchell, (University of Pittsburgh)

Background: Both arterial stiffness and carotid plaque burden are predictors of cardiovascular disease (CVD) events. Specific carotid plaque morphology may confer increased CVD risk. Although higher arterial stiffness has been associated with carotid plaque burden, morphology data are limited in women at midlife, when CVD risk increases. The objective was to assess the association between central aortic stiffness (carotid-femoral pulse wave velocity (cfPWV)) and carotid plaque morphology and burden. Methods: Plaques were assessed via high-resolution Bmode ultrasound and cfPWV via tonometry in 245/293 SWAN women. Plaques were classified as calcified or non-calcified. Plaque index (PI) was based on percent vessel diameter occlusion summed across plaques. Multinomial logistic regression was used to assess the association of cfPWV (1 SD increase) with calcified plaque status and ordinal logistic regression to assess the association of cfPWV with plaque burden (PI: 0, 1-2, >2) both adjusting for age, race, systolic blood pressure, LDL cholesterol hypertension medication, smoking and financial strain. Results: The women were mean age (SD) 59.6 (2.5) years, 31% black, 69% white, 46% hypertensive and BMI of 29.3 (5.9) kg/m2. Overall, women had median (Q1, Q3) cfPWV (em/s) of 965 (845, 1119) and 85 (34.7%) had calcified plaques, 33 (13.5%) had non-calcified plaques and 127 (51.8%) had no plaques. CfPWV was associated with higher odds of non-calcified (OR (95% CI) 1.002 (1.000-1.004), p=0.014) and calcified plaques (OR (95% CI) 1.002 (1.001-1.004), p=0.0049) vs no plaque. cfPWV was associated with increased odds of higher plaque burden (OR (95% CI) 1.001 (1.000-1.003), p=0.0127). Conclusions: In midlife women, arterial stiffness was associated with greater carotid plaque burden and both calcified and non-calcified plaques independent of traditional CVD risk factors. These findings linking arterial stiffness to atherosclerosis in midlife women merit further investigation.

INFLAMMATORY MARKERS AND FUTURE RISK OF PERIPHERAL ARTERY DISEASE Ning Ding* Ning Ding, Shoshana H. Ballew, Corey Andrew Kalbaugh, Ron C. Hoogeveen, Josef Coresh, Elizabeth Selvin, Christie M. Ballantyne, Kunihiro Matsushita, (Johns Hopkins University)

Introduction: Inflammation is associated with increased risk of coronary heart disease and stroke, but few prospective studies have evaluated its association with incident peripheral artery disease (PAD) in the general population. Hypotheses: Inflammatory markers are associated with an increased risk of incident PAD and its severe form, critical limb ischemia (CLI). Methods: In 12,258 ARIC participants free of PAD at baseline (1990-92), we quantified the associations of two representative inflammatory markers, high-sensitivity C-reactive protein (hsCRP) and white blood cell count (WBC) with incident PAD (hospitalizations with PAD diagnosis [ICD-9: 440.2-440.4] or leg revascularization [e.g., 38.18]) and CLI (severe PAD cases with ulcer, gangrene, or leg amputation) using Cox proportional hazards models hsCRP was log-transformed. Results: Over a median follow-up of 22 years, there were 448 cases of PAD and 161 cases of CLI. Log-hsCRP was significantly associated with incident PAD (unadjusted HR 1.73 [95% CI 1.58-1.89] per 1 SD). The association was attenuated but remained significant after adjusting for potential confounders such as diabetes and smoking (1.46 [1.31, 1.63]). WBC demonstrated similar results with unad justed HR (for 1 SD) 1.15 [1.12-1.18] and adjusted HR 1.08 [1.04, 1.12]. Largely similar results were observed for CLI and across demographic and clinical subgroups. Conclusions: hsCRP and WBC are independently associated with incident PAD in the general population. Our results confirm the importance of inflammation in the development of PAD and potential usefulness of these inflammatory markers available in daily practice for identifying individuals at high risk of PAD.

INDIVIDUAL SOCIODEMOGRAPHIC FACTORS MODIFY RELATIONS BETWEEN MEASURES OF COMMUNITY CONTEXT AND CHANGE IN HBA1C LEVELS IN INDIVIDUALS WITH TYPE 2 DIABETES Annemarie G. Hirsch* Annemarie G. Hirsch, Cara Nordberg, Melissa Poulsen, Brian S. Schwartz, (Geisinger, Department of Epidemiology and Health Services Research)

Background Associations of community contexts with health have been found to vary by individual-level characteristics. We recently reported that community factors were associated with change in glycated hemoglobin (HbAlc) in patients receiving care for type 2 diabetes. We now evaluated whether individual factors modified the observed associations. Methods Using medical record data, we identified patients with type 2 diabetes who had an HbAlc \geq 7.5% and a follow-up HbA1c within 90-270 days. We used 4 community factors that we previously found were associated with HbAlc change - community socioeconomic deprivation (CSED), food availability, fitness assets, and utilitarian physical activity favorability. We used mixed effects models and tested whether individual-level characteristics modified these associations by including cross-product terms between community factors and age (<65, 65+ years), history of Medical Assistance (yes/no, surrogate for low family socioeconomic status [SES]), and race/ethnicity (white/non-white), controlling for sex, treatment, body mass index, time since diagnosis, and baseline HbAlc. Analysis was stratified by community type (townships, borough, census tract in city). Results We identified 15,308 patients with 69,818 elevated HbAlc measures. In townships and cities, better physical fitness assets were associated with a greater reduction in HbAlc only in subjects with low family SES (vs. not low, interaction p<0.04). In boroughs, utilitarian physical activity favorability was associated with a greater reduction in HbAlc only among those of non-white race/ethnicity (vs. white, interaction p<0.03). Conclusion The relations between two measures of physical activity context and HbAlc change differed by family SES and race/ethnicity. Understanding how individual-level factors magnify or mitigate the role of context in type 2 diabetes control could inform targeted secondary prevention strategies.

DIABETES

1151 S/P

THE EFFECTS OF PERIODONTAL CARE INTERVENTION ON PERIODONTAL STATUS AND SELF-CARE BEHAVIORS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS (T2DM): A PILOT RANDOMIZED CONTROL TRAIL STUDY Yi-Ying Hsiao* Yi-Ying Hsiao, Yuan-Jung Hsu, Hsiao-Ling Huang, (Department of Public Health, College of Health Sciences, Kaohsiung Medical University, Taiwan)

Background: The association between diabetes and periodontitis is bidirectional: patients with T2DM are more susceptible to periodontitis, and the presence of periodontitis affects glycemic control. Most intervention studies for DM patients have employed the systemic care model; however oral health and periodontal care have been generally omitted. Objective: Our aim is to evaluate the effects of periodontal care intervention on periodontal status and self-care behaviors in patients with T2DM. Methods: A randomized experimental design was used; patients with T2DM were recruited and randomly assigned to the experimental group (EG) or control group (CG). There were 19 and 14 patients included in the EG and CG, respectively. A periodontal care intervention used for EG, in which the participants underwent the conventional periodontal therapy (subgingival scaling and root planning) combined with 30 minutes of oral health education and instruction once a week for 4 weeks by a certified dental hygienist. The CG received conventional periodontal therapy and the brochure. Pre- and post-test data were collected including periodontal-related knowledge and behaviors, periodontal pocket depth (PPD), plaque index (P1), gingival index (GI), bleeding on probing (BOP) and clinical attachment loss (CAL). Comparisons of periodontal parameters between EG and CG were analyzed by the t-test. Proportion test analyzed the change of self-care behaviors between pre- and post-test. Result: There was a significant difference of change in level of knowledge between the EG and CG. After intervention, two groups differed significantly in terms of changes in PPD, CAL, GI, PI, and BOP (all P<0.05). Moreover, the EG had a significantly higher degree of improvement. Modify Bass brushing technique and interdental brush behaviors showed significant increase in EG. Conclusion: The results suggest periodontal care intervention was effective on periodontal status and self-care behaviors in patients with T2DM.

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HAS THE SKYROCKETING COST OF INSULIN AFFECTED GLYCEMIC CONTROL IN THE US? Mitra Mosslemi* Mitra Mosslemi, Nathan D. Wong, (Epidemiology Department, School of Medicine, University of California Irvine)

Background: Major randomized control trials conducted during the 1990s demonstrated the central role of managing A1C levels in diabetes care. Previous studies have shown a significant improvement in AIC among US adults between 2001-2004. On the other hand, insulin price has been increasing steadily since 1999, and the rate of increase has intensified since 2009. The potential effect of the intensified rise in insulin price on the glycemic control among patients with diabetes in the US has not been studied. Methods: Data from the National Health and Nutrition Examination Survey (NHANES) 2009-2014 and yearly insulin price data from Truven Health Analytics were used to investigate the association between the trends in increasing cost of insulin and the national glycemic control in the US adults (aged ≥18 years) with diagnosed diabetes. First, we performed a Cochran-Armitage trend analysis on the insulin price and the number of patients with $A1C \ge 8$ (poor control) from 2009 to 2014. Next, we used multivariate regression analyses to test which of the demographic, diabetes-related and/or insulin price contributes to the A1C variation in the period of 2009-2014, controlling for other factors. Results: Using NHANES data, we demonstrated that the mean A1C level among individual with diagnosed diabetes inclined from 7.33 in 2003-2004 to 7.44 (7.36-7.52, p<0.01) in the period of 2009-2014. The Cochran-Armitage test demonstrated the expected increasing trend in the proportion of poorly controlled A1C among diabetes patients with the increasing cost of insulin (from 22% to 28%, p<0.01). In the final model (F=7.17, p<0.0001), the family income to poverty (F=3.83, p=0.04) and its interaction with insulin price (F= 5.22, p=0.02) were the only statistically significant contributors to the A1C variations (at p < 0.05). Conclusions: This study suggests that glycemic control is worsened in recent years among US adults with diabetes and the deterioration is associated with the increasing price of insulin.

PRENATAL EXPOSURE TO POLYCHLORINATED BIPHENYLS AND BODY FATNESS IN GIRLS Alice Wang* Alice Wang Zuha Jeddy. (CDC)

Background: Polychlorinated biphenyls (PCBs) are synthetic organochlorine compounds previously used in industrial processes. Although banned, these chemicals continue to persist in the environment and are associated with adverse health outcomes in children Using data from a contemporary pregnancy cohort, we investigated the association between prenatal exposure to PCBs and body fatness in 9 year-old girls in the United Kingdom. Methods: The concentrations of various PCB congeners (PCB-118, PCB-138, PCB-153, PCB-170, and PCB-180) were measured in maternal serum samples collected during pregnancy (N=393). Body fatness was measured using body mass index (BMI), and dual-energy x-ray absorptiometry (DXA) for body fat mass, trunk fat, and overall percent body fat. Using multivariable linear regression, we explored associations between PCB congener concentrations measured in maternal gestational serum and body fatness outcomes with adjustment for maternal pre-pregnancy BMI, maternal education, breastfeeding status, and birthweight. Results: Among 339 mother-daughter dyads, the median (range) (IQR) for PCB congeners was between 15.0 pg/g (11.0-20.8) for PCB-118 to 64.6 pg/g (48.6-86.3) for PCB-153. Means (standard deviations) for percent body fat was 28.1 g (8.5) and for BMI was 18.4 kg/m2 (4.2). A unit (pg/g) increase in PCB-170 concentration was associated with a 0.15 kg/m2 (95% Confidence Interval: 0.02-0.28) higher BMI. No other assessed PCB congeners were associated with body fatness outcomes. Conclusions: Although biologically plausible based on the literature, in this study, prenatal exposure to PCB congeners was not associated with adjusted measures of body fatness in 9-year-old girls.

1162 S/P

ASSOCIATIONS BETWEEN AMBIENT OZONE AND FINE PARTICULATE MATTER EXPOSURES AND AUTISM SPECTRUM DISORDER IN METROPOLITAN CINCINNATI John Kaufman* John Kaufman, J. Michael Wright, Glenn Rice, Natalia Connolly, Julia Anixt, Katherine Bowers, (Association of Schools and Programs of Public Health)

Epidemiological studies have found fairly consistent associations between various air pollution measures and autism spectrum disorder (ASD) for prenatal and postnatal exposures. We examined associations between ASD and ambient fine particulate matter (PM2.5) and ozone concentrations during pregnancy through the 2nd year of life in a study of 428 ASD cases diagnosed at a large regional children's hospital in metropolitan Cincinnati, Ohio, frequency matched (15:1) on birth year to 6420 controls from Ohio birth records. We assigned daily PM2.5 and ozone estimates from US EPA's Fused Air Quality Surfaces Using Downscaling model to each subject for each day of the study period (2005-2012) based on the census tract of the mother's residence at birth. We calculated adjusted ORs (aORs) with logistic regression models using continuous and categorical exposure period averages while adjusting for a priori confounders, other air pollutants, and multiple time windows of exposure. In the multipollutant models, we detected elevated aORs for PM2.5 in the 2nd trimester (aOR range across sextiles: 1.32-1.55) and 1st year of life (OR range across sextiles: 1.63-2.55), and for ozone in the 3rd trimester (highest sextile OR=1.49, 95% CI: 0.74, 2.97) and 2nd year of life (aOR range across sextiles: 1.26-1.92). aORs for cumulative exposure metrics from pregnancy through the 2nd year of life were more consistently elevated for PM2.5 (OR range across sextiles: 1.32-1.66; highest exposure sextile=1.66, 95% CI 1.04, 2.65) than for ozone (OR range across sextiles: 0.77-1.27; highest exposure sextile=1.27, 95% CI: 0.75, 2.13). Though we saw little evidence of exposure-response relationships, the elevated ORs for PM2.5 in upper exposure categories were similar in magnitude to those reported in previous studies. We did not see a consistent pattern of sensitive exposure periods between the two pollutants, but our strongest results for postnatal exposures agree with some previous research.

1161 S/P

NEIGHBORHOOD ENVIRONMENT WALKABILITY SCALE IN SOUTH AMERICAN CHILDREN AND ADOLESCENTS: MULTILEVEL VALIDATION STUDY Augusto Cesar Ferreira De Moaes* Augusto Cesar De Moraes, Elsie C. de O. Forkert, Juan Carlos Aristizábal, Heraclito Barbosa Carvalho, (University of Sao Paulo, School of Medicine YCARE (Youth/Child cArdiovascular Risk and Environmental) Research Group)

Introduction: The literature is scarce on construct validity of perceived neighborhood environment walkability scale (NEWS) by South American children and adolescents. Our hypothesize is: NEWS is correlated with PA level in South American children and adolescents and this construct validity influenced by cities and age group. Methods: The sample involving 456 children and adolescents (3 to 17 years) participants of South American Youth/Child cARdiovascular and Environment Study. Data collection took place in South American cities: Argentina (Buenos Aires), Brazil (São Paulo and Teresina), Chile (Santiago), Colombia (Medellín), Peru (Lima) and Uruguay (Montevideo). The NEWS questionnaire was composed to measure the home environmental characteristics. As a reference method The PA questionnaire evaluate three domains considering frequency, duration and intensity of the included activities and the PA level was classified according WHO criteria. ≥ 60 min/d & < 60 min/d. The intra-class correlation and multilevel linear regression with random intercept model were used to estimate the construct validity of the NEWS. Results: 95.4% of the adolescents and 92.7% of the children reported in their neighborhood has sidewalks and bike paths in good conditions. The children spent 62.8 min/d and adolescents 34.7 min/d doing PA. The prevalence's of $\ge 60 \text{ min/d}$ were: 66.0% (children) and 84.3% among adolescents. The validation coefficients in both age groups were moderate (r=0.41 in children; r= 0.37 in adolescents). The NEWS validation coefficients are explained in 16% in children and 10% in adolescents by contextual factor (cities). Conclusions: Findings suggest that neighborhood environment walkability scale have moderate correlation with PA level. The NEWS questionnaire demonstrates substantial construct validity. Our results provide evidence that self-reported the built environment can be a useful tool for measuring differences in community-level among South American countries.

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PREDICTORS OF URINARY PHTHALATE METABOLITE LEVELS IN POSTMENOPAUSAL WOMEN Katherine W. Reeves* Katherine W. Reeves, Mary Diaz Santan, JoAnn Marson, Susan E. Hankinson, R. Thomas Zoeller, Carol Bigelow, Lifang Hou, Jean Wactawski-Wende, Simin Liu, Lesley Tinker, (University of Massachusetts Amherst)

Background Phthalates are endocrine disrupting chemicals linked to poor health outcomes (e.g. obesity, infertility, cancer). However, the personal and behavioral characteristics that are associated with phthalate exposure are unclear. Methods We measured thirteen phthalate metabolites (PMs) in stored urine samples from 1,257 postmenopausal women enrolled in the Women's Health Initiative. We fit multivariable linear regression models to predict urinary PM concentrations from a broad range of personal, behavioral, and reproductive characteristics. Results The PMs with the highest median concentrations (µg/mg creatinine) were monoethyl phthalate (MEP; 102.4), monobutyl phthalate (MBP; 36.9), mono-(2-ethyl-5-carboxypentyl) phthalate (MECPP; 32.6), mono-(2-ethyl-5-hydroxyhexyl) phthalate (MEHHP; 24.8), and monobenzyl phthalate (MBzP; 17.1). Common predictors of these PMs were age (negative associations with MBP, MBzP, and MEHHP), race/ethnicity (lower MBzP and MECPP and higher MEP in blacks versus whites), geographic region (lower MECPP and MEHHP in the South and higher levels of MBP and MBzP in the West, versus Northeast), and body mass index (positive associations with MBzP, MECPP, and MEHHP). Alcohol intake was associated with higher MBP and lower MECPP levels. Higher physical activity was associated with small increases in MECPP and MEHHP. Higher educational attainment was associated with lower MEP levels. R2 values ranged from 2.3% (MBzP) to 10.3% (MECPP). Conclusion Despite statistically significant associations between some participant characteristics and

urinary PM levels, these variables explained <10% of the variability in PM

concentration. Additional work is needed to identify factors associated with

phthalate exposure to facilitate epidemiologic studies.

PREDICTORS OF SERUM CONCENTRATIONS OF POLYCHLORINATED BIPHENYLS AMONG REPRODUCTIVE-AGED BLACK WOMEN Amelia K Wesselink* Amelia K Wesselink, Traci N Bethea, Michael McClean, Paige Williams, Russ Hauser, Andreas Sjodin, Theodore Brasky, Donna D Baird, Lauren A Wise, (Boston University School of Public Health)

Polychlorinated biphenyls (PCBs) are a class of lipophilic endocrine-disrupting chemicals with wide industrial production and usage from the 1930s through 1977 in the U.S. Due to their environmental and biological persistence, PCBs remain commonly detected in wildlife and humans. We examined predictors of serum PCB concentrations in a prospective cohort study of premenopausal black women aged 23-34 years from the Detroit area (2010-2012). Eligible women did not have a prior diagnosis of fibroids, autoimmune disease, or cancer. We collected demographic, behavioral, dietary, and medical data via self-administered questionnaires, telephone interviews, and in-person clinic visits. We collected non-fasting blood samples from a random subset of 477 participants at enrollment, in which we measured 24 PCB congeners at the Centers for Disease Control and Prevention. We lipid-adjusted PCB concentrations and set values below the limit of detection (LOD) to LOD/sqrt(2). Linear regression was used to calculate percent differences and 95% CI for selected predictors with individual PCBs, sum of total PCBs and sum of PCBs by degree of chlorination. PCB concentrations were inversely associated with education, body mass index (BMI), parity, and lactation duration, and positively associated with age and fish intake. The strength of associations varied by degree of chlorination. For example, BMI ≥35 vs. <25 kg/m2 corresponded to 15.1% lower sum of tri- and tetra-substituted PCBs (95% CI 4.9-24.1), 34.6% lower sum of penta- and hexa-substituted PCBs (95% CI 25.8-42.3), and 49.5% lower sum of hepta-, octa-, nona-, and deca-substituted PCBs (95% CI 42.6-55.6). Likewise, associations for age, education, and fish intake were stronger for more highly chlorinated PCBs. Associations for parity and lactation duration, however, were stronger for less chlorinated PCBs. Results are consistent with studies on predictors of PCB body burdens, few of which include large numbers of black women.

1166 S/P

TROPICAL STORMS AND ASSOCIATED RISK TO ALL-CAUSE, ACCIDENTAL, CARDIOVASCULAR, AND RESPIRATORY MORTALITY IN 78 UNITED STATES COMMUNITIES, 1988-2005 Meilin Yan* Meilin Yan, Ander Wilson, Roger Peng, Mohammad Al-Hamdan, William Crosson, Andrea Schumacher, Seth Guikema, G. Brooke Anderson, (Colorado State University)

While risks of accidental deaths from tropical storms (e.g., drowning, carbon monoxide poisoning) have been well-documented, much less is known about risks for more common causes of mortality (e.g., cardiovascular, respiratory). Here, we conducted the first multi-year, multi-state epidemiological study to estimate the relative risks (RRs) of community-wide all-cause, cardiovascular, respiratory, and accidental mortality associated with tropical storm exposure in the United States (US). To measure storm exposure, we used five hazard-related metrics-distance to storm track; cumulative rainfall; maximum sustained wind speed; flooding; and tornadoes. For each exposure metric, we modeled the association between community-level storm exposure and daily death counts in 78 large eastern US communities, 1988-2005, using a matched analysis of storm-exposed days versus similar unexposed days. We assessed risks for a window from two days before to seven days after the storm's closest approach. Over the study period, 92 Atlantic Basin tropical storms were considered based on US landfall or near-approach, with 70 communities exposed to at least one storm. Under wind-based exposure metrics, we found substantially elevated risk for all mortality outcomes considered, with highest risk typically on the day the storm was closest. Based on wind-exposure, overall RRs of mortality during the full storm exposure window were 1.90 (95% CI: 1.58-2.29), 161.41 (61.62-422.80), 1.30 (0.97-1.76), 1.54 (0.70-3.39) for all-cause, accidental, cardiovascular, and respiratory mortality, respectively. These estimated associations may be dominated by extremely high risks during the few most severe storms (e.g., Andrew [1992], Katrina [2005]), a hypothesis we continue to explore. Our results suggest that very severe tropical storm exposures can have important mortality impacts beyond direct accidental deaths, including potentially important risks for cardiovascular and respiratory mortality.

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AIR POLLUTION AND PRETERM BIRTH: DO AIR POLLUTION CHANGES OVER TIME INFLUENCE RISK IN CONSECUTIVE PREGNANCIES AMONG LOW-RISK WOMEN? Pauline Mendola* Pauline Mendola, Carrie Nobles, Andrew Williams, Danping Liu, Seth Sherman, Indulaxmi Seeni, Katherine Grantz, (NIH/NICHD)

Air pollution has generally decreased over time in the U.S. while having a prior preterm birth (PTB) increases subsequent pregnancy PTB risk. To investigate whether air pollution exposures would have differential effects on PTB risk in two consecutive pregnancies, we estimated exposures based on modified Community Multiscale Air Quality models linked to the NICHD Consecutive Pregnancy Study. Electronic medical records for consecutive delivery admissions were available for 50,005 women with singleton births in 20 Utah-based hospitals between 2002-10. We categorized exposures based on percentiles as high (>75), moderate (25-75) and low (<25). Modified Poisson regression with generalized estimating equations estimated the PTB risk in a second pregnancy associated with persistent high and moderate exposure, and increasing or decreasing exposure, compared to persistent low exposure. Analyses were adjusted for prior PTB, interpregnancy interval and other demographic and clinical characteristics. Pollution levels generally decreased over time, reducing the number of women in the higher categories for the second pregnancy. Second pregnancy PTB risk was increased when exposure stayed high for sulfur dioxide (32%), ozone (17%), nitrogen oxides (24%), nitrogen dioxide (43%), carbon monoxide (31%) and for particles <10 microns (29%) versus consistently low exposure. No effect was observed for particles <2.5 microns. Estimating effects by PTB history, we found that when pollutant levels increased over time compared to staying low, PTB risk tended to increase to a lesser extent for repeated PTB (14-19%) than for women without a prior PTB (51-79%). These findings suggest that area-level changes in air pollution exposure appear to have important consequences in repeated pregnancies. Women with and without a prior PTB were impacted by increasing levels of air pollutant exposure over time but results were stronger among those without a prior PTB.

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PRENATAL AND EARLY LIFE EXPOSURES TO AIR POLLUTION AND CHILDHOOD DEVELOPMENT Sandie Ha* Sandie Ha, Edwina Yeung, Erin Bell, Tabassum Insaf, Akhgar Ghassabian6, Griffith Bell, Pauline Mendola, (Department of Public Health, School of Social Sciences, Humanities and Arts, University of California, Merced, CA)

Particulate matter <2.5µm (PM2.5) and ozone (O3) have been linked to poor fetal outcomes but few studies simultaneously explored prenatal and early life exposures in relation to childhood development. Participants included 3,754 singletons and 2,071 twins from the Upstate KIDS Study, a pediatric cohort in upstate New York (2008-2010). Census tract level PM2.5 and O3 estimated by the Environmental Protection Agency Downscaler models were linked to each child's addresses during pregnancy and early life incorporating residential history, and locations of maternal work and day-care. Parents reported on their children's development at ages 4, 8, 12, 18, 24, 30 and 36 months in 5 domains using the Ages and Stages Questionnaire. Generalized mixed models were used to obtain the RRs and 95% CIs for the risk of failing any developmental domain per µg/m3 increase in PM2.5 and ppb increase in O3. Models were adjusted for maternal demographics, lifestyle, birth characteristics, gestational complications, season, and exposures during other windows. Among twins, exposures to PM2.5 during trimester 2 [RR: 1.06(1.01,1.11)], and the first two years [RRY1: 1.57(1.33,1.84); RRY2: 1.67(1.40,2.01)] were associated with the risk of failing any developmental domain. Whole-pregnancy and first-year PM2.5 exposures also increased the risk of failing fine motor [RR:1.10(1.03,1.18)] and communication [RR: 1.24(1.04,1.48)] domains, respectively. Third trimester O3 exposure increased the risk of failing the personal-social domain [OR: 1.03(1.01,1.05)], but exposure during the first three years was associated with a slightly lower risk of failing the communication, fine motor, and personal-social domains. Similar findings were observed for singletons but they were weaker and not significant. We found evidence suggesting that PM2.5 exposures during pregnancy and early life may increase the risk of delayed childhood development, especially among twins. The associations with O3 appear inconsistent.

USING MULTIPLE SPATIAL MEASURES TO EXAMINE PATHWAYS BETWEEN RESIDENTIAL GREEN SPACE AND BIRTH OUTCOMES IN PORTLAND, OREGON Leanne Cusack* Leanne Cusack, Mike Papenfus, (ORISE fellow at the Environmental Protection Agency)

Background: Measures of green space used in epidemiological studies (e.g. Satellite Normalized Difference Vegetation Index (NDVI) or land cover) capture multiple exposures and pathways potentially relevant to health (e.g. air pollution reduction, physical activity, psychological influences, etc.) Here we examine how different exposure measures of green space are related to each other and the specific pathways in which they may be associated with birth outcomes in a population-based birth cohort Portland, Oregon. Methods We used Vital Statistics data to create a birth cohort in Portland, Oregon from 2000 to 2011 (n=244,709). Residential green space was assigned using multiple measures including % tree cover from the EPA EnviroAtlas, number of street trees obtained from the Portland Street Tree Inventory and mean annual LandSat 5 30m NDVI at various buffer distances Logistic and linear mixed models were used to determine associations with preterm birth, small for gestational age (SGA) and term birth weight, controlling for individual and neighborhood factors Results: We observed varying degrees of correlation between the different green space measures. These ranged from 0.04 for tree count in 50m and NDVI to 0.70 for NDVI and tree cover. Unadjusted results demonstrated protective effects of NDVI for all buffer sizes (50m, 100m, 250m,500m and 1000m) on birth weight; however, in fully adjusted models these effects disappeared. For example, an IQR increase (0.1) in NDVI with a buffer of 50m was associated with a 20.7 gram (95% CI: 19.2, 22.3) increase in term birth weight in unadjusted models and a 0.3 gram (95% CE -1.2, 2.0) increase in fully adjusted models. Maternal and paternal race, ethnicity and education had the largest impact on reducing associations.

TRADITIONAL AND GENETIC RISK SCORE AND STROKE RISK PREDICTION IN KOREA Sun Ha Jee* Sun Ha Jee, Keum Ji Jung, (Yorsei University)

Background: Whether stroke model with single nucleotide polymorphisms (SNPs) with big effect size identified in Genome-wide association studies (GWAS) is to improve predictability and stroke prediction model with genetic variants has higher predictability for young-stroke than old stroke remains unknown. Methods: In this study, we used a case-cohort study from the Korean Cancer Prevention Study-II (KCPS-II) (N = 156,701). We genotyped 74 SNPs identified in GWAS on the KCPS-II sub-cohort members and incident stroke cases. We calculated a genetic risk score (GRS) by summing the number of risk alleles over all SNPs. Prediction models with or without GRS were evaluated in terms of the area under the receiver operating characteristic curve (AUROC). Results Sixteen out of 74 SNPs identified in GWAS in this study showed significant association with stroke, with an odds ratio greater than 2.0 in Koreans. For participants aged <40 years, AUROCs (95% CI) for modifiable traditional risk factors (Model 1), GRS only (Model 2), and Model 1 plus GRS (Model 3) were 0.58, 0.65 and 0.67 for incident stroke, respectively. Compared to Model 1, Model 2 improved AUROC by 7%, while Model 3 improved it by 9%. A favorable traditional risk was associated with a significantly less stroke risk within each genetic risk category. Conclusions Traditional and genetic risk scores were independently associated with susceptibility to stroke. Among young participants, genetic variants may be useful for predicting stroke risk. Moreover, a favorable traditional risk was associated with stroke regardless of the genetic risk level. This research was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (NRF-2016R1A6A3A11933465) and a grant of the Korean Health Technology R&D Project, Ministry of Health & Welfare, Republic of Korea (HI14C2686). Keywords prediction, genetic variants, stroke, case-cohort study

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TRANS-ETHNIC GWAS META-ANALYSIS IDENTIFIES OVER 180 GENETIC LOCI FOR SERUM URATE Adrienne Tin* Adrienne Tin, Jonathan Marten, (Johns Hopkins Bloomberg School of Public Health)

Background. High serum urate levels are a cause of gout, an excruciating disease with suboptimal treatment affecting ~4% of the adult population in many developed countries. Ancestry-specific genome-wide association studies (GWAS) of serum urate in European, African, and Asian ancestries have identified a total of >30 loci. Together the index SNPs at these loci explain <10% of the phenotypic variance, suggesting that additional loci remain to be identified. No trans-ethnic association studies of serum urate have been performed to date. Method. We performed ethnicspecific and trans-ethnic meta-analyses of GWAS among 457,690 individuals (European ancestry: 288,649; East Asians: 125,725; African Americans: 33,671; South Asians: 9,037, Hispanic Americans: 608) from 74 studies using fixed-effect inverse variance weighting in METAL. To further investigate ancestry as a source of heterogeneity of allelic effects, we conducted trans-ethnic genome-wide metaregression using MR-MEGA by generating axes of genetic variation based on pairwise allele frequency differences between studies and estimate the effects of these axes for each variant. Results. Ethnic-specific meta-analyses identified 124, 46, and 14 genome-wide significant 1-Mb genomic intervals in European ancestry, East Asian, and African-American individuals, respectively. Trans-ethnic metaanalysis identified 184 intervals that contained ≥1 variant associated with serum urate at p140 1-Mb genomic intervals with no previous association with serum urate. Further fine mapping and integration with bioinformatics will generate novel insights into serum urate metabolism and potential treatment targets for lowering urate levels and prevention of gout.

THE ASSOCIATION BETWEEN GUT MICROBIOTA AND

ANTHROPOMETRIC MEASUREMENTS IN BANGLADESH Gwendolyn Osborne* Gwendolyn Osborne, Fen Wu, Liying Yang, Farzana Jasmin, Muhammad G Kibriya, Faruque Parvez, Ishrat Shaheen, Golam Sarwar, Alauddin Ahmed, Mahbub Eunus, Tariqul Islam, Vesna Slavkovich, Jiyuan Hu, Huilin Li, Joseph H. Graziano, Zhiheng Pei, Habibul Ahsan, Yu Chen, (Departments of Population Health and Environmental Medicine, New York University School of Medicine, New York, New York, USA)

Background: Many studies have observed an association between gut microbiota and obesity measured using body mass index. However, few studies have investigated the gut microbiota in relation to other anthropometric measures. Also, no studies have been done in low-income, lean populations. Objective: To investigate the relationship between the gut microbiota and anthropometric measurements among 248 participants from the Health Effects of Arsenic Longitudinal Study (HEALS) in Bangladesh. Our cohort represents a unique population that allows for the investigation of the gut microbiota and anthropometric measurements in lean individuals. Methods: We measured height, weight, and arm, thigh, hip, and waist circumferences, and collected fecal samples. Microbial DNA was extracted from the stool samples and sequenced by 16S rRNA gene sequencing. We examined the associations between relative abundance of individual bacterial taxa from phylum to genus levels and the anthropometric measurements. Results: Higher BMI, mid-upper arm circumference, waist circumference, and waist-to-hip ratio were associated with a lower diversity of fecal bacteria after adjusting for sex, age, smoking, betel nut chewing, and education. The relative abundance of the genus Oscillospira and the family S24-7 were inversely related to all the measurements after correction for multiple testing (FDR p-value <0.05). The relative abundance of the genus Acidaminococcus and the family Ruminococcaceae were also associated with several measurements The positive associations of the genus Acidaminococcus with BMI, as well as waist and hip circumferences, were stronger in women than in men (p-values for interaction <0.01). Conclusions: Our data in a lean Bangladeshi population are consistent with the evidence of an association between Oscillospira and leanness, measured using multiple anthropometric measures. We also identified several other bacterial taxa that were related to various anthropometric measurements

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EFFECTIVENESS OF STRATEGIES FOR IMPLEMENTING CHILDHOOD VACCINATION PROGRAMS IN FRAGILE COUNTRIES Faiza Rab* Faiza Rab, Zhe Li, (Doctoral student)

Background Despite emphasis on childhood vaccination programs as being the most effective intervention in reducing childhood mortality, millions of children remain unvaccinated globally, majority of whom live in countries in 'fragile states'. According to Organisation of Economic Co-operation and Development, political destabilization, human rights violations, economic and social insecurities have resulted in many countries being in 'fragile state,' with crumbling health infrastructure and poor health care delivery. Objectives Our aim was to identify strategies to improve childhood vaccination uptake in 'fragile' countries and compare community based programs for their effectiveness. Methods 'Childhood', 'immunization' and 'fragile states' were key concepts identified for systematic literature search, limited to English language, conducted between January and March 2017 by two independent reviewers. Screening results were compared at 3 levels and kappa statistics calculated at each level. Data extraction included year of the study, location, setting, study design, characteristics, type of vaccination assessed in the study, the intervention or campaign, control, vaccination outcomes and study limitations, measures of effect (OR, RR) describing increase in coverage or decrease in dropout and missed vaccination. Random effects model was used to evaluate effectiveness of vaccination programs. Results Twenty seven studies published between 1996 and 2016 were identified as effective community level strategies for childhood vaccinations in fragile countries. Kappa for the three levels of screening ranged from substantial to good (0.75, 0.61, 0.58). The identified strategies included: recall and reminder through SMS texts, phone calls, reminder stickers and cards; health education programs; microplanning strategies; monetary incentives. Data was collected from 43,018 participants. SMS text reminders was found to be the most effective intervention (RR 1.32, CE 1.14 to 1.52).

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THE INTERACTION EFFECTS OF COMMON GENETIC VARIANTS AND ENVIRONMENTAL FACTORS ON HYPERCHOLESTEROLEMIA: A GENOME-WIDE ASSOCIATION STUDY Yi Shian Liu* Yu-Ting Tseng, Yi Shian Liu, Tsu-Nai Wang, (Department of Public Health, College of Health Science, Kaohsiung Medical University)

Introduction High blood cholesterol is a major risk factor of cardiovascular diseases. The prevalence of hypercholesterolemia was raised from 11.2% to 20.4% in the past decades. Recently, several genome-wide association studies (GWAS) have identified single nucleotide polymorphisms (SNPs) associated with the blood cholesterol levels in Europeans and Americans, few studies have conducted in Asian. Objectives Our aims are to identify novel genetic variants which are associated with high blood cholesterol levels, and to investigate the interactions between genetic variants and environments in Han Taiwanese. Methods A total of 436 men and 518 women were genotyped using the Affymetrix Axiom Genome-Wide Array Plate, which comprised 61,565 SNP markers from the Taiwan biobank. After quality control, we looked for the associations between SNPs and high blood cholesterol levels. Results We found that rs57934221 and rs2073068 showed the statistical significance after adjusting for confounding factors (P=3.76E-06 and 5.29E-06), which located on NXNR3 and PLEKG1 genes. Moreover, the smoking subjects with the rs57934221 AA genotype had 6.35-fold risk of high blood cholesterol levels than nonsmoking subjects with the GG genotype. The smoking subjects with the rs2073068 GG genotype had 3.17-fold risk of high blood cholesterol levels than nonsmoking subjects with the AA genotype. We also found that the overweight subjects with the rs2073068 GG genotype had 4.46-fold risk of high blood cholesterol levels than normal weight subjects with the AA genotype. Conclusions We identified NXNR3 and PLEKG1 genes as novel genes of high blood cholesterol levels in Taiwan adults. Further replication studies in large sample sizes are needed.

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AGE-PERIOD-COHORT EFFECT IN MARIHUANA USE IN THREE SOUTH AMERICAN COUNTRIES Alvaro Castillo-Carniglia* Alvaro Castillo-Carniglia, Ariadne Rivera-Aguirre, Katherine M. Keyes, Magdalena Cerdá, (Violence Prevention Research Program, University of California, Davis)

Introduction: In a context of recent drug policy changes, and increasing rates of marijuana use in some Latin American (LA) countries, the decomposition of population-level trends can help to explain the sources of variation over time. While studies have examined age-period-cohort (APC) effects in the US and other developed countries, little is known about this in LA. Objective: We estimated and compared the APC effects in past year marijuana use in three South-American countries, including Uruguay that legalized recreational marijuana use, and Chile and Argentina that are considering the legalization of medical and recreational marijuana. Methods: We used methodologically comparable, nationally representative, repeated cross-sectional general population surveys on substance use from 1994 to 2016 (n=18,218 in Uruguay; n=42,429 in Argentina; n=202,585 in Chile). The surveys were conducted at 2-4 year intervals depending of the country. All surveys used a three-stage random sample design, included people aged 15-65, and used a face-to-face interview. APC effects were estimated using cross-classified logistic hierarchical models. Results: By period, Chile and Uruguay experienced an increasing trend in past year marijuana use, while in Argentina, past year use remained stable over time. By age, the highest probabilities of use in Chile and Uruguay were in the younger groups (ages 15-25), while in Argentina the highest probabilities were at ages 30 to 40. By cohort, the oldest (1945 to 1950) and the youngest (1985 to 1995) cohorts had the highest probabilities of use in Argentina, while in Chile the probability of use increased until 1975, to decrease thereafter. There was no clear cohort effect in Uruguay. Conclusions: We observed different APC effects in marijuana use across the three countries. To the contrary of US and some European countries, after accounting for cohort and age effects we saw a consistent increase in marijuana use over time in Chile and Uruguay.

THE CHRONIC KIDNEY DISEASE PROGNOSIS CONSORTIUM (CKD-PC): A GLOBAL, COLLABORATIVE, INDIVIDUAL PATIENT DATA META-ANALYSIS Shoshana H. Ballew* Shoshana H. Ballew, Morgan Grams, Kunihiro Matsushita, Mark Woodward, Ron T. Gansevoort, Andrew S. Levey, Josef Coresh, (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD and CKD Prognosis Consortium)

Background: The Chronic Kidney Disease Prognosis Consortium (CKD-PC) was established in 2009 and has grown to be the largest CKD consortium in the world. CKD-PC has contributed to multiple clinical practice guidelines over the past decade, while respecting cohort autonomy and allowing some of the largest datasets to share only aggregate results. Methods: CKD-PC procedures include: rotating membership on a Steering Committee; a single data coordinating center (DCC) responsible for statistical programs and management of papers; continuous open cohort enrollment; opt-in for each cohort for each paper; rotating lead and coauthorship with ~15 authors per paper and all contributing collaborators listed in PubMed. Piece-wise linear spline models allow a detailed examination of the doseresponse association between estimated glomerular filtration rate and albuminuria and outcomes (mortality, cardiovascular diseases, end-stage renal disease [ESRD], acute kidney injury, and progression of CKD) and can be pooled across cohorts using the variance-covariance matrix of the regression coefficients Results: CKD-PC now includes 80+ cohorts representing general, high cardiovascular risk, and CKD populations from 40+ countries including 13+ million participants. CKD-PC has published 20 meta-analyses since 2010 and contributed to numerous international guidelines and regulatory body policies. For example, CKD-PC observational analyses combined with re-analysis of clinical trials and mathematical simulations demonstrated that a 30-40% decline in kidney function could be an acceptable surrogate for ESRD in clinical trials. Implications: CKD-PC procedures enable flexible collaborative meta-analyses, inclusion of cohorts that cannot share raw data due to legal/administrative constraints, and allow efficient response to guideline workgroups and regulators' needs.

RACIAL AND ETHNIC DISPARITIES IN STAGE AT PRESENTATION OF EWING SARCOMA: RESULTS FROM THE FLORIDA CANCER DATA SYSTEM Mohammad Alawad* Mohammad Alawad, Tulay Koru-Sengul, (King Saud Medical City)

BACKGROUND: Ewing Sarcoma (ES) is a rare, malignant small round cell tumor affecting children and young adults. In the United States (US), ES is the second most common malignant bone tumor among children/adolescents after osteosarcoma. Previous reports on ES epidemiology were mainly directed toward incidence rates, patient characteristics, and overall survival. There is limited research on disparities in tumor stage at presentation. This study examines sociodemographic and clinical disparities in ES and ES stage at presentation. METHODS: Patients with ES diagnoses were identified using 1981-2013 Florida Cancer Data System (FCDS) and linked with 2000 US census. Patients' sociodemographic and clinical characteristics were extracted. Explanatory data analysis and Chi-square test were used to analyze the differences across patient sociodemographic and clinical characteristics and stage at presentation (localized, regional, distant) and ES site (bone/joints, soft tissue), respectively. SAS v9.4 were used for data management and statistical analysis. RESULTS: There were 675 incident cases of ES including children (56.9%) and adults (43.1%). Majority of cases were male (60.9%), white (91.1%), non-Hispanic (78.1%) and <18 years (56.9%). Bone/joints ES (88.2%) were diagnosed more often than soft tissue ES (11.9%). With respect to stage at presentation, there were more distant (36.2%) than regional (34.6%) and localized (29.2%) stage. No significant differences between stage at presentation and age, sex, race, ethnicity, respectively. With respect to ES site, there were statistically significant differences in age and stage presentation. CONCLUSION: To our knowledge, this study is the first study to explore ethnic/racial disparities in ES stage at presentation. Despite the substantial difference in incidence rates among racial/ethnic groups, no statistically significant difference was noticed when it comes to stage at presentation. Further studies with large sample size across different US regions ar

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IMPACT OF ORGANIZED COLORECTAL CANCER SCREENING PROGRAMS ON SOCIOECONOMIC AND HEALTH-SERVICE RELATED SCREENING INEQUITIES: A STUDY OF THREE PROVINCIAL PROGRAMS IN CANADA Alexandra Blair* Alexandra Blair, Lise Gauvin, Geetanjali D. Datta, (University of Montreal, CHUM Research Center)

Background: Preventive colorectal cancer screening participation remains low in Canada, and large social disparities in screening exist. Several Canadian provinces have implemented organized screening programs to promote screening uptake. Objectives To evaluate the effectiveness of systematic and patient-reliant organized colorectal screening programs at 1) increasing overall recent (<2 years) stool-based screening, and 2) reducing screening inequities by income, access to a regular medical doctor (MD), education, and rural residence. Methods: Using a sample of Canadian Community Health Survey respondents (cycles 2003-2014), aged 50-75 years with no family history or symptoms of colorectal cancer, we evaluated two systematic programs, in provinces of Saskatchewan (SK) and Nova Scotia (NS), where all age-eligible residents receive screening kits via mail; and one patientreliant program in Prince Edward Island (PEI), where respondents receive screening kits via mail following their request. The Difference-in-Differences framework was applied using adjusted Poisson regression models with pooled, weighted populations of New Brunswick and Newfoundland as controls. Results: All programs increase recent screening overall (compared to controls, prevalence differences (PD) were 4.7%, [95% CI 1.7%, 7.8%] in SK and NS, pooled; and 11.9% [95% CI 1.5%, 7.5%] in PEI). PEI's program increased the gap in screening according to MD access (PD=19.9% [95% CI 5.7%, 34.2%]), while the other inequities were unchanged. Educational disparities increased after the implementation of SK's program screening (PD=9.1% [95% CI 1.4%, 16.7%]), while other inequities remained. NS's program had no impact on any of the assessed inequities. Interpretation: Organized programs appear to increase screening overall, but not to reduce identified screening inequities. Future work on the acceptability, feasibility, and effectiveness of complimentary targeted interventions is needed.

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POVERTY AND INVASIVE GROUP A STREPTOCOCCUS INFECTIONS IN MINNESOTA 1996-2016: ANALYZING SOCIAL DISPARITY WITH THE USE OF GEOCODING AND AREA- BASED POVERTY MEASURES Ishrat Kamal-Ahmed* Ishrat Kamal-Ahmed, Dr. Richard Danila, Dr. Michael Osterholm, Dr. Craig Hedberg, Dr. James Hodges, (University of Minnesota)

It has been difficult to determine the association, if any, between invasive Group A Streptococcus (GAS) disease and poverty due to lack of individuals' income/ poverty status. We used Census derived area-based poverty information as a proxy for an individual's poverty status as outlined by the Harvard School of Public Health Disparities Geocoding Project method. Data were collected by the Minnesota Department of Health Emerging Infections Program. More than 3,600 GAS cases from 1996 to 2016 were geocoded to their corresponding census tract poverty levels and analyzed. Results demonstrated there would be 18% (population attributable fraction or PAF of 18%) reduction in GAS if the exposure to poverty were reduced to zero. PAF was highest (29.4%) for 45-64 year-olds. The highest incidence rate ratio (IRR) of 2.26 (95% CI [2.02, 2.52]) was observed between the least impoverished (poverty level =20%). RII (relative index of inequality) of 2.45 (95% CI [2.14, 2.77]) indicated that people in the most impoverished group were 2.45 times more likely to have GAS than those in the least impoverished group. Similar methods can be applied where an individual's information on social determinants of health such as race, ethnicity, literacy, employment status, etc. is missing from the data. This may help accurately quantify any social disparity, and subsequently design proactive health measures, for both chronic and infectious diseases.

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SOCIOECONOMIC DISPARITIES IN WEIGHT, HEIGHT AND BODY MASS INDEX IN CHILDHOOD/ADOLESCENCE FROM 1953–2015: FINDINGS FROM FOUR BRITISH BIRTH COHORT STUDIES David Bann* David Bann, William Johnson, Leah Li, Diana Kuh, Rebecca Hardy, (University College London)

Socioeconomic disparities in childhood body mass index (BMI) have been repeatedly documented in high income countries, yet it is unclear how they have changed across time, how disparities in the components of BMI have changed (weight and height), or whether disparities differ in magnitude across the outcome distributions. We investigated disparities in childhood/adolescent weight, height, and BMI using data from four national British birth cohort studies initiated in 1946, 1958, 1970, and 2001 (N=34,873). Associations between childhood socioeconomic position (SEP-father's social class in 6 categories) and anthropometric outcomes at age 7, 10/11 and 14/16 years were examined via gender-adjusted linear regression. Multilevel models were used to examine if disparities widened or narrowed from childhood to adolescence; quantile regression was used to examine whether the magnitude of associations differed across the outcome distribution. Lower SEP was associated with lower childhood/adolescent weight in earlier born cohorts, yet with higher weight in the 2001 cohort. Lower SEP was associated with shorter height in all cohorts, yet the absolute magnitude of this difference narrowed across generations. There was little evidence for childhood BMI disparity in the 1946-1970 cohorts, yet disparities were present in the 2001 cohort, and in all cohorts at 14/16 years (P<0.05 age x SEP interactions). BMI and weight disparities were present at the median, yet systematically larger at higher quantiles-e.g., a 0.98kg/m2 disparity (95% CI: 0.63-1.33) at the median in the 2001 cohort at 11 years (lowest to highest SEP), yet 2.54kg/m2 (95% CI 1.85-3.22) at the 90th percentile. Findings suggest that weight disparities reversed yet height disparities narrowed from 1953-2015, leading to BMI disparities in more recently-born British children/adolescents. Reducing socioeconomic disparities may benefit population health by both shifting the median and right-skew of the BMI distribution.

LIMITED HEALTH LITERACY AND ADVERSE OUTCOMES AMONG KIDNEY TRANSPLANT CANDIDATES Mara McAdams-DeMarco* Fatima Warsame, Christine Haugen, Jacqueline Garonzik-Wang, Niraj Desai, Rasheeda Hall, Rekha Kambhampati, Deidra Crews, Tanjala Purnell, Dorry Segev, Mara McAdams-DeMarco, (Department of Surgery, Johns Hopkins School of Medicine)

Background: Limited health literacy adversely affects health outcomes in patients with chronic disease. We aimed to examine the association between health literacy, listing, and waitlist mortality among KT candidates. Methods In a prospective cohort study of 1,544 adult KT candidates, health literacy was assessed at the time of KT evaluation (5/2014-8/2017). We ascertained responses to the Brief Health Literacy Screen (scores range from 0-12 with lower scores indicating worse health literacy); limited health literacy was defined as a score ≤ 5 . Using adjusted logistic regression, we identified risk factors for limited health literacy. Using adjusted Cox proportional hazards models, we quantified the association between health literacy with listing and waitlist mortality. Results 9.3% of all KT candidates and 7.2% of KT waitlist patients had limited health literacy. Risk factors for limited health literacy included less than a college education (aOR=2.57, 95%CI:1.73-3.85), frailty (aOR=1.98, 95%CI:1.32-2.97), and cognitive impairment (aOR=4.49, 95%CI:2.91-6.93). Candidates with limited health literacy had a 31% (aHR=0.69, 95%CI:0.52-0.90) decreased likelihood of listing and a 2.26-fold (95%CI:1.04-4.94) increased risk of waitlist mortality. Conclusion: KT candidates with limited health literacy are less likely to be listed for KT and those who are listed are at increased waitlist mortality risk. ESRD patients with limited health literacy may represent a more vulnerable subgroup of KT candidates that require additional support and resources in their pursuit of KT.

COMPARING THE ROLES OF HOUSEHOLD AND AREA POVERTY IN THE LONGITUDINAL YOUTH FITNESS-SCHOOL ABSENTEEISM ASSOCIATION ACROSS GENDER Emily M. D'Agostino* Emily M. D'Agostino, Sophia E. Day, Kevin J. Konty, Michael Larkin, Subir Saha, Katarzyna Wyka, (Miami-Dade County Department of Parks, Recreation and Open Spaces)

Youth fitness improvements are associated with lower school absenteeism, particularly for girls attending schools in high poverty areas. Area-based poverty may better capture heath inequities resulting from socioeconomic differences across individuals, particularly in urban settings where great disparities exist in health resources across neighborhoods. However, socioeconomic factors may differ between school and home, and across gender, potentially having different influences on the fitness-absenteeism association. We studied the relationship between schoolarea and household poverty to address the impact of employing different poverty measures in fitness-absenteeism research. Students were followed from grades 5 through 8 (n students=349,381, n schools=624; 51% male; 38% Hispanic, 28% non-Hispanic black; 83% US-born; 69% and 48% high household and area poverty, respectively). Three-level generalized linear mixed models were run to examine the longitudinal association between individual children's fitness and lagged school absenteeism over 4 years in New York City middle schools, comparing models which accounted for individual household poverty (free/reduced lunch status) and school-area poverty. An inverse dose-response fitness-absenteeism relationship was observed, with highest magnitude for girls in high household poverty. Relative to the reference group (>20% decrease in fitness), girls in high household poverty with a large fitness increase (>20%) demonstrated 11.6% fewer days absent (IRR 95% CI: 0.833, 0.938), followed by those who had a 10-20% fitness increase (9.5%, IRR 95% CI: 0.844, 0.969), no change (7.7%, IRR 95% CI: 0.883, 0.981) and a 10-20% fitness decrease (4.3%, IRR 95% CI: 0.891, 1.023). Findings did not change when models included a household*area poverty interaction term, and no models were significant in boys. Expanding home-neighborhood youth physical activity programs, particularly for girls living in poverty may reduce school absenteeism.

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RACIAL/ETHNIC VARIATIONS IN PERSONAL AND HOME PRODUCT USE IN PREGNANT WOMEN Marissa C. Grenon* Marissa C. Grenon, Andrea Bellavia, David Cantonwine, Ellen W. Seely, Thomas F. McElrath, Tamarra James-Todd, (Harvard T.H. Chan School of Public Health)

Background: Pregnancy exposure to endocrine-disrupting chemicals (EDCs) varies across racial/ethnic groups, which could increase the risk of certain pregnancy complications and adverse reproductive health outcomes in disadvantaged populations. Identification of modifiable sources of EDCs that are unequally distributed by race/ethnicity is required to design effective public health interventions. Therefore, we evaluated differences in product use associated with EDC exposure in a diverse pregnancy cohort. Methods: We included a total of 437 women from the LIFECODESs pregnancy cohort study (Boston, MA) who completed a self-reported questionnaire in the 1st and/or 2nd trimester (median 9.9 and 26 weeks gestation, respectively). Race/ethnicity was categorized as: White, Black, Asian, Hispanic, Other. The use of 19 products (13 personal care, 6 home) within 48 hours of the prenatal visit was reported. We calculated the proportion of each product use, as well as the total number of products used by racial/ethnic group. We also evaluated change in product use between the two time periods. Results: Compared to Asian and Black women, white and Hispanic women reported a significantly higher use of total products in the 1st trimester (Asians: 6, 95% CI:5.5,7.4; Black: 7, 95% CI:6.2,7.8; white: 8, 95% CI:7.9,8.5; Hispanic: 9, 95% CI:8.2,9.4). Differences were mainly driven by higher use of personal care products and remained similar in the 2nd trimester. A significant reduction over time in total, personal care, and home products used was observed only among Hispanic women (-1.4, 95% CI:-1.9,-0.9; -0.8, 95% CI:-1.3,-0.3; -0.6, 95% CI:-1.1,-0.2), respectively). Conclusions: In a pregnancy cohort, we observed significant racial/ethnic differences in use of personal care and home products known to be sources of EDCs. Future studies should investigate how these usage patterns could contribute to racial/ethnic disparities in reproductive outcomes known to be associated with EDCs.

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SOCIOECONOMIC FACTORS, ANEMIA AND THEIR EFFECTS ON MORTALITY IN HEART FAILURE. Johnbosco Umejiego* Johnbosco Umejiego,, (Cook Children's Health Care System)

Background Despite the introduction of survival-enhancing therapies in the clinical management of heart failure (HF), the association between socioeconomic status (SES) and mortality remains uncertain. This has created an unmet need in subgroups of HF populations. The aim of this study was to determine if the elevated risk of mortality in HF is significantly mediated by SES. Methods The study was a population-based survey using the National Health and Nutrition Examination Survey (NHANES) data from 1999-2010. Respondent's coverage by health insurance, education level, and reported annual family income was used as domains of socio-economic measures A series of models were developed using Cox regression model to estimate the effect of socioeconomic factors on mortality ad justing for demographics and comorbid covariates. The excess risk of mortality was calculated in determining the population attributable risk. Results The study population consisted of 926 subjects with a self-reported diagnosis of HF. In the full model, results showed a strong and significant anemia effect on mortality after ad justments (HR= 2.0, 95% CI: 1.47-2.79). These results suggest socioeconomic factors contributed 23% of the excess risk of mortality due to anemia. (i.e., [2.3-2.0]/ [2.3-1]). The relationship between income, education, and mortality remained weak and insignificant, controlling for demographics and comorbidities simultaneously. Those without health insurance had a two-fold higher risk of mortality than those with health insurance (HR=1.81, 95% CI: 0.85-3.81). Conclusion Aside from health insurance, education and income are not significant predictors of mortality in HF. There is a modest contribution to the risk of mortality due to anemia by SES. Increased access to care through coverage will reduce mortality in HF population.

ESTIMATING THE EFFECTS OF MIGRATION FROM MEXICO TO THE US ON SELF-RATED HEALTH AND MORTALITY: A COMPARISON OF MEXICAN-BORN US RESIDENTS AND NON-MIGRANT MEXICANS Adina Zeki Al Hazzouri* M. Maria Glymour, Adina Zeki Al Hazzouri, Lanyu Zhang, Audrey Murchland, Leslie Grasset, Rebeca Wong, Clinton Wright, Jacqueline M. Torres, Mary N Haan, Elizabeth Rose Mayeda, Richard N Jones, (UCSF)

Most evidence on the health effects of migration to the US compares migrants residing in the US with US-born individuals. The relevant counterfactual for migrants, however, corresponds better with non-migrants who remained in the country of origin. Regardless, such comparisons may be biased if childhood socioeconomic status (SES) influences migration and also predicts later life health. We merged harmonized data for Mexicans living in Mexico who never migrated to the US and participated in the Mexican Health and Aging Study (N=9,837) with data for Mexican-born migrants living in the US participating in the Health and Retirement Study (n= 494). First, we examined predictors of migration, and second, we examined the prevalence of fair/poor self-rated health at baseline (2001/2000) and mortality through 2012, comparing migrants to non-migrants. Logistic regression (for self-rated health) and Cox proportional hazards models (for mortality) were adjusted for age, sex, and parental education. Mean age at baseline was 62 years (SD=9) in both groups; 55% of migrants and 57% of non-migrants were female. Migration to the US was predicted by higher maternal (OR=3.97 for ≥ primary versus < primary; 95% CI: 2.76, 5.70) and paternal (OR= 2.08; 95% CI: 1.44, 2.99) education. In age and sex adjusted models, compared to non-migrants, fair/poor self-rated health was less common among migrants to the US (OR=0.79, 95% CI: 0.63, 1.00). Adjusting for parental education (OR=0.94; 95% CI: 0.72, 1.22) substantially attenuated this advantage. Migrants had lower mortality hazard compared to non-migrants in age and sex adjusted models (HR=0.40; 95% CI: 0.35, 0.45); additional adjustment for parental altered this association very little (HR=0.36; 95% CI: 0.31, 0.41). Mexico-US migration for these cohorts was strongly patterned by childhood SES. After accounting for parental education, migration appeared to have little effect on self-rated health but was associated with lower mortality.

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DISPARITIES, MULTIPLE PRIMARIES AND VITAMIN D Amy E. Abruzzi* Amy E. Abruzzi, Kitaw Demissie, Pamela Ohman Strickland, David August, (Rutgers University -Edward J. Bloustein School of Policy and Public Planning)

Background: Disparities have been well documented in both colorectal and prostate cancer occurrence but have not been extensively examined in multiple primary cancers. The extent to which race is associated with vitamin D radiation (VDR) or socioeconomic (SES) deprivation, adjusted for prior radiotherapy, is unknown. Methods: White and black males aged 50 years with first primary cancer (FPC) of the colon, rectal or prostate and no distant metastasis were drawn from SEER and followed for subsequent primary cancer (SPC) development. Logistic regression and competing risk Cox Proportional Hazards models were used to estimate the adjusted risk associated with individual and county-level factors. Results: Overall, blacks were at higher risk of SPCs than whites, with the greatest increase in risk observed among colon FPC (76%) and rectal FPC (95%) patients. High levels of winter VDR were protective for most SPCs with a 10% to 22% decrease in risk, depending on the pairing. Additional analysis indicated some pairings had greater benefit for whites than blacks. Increasing levels of SES deprivation were associated with a steep increase in risk among Blacks with prostate FPC for colon SPC. Conclusions: Racial disparities in the incidence of SPCs are present and seem to be associated with areas with lower winter VDR and in some cases, SES. Additional research is needed to better understand risk factors and identify individuals at higher risk of SPCs. Keywords: prostate cancer, colorectal cancer, disparities, vitamin D, multiple primaries

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GEOGRAPHIC DISPARITY IN ACCESS TO DECEASED-DONOR LIVER TRANSPLANTATION Mary Grace Bowring* Mary Grace Bowring, Allan Massie, Sheng Zhou, Sommer Gentry, Dorry Segev, (Johns Hopkins University School of Medicine)

Over 12,000 patients with end-stage liver disease join the liver transplant (LT) waitlist each year. For most patients, LT is the only viable treatment and approximately 1500 die annually awaiting LT. By law, access to organ transplantation should be independent of place of residency, yet geographic disparities persist and are likely driven by regional variation in organ supply and demand. Prior analyses of this disparity have focused on health status of transplanted patients, and do not account for patients who remain on the waitlist or who die without receiving LT. Additionally, recent policy (Share35), which increased organ sharing, might have improved or worsened geographic disparities. We sought to quantify and identify changes in geographic disparity in LT following Share35. We used national registry data from 6/2010-6/2016 to identify a cohort of 93,610 adult liver transplant candidates and retrospectively estimate LT rates using multilevel Poisson regression with random intercept for Donation Service Area (DSA; 58 geographic areas used to define organ sharing) pre- and post-Share35. We adjusted for candidate Model for End-stage Liver Disease (MELD) score, a validated risk score that quantifies severity of liver disease and is used for allocation. From the model, we derived the DSA-level median incidence rate ratio (MIRR) of LT rates, a summary measure of DSA-level heterogeneity in access to LT. Confidence intervals around MIRR were estimated using bootstrap methods. Pre-Share35, DSA-level LT rates ranged from 0.24-7.25 events per person-year. MIRR was 2.25 (95% CI: 2.21-2.39). In other words, two candidates with the same MELD in two different DSAs were expected to have a 2.25-fold difference in LT rate driven by geographic location alone. After the policy change there was no evidence of change in MIRR (post-Share35 MIRR= 2.28 (2.25-2.34, p=0.7). Geographic location remains a major determinant of access to LT, and targeted policy is warranted.

TRENDS IN EYECARE ACCESS AND AFFORDABILITY: THE NATIONAL HEALTH INTERVIEW SURVEY (NHIS) 2008–2016 Varshini Varadaraj* Varshini Varadaraj, Kevin Frick, David Friedman, Bonnielin Swenor, (Wilmer Eye Institute)

Purpose To examine trends in accessing and affording eyecare in the United States. Methods We analyzed NHIS data from 2008–2016 in adults ≥18 years. Outcome measures included visits to an eye doctor and inability to afford eyeglasses in the past year. Vision impairment (VI) was defined as difficulty seeing despite wearing glasses. Survey logistic regression, adjusted for potential confounders was used to examine associations between survey year and eyecare outcomes. Results In fully adjusted models, Americans were less likely to access eyecare from 2009-2014, as compared to 2008, although this estimate was significant only in 2013 (OR=0.94, p=0.048) and 2014 (OR=0.92, p=0.007); this pattern reversed in 2015 (OR=1.04, p=0.27) and 2016 (OR=1.06, p=0.09), with increased access noted, although not significant. When compared to 2008, Americans were more likely to report difficulty affording glasses from 2009-2012, although this estimate was significant only in 2010 (OR=1.14, p=0.029). By 2014 this pattern reversed and Americans were less likely to report difficulty (2014 OR =0.80, 2015 OR =0.77; 2016 OR =0.69, p≤0.001 for all). After adjusting for all covariates including survey year, those with VI, compared to those without VI, were more likely to access care (OR=1.58) but had greater difficulty affording glasses (OR=4.14) (p<0.001 for both). Women were also more likely to access care (OR=1.47) and report difficulty affording glasses (OR=1.65), compared to men (p<0.001 for both). As compared to non-Hispanic whites, blacks, Asians, and Hispanics were less likely to access care; and Blacks were more likely to have difficulty affording glasses (p<0.05 for all). Conclusions A pattern of decreased difficulty affording glasses was observed from 2014-2016, which may reflect economic recovery after the Great Recession and/or healthcare changes due to the Affordable Care Act. However, marginalized populations continue to face difficulties with accessing/affording eyecare

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INSURANCE STATUS AS AN EFFECT MODIFIER ON ASSOCIATIONS BETWEEN PRESCRIPTION DRUG MONITORING PROGRAMS AND TRENDS IN PRESCRIPTION OPIOID-RELATED POISONINGS Nathan Pauly* Nathan Pauly, Magdalena Cerda, Chris Delcher, Silvia S. Martins, Brandon Marshall, Jeff Talbert, Corey Davis, (University of Kentucky)

Background: The United States is in the midst of an opioid epidemic. Prescription drug monitoring programs (PDMPs), state-run databases that collect information on Controlled Substance prescribing, have been suggested as a tool to mitigate the crisis. This study examines the effects of specific administrative features of PDMPs on prescription opioid-related poisoning (RxORP) rates over a 14 year period. Methods: The State Inpatient Databases from the Healthcare Cost and Utilization Project were used to identify hospital admissions related to RxORP in 17 states from 2001 – 2014. Generalized estimating equation Poisson regression models were used to examine associations between state adoption of specific PDMP features and changes in county-level RxORP rates over time. Models were stratified by payer type to assess whether insurance status acts as an effect modifier on these associations. Results: From 2001-2014 the RxORP rate increased 144% from 89 to 217 per 100,000 discharges in the 17 state sample. Associations between PDMP features and RxORP rates differed by insurance type. In the Medicaid population, counties without PDMP coverage experienced significant increases in the RxORP rate (aRR: 1.02 [95% CI: 1.00-1.05] per year), while counties covered did not experience a significant change over time (aRR: 0.99 [95% CI: 0.98-1.01] per year). Similar patterns were observed in the uninsured population. In the Medicare population, there was no significant difference in counties with and without PDMPs-both experienced significant increases in RxORP rates. In the privatelyinsured and Medicaid population, counties with PDMPs requiring unsolicited reporting experienced decreases in RxORP rates over time (aRR: 0.98 [95% CI: 0.96 - 0.99] and aRR: 0.97 [95% CI: 0.95 - 0.99] per year respectively). Conclusion: Results suggest that PDMPs exert a stronger effect on RxORP rates in the Medicaid and uninsured populations relative to the Medicare and privately insured populations.

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A THREE-TIERED APPROACH TO CHOOSING A CAUSAL INFERENCE METHOD FOR ESTIMATING THE EFFECT OF A PRIMARY CARE REFORM IN ONTARIO, CANADA Nadia Sourial* Nadia Sourial, Isabelle Vedel, Tibor Schuster, (McGill University)

Objectives Causal inference methods present an opportunity to improve the analysis of data from observational studies including health policy evaluation studies. This study uses the causal inference framework to evaluate a primary care reform in Ontario, Canada and proposes a three-tiered approach to choosing the appropriate causal method based on the degree of unmeasured confounding. Methods A new primary care reform, Family Health Teams (FHTs), was rolled out in Ontario between 2005 and 2010. The average causal effect (ACE) of patient enrolment into FHTs on health system use will be estimated using health administrative data. Required causal conditions (consistency, positivity, exchangeability) will be assessed. A directed acyclic graph will be mapped with subject experts to identify the set of potential confounder and collider variables. The set of confounder variables not measurable through the administrative data will be determined. Depending on the degree of unmeasured confounding, the following three-tiered analytical approach is proposed to estimate the ACE: 1) if no to few confounders are unmeasured, a marginal structural model will be used with a sensitivity analysis using simulated data to determine the extent of bias; 2) if few confounders are unmeasured in the administrative data but available for a subset of the population through an alternate data source, then propensity-score calibration will be used; 3) if a large number of confounders are unmeasured, instrumental variable (IV) analysis, using distance from home to the FHT as the IV, will be used, if IV assumptions are met, to approximate the ACE. Conclusion This study illustrates a simple step-bystep approach to applying causal inference methods in policy evaluation. As these methods are still underutilized, developing recommendations or guidelines to choosing the most appropriate methods may help health services researchers adopt these methods into their toolkits and strengthen their evaluations.

ACHIEVING THE FIRST 90 FOR CHILDREN: AN ECOLOGICAL ANALYSIS OF DETERMINANTS OF NATIONAL EARLY INFANT HIV DIAGNOSIS IN 33 LOW AND MIDDLE-INCOME COUNTRIES. Daniel A. Adeyinka* Daniel A. Adeyinka, Babayemi Olakunde, Mercy Morka, Esther F. Adeyinka, Olanrewaju Oladimeji, Emmanuel Agogo, Olufunke Ilesanmi, Chamberline Ozigbu, (University of Saskatchewan, Canada)

Background: Late infant testing continues to hamper progress towards eliminating AIDS-related deaths in the low and middle-income countries (LMIC). The relative contributions of governance and income inequality to early infant diagnosis (EID) coverage; and efficacy of maternal and child health systems in accelerating national EID coverage, are currently unclear. The objective of the study is to identify the critical social and structural indicators for EID coverage across the global priority LMIC for fast-tracking HIV elimination. Methods: We estimate ecological regression models with data from 33 LMIC on EID from the UNAIDS; governance index and corruption control from Transparency International; and economy, behavioral factors and health service system indicators from World Bank and WHO database. Non-parametric regression models were performed. We computed covariates that were associated with EID at p-value≤0.20 from univariate analyses. In multivariate regression, adult literacy and poverty index were fitted into separate models to avoid multicollinearity (r>0.7). A p-value ≤0.05 was considered statistically significant. Results: EID coverage was 33% [Range 1%, Pakistan and South Sudan; 95%, South Africa]. Countries with significantly higher EID coverage have controlled corruption [β =0.5;95% Confidence Interval (CI): 0.4,0.6;p< 0.001], increased adult literacy rates (β =0.5;95%CI:0.45,0.49; p< 0.001), increased income inequality (β=0.96;95%CI:0.9,1.0; p< 0.001), lowered HIV-related stigma $(\beta=-0.8;95\%$ CI: -0.9,-0.8;p< 0.001) and improved government spending on health (β=7.3; 95%CI: 0.4,0.6,p< 0.001). Conclusion: Countries with better corruption control, adult literacy, government expenditure on health, income inequality and decline in HIV-related stigma experience higher EID coverage. Our findings indicate that improving EID coverage will require not only investment in strengthening HIV control programmes, but community and population health strategies that accelerate EID coverage.

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ESTIMATING BIAS IN HOSPITALIZATION RATES DUE TO MISSING HOSPITALIZATION DATA Thibaut Davy-Mendez* Thibaut Davy-Mendez, Sonia Napravnik, Oksana Zakharova, David A. Wohl, Claire E. Farel, Joseph J. Eron, (University of North Carolina at Chapel Hill)

Clinical cohort studies often collect medical records from a single hospital system and may be biased due to missing hospitalizations at other centers. We used the University of North Carolina (UNC) HIV Clinical Cohort, which includes data on non-UNC hospitalizations, to estimate bias in hospitalization rates, calendar time trends, and risk factors due to missing data. Patients were followed from latter of 01/1996 or HIV care initiation at UNC, until first of death, 12/2016, or loss to follow-up (18 months with no clinical visit). Patients who reentered care contributed additional time. Hospitalizations were stratified by UNC/non-UNC site and compared using log-binomial regression with GEE. We calculated crude hospitalization rates per 100 person-years (PY), overall and by CD4 at admission (CD4</≥200). Poisson regression with GEE estimated time trends and yearad justed IRRs. We compared rates and IRRs obtained when including all hospitalizations vs. only UNC ones. 4,327 patients contributed 30,000 PY and 10,107 hospitalizations (73% at UNC). Compared to non-UNC hospitalizations, those at UNC were less likely to be in 2010-2016 (29 vs. 38%), with CD4≥200 (51 vs. 66%), and with undetectable HIV RNA (47 vs. 54%) (all P<0.01). Including both UNC and non-UNC admissions, crude hospitalization rate per 100 PY (95% CI) over the study period was 33.7 (33.0-34.3) overall, 13.6 (13.2-14.0) for hospitalizations with CD4<200, and 16.8 (16.4-17.3) with CD4≥200. When excluding non-UNC hospitalizations, these dropped to 24.6 (24.1-25.2), 11.0 (10.7-11.4), and 11.7 (11.3-12.1), respectively. Rates with CD4≥200 decreased over time when examining only UNC admissions but remained constant when including non-UNC ones; other time trends and associations with demographic factors did not change. In this clinical cohort, hospitalization rates were substantially lower when data on external admissions was missing, especially for those with CD4≥200, affecting association with calendar time.

INTER-JURISDICTION MIGRATION AFTER HIV DIAGNOSIS AMONG PERSONS LIVING WITH HIV IN THE UNITED STATES AND DEPENDENT AREAS, 2015 Azfar-e-Alam Siddiqi* Azfar-e-Alam Siddiqi, Jianmin Li, Anna Satcher Johnson, Angela Lee Hernandez, (Centers for Disease Control and Prevention)

Assessments of geographic distribution of HIV burden have traditionally used surveillance data based on individuals' jurisdiction of residence at HIV diagnosis. As persons living with HIV (PLWH) are mobile, we calculated the number of PLWH alive by year-end 2015, for 50 states, the District of Columbia and 6 US dependent areas based on the most recent address reported to surveillance and compared it with the distribution based on jurisdiction of residence at diagnosis. A total 994,330 persons had HIV diagnosed, and were alive by year-end 2015. Populations remained stable (net change of <5%) in 32 jurisdictions. The largest absolute difference and percent increases were in Georgia (4,358) and Montana (42.3%) respectively, and the largest decreases in California (-2,751) and US Virgin Islands (-11.9%) respectively. Breaking absolute difference by in- and out-migration, Florida and North Dakota had the largest absolute and percent in-migration (Florida 12,670, North Dakota 74.6%), whereas California and North Dakota had the largest outmigration, 12,749 and 41.4% respectively. Overall, among persons who moved since HIV diagnosis, the largest proportions were male (81.6%), had HIV attributed to male-to-male sexual contact (59.9%), were white (38.4%), or were aged 45-54 (34.7%). By sex, 73.5% of men had HIV attributed to male-to-male sexual contact, whereas among women 71.0% had HIV attributed to heterosexual contact. The distribution of characteristics such as age, sex, race/ethnicity and transmission category among persons who moved were similar to the distribution among the total population of persons living with diagnosed HIV. Using Jurisdiction-level HIV surveillance data based on most recent known address to determine the geographic distribution of HIV may be more accurate and beneficial in informing prevention and care services and allocating funds.

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HBV AND HIV COINFECTION AMONG MEN WHO HAVE SEX WITH MEN, NIGER, 2015 Batoure Oumarou* Batoure Oumarou, Daouda Hassane, Zeinabou Alhousseini, Bernard Sawadogo, Simon Antaraa, Andre Mckenzie, (Direction of immunisations)

Introduction: HIV and hepatitis B virus (HBV) share transmission pathways, and coinfection is associated with high morbidity and mortality. Our objective was to describe the socio-demographic characteristics of men who have sex with men (MSM) and to determine the prevalence of HBV and HIV in this target group. Methods: We conducted a cross-sectional survey from November to December 2015 in 8 regions of Niger among MSM. An MSM: any man who claims to have already anal sex with another man. The sample size calculated with Schwartz's formula was 172. There were 87 who agreed to perform the HBV and HIV test. The data was collected using an electronic questionnaire. The Chi2 test was used to compare the proportions. Unadjusted prevalence ratio and their 95% confidence intervals were calculated. Results: Mean age 24.8 (17; 57) years; Standard deviation: 5.7 years. 21 (12.2%) out of school; 81 (47.9%) identified as "Gays", 74 (43.8%) "Bisexuals" and others transvestites. Prevalence HIV: 17.2% CI 95% [10.7; 26.5]. Niamey is the most affected region: 28.6% CI 95% [19.5; 44.5]. Of the 15 MSM infected with HIV, 10 (66.7%) were infected with HBV. The proportion of MSM with HBsAg (+) is statistically higher among MSM HIV(+) (66.7%) than MSM HIV(-) (6.9%) p <0.001. the risk of carrying HBsAg is 9.6 times higher in MSM HIV(+). Conclusion: HBV and HIV coinfection is high among MSM in Niger. The mode of transmission is similar, so it is important to take into account this additional risk in prevention work with MSM. Keywords: Coinfection, HBV, HIV, MSM, Niger, Prevalence

GENDER DIFFERENCES IN ANTIRETROVIRAL TREATMENT (ART) AND FRACTURE RISK AMONG PATIENTS WITH HUMAN IMMUNODEFICIENCY VIRUS (HIV) Laura Bozzi* Laura Bozzi, O'Mareen Spence, Susan dosReis, (University of Maryland School of Pharmacy)

Adults with Human Immunodeficiency Virus (HIV) experience premature aging, developing chronic medical conditions at a younger age. This is true among HIV patients who experience bone loss after initiating antiretroviral treatment (ART), placing these individuals at risk for fractures. Tenofovir disoproxil fumerate (TDF), an ART, has previously been associated with fracture risk. It is largely unknown whether TDF is selectively prescribed to men versus women given the known risks of bone health. Our objective is to examine gender differences in TDF use and to investigate whether risk factors attributable to fracture explain variability in TDF use by gender. The study is a cross-sectional analysis of the 2010-2012 Medical Expenditure Panel Survey data. We identified adults age 25+ years diagnosed with HIV and received any ART. We classified ART as TDF versus other ART. Risk factors for fracture are older age (≥55 years), race, rheumatoid arthritis, current smoking, and body mass index ≥25. We used bivariate analysis to compare gender and fracture risk factors and multivariable logistic regression to examine the association between gender and ART, adjusting for fracture risk factors. We weighted the estimates to account for complex survey design. The overall weighted sample size of HIV patients with any antiretroviral use was 757,539. The majority of HIV patients were men (85.4%) and received TDF (78.4%). Fifty-two percent of women were African-American compared to 19% of men (p=0.02) and 17% of women were age 55+ years compared to 31% of men (p<0.0001). After adjusting for fracture risk factors, women were 72% less likely to receive TDF compared to men (p=0.03). The significantly lower use of TDF among women with HIV may be a result of channeling bias, since women already are at increased risk of bone loss with age. A prospective cohort study is warranted to explore the gender disparities in the long-term risk of TDF on bone health among adults aging with HIV.

VIRAL HEPATITIS AMONG IMMIGRANTS: A VALIDATION STUDY OF HEALTH ADMINISTRATIVE DIAGNOSIS AND BILLING CODES ACROSS CANADA Abdool S. Yasseen III* Abdool Yasseen, Jordan Feld, Liane MacDonald, Jeff Kwong, Natasha Crowcroft, Naveed Janjua, (University of Toronto)

Background: Surveillance efforts often rely on administrative data for determining disease distribution and prevalence. However, if not properly validated among sufficiently representative groups, such efforts could be misleading. Moreover, geographically distinct medical and cultural practices in the collection and documentation of administrative data may result in varying results. Aim: To determine the appropriateness of using health administrative diagnosis and billing codes to identify individuals living with viral hepatitis B and/or C (HBV/HCV). Methods: We use linked laboratory and health administrative data in Ontario, Canada between 1997-2013 to estimate the diagnostic performance of health administrative diagnosis and billing codes at identifying individuals living with HBV/HCV. Diagnostic measures (i.e. sensitivity, specificity, and positive predictive value) along with their 95% binomial confidence intervals were produced from confusion matrices. The codes were externally validated using linked lab and health administrative data from British Columbia. Results: In total, there were 2,541,005 individuals included in our study cohort, 1,533,754 that were tested for HBV only, 209,671 that were tested for HCV only, and 797,580 that were tested for both HBV and HCV across the study period. There were 57,699 and 40,234 individuals with at least one HCV and HBV infection, respectively. High specificity (85-95% for HBV; 86-99% for HCV) and positive predictive values (84-91% for HBV; 87-98%) were observed for both HBV and HCV, and similarly low sensitivity values (2-20% for HBV; 7-50% for HCV). Conclusion: If present, health administrative diagnosis and billing codes can reliably detect the presence of HBV/HCV infections among individuals presenting to the Ontario health care system. Additional studies are needed to assess the potential for using medical co-morbidities to improve the diagnostic performance of the available diagnosis and billing codes

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OUTBREAK INVESTIGATION OF MEASLES IN FARASH TOWN, ISLAMABAD, APRIL 2017 Dr Nadia Noreen* Nadia Noreen, Baig MA, Dr Asghar RJ, (FELTP Pakistan)

Abstract Text Background: On April 14, 2017, two measles cases were reported by local health practitioner from Farash Town. A team of FEL TP fellows were deputed to investigate the outbreak. Objectives: On the request of district health authorities an outbreak investigation was conducted to assess magnitude, identify risk factors and recommend control measures. Methods: Outbreak investigation was carried out from April 18 to May 05, 2017. Active case finding was conducted through a houseto-house survey. A case was defined as "onset of maculopapular rash with fever and presence of any of the sign/symptoms like coryza, conjunctivitis and cough in a resident of Farash Town from March 25, 2017 to April 30, 2017". Communitybased age and sex-matched controls were selected. Vaccine coverage survey was conducted in a cluster of 245 houses. Frequencies were calculated, attack rates computed and vaccine efficacy was determined. Blood samples of 03 suspected cases were sent to Public Health Laboratories at NIH Islamabad for confirmation. Results: A total of 15 cases were identified; 13 through active case finding. Mean age was 44.5 months (range 05-120 months). The cases were predominantly male n=9(60%). Overall attack rate was 1.15% and most severely affected age group was 24-36 months (n=4, AR=10.81%) followed by 12-24 months (n=3, AR=8.10%). Diarrhea developed in n=12 (80%) and pneumonia developed in n=2 (13.3%). Immunization coverage survey showed that AR in unvaccinated was 25% and AR in vaccinated was 10%, hence the vaccine efficacy was calculated to be 60%. The most significant reason for non-vaccination was misconception about vaccination (OR: 24.0, CI: 4.9-116.1). All blood samples were positive for measles-specific IgM on ELISA. Conclusions: Low immunization status was the most probable cause of outbreak. The results were communicated to district health authorities for mass vaccination. Health awareness session was conducted for all households. No new case was reported during two week

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PERIPHERALLY-INSERTED CENTRAL CATHETERS AND RISK OF BLOODSTREAM INFECTION Rebecca M. Guth* Rebecca M. Guth, Liana R. Merz, (BJC HealthCare)

Background: Central line-associated bloodstream infection (BSI) is a significant source of morbidity and mortality. Peripherally-inserted central catheters (PICC) may reduce risk of BSI compared to short-term central venous catheters (CVC). This systematic review evaluates the impact of PICCs compared to short-term CVCs on BSI risk. Methods: Three databases were systematically searched for studies comparing PICCs to short term CVCs in adult inpatients. BSI was the primary outcome. Study quality was assessed using standardized criteria. Random effects meta-analysis with subgroup analysis by patient type was conducted. Heterogeneity was assessed using the I2 statistic; reporting bias was assessed with a funnel plot. Results: Thirteen studies were included: 1 randomized, 10 observational, and 2 before-after studies. Pooled analysis showed a significant decrease in BSI for patients with a PICC compared to short-term CVCs [RR 0.66; 95% CI 0.53-0.81; 12=0%; 11 studies]. Funnel plot analysis showed no asymmetry. Subgroup analysis by patient type showed no difference in BSI risk in intensive care or general patients [RR 1.07; 95% CI 0.58-1.97; 5 studies], patients receiving total parenteral nutrition [RR 0.49; 95% CI 0.11-2.24; 2 studies], or spinal cord injury patients [RR 1.03; 95% CI 0.12, 9.02; 1 study] Oncology patients had lower BSI risk with PICCs compared to short-term CVCs [RR 0.61; 95% CI 0.49-0.77; 3 studies] The methodological quality of literature was low to moderate; only one study used a randomized design, so findings are primarily based on unadjusted observational data. Findings were similar when the incidence rate ratio (BSI per 1000 catheter days) was calculated. Conclusions: PICCs may reduce BSI compared to short-term CVCs, though risk reduction was most prominent in oncology patients; it is unclear if the risk reduction translates to intensive care and other hospitalized groups.

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MODELLING THE IMPACT OF TRACHOMA MDA ON GU CHLAMYDIA USING TRANSMISSION MODELS S. Rae Wannier* S. Rae Wannier, Travis C. Porco, PhD, MPH, Lee Worden, PhD, Tom Lietman, PhD MD, (University of California San Francisco)

Annual Trachoma Mass Drug Administration (MDA) with azithromycin impacts the burden of genitourinary (GU) chlamydia. Communities that are especially hard hit with Trachoma are almost exclusively poor communities with poor access to sanitation, screening and antibiotics to treat the infection; conditions that may allow for STDs to maintain a high chain of transmission. The dosing of azithromycin for the Trachoma MDA is consistent with dosing given clinically to treat GU chlamydial (GUC) disease, and recent evidence has suggested it reduces the population prevalence. We modelled the impact of Trachoma MDA upon the prevalence of GUC. Methods We analyzed an extended compartmental SIS model, accounting for the natural history of GUC, risk structure, and gender. The model includes slowly developing partial immunity. MDA was modelled as an impulsively forced treatment with varying coverage and efficacy. Results: Our model showed that three years of MDA at current levels reduced the prevalence of GUC in all populations by at least 15%. Between annual MDA, the prevalence partially rebounded to pre-treatment levels. With Coverage x Efficacy ≥ 0.80 , the time between MDA treatments was insufficient to sustain transmission, allowing for GUC burden to be suppressed below 1 in 10,000 after 5 rounds for starting prevalence less than 9.2%. When serial non-compliance is increased from 20% to 80%, this target is achieved for starting prevalences below 4.7%, down from 9.2%. Targeting azithromycin treatment only to high-risk individuals reduces the starting prevalences for which target is reached to 1.8%. Discussion: Our model suggests that MDA could reduce the prevalence of GUC to less than 1 in 10,000 within 5 years time. This reinforces the suggestions of potential additional health benefits of trachoma MDA and points to potential value of screening and disease treatment even in impoverished areas, and suggests testable hypotheses regarding prevalence in endemic areas under treatment.

EVALUATING TRENDS IN FOODBORNE OUTBREAKS AND OUTBREAK-ASSOCIATED ILLNESSES FOR VARIOUS PATHOGEN-FOOD CATEGORY PAIRS FROM 1998–2015 Beau B. Bruce* Beau B. Bruce, LaTonia C. Richardson, Michael C. Bazaco, (Centers for Disease Control)

The Interagency Food Safety Analytics Collaboration (IFSAC), established by the Centers for Disease Control and Prevention, the Food and Drug Administration, and the U.S. Department of Agriculture's Food Safety and Inspection Service, works to improve U.S. foodborne illness source attribution estimates. Evaluating trends in sources of foodborne illness is useful for developing food safety policies, but quantifying changes over time in the relative importance of those sources is challenging. IFSAC's goal was to develop a model to estimate changes in count data (outbreaks and outbreak-associated illnesses) over time for specific pathogen-food category pairs. We developed a Bayesian negative binomial regression model using thin plate splines to estimate the number of foodborne outbreaks and confirmed outbreak-associated illnesses caused by Salmonella, Escherichia coli O157, Listeria monocytogenes, and Campylobacter from 1998-2015 attributed to 17 food categories of the IFSAC Food Categorization Scheme. Overall, our model is versatile and portable to various levels of food categorization granularity or other time series analyses of foodborne outbreak data. Thin plate splines adequately follow changes over time while remaining resistant to outliers. The Bayesian approach allows hypothesis-testing between relevant time periods. We found several significant changes in outbreaks and outbreak-associated illnesses over time, including a decrease in 2013-2015, compared to 2010-2012, in the number of Salmonella outbreaks associated with eggs (median: 1.2 fewer outbreaks/year; 95%CI: 0.2-2.0) and E. coli O157 outbreaks associated with land animals (median: 3.7 fewer outbreaks/year; 95%CI: 0.1-8.6). In conclusion, our model can be used to estimate changes in the number of foodborne outbreaks and outbreak-associated illnesses over time for food category-pathogen pairs. It may be applicable in evaluating trends in other types of foodborne illness or time series data.

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HOMOPHILY IN OBSERVATIONAL STUDIES OF VACCINE

EFFECTIVENESS Paul Zivich* Paul Zivich, James Moody, Allison Aiello, (University of North Carolina at Chapel Hill)

We propose a novel, network-based method to account for the tendency of individuals to contact individuals with similar characteristics, also known as the property of homophily in networks. We implemented this method in a simulation study of vaccine effectiveness (VE). Classical methods, which directly compare outcomes between vaccinated and unvaccinated individuals, are potentially biased in situations of homophily. The proposed method used a Poisson regression model along with network structural features to account for contacts' covariates. To demonstrate the advantage of the proposed method, we simulated outbreaks in a realworld network generated from the eX-FLU study (n=467). For a vaccine of no direct VE, we compared point estimates and 95% CI coverage of the true value of zero for vaccines with no indirect effect, reduced probability of transmission for vaccinated-but-infected, and reduced duration of infectiousness in vaccinated-butinfected individuals. Classic VE assessment performs well within non-homophilous networks across indirect VE mechanisms (Direct VE=0.008, Coverage: 95.0%; Direct VE=0.073, Coverage 93.7%; Direct VE=0.009, Coverage 94.9%), but CI coverage is diminished in presence of homophily (Direct VE=-0.050, Coverage 54.7%; Direct VE=0.390, Coverage: 25.9%; Direct VE=0.063, Coverage: 56.7%). The proposed method performs well in both non-homophilous (Direct VE=0.005, Coverage: 94.5%; Direct VE=0.074, Coverage: 92.6%; Direct VE=0.009 Coverage: 94.0%) and homophilous networks (Direct VE=0.022, Coverage: 95.2%; Direct VE=0.074, Coverage: 93.5%; Direct VE=0.019, Coverage: 95.2%). For protective direct VE, we demonstrate the performance of our method compared to the classical method in both types of networks. Observational epidemiology has traditionally ignored network homophily. This method provides a novel way to account for homophily in network studies, and will be applicable to VE studies and other infectious disease interventions.

ANTIMICROBIAL RESISTANCE OF VIBRIO PARAHAEMOLYTICUS IN SHANGHAI FROM 2014 TO 2017 Yinghua Zhang* Yinghua Zhang, Dongli Xu, Hongjing Yan, Jing Wang, Yue Chen, (Minhang District Centre for Disease Control and Prevention, Shanghai, China)

The study aimed to explore the spectrum and trendency on antimicrobial resistance of Vibrio parahaemolyticus from patients with acute diarrhoeal diseases. Every 10th patient who was admitted to intestinal clinics for acute diarrhea in Minhang District, Shanghai was enrolled in the study during the period from January 2014 to December 2017, and strains of Vibrio parahaemolyticus were isolated from 1376 patients aged13 to 93 years. Disc Diffusion test(Kirby-Bauer antibiotic testing) was conducted for testing susceptibility of 11 antibiotics including cefotaxime (CTX), cefuroxime (CXM), cefxitin (FOX), ciprofloxacin (CIP), norfloxacin (NOR), levofloxacin (LEV), tetracycline (TE), gentamicin (CN), naphthalic acid (NA), chloramphenicol (C) and sulfamethoxazole (SXT). Analysis of variance (ANOVA) was used to compare the inhibition zone diameters of antibiotics in different years, and the mean values of inhibition zone diameters each year were taken as line chart. Most patients were 20 to 60 years of age. The rates of resistance to CTX, CXM and FOX were 1.9%, 19.4% and 1.6%, respectively. The sensitivity rates were 89.2%, 41.1% and 86.8%. The susceptibility rates for Vibrio parahaemolyticus to CIP, NOR, LEV, NA, TE, CN, C and SXT were 94.9%, 99.0%, 99.3%, 97.7%, 98.8%, 98.0%, 99.1% and 98.2%, respectively. For those susceptible strains, the inhibition zone diameters of CTX, LEV and NA decreased over the study years. The antimicrobial resistance is predicted to gradually increase in the next 3 to 10 years.

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COMPARISON OF SEROLOGICAL AND SYMPTOMATIC DIAGNOSIS OF ZIKA VIRUS INFECTION USING THE RVP NEUTRALIZATION ASSAY ON SAMPLES FROM BARRANQUILLA, COLOMBIA DURING THE 2015 ZIKA VIRUS OUTBREAK Brooke Talbot* Brooke Talbot, Grace Mantus, Rebecca, Aileen Chang, (The George Washington University)

Background: The outbreak of Zika virus infection in South America in 2015 prompted a global response to Zika infection detection. In South American countries where other mosquito-borne viruses are already endemic, it is necessary to accurately distinguish Zika cases to ensure better patient outcomes. In resourcelimited settings, it is necessary to assess the utility of the standard diagnostic strategy for Zika using clinical symptoms. This study will compare reporter virus particle (RVP) neutralization assay for positive Zika infection to symptomatic clinical diagnosis of Zika virus. Methods: Serum samples collected from patients in Barranquilla, Colombia will be tested with two RVP neutralization assays, one for Zika virus and one for Dengue-II. Inhibitory concentrations (IC) for each assay will be determined at IC50, IC80, and IC90. RVP positive Zika results are indicated by a Zika IC at two-fold greater than the corresponding Dengue IC. Results will be compared to patient symptoms, flavivirus history, and time since infection. Results: Optimal RVP assay conditions will be determined using positive controls. It is expected that clinical diagnosis using patient symptoms will not consistently match with serological confirmation, and thus a sensitivity and specificity analysis will be conducted to determine the accuracy of clinical symptomatic diagnosis. History of arbovirus infection, length of time between symptom and sample collection, and number of symptoms will be compared between patients with and without serologically confirmation. Discussion: This project will help determine the utility of symptomatic diagnosis of Zika virus in Colombia and help inform physicians in areas with multiple endemic flaviviruses on the best practices to confirm diagnosis of suspected Zika virus infection

MULTIPLE EXPOSURES, REINFECTION, AND RISK OF PROGRESSION TO ACTIVE TUBERCULOSIS Sarah Ackley* Sarah Ackley, Robyn S. Lee, Erin Zwick, Marcel A. Behr, Caitlin S. Pepperell, (UCSF)

Tuberculosis (TB) remains one of the leading preventable causes of death worldwide. A more complete understanding of the dynamics of contagion could be used to improve control strategies. A recent study of a TB outbreak in a largely Inuit village found that among recently infected individuals, exposure to additional active cases was associated with a significantly increased probability of developing active disease within a year. Two models might account for this. In the reinfection model, multiple exposures have an independent risk of becoming an infection, and infections independently contribute to active disease. In the threshold model, small numbers of exposures confer a low risk of active disease, and this risk increases in a stepwise fashion past a threshold number of exposures. We used binomial risk models to evaluate whether either or both of these competing explanations were consistent with observed data. To determine the dynamic impact of reinfection during the early phase of infection, we performed a simulation from a modified Reed-Frost model of TB dynamics following spread from an initial number of cases. We parameterized this model with the maximum likelihood estimates from the reinfection and threshold models in addition to the observed distribution of exposures among recent infections. While both models are consistent with the observed increase in disease risk with increasing exposures, the threshold model confers a better fit to this data (p=0.04). Our simulations indicate that multiple exposures during this critical time period can lead to dramatic increases in outbreak size. In addition to preventing primary infection, strategies to prevent repeated exposures may reduce TB burden in high-prevalence settings.

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WHERE DO U.S. ADULTS REPORT RECEIVING THE ANNUAL INFLUENZA VACCINE? Patrick Maloney* Patrick Maloney, Susanne Straif-Bourgeois, (Louisiana State University Health Sciences Center)

Background: Despite significant morbidity and mortality the rates of annual influenza vaccination remain far below desired levels. Few studies have explored the locations where individuals are seeking vaccination, despite the fact that locations that offer the influenza vaccine have expanded and diversified. This study examined the influence of demographics, health care coverage, and high risk conditions on vaccination location. Methods: Data from the 1999-2015 Behavioral Risk Factor Surveillance System (BRFSS) were used to establish relative trends over time of the locations where influenza vaccination was reportedly received by U.S. adults. Data from the 2015 BRFSS were used to assess the relationship between demographic factors, health care coverage, and high risk conditions and vaccination location. Multivariable logistic regression was used to examine this relationship. All analyses were stratified by age group. Results: Overall, the percentage of U.S. adults receiving the influenza vaccine at traditional locations has decreased from 70% in 1999 to 57% in 2015. Conversely, the percentage of U.S. adults receiving vaccinations at non-traditional location has increased from 30% in 1999 to 43% in 2015. Multivariable analysis revealed that vaccination at non-traditional locations was linked with higher income and education levels, being employed, being nonminority (white), having greater access to care, having insurance, living in more urban areas, and not having at least one high risk condition. Conclusions: Although vaccination at non-traditional locations has become more frequently used and more readily available, a significant disparity exists between those who get vaccinated at traditional locations and those who use non-traditional locations. These results indicate that the traditional setting remains essential for reaching certain populations. Efforts should be made by non-traditional locations to reach underserved populations.

LOW BACK PAIN AMONG STUDENTS IN RELATION TO THE WEIGHT OF SCHOOL BAG Abdullah Al-Taiar* Abdullah Al-Taiar, Fatemah Akbar, Muneera AlBesharah, Dana Mohammad, Jumana Al-Baghli, Farah Bulbul, Bann Qadoura, (Faculty of Medicine, Kuwait University)

Objectives: The association between the weight of school bag and Low Back Pain (LBP) amongst students remains under intense debate worldwide. This study aimed to estimate the prevalence of LBP amongst public high school students in Kuwait and to investigate the association between LBP and the weight of school bag. Methods: A cross-sectional study using multistage cluster sampling with probability proportional to size method was conducted on a total of 950 public high school students from all governorates. Data on LBP were collected through face-to-face interviews using a standardized questionnaire. The students' height and weight and the weight of their school bags were measured using appropriate weight and height scales. Logistic regression was used to investigate the association between the weight of school bags and LBP while adjusting for potential confounders. Results: The estimated lifetime, 6-month, and 1-month prevalence of LBP were 70.3%(95%C1:67.30-73.21%), 49.1%(95%C1: 45.83-52.28%), and 30.8% (95% C1:27.81 %-33.78%) respectively, with significantly higher prevalence in females compared to males (p<0.001). The absolute weight of school bag was not significantly associated with LBP neither in univariate nor multivariate analysis. The relative weight of school bag (as a percentage of the body weight) was significantly associated with LBP in univariate analysis but not in multivariate analysis. The students' perception towards their bag weight, however, was found to be significantly associated with LBP throughout the analysis (p<0.001). Conclusion: LBP amongst high school students in Kuwait seems to be very common with a prevalence resembling that of high-income countries. Our data suggest that the students' perception on the weight of school bag is far more important than the actual weight. Current recommendations about the weight of school bags, which are not supported by evidence, should be revised to take into account the students' perception on the weight of school bag.

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GEOGRAPHIC HETEROGENEITY IN FIREARM-RELATED HOMICIDE TRENDS IN CALIFORNIA, 2005-2016 Christopher Rowe* Christopher Rowe, Ellicott Matthay, Jennifer Ahern, (University of California, Berkeley)

The focus on interpersonal firearm violence in urban areas, where the scale of the problem is greatest, may obscure important trends occurring outside of urban centers in the United States. Using state mortality records, we explored geographic heterogeneity in firearm homicide trends from 2005-2016 in California by comparing rates among zip codes in Census designated urbanized areas (areas with 50,000 or more people), urban clusters (areas with 2,500-49,999 people), and rural areas (all other areas). We also used American Community Survey data and Kruskal-Wallis tests to characterize sociodemographic differences, in terms of overall levels of sociodemographic covariates and changes over the study period, among these three geographic classifications. From 2005-2013 (to be updated through 2016), the overall firearm homicide rate declined from 5.2 to 3.4 per 100,000. Rates declined in urbanized area (5.4 to 3.4 per 100,000, n=1026) and rural zip codes (4.2 to 2.5, n=549) but increased in urban cluster zip codes (2.0 to 4.2, n=194). Compared to urbanized area and rural zip codes, urban cluster zip codes were characterized by a higher percentage of people living in poverty, lower percentages of high school and college graduates, and a higher percentage of Hispanic residents during the study period (p<0.05). Considering temporal trends in covariates over the study period, all three classifications experienced growth in population and percentages of high school and college graduates and declines in unemployment. Urban cluster zip codes experienced the smallest increases in population and education and the smallest decline in unemployment (p<0.05). Populations in urban clusters are simultaneously experiencing an increasing burden of firearm-related homicides and decreasing socioeconomic opportunity. These regions outside of large urban centers warrant more research to understand whether these trends are related and to inform geographically-relevant prevention strategies.

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INCOME INEQUALITY AND FIREARM HOMICIDE: A NATIONAL STUDY Ali Rowhani-Rahbar* Ali Rowhani-Rahbar, Alex Quistberg, Anjum Hajat, Frederick Rivara, (University of Washington)

There is growing consensus that income inequality, which has been rising since the 1970s in the US, is broadly associated with poor health outcomes. The latest empiric evaluation of the association between income inequality and firearm homicide dates back to 20 years ago. Using two pre-specified lag times of at least 15 and 5 years, we examined the association of income inequality measured by the Gini index (range: 0 [complete equality] to 1 [complete inequality]) separately in 1990 and 2000, with firearm homicide rates during 2005-2015 among individuals aged 14-39 years across all US counties. Gini and race/ethnicity-specific firearm homicide rates data were respectively obtained from the American Community Survey and Compressed Mortality Files compiled by the National Center for Health Statistics. Z scores were constructed to allow for the interpretation of the estimates as differences in firearm homicide associated with differences in one standard deviation of Gini. Multivariable mixed effects Poisson regression models were incrementally controlled for county-level covariates of age, sex, racial distribution, crime rates, a deprivation index constructed using principal components analysis, and social capital, all measured in 1990 or 2000 to avoid the inclusion of downstream effects of income inequality. In the overall crude model among all races combined, Gini in both 1990 (IRR=1.57; 95% CI:1.33-1.86) and 2000 (IRR=1.64; 95% CI:1.40-1.92) was associated with firearm homicide. Gini was consistently associated with firearm homicide in all models only among African Americans even after incremental accounting for all aforementioned contextual factors. Findings suggest that policies to alleviate income inequality may impact firearm homicide rates for the most vulnerable subpopulations, and have the added benefit of potentially exerting a positive effect on other contextual factors related to income inequality.

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COMPARING METHODS FOR DETECTING SPATIOTEMPORAL CLUSTERS OF HOMICIDE AND FIREARM-RELATED ASSAULT Tigran Avoundjian* Tigran Avoundjian, Kennedy Muni, Stephen J Mooney, Ali Rowhani-Rahbar, (University of Washington)

Gun violence in the U.S. has been described as a "social contagion" because it exhibits similar characteristics to other infectious diseases, including spatiotemporal clustering. However, it is not clear how sensitive detection of gun violence clusters is to the scan statistic used to detect them. Using public safety data portal data from Philadelphia from 2006-2010, we compared spatiotemporal clusters detected using two distinct approaches: (1) Poisson scan statistic which uses population estimates to calculate the expected number of cases; and (2) Space-time permutation scan statistic which estimates expected number of cases by the marginal distribution of observed cases. For the Poisson scan statistic, we obtained commuter-adjusted population estimates at the census tract level from the Census Tract Planning Program. For both methods, we used months and census tracts as temporal and spatial units, respectively. We adjusted for temporal trend and allowed clusters to overlap, but no two clusters were allowed to share the same center. We used Monte Carlo simulations (999 simulations) to identify statistically significant clusters. The Poisson scan detected 12 statistically significant clusters, whereas the space-time permutation scan detected 16 clusters. Cluster standardized incidence ratios (SIRs) detected using the Poisson scan ranged from 1.5 to 8.3. By contract, SIRs detected using the space-time permutation scan ranged from 2.55 to 46.7. In general, the Poisson scan clusters were more spread out and had a larger radius than the spacetime permutation scan clusters. While Poisson scan clusters did not vary over time, there was considerable diffusion of the space-time permutation scan clusters over time. Findings provide empiric support that the choice of scan statistic and definition of population at risk affect the detection of spatiotemporal clusters and inferences about diffusion patterns of homicide and firearm-related assault.

TRAUMATIC BRAIN INJURY WITH POLYTRAUMA: HOW BODY REGIONS INJURED AND INJURY SEVERITY INFLUENCE MORTALITY Rebecca Adeigbe, PhD* Rebecca Adeigbe, Jennifer Gurney, Melissa Kottke, Anthony Pusateri, Tuan Le, (USAISR)

Background: High energy explosives resulting in traumatic blast injuries and polytrauma was frequently observed in casualties from the Iraq and Afghanistan wars. We sought to identify an association between body region (BR) injured and the outcome effects of concomitant traumatic brain injury (TBI) in order to determine how injured BR influence mortality in US service members. Methods: Data were extracted from the Department of Defense Data Registry from 2002-2016. pTBI was defined as a having a TBI diagnosis and an Abbreviated In jury Scale (AIS) score \geq 3 in one or more other BR. Descriptive statistics were used for demographic and injury characteristics. Logistic regression was used to determine how AIS severity for each of the body regions influenced odds of mortality. Results: A total of 10,282 patients with pTBI were analyzed. In addition to sustaining TBI, 31% of patients sustained injury to the face, 16.7% to the chest, 18.1% to the abdomen, 36.3% to extremities and 70.4% to soft tissue. While all patients were diagnosed with TBI, for the head and neck, 22.1% of patients had a severe or critical AIS score. Additionally, 2.6% had a severe or critical AIS score for the face, 56.5% for the chest, 27.5% for the abdomen, 47.4% for extremities and 2.3% for soft tissue. After controlling for covariates (e.g., injury mechanism), odds of mortality were greater for patients who had higher AIS scores for the head (OR:3.1; CI:2.7-3.6) and face (OR:1.5; CI:1.1-2.0). For patients who sustained injury to all body regions (n=18), odds of mortality were greater for those with higher extremity (OR:3.6; CI:1.6-8.2) and soft tissue (OR:3.0; CI:1.3-7.2) scores. Conclusion: Patients with TBI and chest trauma presented with the highest AIS scores, but this injury pattern was less lethal than TBI associated with extremity and soft tissue injuries. Given that isolated chest injuries are more lethal than isolated extremity injuries, these findings warrant further investigation.

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RISK FACTORS FOR MORBIDITY AND MORTALITY FOLLOWING A FIREARM ASSAULT INJURY: A POPULATION-BASED

RETROSPECTIVE COHORT STUDY Veronica A. Pear* Veronica A. Pear, Aaron Shev, Nicole Kravitz-Wirtz, Christopher D. McCort, Garen J. Wintemute, (Violence Prevention Research Program, University of California Davis School of Medicine)

Firearm violence is a substantial cause of death and injury in the United States. A small number of studies suggest individuals who survive a firearm injury are at particularly high risk of subsequent firearm-related in jury and death. However, little is known about the risk factors associated with re-injury or death in this population. The primary aim of this study is to identify these risk factors. We will evaluate the risks associated with demographic characteristics, time since index in jury, location, hospital payment source, severity of injury, and co-occurrence of mental health or substance abuse diagnoses. We will also quantify the overall and transition-specific hazards of subsequent violent injuries or death among people with a firearm injury. The study population comprises all individuals in California who visited a hospital for a firearm assault injury between 2005-2013. Using data from California's Office of Statewide Planning and Health, we will link these individuals' emergency department (ED) visits, hospitalizations, and mortality records across the study period. To our knowledge, this will be the first population-based study to evaluate this question using both inpatient and ED data. We will use multi-state models to explicitly and simultaneously model transitions from one injury to the next or from an injury to death, accounting for event history and other covariates. These models allow the hazards to change with each subsequent event and are able to account for competing risks. Individual frailty will also be included to incorporate variability in individuals' underlying propensities for (re)injury by a firearm. Multi-state models are particularly well suited for prediction of recurrent events. By identifying characteristics of patients at especially high risk of violent re-injury or death, this study can inform clinical decision making and the targeting of preventive interventions and policies in California and nationwide.

DISPARITIES IN HIV PREVENTION AND TREATMENT: OBSTACLE TO ACHIEVING ELIMINATION OF HIV IN NIGERIA Daniel A. Adeyinka* Daniel A. Adeyinka, Babayemi Olakunde, Mercy Morka, Chamberline Ozigbu, Emmanuel Agogo, Deborah Odoh, Finti Sambo-Donga, Olufunke Onifade, Abiola Davies, Ikechukwu Amamilo, Dorothy Mbori-Ngacha, (University of Saskatchewan, Canada)

Background: Inequity is considered as a major contributor to the global HIV but empirical evidence is limited. Most studies often recommend reducing normative physiological risks, economic differences and gendered power dynamics that make women to be disproportionately affected by HIV. Few researchers have addressed this issue through a gender lens. Paradoxically, men are overrepresented in AIDS deaths. Also, more efforts are concentrated on adults while children are often left behind. This study measured the impact of age-gender disparity on HIV control in resource-limited setting by using Nigeria as a case study. Methods: We conducted trend analysis from 2010-2015 on HIV tipping point ratios (TPR) by using the National HIV programmatic data and spectrum estimates for the 36 states and Federal Capital Territory. A cut ratio of <1 was used to depict effective control of HIV infections by showing that the HIV incidence falls below rate of ART initiation. Differences in ratios across the years were assessed with Mann-Kendall test for trend. Mann Whitney U test was used to explore age and gender differences. The significant level was set at α =5%. Results: From 2010-2015, the national TPR has significantly declined from 2.2 to 1.1; [p=0.03]. In 2015, Nigeria significantly achieved safe TPR of 0.9 for adults but not for children (3.6); [p=0.0001]. Despite the yearly variations, the TPR for 2015 was marginally significantly lower for female than male, 0.9 and 1.5 respectively, (p=0.045). It was observed that 4(10.8%) of the states have reached a safe TPR for children, compared to 16(43.2%) observed for adults. More (43.2%) states have attained safe TPR for females compared to males (24.3%). Conclusion: As is the case in Nigeria, age-gender bias has led to an undesirably slow decline in new HIV infections among men and children. This signals an urgent need to ensure that strategies adequately capture HIV prevention and treatment for these population-groups in particular men and children.
ADJUSTMENT DISORDER AND TYPE-SPECIFIC CANCER INCIDENCE: A DANISH COHORT STUDY Tammy Jiang* Tammy Jiang. Thomas P. Ahern, Dóra Kormendine Farkas, Timothy L. Lash, Katalin Veres, Henrik Toft Sørensen, Jaimie L. Gradus, (Boston University School of Public Health)

Background: Although adjustment disorder is common, there is a dearth of research on its physical health consequences. Earlier studies, biological mechanisms, and stress-related behaviors suggest that cancer may be a potential sequela of adjustment disorder. This study examined the association between adjustment disorder and typespecific cancer incidence in a nationwide cohort. Methods Data were obtained from the comprehensive nationwide medical and administrative registries of Denmark. We calculated the incidence of type-specific cancers from 1995 to 2013 in patients with a prior adjustment disorder diagnosis (n = 58,712), and compared it with the incidence in the general population by calculating standardized incidence ratios (SIRs) with accompanying 95% confidence intervals (CIs). SIRs were adjusted using semi-Bayes shrinkage. Results The SIR for any type of cancer was 1.0 (95% CI: 0.99, 1.1). Adjustment disorder was associated with a 10% lower rate of immunerelated cancers (SIR=0.9, 95% CI: 0.84, 0.97) and with a 20% higher rate of smoking- and alcohol-related cancers (SIR=1.2, 95% CI: 1.1, 1.3). We found a null association for hematological malignancies (SIR=1.1, 95% CI: 0.89, 1.3). After semi-Bayes adjustment, type-specific cancer SIRs indicated no association between ad justment disorder and cancer incidence. Conclusions: This study provides persuasive evidence for a null association between adjustment disorder and typespecific cancer incidence in a nationwide study cohort.

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IMPUTATION OF TIME-VARYING COVARIATES IN A SURVIVAL ANALYSIS Trisha Hostetter* Trisha Hostetter, Jeri Forster, Lisa Brenner, (Rocky Mountain Mental Health Illness Research, Education, and CLinical Center, Denver Veteran Affairs Medical Center)

Objectives A survival analysis was conducted to investigate the association between low vitamin D levels and suicide in a sample of 446,097 Veterans using Veteran Health Administration (VHA) data over a 10-year period. Both time-varying and static covariates were utilized in the model. Given variability of VHA health service utilization over time among this population, accounting for missing data was necessary. There were 17,996 Veterans (4.03%) missing baseline values, which was the year prior to vitamin D laboratory results, and there were 13,150 (2.95%) Veterans with missing data at a time point other than baseline. Leaving the missing data issue unaddressed would have resulted in excluding a large number of Veterans from the sample. As such, multiple imputation methods were explored to retain these data in the survival analysis model. Methods To account for missing time points for the time-varying covariates, multiple imputation was utilized. Given there were few Veterans who had follow-up years 6 and greater, those that had missing data at those time points were removed from the sample (n=1,298; 0.3%). PROC MI and PROC MIANALYZE in SAS 9.4 were used to perform the multiple imputations and 5 imputations were utilized for all missing time points. We also conducted a complete case analysis which included only Veterans with complete data at all time points. Results: The model using multiple imputation had similar results to the complete case analysis. However, 28 (6.2%) additional Veterans who died by suicide and 11,852 Veterans overall could be retained in the model. Given that suicide is a rare outcome, it is ideal to keep as many Veterans with suicide in the model as possible. Conclusions While the study conclusions remained the same in this example, retention of additional events increased power and decreased standard errors. Additionally, the inclusion of substantially more subjects can lead to more representative results.

THE RELATIONSHIP BETWEEN DEPRESSIVE SYMPTOMS AND ADVERSE OUTCOMES ALONG THE HIV TREATMENT CASCADE Angela M. Bengtson* Angela M. Bengtson, Brian W. Pence, Bradley N. Gaynes, Katerina Christopoulos, William Christopher Mathews, Michael Mugavero, (Dr.)

The effect of depressive symptoms over time on progression through the HIV care cascade is complex. We included participants from the Center for AIDS Network of Integrated Clinic Systems Cohort who were antiretroviral therapy (ART)-naïve, had at least one viral load and appointment measure after ART initiation, and had a depressive symptom measure within 6 months of ART initiation. Depressive symptoms over time were measured using the Patient Health Questionnaire-9 (PHQ-9) and categorized using a validated cut-point (PHQ-9 > 10). We followed participants from ART initiation through the first of the following: loss to follow-up (> 12 months with no HIV appointment), death, administrative censoring (2011-2014), or 5 years of follow-up. We used log binomial models with generalized estimating equations to estimate associations between depressive symptoms at a given visit and the risk of having a detectable viral load(> 75 copies/mL) or subsequent missed HIV visit over time, controlling for time-fixed and time-varying confounders. We included 1,087 HIV-infected adults, who contributed 2,422 person years (median follow-up time 703 days). At ART initiation 31% of participants reported depressive symptoms. Participants were primarily male (88%), white, non-Hispanic (49%), and contracted HIV through male-to-male sexual contact (68%). Mental health issues and substance use at ART initiation were common. In multivariable analyses, depressive symptoms were associated with an increased risk of a detectable viral load (RR 1.27, 95% CI 1.07, 1.52) over time. The association between depressive symptoms and missing the next HIV appointment (RR 1.19, 95% CI 1.05, 1.36) moved to the null after adjustment for lagged depressive symptom score, anxiety, and mental health diagnoses (RR 1.00, 95% CI 0.85, 1.18). Depressive symptoms at a given visit are a risk factor for unsuppressed viral load, while established mental health issues may play a larger role in HIV appointment adherence.

1273 S/P

INTELLECTUAL DISABILITY AND MENTAL DISORDERS IN A US POPULATION REPRESENTATIVE SAMPLE OF ADOLESCENTS Jonathan Platt* Jonathan Platt, Katherine Keyes, Katie McLaughlin, Alan Kaufman, (Columbia University)

Most research on the prevalence, distribution, and psychiatric comorbidity of intellectual disability (ID) relies on clinical samples. These samples limit the generalizability and utility of ID assessment in a legal context. The present study assessed the prevalence of ID in a population-representative sample of U.S. adolescents, and examined associations of ID with socio-demographic factors and mental disorders. Data were drawn from the National Comorbidity Survey Adolescent Supplement (N=6256). ID was defined as: 1) IQ<=76, measured using the Kaufman Brief Intelligence Test; and 2) an adaptive behavior score <= 76, measured using a validated scale. The Composite International Diagnostic Interview assessed fifteen lifetime mental disorders. The Sheehan disability scale assessed disorder severity. We used logistic regression models to estimate differences in lifetime disorders for adolescents with and without ID. ID prevalence was 3.2%. Among adolescents with ID, 65.1% met lifetime criteria for a mental disorder. ID status was associated with specific phobia, agoraphobia, and bipolar disorder, but not behavior disorders after adjustment for socio-demographics. Adolescents with ID and mental disorders were significantly more likely to exhibit severe impairment than those without ID. These findings highlight how sample selection and overlap between ID and psychopathology symptoms might bias understanding of the mental health consequences of ID. For example, associations between ID and behavior disorders widely reported in clinical samples were not observed in a populationrepresentative sample after adjustment for socio-demographic confounders. Valid assessment and understanding of these constructs may prove influential in the legal system by influencing treatment referrals and capital punishment decisions.

EFFECTIVENESS OF A LINKAGE TO MENTAL HEALTH CARE PROGRAM AFTER HURRICANE SANDY Samantha Schneider* Samantha Schneider, Rehana Rasul, Wil Liberman-Cribbin, Bian Liu, Kristin Bevilacqua, Emanuela Taioli, Rebecca Schwartz, (Department of Occupational Medicine, Epidemiology and Prevention, Northwell Health)

Background: Hurricane Sandy hit New York on October 29, 2012 and contributed to mental health difficulties (MHD). In the Rockaways, Project Restoration (PR) offered a program linking participants at risk for MHD into mental health care (L2C). Leaders in Gathering Hope (LIGHT) studied MHD in Long Island/Queens/Staten Island and did not have a L2C component. Aim: Determine the efficacy of L2C in reducing MHD after Sandy, using LIGHT participants as a comparison. Method: PR gave eligible participants the option to enroll in L2C, resulting in attending ≥1 appointment for MHD. All participants completed baseline and follow-up questionnaires (PR:n=52; LIGHT: n=128). Primary outcomes were symptom scores of PTSD, anxiety, depression, and perceived stress (PSS). Baseline demographics, history of MHD, current treatment status, hurricane exposure, and months since Hurricane Sandy were also assessed. Multivariable linear mixed models determined whether mental health changes from baseline to follow-up differed between L2C and LIGHT. Results L2C and LIGHT participants had similar mean ages (48.2 vs. 49.6 years). L2C participants were more likely to have a history of MHD (65.4% vs. 21.9%) and baseline current treatment (67.3% vs. 9.8%). Although the median time since Sandy was longer in L2C compared to LIGHT (30.6 months vs 13.1 months), L2C participants reported more hurricane exposure items (6.5 vs. 3.5). Baseline MHD outcomes were higher in L2C vs. LIGHT. Multivariable models showed that the L2C group was associated with a decrease in PTSD (β=-7.12, SE=1.67; P< .001), anxiety (β=-1.24, SE=0.25; P<.001, depression (β = -0.70, SE=0.25; P=.026, and PSS(β = -3.75, SE=1.02; P=.002) scores from baseline to follow-up. In LIGHT, MHD outcomes were not significantly different between baseline and follow up. Conclusion: Engagement in L2C was effective in reducing MHD in this population. These findings confirm the powerful impact community outreach has on reducing MHD after a disaster.

1277 S/P

DEPRESSIVE SYMPTOMS AT HIV TESTING AND TWO-YEAR SURVIVAL AMONG HIV-POSITIVE PEOPLE WHO INJECT DRUGS IN VIETNAM Sara N. Levintow* Sara N. Levintow, Brian W. Pence, Tran Viet Ha, Nguyen Le Minh, Teerada Sripaipan, Carl A. Latkin, Pham The Vu, Vu Minh Quan, Constantine Frangakis, Vivian F. Go, (University of North Carolina, Gillings School of Global Public Health, Chapel Hill NC USA)

Introduction. HIV-positive people who inject drugs (PWID) experience higher rates of mortality than other HIV-infected individuals. A potentially important determinant of survival is the high burden of depression among PWID. Our study examined the relationship of depressive symptoms at HIV testing with two-year allcause mortality among newly diagnosed HIV-positive PWID in Vietnam. Methods. We analyzed data from 336 HIV-positive PWID in a randomized controlled trial of a stigma reduction intervention in Thai Nguyen, Vietnam from 2009-2013. Depressive symptoms at HIV testing (prior to receiving an HIV diagnosis) were measured with the Center for Epidemiologic Studies Depression Scale (CES-D). Mortality was ascertained at 6, 12, 18, and 24 months following HIV diagnosis. We compared mortality between participants with and without depressive symptoms at HIV testing by estimating risk differences (RDs) from crude and weighted Kaplan-Meier cumulative risk curves, using inverse probability weights to control for confounding. Results. At HIV testing, 141 of 336 PWID (42%) experienced severe depressive symptoms (CES-D score ≥23), and over the two years following HIV diagnosis, 82 of 336 PWID (24%) died. Those with depressive symptoms faced an 11.7% (95% CI: 2.3%, 21.2%) higher risk of death at 24 months. Controlling for potential confounders led to a slight attenuation of this risk difference (RD=9.7% [-1.2%, 20.6%]). This increased risk of mortality for PWID with depressive symptoms was consistent throughout the two-year period: at 6, 12, and 18 months after HIV diagnosis, the weighted RD was 12.6% (5.5%, 19.7%), 13.9% (4.6%, 23.2%), and 11.0% (0.9%, 21.1%), respectively. Discussion. PWID with depressive symptoms at time of HIV testing faced a markedly higher risk of death over the next two years. HIV diagnosis provides an important opportunity to screen and treat depressive symptoms and could subsequently improve survival in this high risk population.

1276 S/P

EXPLAINING THE BLACK-WHITE DEPRESSION PARADOX: INTERROGATING MEDIATION UNDER THE ENVIRONMENTAL AFFORDANCES MODEL John R. Pamplin* John R. Pamplin, Katrina L. Kezios, Eleanor Hayes-Larson, Katherine M. Keyes, Pam Factor-Litvak, Bruce G. Link, Ezra S. Susser, Lisa M. Bates, (Columbia University Mailman School of Public Health)

A prominent yet debated explanation for the black-white depression paradox is the Environmental Affordances (EA) model. This model has been articulated in some instances as mediation: stress causes engagement in unhealthy coping behaviors [UBs] such as smoking, alcohol use, or comfort eating which may reduce the biologic stress response and through it the psychological impact of stress; blacks' high stress exposure may thereby paradoxically protect against depression through this pathway. In other cases, the EA model has been posited as modification: the effect of stress on depression is modified by UBs and/or race. Both articulations of the model would explain why U.S. blacks have lower rates of depression than whites but, to our knowledge, only effect modification has been tested empirically, and results have been contradictory. We aimed to conduct the first test of the mediational pathway suggested by the EA model. Data are from the Disparities Study of the Child Health and Development Studies, restricted to 307 white and 252 black participants age 45-52. We assessed each step of the mediation pathway descriptively. We conducted logistic regression for the association between race and depression and tested the hypothesized mediators of stress and UBs (smoking, alcohol use, and BMI), assessed as a group and individually. These UBs were chosen and coded for consistency with previous tests of the EA model. In the unadjusted model, blacks had 0.61 times the odds of depression compared to whites (95% CI 0.35, 1.07). The association between race and depression was unchanged when adjusting for mediators stress (OR: 0.58, 95% CI: 0.32, 1.07); UBs as a group (OR: 0.62, 95% CI: 0.30, 1.26); both (OR: 0.58, 95% CI: 0.29, 1.19). We find no evidence of stress and UBs mediating the association between race and depression. Thus, data do not support the straight mediation version of the EA model as an explanation for the black-white depression paradox.

1278

EPIDEMIOLOGICAL CHARACTERISTICS OF INPATIENT ALCOHOLICS WITH SLEEP DISORDERS AND FACTORS AFFECTING THE CHANGING STATUS OF REPETITIVE HOSPITALIZATION: A NATIONWIDE POPULATION-BASED STUDY IN TAIWAN Fu-Huang Lin* Fu-Huang Lin, Chieh Sung, Daphne Ng Yih, Yu-Ching Chou, Chi-Hsiang Chung, Wu-Chien Chien, (School of Public Health, National Defense Medical Center, Taipei, Taiwan)

Factors such as having trouble in sleeping or unsound slumber may affect patients with long-term sleep disorders in their behavior. Clinically, insomnia patients often drink to sleep and gradually increase the amount of alcohol once the soporific action decrease. Withdrawal symptoms lead to more serious insomnia after stop drinking. As there are no studies exploring the epidemiological characteristics of alcohol abusers with sleep disorders currently, this study analyzed the influencing factors of repetitive hospitalization in cases of alcoholics with sleep disorders by data from the National Health Insurance Research Database. SPSS 21.0 is used in the statistical analyze. A total of 313 patients from 2000 to 2013 (83.4% males and 16.6% females), age between 25-44 had the highest proportion of occurrence (65.5%), 10.9% in low income group 39.9% in major injuries patients. Winter has the highest occurrence rate (29.7%) compare with other seasons. Most of the patients (34.5%) lived in the South of Taiwan. Furthermore, lower income, major injuries and living in island areas were the affecting factors of the changing status of repetitive hospitalization. Low- income patients had 85.37 times more than higher income populations while living in island areas had 1.35 times more than living in north of Taiwan mainland. In conclusion, relevant interventions are suggested to make so as to reduce the repetitive hospitalization of alcohol abusers with sleep disorders

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DATA SCIENCE CONSIDERATIONS FOR THE DEVELOPMENT OF VISUALIZATION TOOLS FOR CONFOUNDING AND SELECTION-BIAS IN LONGITUDINAL DATA Erin Schnellinger* Erin Schnellinger, Linda Valeri, John W. Jackson, (University of Pennsylvania)

We have recently developed a suite of SAS macros to diagnose confounding and selection-bias of time-varying and joint exposures in clinical trials and epidemiological studies. More specifically, the macros take the users' raw study data as input, compute relevant balance statistics, and produce trellis plots illustrating patterns of confounding (or selection-bias) and the degree to which covariate ad justment methods - such as inverse-probability weighting - are successful in controlling for confounding (or selection-bias). While the user simply inputs his or her raw data into the software, and inspects the resulting trellis plot, much data manipulation occurs behind the scenes: the software must take the researchers' existing data, reformat it appropriately, and compute longitudinal covariate balance tables. The challenge of this project was to ensure that the software could perform these manipulations for a variety of data collection schemes, all while requiring minimal input from the user, and while reducing the amount of computation time and memory consumed by the macros. Here, we discuss how we approached these challenges from a data science perspective. Our solutions involved complex data transformations via PROC IML and PROC SOL to create a "tidy" dataset. The result is a set of macros which flexibly captures the users' data, regardless of how each variable is named or the number of times each variable is measured. Additionally, the software contains few loops, ignores irrelevant covariate history, and restructures the users' data so that it can be easily read by standard SAS graphing procedures (e.g., PROC SGPANEL). By adopting a data science perspective to program development, we have created software that can accommodate a variety of data and, therefore, a variety of research. Our project demonstrates the power of adopting data science perspectives to advance epidemiologic research.

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ESTIMATING BIAS DUE TO INFORMATIVE CENSORING IN MULTIDRUG-RESISTANT TUBERCULOSIS COHORT ANALYSES: A SIMULATION STUDY Meredith Brooks* Meredith Brooks, Justin Manjourides, (Harvard Medical School)

When individuals in multidrug-resistant tuberculosis (MDR-TB) cohorts lack observed survival times subsequent to an initial treatment outcome, the underlying Cox proportional hazards model assumption of non-informative censoring may be violated. Naïve analysis of data characterized by informative censoring may result in biased treatment effect estimates. Alternate censoring techniques show potential to reduce these biases. However, without long-term survival data available, validating and comparing these methods is difficult. Here, we use simulated data to compare the performance of the Cox model under several techniques to handle these censored observations. We simulate data to emulate a cohort of MDR-TB patients from Lima, Peru. Informative censoring is introduced using a rejection sampling algorithm. Cox proportional hazards models are used to estimate associations between an aggressive treatment regimen and death across three methods for including censored observations: the conventional method assuming non-informative censoring, a selective extension of short-term survival informed by literature, and incorporation of a predicted long-term vital status. Models are compared across several scenarios to demonstrate which censoring technique produces the least biased estimates. The protective effect of the aggressive treatment regimen is consistently underestimated by the conventional naïve analysis, up to 7.6%. Models using alternative censoring techniques produce treatment effect estimates consistently stronger and more accurate than the conventional method, underestimating the treatment effect by less than 2.4% across all scenarios. Use of alternative censoring techniques that account for differential risks of survival beyond the initial treatment outcome may more accurately reflect long-term survival, leading to reduction in bias of treatment effect estimates in MDR-TB cohort analyses. Reducing this bias yields more accurate and larger treatment effect estimates.

METHODS/STATISTICS

1281 S/P

IDENTIFICATION OF LIFETIME PROFILES OF SMOKING INTENSITIES AND ASSOCIATION WITH LUNG CANCER RISKS : RESULTS FROM THE ICARE CASE-CONTROL STUDY Emilie Leveque* Emilie Lévêque, Aude Lacourt, Danièle Luce, Pascal Guenel, Isabelle Stücker, Karen Leffondre, (Univ. Bordeaux, ISPED, INSERM, Bordeaux Population Health Research Center, team Biostatistics, team EPICENE, UMR 1219, F-33000 Bordeaux, France)

Objectives: To identify the different lifetime profiles of smoking intensities in the ICARE population-based case-control study and to compare their association with lung cancer risks. Methods: Incident lung cancer cases were recruited in 2001-2007 in 10 French territorial departements, and controls were selected via incidence density sampling and frequency matched to cases on age, sex and departements. The average number of cigarettes smoked per day was reported for each smoking episode, in a standardized questionnaire during face-to-face interview. The present analysis was restricted to male ever smokers. A joint latent class mixed model was used to identify lifetime profiles of smoking intensities and estimate their association with lung cancer risk. Results: 1938 cases and 1837 controls contributed to the analysis. Five latent classes were identified: Class 1 with a moderate constant smoking intensity over lifetime at about 15 cig/day (48.8% of subjects); Class 2 with a high distant peak at about 27 cig/day around 35 years before diagnosis (9%); Class 3 with a very high peak at 36 cig/day around 20 years before diagnosis (12.7%); Class 4 with very high recent intensity at 37 cig/day in the last ten years (10.5%); and Class 5 with a high constant intensity at 25 cig/day in the last 30 years (19%). Class 5 had the strongest risk of lung cancer compared to Class 1 (OR=1.82 95% CI: 1.47; 2.25). Classes 3 and 4 with the most recent very high intensities had a significantly increased risk of lung cancer compared to Class 1 which smoked less but for a longer time (OR=1.62 95% CI: 1.27; 2.06, and OR=1.63 95% CI: 1.25; 2.11, respectively). Class 2 with a high distant peak had a similar risk of lung cancer compared to Class 1 with a moderate intensity over lifetime (OR= 1.01 95% CI (0.78; 1.30)). Conclusion: Our results provide a description of smoking behaviors over lifetime, and illustrate how recent high smoking intensities contribute to the risk of lung cancer

1283 S/P

ASSESSMENT OF REPORTED SEDENTARY BEHAVIOUR IN CHILDREN AND ADOLESCENTS: WHAT ARE THEIR RELIABILITY AND VALIDITY? Marcus Vinicius Nascimento-Ferreira* Marcus Vinicius Nascimento-Ferreira, Augusto César Ferreira de Moraes, Tara Rendo-Urteaga, Paulo Vinícius Toazza Oliveira, Luis A. Moreno, Heraclito B Carvalho, (School of Medicine, University of Sao Paulo, Sao Paulo, Brazil)

Background: Although subjective instruments (questionnaires and diaries) are the most common tools to measure sedentary behaviour (SB) levels, their reliability and validity remain unclear. Our aims were to assess the reliability and validity of SB subjective instruments in children and adolescents, and to examine the association of the measurement framework in these properties. Methods: We carried out a systematic review. Published studies were retrieved from electronic databases. We pooled correlation coefficients (r) as an indicator of agreement estimates. Results: A total of 14 studies met the inclusion criteria with ages ranging from 3 to 17.5 years. Ten of these studies (71.4%) reported correlation coefficients. We found two major groups of sedentary activities: screen time (38.1%) and sedentary behaviors (61.9%). The pooled reliability and validity of the SB instruments were 0.59 (C195%: 0.56 to 0.62) and 0.04 (C195%: 0.03 to 0.06), respectively. In stratified analyses, the direct observation showed a moderate validity coefficient to measure screen time (0.58; CI95%: 0.53 to 0.63). In the meta-regression, the objective measure during more than 7 days showed significant association with the validity (β=0.271; p=0.031). Conclusions: While sedentary behaviour subjective instruments show moderate/strong reliability, their criterion validity in children and adolescents depends on the reference method. Moreover, an extended period under objective evaluation improves the validity.

STRATEGIES FOR ADJUSTING FOR URINARY CREATININE OR SERUM LIPIDS WHEN EXPOSURE IS MEASURED ON POOLED SPECIMENS Clarice Weinberg* Clarice Weinberg, Min Shi, David M Umbach, Katie M O'Brien, (National Institute of Environmental Health Sciences)

Assays of biomarkers of exposure can sometimes be prohibitively expensive. For a case-control study, pooling equal aliquots of specimens before assay (cases with cases and controls with controls) is an effective strategy with several important advantages 1. Pooling saves money with little loss of statistical efficiency, 2. Pooling conserves irreplaceable biospecimens; and 3. Because concentrations measured in pools are pulled toward the mean, pooling can markedly reduce the fraction of determinations that fall below the assay's limit of detection (or outside its limits of reliable performance). Pooling across replicates within individuals is also used in cohort studies to control day-to-day variability. There is, however, a vexing problem with pooling: One would normally adjust individually-assayed urinary measurements for diluteness of the urine, typically by dividing by creatinine, and similarly one would adjust serum levels of a lipophilic analyte by dividing by the serum total lipid level. Unfortunately, one cannot simply divide the analyte concentration measured in a pooled urine (or serum) specimen by the creatinine (lipid) concentration found in the pool, because the ratio of means is not the same as the mean of the corresponding ratios. Our proposed remedy requires individualspecimen measurements for creatinine (lipid). One either physically dilutes the specimens before pooling, to equalize creatinine or lipid levels across the specimens in each pooling set, or pools together aliquots of algebraically-determined unequal volumes and then adjusts the pooled concentration using the individual-specimen creatinine (lipid) values. If a causal DAG has implied the need to use modeled mean creatinine in the adjustment (as in O'Brien, et al., 2017), then that model is instead used together with the individual determinations to assign volumes to the aliquots to be pooled or to devise a dilution strategy. We assess performance of the approaches via simulations.

1286 S/P

IMPROVEMENTS IN THE US LIFESPAN FROM 1968 TO 2015 AS DISPLAYED IN ANIMATED RISK FUNCTIONS ACROSS TIME Jacqueline Rudolph* Jacqueline Rudolph, Stephen Cole, (University of North Carolina at Chapel Hill)

Mortality is a fundamental marker of population health, and time trends in mortality can reveal much about improvements in public health. National vital statistics have been traditionally reported using rates (marginal and age-standardized) or life expectancy, but these measures do not utilize the full potential of the data because they are derivatives of a more informative measure of incidence: the survival function. Here, we use US National Centers for Health Statistics mortality and population data to estimate risk curves for all-cause and competing cause-specific mortality across the lifespan, and we examine trends in those curves over calendar time using animated visual displays. For all-cause mortality, we estimated annual probabilities of death in each age category by pooled logistic regression. We then used the estimated probabilities in a Kaplan-Meier estimator to obtain risk curves. For cause-specific mortality, we instead used pooled multinomial logistic regression and the Aalen-Johansen estimator. Point-wise 95% confidence intervals were estimated by Greenwood's formula. We obtained marginal curves as well as curves by sex, race, and region. We report the median age at death (obtained from those curves) marginally from any cause, for select years. The corresponding male (M) and female (F) median ages are given in parentheses. In 1970, 1985, 2000, and 2015, the median ages at death were 75 (M: 69, F: 78), 77 (M: 73, F: 81), 79 (M: 77, F: 82), and 82 (M: 79, F: 85). This corresponds with known mortality trends, whereby improvements in lifespan are seen with a diminishing difference by sex. Our animated curves, in addition to potentially revealing new information about the US life course, could supplement annually reported national mortality rates or serve as a moving picture of the natural history in analyses seeking to compare observed mortality to mortality under particular interventions.

1285 S/P

COMPARISON OF METHODS FOR ESTIMATING TREATMENT EFFECTS ON OBSERVATIONAL DATA Lisa C Bosman^{*} Lisa C Bosman Judith JM Rijnhart, Jos WR Twisk, Martijn W Heymans, (VU University Medical Center, Department of Epidemiology and Biostatistics and the EMGO Institute for Health and Care Research, Amsterdam, The Netherlands)

Randomized controlled trials (RCT) provide strong evidence for causality and are therefore considered to be the golden standard for determining treatment effects. However they also come with multiple disadvantages related to the compromised generalizability of the results and limited comparison of effects from different treatments. Instead, observational data may provide opportunities for determining causal treatment effects without the disadvantages of RCT's. Deriving causal effects from observational data is however still considered difficult primarily due to the control of confounding. For years, multivariable regression models have been the most widely applied method to adjust for confounders. Nowadays researchers also start to apply other methods for confounder adjustment, such as propensity score (PS) and instrumental variable (IV) analysis. However, the increasing popularity of these more advanced methods for causal inference, also leads to incorrect use of these methods. Preliminary results of this study show that estimates yielded by multivariable regression models, PS analysis, and IV analysis could lead to different conclusions. The validity of the results are dependent on the data situation, as each method has its own assumptions for the data. Based on further analyses we will provide an advise on how and when to use multivariable regression models, PS or IV analysis for estimating causal treatment effects on observational data.

1287 S/P

ASSESSING THE IMPACT OF PARAMETERIZATION ASSUMPTIONS ON SIMULATION MODELS DESIGNED FOR TRANSPORTABILITY: AN APPLICATION TO THE EFFECT OF STATINS ON LIFE-EXPECTANCY Eleanor Murray* Eleanor J Murray, Ellen C Caniglia, Saima Hilal, Myriam Hunink, Sonja A Swanson, (Harvard T.H. Chan School of Public Health)

Policy makers and health policy researchers are often interested in understanding long-term population effects of medical or public health interventions. One common metric for estimating these long-term effects is life expectancy. However, unless all individuals included in a study have died by end of observed follow-up, estimating life expectancy requires transportability of estimates to future populations. Agentbased and individual-level simulation models are a popular tool for estimating lifeexpectancy since these simulation models can incorporate complex systems models. However, simulation models can be biased when incorrectly parameterized in the presence of treatment-confounder feedback if input parameters are estimated from an external population. Here, we demonstrate that this bias can occur even when the parameters are obtained from the target population of interest. We describe the strong assumptions required to obtain unbiased estimates of the counterfactual life expectancy under an intervention, and weaker assumptions that suffice to obtain unbiased estimates of the causal effect on life expectancy comparing two interventions. As an example, we consider the effect of statin treatment initiation versus no initiation on life-expectancy in the Rotterdam Study, a cohort of 7931 individuals aged 55 years and older and followed since 1990. To explore the impact of extrapolating beyond available follow-up data, we develop simulations parameterized from 5, 20, and 25 years of follow-up data at which times 79%, 27% and 13% of cohort participants remained alive and under follow-up, respectively.

VISUALIZATION TOOL OF VARIABLE SELECTION IN BIAS-VARIANCE TRADEOFF FOR INVERSE PROBABILITY WEIGHTS Ya-Hui Yu* Ya-Hui Yu, Lisa M. Bodnar, Maria M. Brooks, Katherine P. Himes, Ashley I. Naimi, (University of Pittsburgh)

Inverse probability weighting (IPW) has become a commonly used confounder ad justment technique. The need to adjust for a high-dimensional set of confounders is becoming increasingly common. Adjusting for all such confounders may reduce bias, but at the expense of increased variance which is usually the result of (near) positivity violations and unstable IPWs. To date, most diagnostic techniques used to evaluate the behavior of IPWs rely on functions of the propensity score (e.g., mean and maximum stabilized weight, or propensity score overlap), but (usually) not the point estimate of substantive interest. We propose an algorithm that allows for the visualization of the bias-variance tradeoff incurred by including or excluding confounding variables from the propensity score model. Bias is quantified as the difference between the estimate from the model excluding certain confounder and the estimate from the model adjusting for all identified confounders. We applied this visualization tool to an empirical study examining the association between incident pre-pregnancy obesity and stillbirth in a cohort of linked birth and death records in Pennsylvania 2003-13. We identified 35 confounders, with a resulting propensity score model dimension of 95. Adjusting for all 35 confounders led to a risk ratio of 1.37 (95% CI: 1.01, 1.90). After applying our algorithm, we identified one confounder (prior gestational weight gain) that increase 3-fold mean squared error compared to full model. Removing this confounder from the propensity score model resulted in a more precise risk ratio of 1.68 (95% CI: 1.43, 1.99). These results demonstrate the potential reduce in mean squared error that can result from removing confounders from a propensity score model, and the strength of visualizing the bias-variance impact of select confounders when implementing IPW methods

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DIAGNOSTIC CODES FOR CHRONIC KIDNEY DISEASE STAGING MAY BE USEFUL FOR CLASSIFYING INDIVIDUALS IN ADMINISTRATIVE HEALTH CARE DATA Jung-Im Shin* Jung-Im Shin, Alex Chang, Josef Coresh, Morgan Grams, , (Johns Hopkins University)

Background and purpose Accurate classification of individuals with respect to kidney function is vital to research. However, many administrative health care data do not have laboratory data on kidney function. Our objective was to evaluate the accuracy of diagnostic codes related to chronic kidney disease (CKD) stages. Methods From January 2005 to January 2017, we analyzed 392,246 outpatient individuals in Geisinger Health System, a large rural health care system in Pennsylvania. We used the international Classification of Disease, 9th revision (ICD-9) codes of 585.1-2, 585.3, 585.4, and 585.5 to classify individuals with glomerular filtration rate (GFR) ≥60, 30-59, 15-29, or <15 ml/min/1.73m2, respectively. Individuals who do not have a 585.x were classified as those with GFR ≥60. This was compared with the closest GFR within 90 days prior to the date of ICD-9 code estimated by outpatient serum creatinine using Chronic Kidney Disease Epidemiology Collaboration equation. Results There were 30,417 patients with a 585.x code. Average GFR for the 361,829 patients without a 585.x code was 93.6; for 585.1 (N=327), it was 76.7; for 585.2 (N=942), it was 68.7; for 585.3 (N=26,650), it was 48.4; for 585.4 (N=1,925), it was 25.2; and for 585.5 (N=573), it was 15.0. The two methods agreed in 92.9% of the individuals. The kappa statistic was 0.611 (95% CI=0.608-0.614). ConclusionsCKD relevant ICD-9 codes may be a useful tool for classifying individuals according to their kidney function in administrative health care data when laboratory data is not available.

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HYPERTENSION AND NIGHT WORK: A NEED FOR G-METHODS Jacqueline Ferguson* Jacqueline Ferguson, Sadie Costello, Andreas Neophytou, Mark Cullen, Ellen Eisen, (School of Public Health, University of California, Berkeley)

Night shift work has been associated with increased rates of hypertension. However, estimates of this association from occupational studies may be downwardly biased by the healthy worker survivor effect due to underlying health status acting as a timevarying confounder affected by prior exposure. This is type of bias that cannot be addressed in standard analyses. To identify if this bias is present, we evaluated a surrogate for health status, annual health-claims-based risk score, as a potential timevarying confounder affected by prior exposure. Three component conditions were evaluated in an aluminum manufacturing cohort of 2,155 shift workers hired after 2003 and followed until 2013: 1) Risk score predicted future night work exposure, 2) Risk score was associated with hypertension, and 3) Prior night work exposure predicted risk score. To assess these conditions, a multinomial model, a Cox proportional hazard model, and a linear model were fit respectively, adjusting for age, sex, location, job type, and race. Annual night work was measured by the percentage of night shifts in a year. History of night work was defined as the cumulative number of months of any night work since hire and categorized. Under condition 1, an increase in risk score (i.e. worse health) was associated with odds ratios of 0.54 [95% CI: 0.11-0.65] and 0.27 [95% CI: 0.30-0.96] for odds of future night work of 50-95% and more than 95% night shifts respectively, compared with day-only work. For condition 2, risk score was associated with increased rate of incident hypertension controlling for history of night work (HR: 4.73 [95% CI 3.42-6.54]). Finally, for condition 3, an additional year of night work history increased risk score 0.6% [95% CI: -0.001, 0.12]. Our findings suggest risk score is a time-varying confounder affected by prior night work exposure. As a result, standard methods (e.g. linear, logistic, Cox regression) may provide biased estimates and G-methods are required.

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FACTORS ASSOCIATED WITH RESPONSE OVER TIME IN THE AVON LONGITUDINAL STUDY OF PARENTS AND CHILDREN Rosie Cornish* Rosie Cornish, Amy Taylor, George Davey Smith, Andy Boyd, John Macleod, Kate Tilling, (University of Bristol)

Estimates of exposure-outcome associations obtained from a complete case analysis may be biased if the outcome is missing not at random (MNAR). Further, a standard implementation of multiple imputation will also produce biased estimates if an imputed variable is MNAR. Neither of these mechanisms can be investigated completely using the observed data. Linkage to external datasets can provide more complete outcome data, or a proxy for the missing outcome; this can be used to identify a set of plausible missingness mechanisms. To investigate potential bias due to dropout, we used random effects logistic regression to examine the association between a number of lifestyle and health-related factors obtained from linked datasets and participation in the Avon Longitudinal Study of Parents and Children, taking account of a wide range of baseline socio-demographic factors known to be associated with participation. Of the 13,972 individuals included in this analysis, 9,049 (65%) had complete baseline covariates; numbers with linked variables varied depending on coverage of the linked dataset. After taking account of baseline covariates, smoking (OR for participation=0.62; 95% CI: 0.52-0.74), depression (OR=0.70; 0.55-0.88), lower educational attainment (OR=0.94; 0.93-0.95 per 10 point decrease in attainment score), special education needs (OR=0.54; 0.37-0.79), and higher school absence (OR=0.87; 0.83-0.91 per 1 unit increase in square root of % absence) and BMI (OR=0.98; 0.96-0.99 per 1kg/m2 increase) were all associated with lower study participation. A wide variety of outcomes may be associated with non-participation in longitudinal studies. This may result in bias in estimates of exposure-outcome associations. Knowledge of the factors that are related to dropout allows the researcher to determine an appropriate analysis strategy that will minimise bias and maximise efficiency. Linkage to external datasets allows the missingness mechanism to be investigated more fully.

AWARENESS OF AND POTENTIAL FOR DEPENDENT MISCLASSIFICATION IN THE EPIDEMIOLOGIC LITERATURE: A SYSTEMATIC REVIEW Lynsie R. Ranker* Lynsie R. Ranker, Julie M. Petersen, Matthew P. Fox, (Boston University School of Public Health)

Introduction: Discussions of measurement error often assume errors are independent. Yet the potential for dependent misclassification (error in one variable is correlated with error in a second) warrants exploration given potential for strong bias. The purpose of this systematic review was to evaluate frequency of error discussions and potential for dependent misclassification in the literature. Methods: We took a random sample of 100 articles from high impact epidemiology and medical journals (June 2015-July 2016). A second sample (n=39) of studies published before July 2016 and citing one of two prominent dependent misclassification articles was collected. Only studies analyzing exposure-outcome contrasts with actual data were included. For each study, we extracted study details, recorded mentions of measurement error (including mechanism: non-differential, differential, dependent), and qualitatively assessed potential for dependent misclassification. Results: Measurement error was often discussed (random sample: 74%; citation sample: 100%). The random sample had no definite mention of dependent misclassification, but one probable mention. Mentions in the citation sample were higher at 59%, though many used the citation to discuss independent non-differential or differential misclassification. When assessing dependent error potential, only 15% (random sample) were at plausible/probable risk for exposureoutcome dependent error; exposure-confounder dependent error risk was more common (24% plausible; 14% probable). Risk for dependent error was higher in the citation sample between both exposure-outcome (13% plausible; 31% probable) and exposure-confounder (31% plausible; 23% probable). Conclusion: There is low awareness of dependent misclassification, particularly between exposure and confounders, even in studies citing a prominent article on the topic. Further education and steps to avoid dependent misclassification via study design and data collection are warranted.

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SIMULATIONS COMPARING PERFORMANCE OF MATCHING METHODS TO UN-MATCHED ORDINARY LEAST SQUARES REGRESSION UNDER CONSTANT EFFECTS Anusha Vable* Anusha Vable, Mathew V. Kiang, Maria Glymour, Joseph Rigdon, Sanjay Basu, (UCSF)

Matching methods are increasingly used to infer causal effects from observational data under the assumption that matching produces unbiased inferences in a broader range of settings than un-matched ordinary least squares regression. We sought to compare inferences from propensity score matching (PSM), coarsened exact matching (CEM), and un-matched ordinary least squares regression (OLS) to identify which methods, in which scenarios, produced unbiased effect estimates and inferences at the expected rate of 95% (type I error=5%). We compared the methods in multiple simulated datasets with simple data structures including a dichotomous exposure, two continuous confounders, and a continuous outcome under constant null effects. We compared the methods in scenarios with correct and misspecified analytic models, good and poor common support, with and without discontinuities in the exposure (probability of exposure=0.5 if x1<0.5, 0.95 if $x1 \ge 0.5$) and/or outcome (coefficient for x1=10 if x1<0, 110 if $x1\ge 0$), and measured and unmeasured confounding. In most scenarios, estimates from PSM, CEM, and OLS approaches were unbiased on average when all confounders were measured; however, compared to OLS, PSM was comparatively inefficient, while CEM type I error rates were comparatively high. Only when there were discontinuities in both the exposure and the outcome did the matching methods consistently outperform OLS in terms of unbiased effect estimation and inferences. When both matching methods and OLS had similar point estimates, OLS estimates resulted in unbiased inferences more often than matching methods, while when point estimates were dissimilar, matching methods resulted in unbiased inferences more often than OLS.

GENERALIZABILITY OF SUBGROUP EFFECTS Marissa J. Seamans* Marissa J. Seamans, Ian Schmid, Elizabeth A. Stuart, (Johns Hopkins University)

Generalizing treatment effect inferences from randomized trials to a target population is challenged when the distribution of effect modifiers differs across the study sample and target. Even after accounting for observed modifiers using generalizability methods such as weighting, direct standardization, or outcome modeling, a key assumption is that subgroup-specific effect estimates do transport from sample to population. Thus, concerns may still remain about potential unobserved effect modifiers within subgroups (e.g., if the effect for males differs across sample and population based on an unobserved racial factor). To our knowledge, the extent of residual bias due to unobserved within-subgroup modifiers has not been examined. Using Monte Carlo simulation, we evaluated the performance of generalizability methods across settings with two- and three-way interactions between treatment, observed subgroups, and a single unobserved factor. In a simulation of 750,000 individuals (the target population), we varied the presence of treatment effect heterogeneity by a single factor within subgroups. From the target, we drew a biased sample (n = 2000) based on covariates and compared bias, absolute bias, variance, and mean square error (MSE) of the population treatment effect estimate after weighting or standardizing the sample to resemble the target population. As treatment effect heterogeneity increased within subgroups, the weighting and standardization approaches resulted in differing bias, absolute bias, and MSE. Our simulations show that generalizability methods are sensitive to the possibility of unmeasured effect modifiers within subgroups; however, the plausibility of such a factor after accounting for important subgroup effects should be considered. We recommend the use of sensitivity analyses developed for unobserved characteristics in generalizability methods to assess the impact of potential treatment effect heterogeneity within subgroups.

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IN MULTIPLE BIAS ANALYSIS, DOES ORDER OF CORRECTIONS REALLY MATTER? Julie M Petersen* Julie M Petersen, Takara L Stanley, Rebecca J Song, Matthew P Fox, (Boston University School of Public Health, Department of Epidemiology)

In multiple quantitative bias analysis (QBA), the recommendation is corrections should be made in the reverse order that each bias occurs. To our knowledge, this has not been explored through empirical or real-life example. We assessed if order of corrections influences validity of bias-adjusted effect estimates via simulation. We simulated 120 scenarios with 1000000 subjects each with a dichotomous exposure (E), disease (D), and confounder (C). First, we simulated true data using risk differences (RD) and prevalences (pr) where RDED=0.3, pr(C+)=50%, pr(E+IC-)=30%, and pr(D+IC-, E-)=1%. In scenarios, the strength of confounding varied: RDCD was 0.1 or 0.5 and RDCE was -0.299, -0.099, 0.1 or 0.5. Second, we simulated non-differential or differential E misclassification (Emis) using Bernoulli trials with sensitivity of 60% or 100% and specificity of 86% or 100% by D. Assuming the study had Emis (not E) and C was unmeasured, we then corrected using QBA in the order (confounding then misclassification) and reverse order (misclassification then confounding) the biases occurred. Reverse order correction always resulted in an adjusted estimate nearly identical to RDtrue, with deviations due to random error. Adjusted estimates using the order the biases occurred approximated RDtrue when RDCD and RDCE were positive or RDCD was 0.1 and RDCE was -0.099, even with strong Emis (65/75 scenarios differed from RDtrue by ≤10%). However, in the other scenarios this order often underestimated RDtrue (31/45 scenarios differed from RDtrue by >10%, max 63%). In 4 scenarios, ad justed estimates were more biased than the observed crude; the net bias of RDcrude before correction was near 0. The recommended reverse order of corrections yields valid bias-adjusted estimates, even in the presence of strong biases. Ignoring this advice could lead to incorrect inferences in some instances. Future simulations should assess more complex scenarios, which may be more generalizable to real-life contexts.

GENERALIZING FINDINGS FROM RANDOMIZED PARTICIPANTS TO ALL ELIGIBLE INDIVIDUALS USING CLINICAL TRIALS NESTED WITHIN COHORTS Sarah E Robertson* Sarah Robertson, Issa J Dahabreh, Elizabeth A Stuart, Miguel A Hernan, (Brown University)

The need to generalize trial findings from randomized participants to all eligible individuals arises naturally in clinical trials nested within cohorts of individuals meeting the trial selection criteria, including those who refuse randomization. In such studies, methods that use baseline covariates from all eligible individuals but use treatment and outcome information only from the randomized participants are appealing because they avoid confounding of the treatment effect among eligible individuals who refuse randomization. Leveraging connections with missing data theory, we show that the data from clinical trials nested within cohorts can be used to identify the average treatment effect in the super-population of eligible individuals. We examine three classes of estimators of the average treatment effect: (1) outcome model-based; (2) probability of trial participation-based; and (3) doubly robust estimators. We assess the finite-sample performance of different estimators in simulation studies. Lastly, we demonstrate the implementation of the methods using data from the Coronary Artery Surgery Study of 2099 eligible patients with coronary artery disease, of whom 780 were randomized into coronary revascularization surgery or medical therapy and 1319 refused randomization and self-selected into treatment

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LEVERAGING ADMISSION LABORATORY TEST RESULTS TO PREDICT PATIENT SEVERITY OF ILLNESS Natalia Blanco* Natalia Blanco, Surbhi Leekha, Laurence S. Magder, Sarah S Jackson, Pranita D Tamma, Daniel Lemkin, Anthony D Harris, (University of Maryland School of Medicine)

Background: Hospital severity of illness (SOI) scores that are simple, widelyavailable and non-syndrome specific are lacking. This study aims to evaluate the ability of hospital laboratory tests, as measures of SOI, to predict in-hospital mortality. Methods: We performed a retrospective cohort study among admissions to the University of Maryland Medical Center between November 2015 and May 2017. The following selected laboratory variables were collected using the hospital's central data repository: hemoglobin, platelet count, white blood cell count, urea nitrogen, creatinine, glucose, sodium, potassium, and total bicarbonate (CO2). They were selected because they are obtained on most hospitalized patients. Laboratory tests were only included if they were ordered within 24 hours of hospital admission in order to assess SOI upon hospital admission. In the absence of linearity with the outcome, variables were categorized as: abnormally low, normal, and abnormally high based on standardized clinical ranges. Stepwise selection was used to construct multivariable logistic regression accounting for patient clustering. The C statistic evaluated the model's discriminatory power. Results All laboratory tests were in the multivariable models and were significantly associated with in-hospital mortality. Patients with abnormally low levels of CO2 (145 mmol/L for males; >148 mmol/L for females) were 2.1 (95%CI 1.7-2.5) more likely to die during the hospital stay than patients with normal levels. The model's discriminatory power was good (C= 0.77(95%CI 0.75-0.78)). Conclusions: Hospital admission laboratory test results are strong predictors of mortality. This suggests that they can serve as severity of illness adjustment measures in multiple different epidemiologic studies.

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MAGNITUDE AND DIRECTION OF SELECTION BIAS IN THE RISK RATIO AND RISK DIFFERENCE IN THE ABSENCE OF A COLLIDER WHEN EXPOSURE CAUSES DISEASE Lyndsey A. Darrow* Lyndsey A. Darrow, Matthew J. Strickland, Mitch Klein, W. Dana Flanders, (School of Community Health Sciences, University of Nevada, Reno)

When exposure causes disease in a population of interest (target), conditioning on a variable that is affected by disease but is not itself a collider induces selection bias in risk ratios and risk differences (but not odds ratios). We describe the magnitude and direction of selection bias within a cohort study in the absence of a collider when (a) exposure is a cause of disease and (b) selection (loss to follow-up) is dependent on disease or a prognostic factor for disease. We quantify the bias for risk ratios and risk differences for a range of baseline risks and selection probability ratios of nondiseased to diseased individuals. Calculations show the risk ratio is biased toward the null when diseased subjects are preferentially selected and away from the null when non-diseased are preferentially selected. The magnitude of bias in the risk ratio increases with baseline risk, and the biased RR away from the null is bounded by the value of the (unbiased) odds ratio. The direction of bias in the risk difference is less consistent. When risks are not high (e.g., 3 fold difference). The greatest bias for risk differences occurs for risks near the boundaries (probabilities of disease close to 0 or 1). When risks are small and selection disparity not extreme, the risk ratio and risk difference exhibit opposite directions of bias. In contrast to the risk difference, bias in the risk ratio is largely ignorable when risks are low. These patterns can inform the choice of effect measure and the interpretation of published studies where loss to follow-up, missing data, or other type of selection into a study population is related to disease. Apparent generalizability of effect measures across studies may also be affected by such selection.

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BIAS DUE TO TIME-VARYING EXPOSURE ALTERS THE DIRECTION OF EFFECT IN A LONGITUDINAL COHORT STUDY Andrea G Buchwald* Andrea G Buchwald, Jessica Nelson, Benjamin H Rossi, Leigh Ann Clayton, John D. Sorkin, Laura Hungerford, (University of Maryland School of Medicine)

Although cohort studies have most commonly examined human subjects, improvements in epidemiologic study design and analyses provide opportunities for understanding difficult problems in small, nonhuman populations. Worldwide, frogs are experiencing catastrophic decline. Understanding effects of morbidity on reproduction is key to managing captive populations with limited resources and a goal of optimizing animal numbers, genetic diversity, and animal welfare. Individually identified, female poison dart frogs at the National Aquarium were followed from metamorphosis to frog stage. The outcome studied was first egg clutch release; the exposure was illness or injury before egg release or censoring. Frogs were checked daily for morbidity and for eggs and were censored if no eggs were released by death or institutional transfer. We initially used a Poisson regression adjusted for injury (present or absent) and follow-up time. Because frogs with delayed egg release may have more time to experience morbidity (reverse causality), we alternatively examined a Cox competing risk (death occurring before egg release) analysis with time varying exposure (i.e. illness or injury). Of 126 female frogs, 44 experienced illness or injury and 37 released egg clutches during follow-up. The Poisson model found that injury was associated with decreased rate of egg release (Rate Ratio=0.46; 95% CI=0.22 to 0.96). The Cox model found that injury was associated with increased egg release (Hazard Ratio=I.94; 95% CI= 0.93 to 4.27). This analysis highlights bias due to time-varying exposure and the need for time-varying analyses in studies where exposure can occur after the beginning of follow up. Additionally, these data support the hormetic theory, that stress can lead to enhanced reproductive success in vertebrates. As a practical result, this study supports the future value of frogs that recover from illness and injury for breeding in conservation of endangered frog populations.

EFFICIENT STATISTICAL ANALYSIS FOR TASK FMRI STUDIES Lan Liu* Lan Liu, Wei Li, Zhihua Su, (University of Minnesota at Twin Cites)

Functional magnetic resonance imaging (fMRI) is a popular technology that measures brain activity by detecting changes associated with blood flow. The fMRI produces a large number of voxels (cubic pixels of the brain volume), thus yielding relatively high spatial-temporal resolution. A task fMRI study collects the brain imaging data while an individual is instructed to accomplish basic tasks such as viewing images and more complex tasks such as logical inference, memorizing, and decision-making. The fMRI data from such studies provides information on behavior, brain development trajectories, and metabolic diseases. A fundamental challenge of fMRI studies has been the limited sample sizes. The main reason for such small sample size is the high scanning cost. If the sample size could be shrunk without compromising the information, a great amount of money could be saved and many additional cohorts could be explored. On the other hand, the rapid technological advances in brain imaging made it possible and routine to obtain highresolution imaging data. While traditional methods of analysis may have produced acceptable results when the imaging data was in low resolution, the high dimensional images demand better statistical methods for more precise and efficient estimations for task fMRI studies. The goal of this project is to develop novel statistical methodologies for conducting efficient multivariate inferences for task fMRI studies. We apply our method to a task fMRI study.

PRENATAL AND NEONATAL LEVELS OF INFLAMMATION AND NEWBORN DNA METHYLATION Edwina Yeung* Edwina Yeung, Weihua Guan, Sunni L Mumford, Robert Silver, Cuilin Zhang, Michael Y Tsai, Enrique F Schisterman, (NICHD)

Prenatal inflammation may be detrimental. Newborn DNA methylation may point to which pathways are impacted but whether it only reflects proximal exposures around delivery or the influence of prenatal inflammation is unclear. We examined DNA methylation using the Infinium MethylationEPIC BeadChip in DNA extracted from cord blood of 391 singletons from the EAGeR Trial (2007-2011). The trial randomized women with previous pregnancy loss to low dose aspirin (LDA) or placebo prior to conception. Maternal levels of high sensitivity c-reactive protein (hsCRP) were measured before pregnancy and at 8, 20 and 36 weeks gestation. Homocysteine was measured prior to pregnancy. Cord blood levels of hsCRP and other cytokines (i.e., interferon-gamma, interleukin (IL)-1a, IL-2, IL-4, IL-5, IL-10, IL-15, IL-23, TNFa) were measured by a multiplex ELISA. We tested methylation differences with respect to randomization to LDA or placebo and both maternal and neonatal measures of inflammatory markers. Linear mixed models were used to test for associations at each CpG site with adjustment for estimated cell count (using a cord blood reference), maternal age, race, sex and smoking, while correcting for batch effects with random effects and multiple testing with Bonferonni method. Randomization to LDA was not associated with methylation differences. Higher maternal homocysteine was associated with lower methylation at the POLR2B gene (p=6.7x10^-9) and hsCRP at 36 weeks was associated with lower methylation in a region near DNAJC25 and GNG10 (p=3.2x10^-9). Many significant associations were identified with cord blood levels of inflammatory markers including 24 CpGs for hsCRP, 6 for interferon-gamma, 5 for IL-2, 6 for IL-4, 3 for IL-5, 1 for IL-10, 8 for IL-15, and 4 for IL-23. The strongest association was for neonatal hsCRP and decreased methylation at a CpG near SLC12A9 and TRIP6 (p=1.8x10^-52). Cord blood DNA methylation strongly reflects newborn inflammation rather than prenatal levels.

VITAMIN D STATUS AND INTAKES AND THEIR ASSOCIATION WITH COGNITIVE TRAJECTORY IN A LONGITUDINAL STUDY OF URBAN ADULTS May A. Beydoun* May A. Beydoun, Sharmin Hossain, Marie T. Fanelli-Kuczmarski, Hind A. Beydoun, Jose A. Canas, Michele K. Evans, Alan B. Zonderman, (NIA/NIH/IRP)

Context: Serum 25-hydroxyvitamin D [25(OH)D], dietary and supplemental vitamin D may influence cognitive outcomes. Objectives Sex/age-specific and race-specific associations of vitamin D status and intake were examined with longitudinal change in various cognitive domains in a large sample of ethnically and socio-economically diverse US urban adults. Design: Two prospective waves of data from Healthy Aging in Neighborhoods of Diversity across the Life Span (HANDLS) study were used. Setting: Baltimore City, MD, 2004-2013. Participants U.S. adults aged 30-64y at baseline visit, length of follow-up between visits 1 (2004-2009) and 2 (2009-2013) with mean follow-up time±SD: 4.64±0.93y. Final analytic sample sizes ranged from 1,231-1,803 participants with 1.5-2.0 visits/participant. Main outcome and exposure measures: Cognitive performance was assessed using 11 test scores covering domains of global cognition, attention, learning/memory, executive function, visuo-spatial/visuo-construction ability, psychomotor speed and language/verbal. Serum 25(OH)D, vitamin D intake and use of supplements containing vitamin D were the key exposures. Results: Based on multiple mixedeffects linear regression models, there was a consistent relationship between vitamin D status (overall) and supplemental intake (older women and African-Americans) with a slower rate of decline in the domain of verbal fluency. Higher dietary intake of vitamin D was linked to slower rate of decline in verbal memory among younger women, and a slower rate of decline in visual memory/visuo-constructive abilities among Whites. All other associations were inconsistent. Conclusions Vitamin D status and intakes were inversely related to domain-specific cognitive decline in US urban adults Larger population studies are needed to replicate our findings.

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RACIAL AND ETHNIC DISPARITIES IN TREATMENT OUTCOMES OF PATIENTS DIAGNOSED WITH RUPTURED OR UNRUPTURED INTRACRANIAL ANEURYSMS: 2002-2012 NATIONWIDE INPATIENT SAMPLE Hind Beydoun, PhD, MPH* Hind Beydoun, May Beydoun, PhD, MPH, Alan Zonderman, PhD, Shaker Eid, MD, MBA, (Department of Medicine, Johns Hopkins School of Medicine, Baltimore, MD, USA)

Background: Intracranial aneurysms (IAs) affect 5-10% of the world population. To date, no nationally-representative study has evaluated treatment outcomes for IAdiagnosed U.S. patients within racial and ethnic groups. Objectives: This study examined how health outcomes varied by treatment and race / ethnicity among hospitalized U.S. patients with IAs. Methods: A retrospective cohort study was conducted using a sample of 62,224 hospital discharges from the 2002-2012 Nationwide Inpatient sample. Logistic regression models evaluated treatment selection as predictor of in-hospital survival (IHS: 'yes', 'no'), length of stay (LOS:≤ 7 days, >7 days) and total hospital charges (THC: <\$75,000', > \$75,000'), overall and across racial/ethnic groups, taking hospital- and patient-level confounders into account. Results Compared to "clipping", "balloon/stent-assisted coiling" was associated with better IHS (unadjusted model only), whereas "combination of treatments" were associated with lower IHS (unadjusted and adjusted models). Compared to "clipping", LOS≤7days was less likely in patients with "combination of treatments", and more likely among patients with "endovascular coiling". THC≤ \$75,000 was more common with "endovascular coiling alone", while being less common for "combination of treatments" or "balloon/stent-assisted coiling", as compared to "clipping". Observed relationships varied by race and ethnicity (P interaction<0.0001). "Combination of treatments" was associated with less IHS among Blacks alone and with THC \leq \$75,000 treatment among Whites and Hispanics alone, whereas "balloon/stent-assisted coiling" was inversely related to THC≤ \$75,000 among Whites and directly related to THC≤ \$75,000 among Hispanics. Conclusions: Racial and ethnic subgroups of IA patients experienced differential IHS and THC by treatment selection.

FOODBORNE ILLNESS IN THE ELDERLY IN MOROCCO: A 17-YEAR RETROSPECTIVE STUDY Fatine Hadrya* Hinde Hami, Fatine Hadrya, (Laboratory of Genetics and Biometry, Faculty of Science, Ibn Tofail University, Kenitra, Morocco)

Background: Several studies have shown that foodborne diseases affect both young and older people. The aim of this study is to evaluate the epidemiological surveillance systems for foodborne illnesses in the elderly used to determine the main characteristics of food poisoning in Morocco in order to reduce morbidity and mortality. Methods: This is a retrospective analysis of food poisoning cases, reported to the Moroccan Poison Control Center during the period 1992-2008. Results: There were 61 cases of foodborne illnesses, aged 75 to 98 years in Morocco. Both men and women were affected in the same way (p=0.37). The most commonly implicated food vehicles were dairy products, with 32% of cases. According to recorded data, all of the patients had digestive disorders ranging from abdominal pain to gastrointestinal bleeding. Three of these cases showed neurological symptoms, one patient has had tachycardia and another patient asthenia. After an average delay in presentation to hospital of seven hours, the patient's status has improved, especially under gut decontamination. Conclusions: The assessment of foodborne illness surveillance systems remains complicated by several factors such as under-reporting, lack of data on types of the disease and lack of laboratory testing.

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ASSOCIATIONS BETWEEN ADIPOSITY MEASURES AND SERUM VITAMIN D3 CONCENTRATION IN POLICE OFFICERS JA K. GU* Ja K. Gu, Luenda E. Charles, John M. Violanti, Claudia C. Ma, Emily Jenkins, Michael E. Andrew, (CDC)

Background: Studies show that circulating levels of 25-hydroxyvitamin D3 (vitamin D3) are lower in persons with higher adiposity levels. According to U.S. national data, law enforcement officers have the highest prevalence of obesity. Therefore, this study examined relationships between adiposity measures and serum concentration of vitamin D3 among 281 police officers, stratified by gender. Methods: Data were obtained from the Buffalo Cardio-Metabolic Occupational Police Stress Study (2011-2016). Measures of adiposity were waist circumference (WC), abdominal height (AbHt), body mass index (BMI), percent of body fat (PBF), fat mass index (FMI), and WC-height ratio (WCHtR). Associations of these measures with vitamin D3 were obtained using multiple regression models after adjustment for age, race/ethnicity, seasons (in Buffalo, NY), multi-vitamin supplement, and high-density lipoprotein cholesterol. Results The average age of officers (71.5% men) was 48.2 years. The prevalence of obesity (BMI≥30 kg/m2) was 50.7% for men and 21.3% for women. Mean levels of vitamin D3 were 28.7 ng/mL for men and 30.0 ng/mL for women. After adjustment, all measures of adiposity were inversely associated with vitamin D3 among women: WC (beta coefficient=-0.22 \pm 0.10, p=0.037); AbHt (β =-0.86 \pm 0.42, p=0.044); BMI $(\beta = -0.73 \pm 0.23, p = 0.002; PBF (\beta = -0.48 \pm 0.21, p = 0.023); FMI (\beta = -1.06 \pm 0.36, \beta = -1.06 \pm 0.36)$ p=0.004); and WCHtR (β =-0.41±0.16, p=0.013). Among men, there were no significant associations between the measures and vitamin D3 except for the association between PBF and vitamin D3 (β =-0.30±0.14, p=0.039). Conclusion: The selected adiposity measures were inversely associated with Vitamin D3 mostly among female officers. Male and female officers have different distributions of adiposity, which may be reflected in the different vitamin D3 levels and associations with the adiposity measures.

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DIETARY PATTERNS IN A FRENCH-SPEAKING POPULATION IN MONTREAL, CANADA AND PROSTATE CANCER RISK Marie-Elise Parent* Karine Trudeau, Dr. Marie-Claude Rousseau, Dr. Ilona Csizmadi, Dr. Marie-Elise Parent, (School of Public Health, University of Montreal, Montreal, QC, Canada)

Other than obesity for advanced prostate cancer (PCa), modifiable risk factors have not been identified. However, there is great interest in the role of diet in PCa prevention. Dietary patterns, which consider foods in combination rather than the consumption of specific nutrients, constitute a promising research approach. We evaluated the role of dietary patterns on PCa risk in a case-control study conducted in the French-speaking population in Montreal, Canada, who tends to share cultural and dietary habits, as well as genetic similarities. Cases (n=1919) aged ≤75 years were histologically confirmed for PCa in 2005-2009. Controls (n=1991) were randomly selected from the permanent electoral list and matched to cases by age (±5 years). A 63-item food frequency questionnaire focusing on the 2 years prior to diagnosis/interview was administered during in-person interviews. Principal component analysis followed by orthogonal rotation allowed the identification of three dietary patterns among controls, namely. "Healthy Eating", "Meat and Alcohol" and "Carbohydrates and Beverage" patterns. Unconditional logistic regression was used to estimate the association with PCa when comparing those who consumed the most (highest quartile) vs. the least (lowest quartile) of foods typical of each dietary pattern while adjusting for age, ethnicity, education, family history of PCa, time since last PCa screening, and total calories. Men who followed a "Healthy Eating" pattern had a decreased risk (OR= 0.74 [95% Cl= 0.60-0.91]) while those who followed a "Carbohydrates and Beverage" pattern had an increase risk (OR= 1.31 [95% Cl= 1.05-1.63]) of PCa. Unexpectedly, men with aggressive PCa (Gleason score of 7 with a primary score of 4, or higher), in the highest quartile of the "Meat and Alcohol" pattern had a lower risk of PCa (OR= 0.72 [95% Cl= 0.53-0.99]) than those in the lowest quartile. These results suggest that dietary patterns may play a role on the risk of developing PCa.

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A JOINT MODEL APPROACH TO DYNAMIC PREDICTION OF THE RISK OF CLASS IJ/III OBESITY USING LONGITUDINALLY-MEASURED BODY MASS INDEX: THE INTERNATIONAL CHILDHOOD CARDIOVASCULAR COHORT (I3C) CONSORTIUM Nanhua Zhang* Nanhua Zhang, Si Cheng, David R. Jacobs Jr, Tian Hu, Alan Sinaiko, Julia Steinberger, Trudy L. Burns, Elaine M. Urbina, Olli Raitakari, Alison Venn, Lydia Bazzano, Jessica G. Woo, (Cincinnati Children's Hospital Medical Center)

Objective: Longitudinally measured body mass index (BMI) can be an important predictor for developing class II/III obesity. Our objective was to take into account the dependency and association between longitudinally measured BMI and time to develop class II/III obesity using the joint model approach. The model is the first to link the childhood BMI trajectory to the risk of class II/III obesity in adulthood. Methods: The i3C Consortium consists of seven long-standing cohorts, each of which measured major cardiovascular risk factors in childhood during the 1970s and 1980s. 4,085 individuals with at least three BMI measures during childhood (<20 years old) and at least one BMI measure in adulthood (≥24 years) from the i3C Consortium were included in the analysis. Class II/III obesity in adulthood was defined as BMI ≥35 kg/m2. A linear mixed model was used to model the childhood BMI trajectory over age via natural cubic spline, and the age until developing class II/III obesity in adulthood was modeled using a Cox proportional hazards model. The two models were linked through the trajectory function. Data for 90% of the individuals were used to fit the joint model, and the other 10% were used to validate the model. Results: The model revealed a significant association between the longitudinal trajectory of BMI and the age until developing class II/III obesity (pvalue < 0.01). Application of the model to the validation dataset indicated significant accuracy for predicting the risk of class II/III obesity (area under the ROC curve= 0.77). The model can provide dynamic individualized prediction of the risk of developing class 11/111 obesity as childhood BMI measurements are updated. Conclusion: Our findings suggest that joint modeling provides a robust and individualized method for predicting the risk of developing class II/III obesity in adulthood using longitudinally-measured BMI during childhood.

LONG-TERM REDUCTION IN CARDIOMETABOLIC CONDITIONS FOLLOWING BARIATRIC SURGERY IN MEDICAID AND COMMERCIALLY INSURED PATIENTS Erin Takemoto* Erin Takemoto,

COMMERCIALLY INSURED PATIEN'IS Erin Takemoto* Erin Takemoto, Bruce Wolfe, Jodi Lapidus, Corey Nagel, Janne Boone-Heinonen, (Oregon Health & Science University)

Bariatric surgery is the most durable obesity treatment with demonstrated potential to alleviate the heavy burden of cardiometabolic disease (CMD) among patients with severe obesity. Bariatric surgery effectiveness among Medicaid patients, a population with the highest burden of CMD, remains unclear. We sought to determine if the risk of CMD following bariatric surgery differs in Medicaid compared to commercially insured patients. Data were obtained from the Longitudinal Assessment of Bariatric Surgery, an observational cohort study of adults undergoing bariatric surgery (2006-2009) at one of 6 geographically diverse centers in the US. We identified 1201 patients that underwent Roux-en-Y Gastric Bypass and were followed for 5 years. Poisson mixed models with robust error variance were used to estimate RRs and compare changes in common CMDs (Type 2 diabetes mellitus [DM]; hypertension [HTN]; dyslipidemia [DYS]) between insurance groups over time. Continuous time was coded into 2 linear spline functions with a knot at 1-year post-surgery to allow for non-linear changes. Interactions between time terms and insurance group allowed differential estimates for Medicaid (N=152) and commercially insured (N=1049) patients. In years 0-1 post-surgery, Medicaid and Commercial patients both experienced substantially lower risk of disease [RR (95% CI): DM: 0.40 (0.28, 0.56) vs. 0.32 (0.27, 0.38); HTN: 0.61 (0.51, 0.75) vs. 0.42 (0.38, 0.47); DYS: 0.66 (0.56, 0.77) vs. 0.57 (0.54, 0.61)], respectively. In years 1-5 post-surgery, the risk of disease increased minimally in both groups, all RRs ranging from 1.0-1.1. Both patient groups experienced a substantial decrease in the risk of CMD post-surgery and experienced minimal increases in the risk beyond 1 year post-surgery. These results provide important evidence for the beneficial association between surgery and long-term reduction in CMD among Medicaid patients.

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NORMAL WEIGHT CENTRAL OBESITY IN RELATION TO ALL-CAUSE AND CAUSE-SPECIFIC MORTALITY IN WOMEN: RESULTS FROM THE WOMEN'S HEALTH INITIATIVE Yangbo Sun* Yangbo Sun, Buyun Liu, Linda G. Snetselaar, Jennifer G. Robinson, Robert B. Wallace, Bette J. Caan, Thomas E. Rohan, Marian L. Neuhouser, Aladdin H. Shadyab, Rowan T. Chlebowski, JoAnn E. Manson, Wei Bao, (university of iowa)

Background: Central obesity, reflected by high waist-hip ratio (WHR), is present among 10% of individuals with normal body mass index (BMI). However, current public health guidelines focus on BMI and ignore central obesity. The risk of allcause and cause-specific mortality associated with normal weight central obesity relative to other combinations of BMI and WHR remains unclear. Methods: We analyzed data on 151784 postmenopausal women in the Women's Health Initiative. BMI was classified as: normal weight, 18.5≤BMI<25; overweight, 25≤BMI<30; and general obesity, BMI≥30. Central obesity was defined as WHR≥0.85. We used multivariable Cox proportional hazards models to estimate adjusted HRs of allcause, CVD and cancer mortality in relation to different combinations of BMI and WHR. Results: During 17.9 years follow-up, 42,266 deaths occurred, including 12,430 CVD and 11,454 cancer deaths. After adjustment for demographic characters, socioeconomic status, lifestyle factors, hormone use and baseline health status, compared with participants with normal weight and without central obesity, the HR (95% CI) for all-cause mortality was 1.28(1.22, 1.34) for those with normal weight and central obesity, 0.95(0.92, 0.98) for those overweight but without central obesity, 1.13(1.09, 1.17) for those overweight with central obesity, 1.10(1.06, 1.13) for those with general obesity but without central obesity, and 1.31(1.27, 1.35) for those with general obesity and central obesity. The corresponding HRs (95% CI) were 1.25(1.15, 1.36), 1.01(0.95, 1.06), 1.23(1.15, 1.29), 1.23(1.16, 1.31), and 1.47(1.39, 1.56), respectively, for CVD mortality and 1.24(1.13, 1.36), 1.01(0.96, 1.07), 1.20(1.13, 1.28), 1.14(1.07, 1.21), and 1.36(1.28, 1.44), respectively, for cancer mortality. Conclusions Individuals with normal weight central obesity represent a high-risk population for all-causes, CVD and cancer mortality. These findings should inform future public health guidelines.

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ASSOCIATION BETWEEN PHASE ANGLE FROM BIOELECTRICAL IMPEDANCE ANALYSIS AND LEVEL OF PHYSICAL ACTIVITY: SYSTEMATIC REVIEW AND META-ANALYSIS Rita Mattiello* Rita Mattiello, Eduardo Mundstock, Marina Azambuja Amaral, Luiza, Rafael R. Baptista, Edgar E. Sarria, Rejane Rosaria Grecco dos Santos, Adriano Detoni Filho, Carlos Alberto S. Rodrigues, Gabriela Carra Forte, Luciano Castro, Alexandre Padoin, Ricardo Stein, Lisiane Marcal Perez, Victória Praetzel, Patricia Klarmann Ziegelmann, (Pontifícia Universidade Católica do Rio Grande do Sul/Universidade Federal do Rio Grande do Sul)

Background: physical activity can be associated with bioimpedance phase angle. Methods: We conducted a systematic review and meta-analysis to assess the association between physical activity and bioimpedance phase angle (BPA). MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials, SciELO, LILACS, SPORTDiscus, Scopus and Web of Science were searched in. Two reviewers assessed independently study eligibility and risk of bias. We synthesized study results using a random-effects model. The association between physical activity and BPA was assessed considering study design. Results: Nine studies, counting a total of 575 participants were included in the meta-analysis. Crosssectional studies: the active subjects presented a higher BPA mean value when compared to controls (MD=0.70; 95%CI: 0.48 to 0.92, P<0.001) with low heterogeneity (I2 = 0%; P=0.619). Longitudinal studies (clinical trials or follow-up): the mean of BPA differences from baseline are significantly higher for the active group when compared with the control group (MD=0.30,95%CI: 0.11 to 0.49, P=0.001) with low heterogeneity (12=13%, P=0.331). No evidence of publication bias was found and the overall risk of bias was moderate to high. Conclusions: Physical activity has a positive association with bioimpedance phase angle; these results reinforce the importance of including exercise routinely in health care, both for disease prevention and for a better prognosis in chronic diseases.

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DIET QUALITY DURING PREGNANCY AND FETAL GROWTH: A MULTIRACIAL PREGNANCY COHORT STUDY Yeyi Zhu* Yeyi Zhu, Monique M Hedderson, Sneha Sridhar, Juanran Feng, Fei Xu, Assiamira Ferrara, (Kaiser Permanente Northern California Division of Research)

Objectives: Emerging evidence suggests that nutritional perturbations during pregnancy may impact fetal growth and disease risk in later life, although with inconsistent data on individual foods or nutrients. Data on overall dietary quality during pregnancy in relation to fetal growth are limited. We aimed to investigate the prospective associations of Healthy Eating Index-2010 (HEI-2010) scores during pregnancy with birthweight z-score and risk of small-for-gestational-age (SGA) and large-for-gestational-age (LGA). Methods: In a prospective cohort of 2,107 singleton pregnancies in the Pregnancy Environment and Lifestyle Study, maternal dietary intake was assessed by a food frequency questionnaire during early pregnancy. Offspring birthweight and gestational age at delivery were obtained from medical records. Size for gestational age was categorized according to gestational age, sex, and racial/ethnic specific birthweight distribution in the underlying population. Linear regression and Poisson regression with robust standard errors were used, ad justing for major risk factors. Results Total HEI-2010 score ranged from 37.5 to 94.2 (mean \pm SD 71.2 \pm 10.0). After adjusting for covariates, HEI-2010 score was significantly and inversely associated with birthweight z-score [β comparing the highest vs. lowest quartile= -0.14, 95% confidence interval (CI) -0.25, -0.02]. Consistently, HEI-2010 score comparing the highest vs. lowest quartile was associated with a 45% decreased risk of LGA [adjusted relative risk (aRR) = 0.55, 95% CI 0.32, 0.95, P-for-trend = 0.036]. The corresponding aRR was 0.67 (95% CI 0.46, 0.99) comparing good vs. poor diet quality defined by the cutoff of 75th percentile (≥ vs. <78.6). No significant associations were observed for HEI-2010 in relation to SGA risk. Conclusions: Better diet quality during pregnancy may reduce risk of LGA. Our findings may inform potential upstream prevention strategies to mitigate risk of fetal growth extremities.

OBESITY IN PEDIATRIC LIVER TRANSPLANTATION (LT) Karina Covarrubias* Karina Covarrubias, Dorry L Segev, Jacqueline Garonzik-Wang, Xun Luo, Allan Massie, Morgan Denhard, Douglas Mogul, (Johns Hopkins University School of Medicine)

The prevalence of obesity in children undergoing LT now exceeds that of the general population Pediatric data on post-LT outcomes is limited and has not accounted for age specific guidelines for defining obesity. We hypothesized that obese children experienced worse outcomes after LT. Using SRTR data, we explored the differences in graft failure(GF) and mortality for first-time pediatric liver transplant recipients(2002-2016) stratified by age (<24 months[infants], n=2715; >24 months[children], n=3131). Weight categories were defined using CDC standards. We used Cox proportional hazards models to evaluate the associations between standardized weight and GF and mortality after adjusting for age, gender, hospitalization status, diagnosis, race, graft type, and insurance. There was no difference in the hazard ratio for GF or mortality in underweight(aHR:1.11[0.81,1.51];P=0.5;0.85[0.54,1.34];P=0.5) or overweight(aHR:1.17[0.89,1.53];P=0.3;1.25[0.90,1.75];P=0.2) infants compared to normal weight infants. There was no difference in the hazard ratio for GF or mortality in underweight(aHR:1.21[0.88, 1.66];P=0.3;1.35[0.93, 1.96];P=0.1) or overweight(aHR:1.20[0.96,1.51];P=0.1;1.12[0.84,1.48];P=0.4) children compared to normal weight children. However, obese children had a 38% increased hazard of GF (aHR:1.38[1.10,1.73];P1 year) (aHR:1.66[1.13,2.45] vs 0.75[0.49,1.39]; interaction P<0.01;1.65[1.12,1.43] vs 0.91[0.59,1.39]; interaction

P=0.03). Obese children experience worse outcomes after LT. Physicians should counsel families on the potential risks of excess weight.

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DIETARY GLYCEMIC LOADS ARE ASSOCIATED WITH INCIDENCE OF TYPE 2 DIABETES IN THE COMMUNITY-BASED COHORT STUDY Kyung Won Lee* Kyung Won Lee, Jieun Lyu, Jae Kyung Park, Chulman Jo, Sung Soo Kim, (Korea National Institute of Health/KCDC)

Objectives To investigate whether dietary glycemic index (GI) and glycemic load (GL) are prospectively associated with type 2 diabetes mellitus (T2DM) incidence in middle-aged and older Korean adults. Methods: We used the data from the Korean Genome and Epidemiology Study. In total, 7,294 Korean adults (aged 40-69 years) with no history of T2DM or cancer at baseline were followed-up, with biennial examinations, for 10 years. Dietary GI and GL were estimated based on baseline dietary information obtained from a 103-item food-frequency questionnaire. Incident T2DM was diagnosed if the participants had fasting blood glucose levels ≥126 mg/dL or postprandial 2-hour glucose levels ≥200 mg/dL in their follow-up examinations. We also included participants who were newly diagnosed with T2DM or taking anti-diabetic medications at or between the follow-ups. With adjustment of the covariates, multivariable Cox proportional hazards models were performed to identify the associations between dietary carbohydrate indicators and T2DM incidence. Results: We documented 1.259 cases of T2DM after an average followup period of 7.7 years. In the fully adjusted model, men in the highest tertile of dietary GL had an approximately 20% higher rate of incident T2DM (ad justed HR: 1.16; 95% CI, 1.01-1.33; P for trend <0.05) than those in the lowest dietary GL tertile. Likewise, women with the highest dietary GL had a 21% higher risk of developing T2DM (adjusted HR, 1.17; 95% CI, 1.03-1.33; P for trend <0.05) than those in the lowest dietary GL tertile. However, no association was observed between dietary GI and T2DM incidence in both sexes. Conclusions: The results of this prospective cohort study suggest that dietary GL contributes to the development of T2DM in Korean adults who consume a substantially high carbohydrate diet. Therefore, nutrition education for this population should involve an emphasis on selfmonitoring of dietary intake, and further recommend a low-GL diet to promote optimal GL control.

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URINARY IODINE CONCENTRATIONS AND MORTALITY AMONG U.S. ADULTS Kosuke Inoue* Kosuke Inoue, Angela M. Leung, Beate R. Ritz, (Department of Epidemiology, UCLA Fielding School of Public Health)

Background: Iodine deficiency has long been recognized as an important public health problem. Global approaches such as salt iodization that aim to overcome iodine deficiency have been successful. Meanwhile, they have led to excessive iodine consumption in some populations, thereby increasing the risks of iodineinduced thyroid dysfunction, as well as the comorbidities and mortality associated with hypothyroidism and hyperthyroidism. We aimed to elucidate whether iodine intake is associated with mortality among U.S. adults. Methods: This is a prospective cohort study to estimate mortality risks according to urinary iodine concentrations (UIC) utilizing a nationally representative sample of 12,264 adults ages 20 to 80 years enrolled in the National Health and Nutrition Examination Survey (NHANES) III. Crude and multivariable Cox proportional hazards regression models were employed to investigate the association between UIC (Very low, 0-49; low, 50-99; normal, 100-299; high, 300-399; and very high, >400 µg/L) and mortalities (allcause, cardiovascular, and cancer). In a sensitivity analysis, we adjusted for total sodium intake and fat/calorie ratio in addition to other potential confounders. Results: Over a median follow-up of 19.2 years, there were 3,159 deaths from all causes. Participants with excess iodine exposure (UIC >400 µg/L) were at higher risk for all-cause mortality compared to those with adequate iodine nutrition (HR, 1.19; 95% CI, 1.04-1.37). We also found elevated HRs of cardiovascular and cancer mortality, but the 95% CI of our effect estimates included the null value for both outcomes Low UIC was not associated with increased mortality. The results did not change substantially after adjusting for total sodium intake and fat/calorie ratio. Conclusion: Higher all-cause mortality among those with excess iodine intake, compared with individuals with adequate iodine intake, highlights the importance of monitoring population iodine status.

DEPRESSIVE SYMPTOMS IN POLICE OFFICERS, GENDER, AND THE RETINAL VASCULATURE Luenda E. Charles* Luenda E. Charles, Anna Mnatsakanova, (NIOSH, CDC)

Objective: Depression has adverse consequences on the vascular system. Police officers experience stressful physical and psychological work-related events and may be more prone to depressive symptoms as a result of their exposure to these stressors. The objective of our study was to investigate associations of depressive symptoms with central retinal arteriolar equivalent (CRAE), a measure of retinal arteriolar width, and central retinal venular equivalents (CRVE), a measure of retinal venular width. Analyses were stratified by gender. Methods: Participants were 221 police officers from the Buffalo Cardio-Metabolic Occupational Police Stress study. Depressive symptoms were assessed using the Center for Epidemiologic Studies of Depression scale (CES-D) and the Beck Depression Inventory-II (BDI-II). Four digital retinal images per officer were taken. Mean diameters of the retinal vessels were compared across tertiles of CES-D and BDI-II scores using ANOVA/ANCOVA. Results: The average age of the officers (73.1% men) was 48.9 (SD=8.2) years. Women had a significantly higher mean level of depressive symptoms than men. Overall, depressive symptoms were not significantly associated with CRAE or CRVE. However, after gender-stratification, the mean CRVE (but not CRAE) significantly increased with higher tertiles (T) of CES-D (T1=214.2±2.98; T2=225.2±3.02; and T3=225.4±2.28; p for trend=0.029) and higher tertiles of BDI-II (T1=213.0±4.08; T2=223.2±2.66; and T3=224.9±2.29; p for trend=0.040) among women only, after adjustment for age, race/ethnicity, glucose, vitamin D3, white blood cell count, and CRAE. Conclusions: Higher levels of depressive symptoms were associated with wider (i.e., worse) retinal venules among female officers. The higher level of depressive symptoms among female officers and the association with adverse changes in the venules are important issues for law enforcement management and occupational clinicians.

PREVALENCE OF WORKPLACE DISCRIMINATION AND BULLVING IN A U.S. NATIONAL SAMPLE OF BLACK AND WHITE MEN AND WOMEN AGED ≥45 VEARS: THE REGARDS COHORT STUDV. Desta Fekedulegn* Desta Fekedulegn, Toni Alterman, Luenda E. Charles, Kiarri Kershaw, Monika Safford, Virginia J Howard, Leslie MacDonald, (NIOSH/CDC)

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Objective: Workplace discrimination and bullying are challenging problems empirically linked to adverse health in previous studies. National prevalence estimates of workplace discrimination and bullying were generated and their association was examined overall, by race, sex, and race-sex subgroups. Methods: Participants were 4,798 employed black and white men and women aged ≥45 years from a national community-based cohort, the REasons for Geographic and Racial Differences in Stroke occupational ancillary study. Workplace discrimination (by race, sex, age, other) and bullying in the current job were measured by computerassisted telephone interview (2011-2013); dichotomous responses (yes, no) were reported and a composite measure of discrimination was defined (yes to one or more). Prevalence estimates and age- and region-adjusted ratios were derived using SUDAAN to account for the complex sample design. Results: This sample comprised 11% blacks and 47% women. The overall prevalence of workplace discrimination was 14%, ranging from 25% for black women (BW), 18% for black men (BM), 16% for white women (WW), to 11% for white men (WM). Blacks reported a 60% higher rate of discrimination compared to whites; women reported a 53% higher prevalence of discrimination compared to men. The overall prevalence of workplace bullying was 10%, ranging from 13% for BW, 12% for WW, 11% for BM, to 8% for WM. Women reported a 52% higher prevalence of bullying compared to men. Race differences in bullying were not significant. Discrimination was significantly associated with bullying; bullying prevalence was 4 to 8 times higher among those reporting discrimination compared to those reporting none. Conclusion: Blacks and women reported the highest prevalence of discrimination and bullying, and discrimination was an important determinant of bullying. Targeted interventions are warranted to reduce workplace discrimination and bullying.

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RECENT OCCUPATIONAL PESTICIDE EXPOSURE AND SERUM THYROID MARKERS IN THE AGRICULTURAL HEALTH STUDV Catherine Lerro* Catherine Lerro, Laura Beane Freeman, Curt Dellavalle, Muhammad Kibriya, Brisa Aschebrook-Kilfoy, Farzana Jasmine, Stella Koutros, Christine Parks, Dale Sandler, Michael Alavanja, Mary Ward, Jonathan Hofmann, (National Cancer Institute)

Background: Animal studies suggest that exposure to pesticides may alter thyroid function; however, few epidemiologic studies have examined this association. We evaluated the relationship between pesticides and thyroid function in 679 male farmers enrolled in the Biomarkers of Exposure and Effect in Agriculture (BEEA) study, a sub-study of the Agricultural Health Study cohort. Methods: We obtained self-reported occupational use of pesticides in the last year and blood samples at BEEA enrollment (2010-2013). In serum, we measured thyroid-stimulating hormone (TSH), thyroxine (T4), and triiodothyronine (T3) using Millipore multiplexing kits, and anti-thyroid peroxidase autoantibodies (anti-TPO) using a Luminex-based kit. We evaluated 19 pesticides with ≥five exposed subclinical hypothyroidism cases (defined TSH>4.5mIU/L). We used logistic regression to evaluate anti-TPO positivity and subclinical hypothyroidism, and linear regression to estimate associations for continuous T4 and T3, adjusting for age, state, body mass index, smoking history, and past exposure (prior to the last 12 months) to pesticides previously shown to be associated with thyroid function (aldrin, pendimethalin, and methyl bromide). Results: The herbicide glyphosate was inversely associated with subclinical hypothyroidism (OR=0.60, 95%CI=0.39-0.92), while another herbicide, dicamba, was associated with a 9.76 ng/dL (95%CI=I.30-18.21) increase in T3 (inter-quartile range [IQR]: 101-138 ng/dL). The organophosphate insecticide chlorpyrifos was associated with anti-TPO positivity (OR=3.05, 95%CI=I.20-7.78) and higher T4 (0.52 µg/dL, 95%CI=0.07-0.96, IQR: 6.00-7.51 µg/dL). There were no other statistically significant associations. Conclusions: Preliminary results suggest that recent exposure to glyphosate, dicamba, and chlorpyrifos may alter thyroid function among male pesticide applicators. Further work is needed to understand how the intensity and timing of recent exposure impacts these associations.

EDITORIAL AUTHORSHIP IN EPIDEMIOLOGIC JOURNALS Riaz Qureshi* Riaz Qureshi, Jimmy Le, Tianjing Li, Michel Ibrahim, Kay Dickersin, (Johns Hopkins Bloomberg School of Public Health, Department of Epidemiology)

Background: Journal editors invite accomplished individuals to write editorials. Since at least half of epidemiologists are women, it would be expected that women would also write half of journal editorials. We studied the distribution of gender among authors who wrote editorials for 5 high-impact epidemiology journals between 2010 and 2017. Methods: We searched MEDLINE to identify articles meeting our eligibility criteria: indexed as "editorial;" published between 2010 and 2017, inclusive; having named authors; and in a journal with "epidemiology" in the name, publishing primary research, and with the five highest Scopus 2016 impact factors. We imported citations into EndNote X8. Two investigators independently classified author gender based on name or professional profile and resolved discrepancies by discussion. We assessed proportion of women editorial authors overall, by journal, year, and authorship order, and whether this differed significantly from an expected 50%. We performed analyses using Stata 13. Results: We identified 169 authors associated with 212 eligible editorials in the American Journal of Epidemiology, Clinical Epidemiology, European Journal of Epidemiology, International Journal of Epidemiology, and Journal of Clinical Epidemiology. Although 28% (47/169) of unique authors were women, they comprised only 19% (85/433) of listed authorships. Women's authorship was less than 50% in all journals and appeared to be differentially represented by journal but not by year of publication. Of editorials with a single author, 22% (14/65) were authored by a women, and of editorials with two or more authors, the proportions of women first and last authors were 14% (21/147) and 25% (37/147) respectively. Conclusions Women are underrepresented in editorial authorship in high impact epidemiology journals. The results of this study will be made available to editors in the hope that it may begin a discussion of contributing factors and ways to remedy the situation.

LONG-TERM RENAL FUNCTION IN LIVING KIDNEY DONORS WITH RENAL CYSTS Madeleine Waldram* Madeleine Waldram, Alvin Thomas, Courtenay Holscher, Anh Nguyen, Samantha Halpern, Saad Anjum, Jennifer Alejo, Brian Boyarsky, Shane Ottman, Macey Henderson, Fawaz Al-Ammary, Jacqueline Garonzik-Wang, Dorry Segev, Allan Massie, (Johns Hopkins University)

In the context of a severe organ shortage, live donor kidney transplantation is the best treatment option for patients with end-stage renal disease (ESRD) and offers a promising solution to increase access to life-saving organs. However, despite rigorous screening, some live kidney donors (LKDs) develop ESRD following donation, which may indicate subclinical renal impairment at the time of donation. Simple renal cysts found during screening are often considered benign; however, these structural abnormalities may impact renal function, and their implications for long-term renal function are unknown. We reviewed computed tomography (CT) imaging taken predonation for LKDs who donated between 2000-2005 at our center and had at least one postdonation serum creatinine measurement (N=322). We compared postdonation renal function (estimated glomerular filtration rate, eGFR, calculated using the CKD-EPI equation) among LKDs with and without renal cysts using mixed-effects linear regression to account for multiple eGFR measurements per donor. Predonation prevalence of renal cysts was 25.5% among LKDs in our cohort. LKDs with cysts were older (p<0.001) and had slightly lower predonation eGFR than those without cysts (median 96 vs. 101 mL/min/1.73m2, p<0.01). LKDs were followed for a median (IQR) of 8.6 (5.4-11.1) years. Without adjustment, cysts were associated with 4.6 units lower postdonation eGFR (95% CI: 1.6-7.6, p<0.01). However, after adjustment for predonation characteristics

(age/sex/race/eGFR/BMI/education), there was no evidence of difference in postdonation eGFR trajectory (difference: -0.1, 95% CI: -2.7-2.4, p=0.9). In this single-center study, predonation renal cysts were associated with slightly lower postdonation eGFR, but were not associated with long-term differences in renal function trajectory after adjusting for predonation characteristics. Our findings are reassuring for current practices of accepting candidates with renal cysts for donor nephrectomy.

TRENDS IN PREEXISTING COMORBID CONDITIONS IN OLDER PATIENTS WITH INCIDENT END-STAGE KIDNEY DISEASE INITIATING HEMODIALYSIS VERSUS PERITONEAL DIALYSIS Jingbo Niu* Jingbo Niu, Wolfgang C. Winkelmayer, (Baylor College of Medicine)

The presence of several comorbidities affects survival in patients with end-stage kidney disease (ESKD). Over time, incident ESKD patients have had an increasing comorbidity burden, with hemodialysis (HD) patients generally having more comorbidities than peritoneal dialysis (PD) patients. Whether these differences have changed over time is not sufficiently studied. We used the US Renal Data System (1996-2013) to compare the time trends of preexisting comorbidities in HD and PD patients. Patients 67 + years who initiated dialysis for ESKD were eligible if they had been continuously enrolled in Medicare A&B during the 2 years pre-ESKD. Comorbidities were defined based on pre-ESKD Medicare claims and Medical Evidence Reports. Prevalence differences in PD vs HD over time were compared using Poisson regression models with robust variance, adjusting for age, sex, race, ethnicity and Medicaid dual eligibility. Hypertension remained high (>96%) throughout in both groups Prevalence of diabetes was slightly lower in PD than HD in 1996 and the difference increased due to faster rise in HD over time, with a -6.0% [95% CI -9.3%, -2.7%] greater difference between PD and HD in 2013 vs. 1996. Similar time trends were observed for atrial fibrillation and pulmonary hypertension. Prevalence of cardiovascular disease was similar in HD and PD in 1996 and decreased over time in both groups, but faster in PD with a -10.3% [95% CI: -13.6%, -7.1%] greater decline than HD in 2013 vs. 1996. Similar time trend was observed for heart failure. Prevalence of cerebral vascular disease and peripheral vascular disease were lower in PD than HD in 1996 and decreased over time in PD but not in HD. In conclusion, the difference in comorbidity burden between PD and HD has increased from 1996 to 2013 independent of changes in sociodemographic characteristics.

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PREDICTORS OF BONDING WITH PETS IN A POPULATION-BASED SAMPLE Pamela J. Schreiner* Pamela J. Schreiner, (University of Minnesota)

Background: Pet ownership has been inconsistently associated with health benefits in humans, and may depend on the bond between owner and pet. We examined predictors of considering cats and dogs as family members at the 2015 Minnesota State Fair. Methods: Adult Minnesota residents visiting the University of Minnesota exhibit were asked about their pets as well as completing demographic and behavioral questionnaires. Exposures included age, sex, race, body mass index (BMI), marital status, having children, working full-time, education level, home ownership, smoking and drinking, and scores on a mental and physical quality of life survey in addition to whether pets lived inside. Predictors of considering pets as family members were determined using stepwise logistic regression with a 2-sided type 1 error of 0.05 considered statistically significant. C-statistics were used to assess goodness-of-fit. Results: Of the 639 participants, 54.5% were women, 94.3% white, 69.8% married, 69.2% never smokers, 74.2% had no children, 71.5% had at least a college education, and 77.8% lived in urban/suburban compared to rural Minnesota based on zip code. Mean± standard deviation for age was 48.9±15.6 years, and mean BMI was 27.3±6.0 kg/m2. Results: There were 199 cat owners and 281 dog owners, with 79.4% and 90.4% considering them as family members, respectively. For cats, multivariable predictors of family membership were urban residence (OR (95% CI)=4.95 (1.49, 16.5)) and living inside (OR=5.29 (1.50, 18.7)), c=0.821. For dogs, urban residence (OR=3.30 (1.35, 8.05)) and living inside (OR=5.27 (2.15, 12.9)), c=0.754, were also the only statistically significant multivariable predictors. Conclusion: These data suggest limited predictors can determine factors associated with bonding with good model fit. Lifestyle factors and role of pets in households may explain the discrepancies in their association with human health between studies. Replication in other populations is needed.

HOW VALID ARE SMALLER GROUP ESTIMATES WHEN USING CITYWIDE TELEPHONE SURVEY DATA? A COMPARISON OF TWO SURVEYS IN NEW YORK CITY. Aldo Crossa* Aldo Crossa, Jillian Jessup, Sze Yan Liu, Carmen Isasi, David B. Hanna, Simin Hua, Fangtao He, Amber Levanon Seligson, Sungwoo Lim, (New York City Department of Health and Mental Hygiene)

Population-level surveys like the New York City Community Health Survey (CHS) are essential to public health surveillance and practice. However, it can be challenging to get reliable estimates for smaller geographic or demographic groups. To determine whether a citywide sample yields similar health estimates as a targeted sample for Latinos in the Bronx, we used baseline face-to-face questionnaire (2008-2012) data from the Bronx site of the Hispanic Community Health Study/Study of Latinos (HCHS/SOL), a population-based cohort study of Hispanics/Latinos in 4 U.S. cities, to compare prevalence estimates of selected selfreported conditions from CHS data (collected via phone interviews) for the Latino population living in a comparable geographic area of the Bronx. We identified ZIP codes in the Bronx that include with the HCHS/SOL Bronx catchment area. Using a CHS data for 2009-2013, we calculated age-adjusted prevalence estimates for obesity, hypertension, diabetes, smoking, and insurance coverage among Latinos within those ZIP codes. Estimates were calculated overall and stratified by selected demographics. Estimates were adjusted for complex sampling designs and weighted to population data. We tested differences in prevalence estimates using at-test with pooled variance. Prevalence estimates were significantly higher in HCHS/SOL compared with CHS for obesity (HCHS/SOL estimate – CHS estimate = Δ = 14.4%, p<0.01) and current smoking ($\Delta = 4.9\%$, p0.05), insurance ($\Delta = -1.2$, p>0.05) and hypertension (Δ = -0.7, p=0.05). When stratified by sex, hypertension estimates were significantly different for men ($\Delta = -7.6\%$, p<0.01) and women ($\Delta =$ 4.7%, p<0.01). Stratified by geography and Latino ethnicity, we found that CHS data yielded similar estimates of selected conditions to HCHS/SOL data, except for obesity and current smoking. Sampling strategies or modes of data collection may contribute to these differences.

CLINICAL UTILITY AND INTERPRETATION OF CKD STAGES IN LIVING KIDNEY DONORS Allan B. Massie* Allan B. Massie, Macey L. Thompson Henderson, Fawaz Al Ammary, Jon Snyder, Dorry L. Segev, (Johns Hopkins University)

Current definitions of chronic kidney disease (CKD) staging define any individual with estimated glomerular filtration rate (eGFR)<60 as having stage 3 or higher CKD. Nearly half of living kidney donors (LKDs) have post-donation eGFR below this threshold, but the clinical interpretation of eGFR<60 in donors is unknown, and the "CKD" label may not be appropriate. Evidence of risk associated with decreased post-donation eGFR is needed to inform international guidelines and best practices for donor followup and care management. Using national registry data, we studied end-stage renal disease (ESRD) risk in 67,571 LKDs 1999-2015 with at least one reported postdonation serum creatinine (SCr). eGFR was calculated via the CKD-EPI equation. Measurements with eGFR<15 were excluded from analysis. We modeled the association between eGFR category (≥60, 45-59, 30-44, 15-30, corresponding to no CKD, CKD stage 3, stage 4A, and stage 4B) using Cox regression with eGFR category as a time-varying exposure and adjusting for donor age, sex, race (black vs nonblack), BMI, and 1st-degree biological relationship to recipient. 117,051 CKD measurements were reported at median (IQR) 11 (4-14) months post-donation (90th percentile 25m post-donation). Of these, 33.9% were in the range 45-59, 5.7% were in the range 30-45, and 0.8% were in the range 15-29. Lower eGFR categories were associated with greater ESRD risk: 5-fold higher risk for eGFR 30-45 (aHR = 5.3 (2.1-13.3)) and 54-fold higher risk for eGFR 15-29 (aHR=53.7 (4.8-421.3); both p<0.001). Donors with eGFR 45-60 had elevated risk but the association was not statistically significant (aHR =1.9 (0.9-3.8), p=0.08). There is insufficient evidence to support the category eGFR 45-60 as clinically meaningful "CKD stage 3" among LKDs. Nevertheless, eGFR category is associated with ESRD risk among donors with eGFR<45, and our results support current guidelines recommending longitudinal followup of renal function in living kidney donors.

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KIDNEY TRANSPLANT BENEFIT TO PATIENTS WITH LONG DIALYSIS VINTAGE Allan B. Massie* Allan B. Massie, Deidra Crews, Tanjala

Purnell, Jacqueline Garonzik-Wang, Dorry L. Segev, (Johns Hopkins University)

Following a recent organ allocation policy change, deceased donor kidney transplant (DDKT) waitlist registrants with long dialysis vintage now have high allocation priority. However, having survived for many years on dialysis, these patients may tolerate dialysis well; moreover, longer dialysis vintage is associated with worse posttransplant survival. As such, the survival benefit of DDKT for these patients is unknown. Using national registry data (SRTR) 2002-2016 on 17,271 DDKT waitlist registrants who were active on the waitlist >10y past dialysis initiation, we studied the survival benefit of DDKT using the Mauger method, treating DDKT as a timevarying exposure and adjusting for candidate characteristics. Among patients alive and waitlisted at 10y after dialysis initiation, 11, 13, and 15-year survival past dialysis initiation were 88.4%, 69.6%, and 55.4, respectively. A total of 4,315 registrants received DDKT >10 years after dialysis initiation. 1, 3, and 5-year post-DDKT patient survival were 95.3%, 89.4%, and 82.4% respectively. Past 30d posttransplant, DDKT was associated with substantially reduced mortality risk (HR = 0.69 (0.51-0.93) at 30-90d post-DDKT, 0.35 (0.30-0.41) at 1-3y post-DDKT, and 0.49 (0.41-0.57 at >5y post-DDKT, all pl5y after dialysis initiation. 1, 3, and 5-year post-DDKT survival were 94.0%, 89.1%, and 80.4% respectively. Past 180d posttransplant, DDKT was associated with substantially reduced mortality risk. Patients with >10 years of dialysis vintage receive substantial survival benefit from DDKT. Since they receive high allocation priority under the new policy, transplantation should be considered as a treatment modality even for patients who have never listed forDDKT.

ESTIMATING THE EFFECTIVENESS OF RECOMBINANT GROWTH HORMONE THERAPY AMONG CHILDREN WITH CHRONIC KIDNEY DISEASE AND GROWTH FAILURE USING A TARGET TRIAL APPROACH Derek K. Ng* Derek K. Ng, Megan Carroll, Frederick A. Kaskel, Susan L. Furth, Bradley A. Warady, Larry A. Greenbaum, (Johns Hopkins Bloomberg School of Public Health, Department of Epidemiology)

Clinical trials have demonstrated that recombinant human growth hormone (rhGH) is an effective treatment for growth failure among children with chronic kidney disease (CKD): however, causal effects in clinical settings have not been estimated. To determine rhGH effectiveness, we employed a target trial study design nested within the Chronic Kidney Disease in Children (CKiD) study. Eligible children had growth failure (height <4th percentile, or -1.75 SDs of the normal population) and were classified by rhGH initiation. A third comparison group included children who initiated rhGH but did not have growth failure. Between-group and within-individual differences in height z-scores were characterized by two-sample and paired t-tests at approximately 18 months after treatment initiation. Inverse probability weights standardized differences in pre-initiation characteristics, including parental height, to estimate the average treatment effect among the treated. Among 107 children with growth failure, a total of 36 children initiated rhGH therapy (mean age= 9.2 and height z-score = -2.5) and 71 did not (mean age = 9.9 and height z-score = -2.5). After receiving rhGH for approximately 18 months, the mean height z-score was -2.1 (mean within-person change= +0.45 SDs). Among children who did not receive rhGH, the mean height z-score was -2.6 at 18 months of follow-up (p for difference=0.012; mean within-person change=+0.13 SDs). Children who initiated rhGH therapy but without growth failure (n= 32), experienced a mean height z-score increase from -1.22 to -0.95 at 18 months of follow-up. Those receiving rhGH experienced improved growth, but this effect was substantially attenuated compared to clinical trials (+0.91 SDs). The emulated target trial study design in this observational cohort not only documented the underutilization of rhGH, but provided a more realistic and generalizable estimation of therapy effectiveness for this high risk population.

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CHARACTERIZATION OF OVARIAN GROWTH AND DEVELOPMENT OF FOLLICLES IN GIRLS FROM BIRTH TO 9 MONTHS Helen Chin* Helen Chin, Donna Baird, Margaret Adgent, Eileen Ford, Kassa Darge, Summer Kaplan, Virginia Stallings, David Umbach, Walter Rogan, (Epidemiology Branch, National Institute of Environmental Health Sciences, RTP, NC)

Childhood ovarian development may influence adult ovarian function, but there are limited descriptions of healthy ovarian growth in girls, particularly during infancy. We used data from the Infant Feeding and Early Development Study, a longitudinal cohort study of estrogen-responsive outcomes in healthy infants, to estimate ovarian growth trajectories and describe the presence of ovarian follicles in girls 0-9 months old. There were 136 girls who completed the study and were included in the analysis. Ultrasounds were performed on the infants within 72 hours of birth and at 4, 16, 24, and 32 weeks. Ovarian volume was calculated as the geometric mean of the right and left ovary at each ultrasound visit. The number of ovarian follicles present was recorded as none, 1-3, or more than 3, and the diameter of the largest follicle was measured. A week-specific analysis was done to assess the association between follicle size and ovarian volume. We used mixed-effects regression splines to examine the overall age trajectory of ovarian volume. The mean ovarian volume increased from 0.2 cm3 (SD=0.2) at birth to a maximum mean value of 1.0 cm3 (SD=0.6) at 16 weeks, which was followed by a slight shrinking and leveling off in later weeks. The largest follicle varied in size over the 9-month study period from a mean diameter of 0.3 cm (SD=0.1) at birth to 0.6 cm (SD=0.2) at week 16. We observed a positive association between the diameter of the largest follicle and overall ovarian volume at each individual study visit. Among girls with observable ovaries at the first visit, the growth trajectory differed by the number of follicles identified (none vs. 1-3, p <0.01; none vs. more than 3, p <0.01). Our results show an increase in infant ovarian volume shortly after birth, which may be driven by the number and size of developing follicles. Further research is needed to understand the stimulus for early increases in follicular and ovarian development.

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PRE- AND EARLY PREGNANCY DEPRESSION AND RATE OF GESTATIONAL WEIGHT GAIN FROM MID TO LATE PREGNANCY Sylvia E Badon* Sylvia E Badon, Monique M Hedderson, Lyndsay A Avalos, (Kaiser Permanente Northern California Division of Research)

Gestational weight gain (GWG) outside recommended ranges is associated with adverse perinatal outcomes. Women with depression before and during pregnancy may be at especially high risk for GWG outside recommendations, given associations of depression with both weight loss and weight gain outside of pregnancy. Using Kaiser Permanente Northern California's universal perinatal depression screening program, we identified 87,600 pregnancies from 2012 to 2016 screened for depression ≤20 weeks gestation using the Patient Health Questionnaire (PHQ-9). Depression was defined as a diagnosis, antidepressant dispensing, or PHQ-9 score ≥10 from 6 months before pregnancy to 20 weeks gestation. We created mutually exclusive joint exposure groups for pre- and early pregnancy (both pre- and early pregnancy depression=chronic depression; depression in early pregnancy only, depression in pre-pregnancy only; no pre- or early pregnancy depression). Rate of GWG from depression screening to delivery was categorized according to Institute of Medicine (IOM) recommendations. Early pregnancy depression was associated with 0.03 lbs/week greater GWG rate (95% CI: 0.02, 0.04) compared to no pre- or early pregnancy depression. Chronic depression and pre-pregnancy depression were associated with 27% (OR=1.27; 95% CI: 1.16, 1.39) and 24% (OR=1.24; 95% CI: 1.10, 1.40) greater odds of GWG rate below the IOM recommendations compared to within the recommendations. Pre-pregnancy depression and early pregnancy depression were associated with 13% (OR=1.13; 95% CI: 1.05, 1.23) and 11% (OR=1.11; 95% CI: 1.04, 1.19) greater odds of GWG rate above the IOM recommendations compared to within the recommendations. Our findings suggest that women with pre-pregnancy or early pregnancy depression may require tailored prenatal counseling or intervention for appropriate GWG.

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ASSOCIATION BETWEEN SLEEP QUALITY AND PREGNANCY OUTCOMES: EVIDENCE FROM A CHINESE BIRTH COHORT Zehong Zhou* Xiu Qiu, Lifang Zhang, Jinhua Lu, Songying Shen, Niannian Chen, Mingyang Yuan, Dongmei Wei, Wanqing Xiao, Huimin Xia, Xiu Qiu, (Guangzhou Women and Children's Medical Center)

Background: Recent studies suggested that sleep disorder and short sleep duration during pregnancy may increase the risk of preterm birth (PTB) or gestational diabetes mellitus (GDM). Little analysis about the correlation of the sleep quality and duration with multiple perinatal outcomes is performed among a large population. Methods: 11640 pregnant women with singleton live born between 26 and 42 weeks of gestation from the Born in Guangzhou Cohort Study in China were recruited from Feb 2012 to Feb 2017, and completed the 19-item Pittsburgh Sleep Questionnaire before 20 weeks. Sleep exposure variables were poor sleep quality (sleep quality index >=5) and short sleep duration (<7 hours/day). Multivariable logistic regression was used to estimate the association between sleep quality and duration with pregnancy outcomes, including PTB, GDM, pregnancy induced hypertension (PIH), small and large for gestation age (SGA and LGA). All analyses were adjusted for maternal age, ethnicity, education, income, pre-pregnancy BMI, smoking, second hand smoking, drinking and parity. Results: Poor sleep quality and short sleep duration increased the risk of PTB (ad justed odd ratio (aOR) =1.33, 95% confidence interval (95%CI) 1.09-1.62; a0R=1.34, 95%CI: 1.05-1.68). No significant associations were found between poor sleep quality and short duration with GDM (a0R=1.11, 95%CI: 0.98-1.27; a0R=1.09, 95%CI: 0.92-1.52), PIH (a0R=0.95, 95%CI: 0.73-1.24; a0R=1.06, 95%CI: 0.74-1.50), SGA (a0R=1.06, 95%CI: 0.90-1.26); a0R=0.92, 95%CI: 0.72-1.16) and LGA (a0R=0.94, 95%CI: 0.79-1.12; a0R=0.89, 95%CI: 0.62-1.37). Conclusion: Our results demonstrated that poor sleep quality and short sleep duration pregnancy increased the risk of PTB, which highlights the importance of adequate sleep quality and duration for pregnant women. Further research is needed to better understand the biology of sleep in pregnancy and whether interventions can modify the risk of PTB.

CHILDHOOD ABUSE, INTIMATE PARTNER VIOLENCE, AND PLACENTAL ABRUPTION AMONG PERUVIAN WOMEN Susanna D. Mitro* Susanna D. Mitro, Sixto E. Sanchez, Henry Palomino, Bizu Gelaye, Michelle A. Williams, (Harvard T.H. Chan School of Public Health)

Experiencing childhood abuse (CA) or intimate partner violence (IPV) has been linked to numerous adverse pregnancy outcomes, and some evidence suggests greater than additive effects if experiencing both types of abuse. We examined whether history of CA and IPV during the current pregnancy are independently and jointly associated with the odds of placental abruption (PA). We recruited 662 PA cases and 665 full-term controls (without PA nor 3rd trimester bleeding) from 6 hospitals in Lima, Peru Participants were interviewed after delivery. We used multivariate logistic regression to calculate odds ratios, adjusting for maternal age, education, and parity. PA cases were more likely than controls to report major depression (18.3% vs 10.5%) and fair or poor self-rated pre-pregnancy health (20.2% vs 13.6%). Approximately 42% of both cases and controls reported a history of CA; 50% of cases and 49% of controls reported IPV during pregnancy. While history of any CA was not associated with PA, history of severe CA (>1 CA event; experienced by 25% of the population) was associated with 38% increased odds of PA (aOR=1.38; 95%CI:1.07-1.80) after adjusting for IPV. There was a small but statistically nonsignificant association between severe IPV (experienced by 20% of the population) and odds of PA (aOR=1.22; 95%CI: 0.92-1.62), adjusting for CA. Women who experienced both severe CA and severe IPV had 2.06-fold (95%CI:1.25-3.40) increased odds of PA compared to women who experienced no or rare abuse. Although the joint effect of CA and IPV was positive, it was statistically nonsignificant on the multiplicative scale (interaction aOR=1.48; 95%CI: 0.79-2.79) and additive scale (relative excess risk due to interaction (RERI)=0.70; 95%CI: -0.39-1.78). Our findings provide further evidence that public health efforts to prevent exposure to violence or mitigate its effects may improve maternal outcomes.

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CYP1A1 MSPI POLYMORPHISM MODIFIES THE MEDIATION EFFECT OF TNF-ALPHA ON THE ASSOCIATION BETWEEN SECONDHAND SMOKE EXPOSURE DURING PREGNANCY AND SPONTANEOUS PRETERM BIRTH Zhongzheng Niu* Zhongzheng Niu, Chuanbo Xie, Xiaozhong Wen, Wei-Qing Chen,, (1, Department of Epidemiology and Environmental Health, School of Public Health and Health Professions, State University of New York at Buffalo; 2, Department of Biostatistics and Epidemiology, School of Public Health, Sun Yat-sen University, Guangzhou, China.)

Background Secondhand smoke (SHS) exposure is metabolized by phase I enzyme CYP1A1, whose gene polymorphism may modify its health effect. Inflammation may intermediate the association of SHS exposure with preterm birth (PTB). Objectives To explore how CYP1A1 msp1 polymorphism modify the mediation effect of tumor necrosis factor- α (TNF- α) on the association of maternal SHS exposure during pregnancy with preterm birth. Methods Maternal blood from 154 PTB cases and 195 term birth controls were drawn at admission for delivery at the Women and Children's Hospitals of Shenzhen and Foshan in Guangdong, China, from Sep 2009 to Mar 2011. PTB was defined as gestational age less than 37 weeks. SHS was assessed from a questionnaire and defined as longer than 15 min/day. Maternal CYP1A1 mspl were genotyped by PCR, while serum TNF-a were measured by flow cytometry. SAS PROCESS package analyzed the moderated mediation effects with adjustment of relevant confounders. Results SHS exposure during pregnancy significantly associated with PTB (OR= 1.685, 95% CI: 1.092 -2.600), and also associated with TNF- α ($\beta = 0.116$, P<0.05). Higher level of TNF- α was a risk factor of PTB (adjusted OR = 1.624, 1.268 - 2.080). The direct effect of SHS on PTB turned to insignificant with the introduction of the TNF-a as a mediator. The indirect effect of SHS on PTB via TNF-a was 0.12 (95% CI: 0.02-0.30). Furthermore, the indirect effects revealed different patterns in each genotype of CYP1A1 mspl. In the wild genotype group (TT), the indirect effect was not significant (effect=0.04, 95% CI: -0.08, 0.24), while heterogeneous mutation group (TC) remained significant as 0.12 (95% CE 0.01, 0.36, and homogeneous mutation group (CC) was 0.19 (95% CI: -0.01, 0.63). Conclusions Maternal inflammation mediates the association between SHS exposure during pregnancy and PTB, and this mediation effect is further modified by gene polymorphism of the phase I metabolism enzyme gene CYP1A1.

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INFORMATION ON PROXIMITY TO AGRICULTURAL CHEMICAL USE INCREASED PRECISION IN ESTIMATING ASSOCIATIONS OF PLACENTAL-FETAL HORMONES IN THE FIRST TRIMESTER AND BIRTHWEIGHT Jennifer Adibi* Jennifer J Adibi, Abigail Cartus, Ellen Kinnee, Sona Saha, Zan Dodson, Yaqi Zhao, Evelyn Talbott, Jane Clougherty, Robert Currier, (University of Pittsburgh Graduate School of Public Health)

We and others have reported a negative association between agricultural (Ag) use of Chlorpyrifos (CF) in California (CA), serum levels of the placental hormone human chorionic gonadotropin (hCG), and birthweight. Ag chemical exposure, assigned by residence, may be confounded by factors that determine both place of residence and maternal-fetal health. We address this limitation by incorporating individual-level measures of placental-fetal hormones in relation to birthweight (BW), treating Ag chemical exposure as a confounder/effect modifier. Routine screening data on 5 placental hormones measured in maternal serum (1st and 2nd trimester) were evaluated from women participating in the California Prenatal Screening Program (2011-2013), Residence, demographic and health information were collected at the time of screening. Application of 10 chemicals was estimated with data from the CA Dept. of Pesticide Regulation and linked to subjects by month, year and zipcode. Mixed models were used to calculate beta coefficients and CIs, with and without stratification by fetal sex. Analytic datasets varied in size and factors related to exposure (e.g. total chemical applied, urbanicity), but were similar in the distribution of maternal and fetal factors. The magnitude of association between hormone and BW changed in 21/30 comparisons ranging from 17%-118%, median 27% (20-755 g, median 122 g) per log unit chemical. Compared to women in the 1st quartile, for women in the 3rd quartile of CF and propiconazole exposure, a log unit increase in 1st trimester hCG was associated with a decrease in birthweight by 59 (95% CI -101, -17) and 80 g (95% CI -126, -34) respectively. These data suggest that women living in areas with higher application of CF and propiconazole experienced shifts in placental function with consequences for fetal growth. Future studies should probe these relationships further with biomarkers of exposure and the application of causal mediation analyses.

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GROWTH PATTERNS FROM BIRTH TO 24 MONTHS IN CHINESE CHILDREN: A BIRTH COHORTS STUDY ACROSS CHINA Fengxiu Ouyang* Fengxiu Ouyang, Fengxiu Ouyang, Fan Jiang, Fangbiao Tao, Shunqing Xu, Yankai Xia, Xiu Qiu, Jun Zhang, (Xinhua Hospital, Shanghai Jiao Tong University School of Medicine)

Objectives: The assessment of child growth is important in detecting under- and over-growth. Poor growth in early life may have long-lasting programming effects on later non-communicable diseases. We aimed to examine growth patterns from birth to 24 months in healthy Chinese infants. Methods: This study was based on six recent birth cohorts across China, which provided data (from 2015) on 4251 children (2174 boys, 2077 girls) who were born at term to mothers without gestational or preexisting diabetes, chronic hypertension, preeclampsia, or eclampsia. Analyses were performed using 28298 longitudinal anthropometric measures and the LMS method to generate smoothed z-score growth curves, which were compared to the WHO growth standards (based on data from 2003) and current Chinese growth references (based on data from 2005). Results: Compared to the WHO longitudinal growth standards for children (ages 0 to 2 years), the growth standards from this longitudinal study (length-, weight-, head circumference-, BMIfor-age, and weight-for-length) were significantly higher for boys and girls. Compared to the current China cross-sectional growth references from a decade ago, these more recent standards were also higher, but the difference was less than for the comparison to the WHO standards. Conclusions: This recent multicenter prospective birth cohort study examined early growth patterns in China. The new growth curves represent the growth patterns of healthy Chinese infants evaluated longitudinally from 0 to 24 months of age, and provide standards for monitoring growth in early life in modern China that are more recent than WHO longitudinal growth standards from other countries and previous cross-sectional growth references for China.

TRAJECTORIES OF SOCIAL SUPPORT IN THE PERINATAL PERIOD Erin Hetherington* Erin Hetherington, Sheila McDonald, Suzanne Tough, (University of Calgary)

Background Low social support during the perinatal period can increase the risk of postpartum depression and anxiety up at one year after giving birth but little is known about women's trajectories of social support during this time. This study will identify trajectories of social support among women from second trimester to 4 months postpartum. Methods Using data from a longitudinal birth cohort, All Our Families, 3231 women were asked about their percieved social support during their second trimester, third trimester, and at 4 months postpartum. Group based trajectory modeling was used to determine the number of groups, shape and proportion of women with differring trajectories Model fit was assessed using Bayesian Information Criterion and model adequacy statistics. Multinomial regression was used to compare probability of group membership. Results Six distinct trajectory groups were identified, with the majority of participants belonging to groups with stable, high social support (60.6%) or stable moderate support (35.8%). Only 2.6% of women had consistently low levels of social support and1 % had rising levels. Groups with stable high support were more likely to have higher incomes, be Caucasian, lived in Calgary for over 2 years, lower levels of depressive symptoms at baseline, fewer pregnancy complications, and increased community engagement than those with low or rising trajectories. Among women who began with low support, those with persistent low levels were more likely to not be in the paid work force and have low levels of optimism compared to those with a rising trajectory (OR 2.72, 95% CI 1.05, 7.06 and OR 3.50 95% CI 1.36, 9.00). Conclusion The majority of women in this sample had high levels of social support that were maintained. Among women who began with low levels of support (3.6% of the overall sample), only a third improved over time. Targeted assistance for women with low levels of perinatal social support may improve outcomes.

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THE ASSOCIATION OF GROWTH PRIOR TO KIDNEY TRANSPLANT WITH POST-TRANSPLANT KIDNEY FUNCTION AMONG CHILDREN WITH END-STAGE RENAL DISEASE Yijun Li* Yijun Li, Derek K. Ng, Larry A. Greenbaum, Bradley A. Warady, Susan L. Furth, (Johns Hopkins Bloomberg School of Public Health)

Among pediatric kidney transplantation (KT) recipients, previous studies have shown poor linear growth at transplant is associated with increased mortality, while lower body surface area (BSA) may be protective. Linear growth (LG) may be an indicator of nutritional deficits, disease severity, and socioeconomic status (SES) before KT, while a lower BSA is hypothesized to be less demanding of a new organ. This analysis aimed to describe the risk of poor KT outcome associated with short stature and BSA based on the Chronic Kidney Disease in Children study. KT outcome was quantified by time from receiving the kidney transplant to the first occurrence of an estimated glomerular filtration rate (eGFR)<45 ml/minl1.73 m2 among individuals who received a KT before age 21. Poor LG was defined as agesex-specific height Z-score <-0.67 at the time of transplant. The association of poor LG with time to eGFR<45 was estimated by parametric survival models and inverse probability weights to account for SES imbalances. We further investigated linear growth as a modifier of the effect of recipient BSA on KT outcome by fitting subgroup models. Among 138 pediatric KT recipients, the median time to eGFR<45 was 6.6 years. Participants with poor LG had a 49% shorter time to eGFR<45 than those without (relative time, RT=0.51, 95%CI: 0.28, 0.93) after adjusting for SES. Higher recipient BSA at KT was associated with increased risk of having an unfavorable outcome. Each standard deviation increase in BSA was associated with 35% (RT=0.65, 95%CI: 0.49, 0.87) and 15% (RT=0.85, 95%CI: 0.51, 1.43) shorter time to eGFR<45 in children with and without poor LG, respectively. Poor linear growth before transplant was independently associated with shorter time to eGFR<45ml/min and modified the effect of recipient BSA on KT outcome. Future research should identify mechanisms explaining the potential positive influence of lower BSA and risks related to poor linear growth in this high-risk population.

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EVALUATION OF AN EDUCATIONAL PROGRAM FOR SELF-PROTECTION AGAINST CHILD SEXUAL ABUSE IN ECUADOR Gabriela Bustamante Callejas* Gabriela Bustamante Callejas, Maria Soledad Andrade, Caley Mikesell, Clara McCullen, Pablo Endara, Soledad Avila, Paulina Ponce, Michelle Grunauer, (University of Minnesota; Universidad San Francisco de Ouito)

Child sexual abuse (CSA) is a complex public health problem with lifetime consequences including depression, anxiety, and other neurocognitive problems Many interventions aim to provide children tools to protect themselves against CSA, but none has been systematically studied in Latin-America. The current study evaluated the immediate and long-term impact of a school-based educational program on knowledge of CSA self-protection tools among children aged 7 to 14 years. We conducted a group-randomized trial of 6 public elementary schools in Ecuador to evaluate changes in knowledge using the Children's Knowledge of Abuse Questionnaire Revised (CKAQ-R), which was previously adapted to the Ecuadorian context. Four schools were randomized to receive the intervention between October-November 2016 (group 1), while two schools received the same intervention between March-April 2017 (group 2). To assess CSA knowledge, a random sample of students from all schools was asked to take the CKAQ-R at 3 time points: 1) initial: before any group received the intervention, 2) intermediate: immediately after group 1 completed the program but before group 2 received the intervention, and 3) final: immediately after group 2 completed the program. We evaluated changes in CKAQ-R scores using a mixed model with school as a clustering variable, reduced degrees of freedom to account for nesting by school and adjusting for age and sex. Scores improved in both groups immediately after each one completed the program (Group 1: 61.7 \pm 14.1% to 69.1% \pm 15.8%; p-value <0.001, and Group 2: 58.0 ± 15.1% to 71.4% ± 16.1%; p-value <0.001). Scores did not change among children who had not yet received the intervention at intermediate evaluation (group 2) and children maintained the same high scores 6 months after the intervention ended (group 1). These results show that the self-protection program increases knowledge of CSA and it remains high 6 months after the intervention without any booster sessions.

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USING THE CAPTURE-RECAPTURE METHOD TO ESTIMATE THE PREVALENCE OF AUTISM IN NYC'S ZERO TO THREE POPULATION Allan Uribe* Allan Uribe, Emily Lemuiex, (NYC Dept Of Health)

Objective: The prevalence of Autism Spectrum Disorder (ASD) among children under three in New York City is unknown. We used the capture-recapture model, to estimate the total number of children missing by evaluating the overlap between multiple, incomplete sources. Accurate prevalence estimates will help to ensure access to early intervention programs and treatment. Methods: We identified a total of 18,314 unique children with ASD between January 1st, 2005 and October 31st, 2015 using three sources Medicaid claim records, the New York City Department of Health and Mental Hygiene's Early Intervention System, and the Statewide Planning and Research Cooperative System (SPARCS) composed of in and outpatient hospital visits. Deterministic matching based on the first two letters of child's first and last names, last two letters of the child's last name, the child's date of birth, and the sex of the child. Once matched, the capture-recapture technique using a log-linear model was applied to estimate the total number of children citywide. The calculated AIC values were compared within each year to determine the best fit for the data, and confidence intervals were calculated using the bootstrapping technique. Results: There were an estimated 31,132 (95% CI: 29,412-31,323) children diagnosed with ASD before age three between January 1st, 2005 and October 31st, 2015. Yearly prevalence estimates were calculated. The prevalence estimate of ASD was higher each year, from 7.41 (95% CI: 3.10-19.82) per 1,000 children in 2005 to 23.22 (95% CI: 21.80-23.63) per 1,000 children in 2014. Confidence in the estimates increased with each year. Conclusions: The capturerecapture technique can provide a reliable ASD estimate in New York City in the absence or population representative data. This approach is limited by the quality of data available and that all ASD cases will be identified from each data source.

DELIVERY BY CESAREAN SECTION AND RISK OF CHILDHOOD ASTHMA Lyndsey A. Darrow* Lyndsey A. Darrow, Hong Chen, Jeannette R. Ferber, Audrey F. Pennington, De-Kun Li, (School of Community Health Sciences, University of Nevada, Reno)

Background: Previously reported associations between cesarean delivery and childhood asthma are biologically plausible but could also be due to uncontrolled confounding. Methods: The relationship between cesarean delivery and childhood asthma was investigated among 230,312 mother-child pairs enrolled in Kaiser Permanente Northern California (births 2005-2014). Delivery mode was obtained from electronic medical records (EMRs); for births after 2009, cesarean deliveries were further divided into (1) elective vs. emergency and (2) subgroups defined by time interval between labor and membrane rupture, and delivery. Using EMRs, asthma was defined at each follow-up age using a combination of asthma diagnoses, including inpatient diagnosis (ICD-9 code 493, ICD-10 code J45), and at least one asthma medication dispensing. Covariates included duration of breastfeeding, prenatal and early-life antibiotic exposure, gestational age, sex, and maternal characteristics (pre-pregnancy BMI, age, education, race, smoking, parity, and asthma, atopy, hypertension and diabetes). Risk ratios were estimated using Poisson regression with robust error variance estimation. Results 28% of children were delivered by cesarean section; 58% of cesareans were emergency and 42% were elective. In preliminary analyses, adjusted risk ratios (RR) for cesarean delivery were 1.10 (95%CI=1.05-1.16) for asthma at age 2 (n=230,312); 1.09 (95%CI=1.05-1.13) for asthma at age 4 (n=168,193); and 1.06 (95%CI=1.03-1.10) for asthma at age 6 (n=112,245). Crude RRs were higher (1.20, 1.20, and 1.17, respectively), with adjustment for breastfeeding, gestational age, and pre-pregnancy BMI having the greatest impact. Discussion: Preliminary analyses indicate cesarean delivery is positively associated with asthma in this cohort. Future analyses will focus on type of cesarean delivery and sensitivity of results to assumptions about causal relationships between cesarean delivery and covariates.

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UNCONTROLLED MATERNAL CHRONIC RESPIRATORY DISEASES IN PREGNANCY INCREASE THE RISK OF ANORECTAL

MALFORMATIONS IN OFFSPRING Nel Roeleveld* Nel Roeleveld, Romy van de Putte, Ivo de Blaauw, Rianne Boenink, Monique Reijers, Paul Broens, Cornelius Sloots, Arno van Heijst, Marleen van Gelder, Iris van Rooij, (Department for Health Evidence, Radboud university medical center, Nijmegen, The Netherlands)

Background: Chronic respiratory diseases and the use of anti-asthmatic medication during pregnancy may both play a role in the etiology of congenital anorectal malformations (ARM). However, it is currently unclear whether the medication use or the underlying condition would be responsible. Therefore, the aim of this study was to unravel the role of maternal chronic respiratory diseases from that of antiasthmatic medication use in the etiology of ARM in offspring. Methods: We obtained 412 patients with ARM and 2,137 population-based controls from the AGORA (Aetiologic research into Genetic and Occupational/environmental Risk factors for Anomalies in children) data- and biobank in the Netherlands. We used maternal questionnaires and follow-up telephone interviews to obtain information on chronic respiratory diseases, such as asthma and chronic bronchitis, anti-asthmatic medication use, and potential confounders from 3 months before conception until 10 weeks of pregnancy. Multivariable logistic regression analyses were performed to estimate ORs with 95%CIs corrected for confounders. Results: We observed a higher risk among women with chronic respiratory diseases without medication use (OR 2.0, 95%CI 0.8-5.0) than among women with chronic respiratory diseases with medication use (OR 1.4, 95%CI 0.8-2.7). When the latter group was studied in more detail, increased risks of ARM were found in women using rescue medication (OR 2.4, 95%CI 0.8-7.3) or a combination of maintenance and rescue medication (OR 2.6, 95%CI 1.0-7.3). In addition, increased risks were found for women having non-allergic triggers (OR 2.5, 95%CI 1.0-6.1) or experiencing exacerbations during the periconceptional period (OR 3.3, 95%CI 1.3-7.9). Conclusion: The results of this study indicate that uncontrolled maternal chronic respiratory diseases in pregnancy, with or without the use of rescue medication to alleviate exacerbations, seem to be associated with ARM in offspring.

ELEVATED MATERNAL CORTISOL LEVELS AND ADVERSE PERINATAL OUTCOMES: A NESTED CASE-CONTROL STUDY Nel Roeleveld* Nel Roeleveld, Richelle Vlenterie, Judith Prins, Marleen van Gelder, (Department for Health Evidence, Radboud university medical center, Nijmegen, The Netherlands)

Background: Maternal hypersecretion of cortisol during pregnancy has been hypothesized as the intermediate process between symptoms of stress and depression during pregnancy and adverse perinatal outcomes Therefore, we examined the associations between fetal exposure to elevated cortisol levels during pregnancy and selected perinatal outcomes in a nested case-control study. Methods This study was embedded in the PRegnancy and Infant DEvelopment (PRIDE) Study, an ongoing prospective cohort study primarily using web-based questionnaires. From the children born in 2012-2016, we selected all cases with preterm birth (n=73), low birth weight (n=54), small-for-gestational-age (n=65), and Apgar score 75th percentile, 12.29 ng/ml) and the selected outcomes corrected for confounders. Results: We did not observe associations between elevated cortisol levels and preterm birth (OR 0.99, 95%CI 0.51-1.92), low birth weight (OR 1.25, 95%CI 0.38-4.13), and small-for-gestational-age (OR 1.22, 95%CI 0.62-2.40). However, elevated cortisol levels were associated with a low Apgar score (OR 2.59, 95%CI 1.03-6.50), especially when the saliva samples were collected in gestational weeks 20-22 (OR 5.60, 95%CI 1.61-19.51). Conclusion: Despite several limitations, this study clearly showed no indications for associations between elevated maternal cortisol levels in mid-pregnancy and adverse perinatal outcomes, except for an increased risk of low Apgar scores at 5 minutes after birth

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MATERNAL PREPREGNANCY OBESITY AND OFFSPRING AUTISTIC TRAITS: FINDINGS FROM THE AVON LONGITUDINAL STUDY OF PARENTS AND CHILDREN Xi Wang* Xi Wang, Nora L. Lee, Dheeraj Rai, Brian K. Lee, (Drexel University)

Background: The prevalence of autism spectrum disorders (ASD) has dramatically increased over the decades. Evidence points toward risk factors in early development, but the etiology of ASD is still not well understood. Objective: This study examined the association of maternal prepregnancy body mass index (BMI) on the risk of ASD and autistic traits among their offspring. Methods: We used data from the Avon Longitudinal Study of Parents and Children (ALSPAC), a prospective register-based cohort of 14,500 women in the UK who were pregnant in 1991-1992. ASD cases were identified from multiple sources including the National Health Service database, the special educational needs database, and mother's report. Seven autistic traits were defined by factor scores summarizing 93 ASD-related measures verbal ability, language acquisition, social understanding, semanticpragmatic skills, repetitive stereotyped behaviors, articulation, and social inhibition. The factor scores were standardized, with lower scores reflecting worse performance. BMI was calculated from maternal prepregnancy weight and height self-reported at 12-18 weeks gestation. Results: In the sample of 11,199 singleton live births, 131 children were diagnosed with ASD. Prior to pregnancy, 613 (5.5%) of the mothers were obese (BMI >=30 kg/m2). In linear regression models, maternal prepregnancy obesity was associated with lower (worse) ASD-related factor scores for verbal ability [-0.11 (95% CI -0.19, -0.02)], language acquisition [-0.09 (95% CI -0.18, -0.01)], and sematic-pragmatic skills [-0.25 (95% CI -0.33, -0.17)], after ad justing for parental demographic characteristics and child's sex. There was no association between maternal prepregnancy BMI and the risk of offspring ASD [OR was 0.88 (95% CI 0.35, 2.19) among obese women]. Conclusion: In a large population-based birth cohort, maternal prepregnancy obesity was related to some ASD traits among offspring.

EVALUATION OF SELECTION BIAS IN STUDIES OF RISK FACTORS FOR BIRTH DEFECTS AMONG LIVE BIRTHS: EVIDENCE FROM THE NATIONAL BIRTH DEFECTS PREVENTION STUDY Dominique Heinke* Dominique Heinke, Janet Rich-Edwards, Sonia Hernandez-Diaz, Paige L. Williams, Sarah Fisher, Tania Desrosiers, Gary Shaw, Paul Romitti, Mark Canfield, Marlene Anderka, Mahsa Yazdy, National Birth Defects Prevention Study, (Harvard TH Chan School of Public Health)

Prior research suggests that risk factor studies of birth defects are affected by selection bias when restricted to live births However, the degree of bias in estimating association measures in actual studies has not been quantified. Using data from the National Birth Defects Prevention Study, we evaluated the association of established risk factors with defects reflecting a range of prenatal loss due to stillbirth and termination: anencephaly (>50% affected pregnancies); spina bifida, encephalocele, and omphalocele (moderate); and cleft palate (<1 %). We considered exposures with a range of strength of association with birth defects and corresponding risk of prenatal loss: first trimester smoking (moderate/moderate), first trimester antiepileptic drug (AED) use (strong /moderate), and multiple gestation (strong/strong). We used logistic regression to estimate ORs and 95% CIs adjusted for maternal age, race/ethnicity, and periconceptional folic acid use. Potential selection bias was evaluated by comparing ORs across models which included only live births, live births and stillbirths, and all outcomes (live births, stillbirths, and terminations). No differences were observed in ORs among live births only compared to those among all outcomes for AED use, smoking, or multiple gestation for each defect examined, except anencephaly: the OR for multiple gestation was twice as high among live births (aOR=4.9, 95% CI 3.2, 7.4) as among all outcomes (2.4; 1.7, 3.4) but an interpretation of increased risk remained; small numbers precluded examining AED use for an encephaly. These observations indicate that results from analyses conducted only among live births were not measurably affected by selection bias, even when the exposure was expected to be associated with prenatal loss. However, selection bias may occur when the birth defect is strongly associated with pregnancy loss and the exposure is strongly associated with stillbirth or termination of affected fetuses.

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FETAL MACROSOMIA, MATERNAL AND PERINATAL MORBIDITY AMONG CREE POPULATIONS OF EASTERN JAMES BAY, CANADA Elisa Jean-Baptiste* Elisa Jean-Baptiste, (Public Health School of Montreal University-Research Center of the Sainte-Justine University Hospital)

Background: Fetal macrosomia is an important risk factor of maternal and perinatal complications such as shoulder dystocia and brachial plexus injury where the risk if further increased by maternal diabetes. Macrosomia suspicion can reduce the gestation length and therefore the fetus weight by an induction of labor or an elective caesarean. In Canada, fetal macrosomia is defined as a birth weight for gestational age > 90th percentile of a population reference based on the Canadian population. Fetal macrosomia rate range from 16% to 36% among First Nations compared to 11% in North America. We investigate whether the Canadian reference values are appropriate for the Cree populations of Eastern James Bay, Canada. Methods: We conducted a population-based prospective cohort study with singleton births mothers (n=2,546) at Val d'Or Hospital, Québec, Canada in 2000-2010. Cree women were compared to the general population of Quebec. The Quebec cohort is from the QUARISMA trial (Quality of Care, Obstetrics Risk Management, and Mode of Delivery), a subpopulation of the multicenter randomized clinical trial (n=97,475 women), recruited in 32 Quebec hospitals between 2008-2010. All birth to a fetus weighting more than 500 grams, after 22 weeks of gestation have been include in the study. Rate of macrosomia in both populations where compared as well as major perinatal morbidity according to birth weight percentile for gestational age. Results/Outcomes: Macrosomia, using Canadian references, prevalence was higher in Cree (40.0%) compared to Quebecers (8.8%). The risk of fetal macrosomia was greater among Cree (OR=6.18; 95% CI 5.67-6.72) but the risk of major perinatal morbidity among newborn with macrosomia was lower among Cree compared to Quebecers population (OR=0.61; 95% CI 0.45 to 0.82). Conclusions: Based on our cohort, Cree-references for the 90th percentile at 40 weeks were 4,417g (female) and 4,488g (male) compared compared to 4,034g (female) and 4,200g (male), using Canadian-references.

HIGH PRE-CONCEPTIONAL HOMOCYSTEINE IS ASSOCIATED WITH ELEVATED RISK OF PREGNANCY LOSS AMONG FERTILE FOLATE-REPLETE WOMEN WITH PRIOR HISTORY OF LOSS Elizabeth DeVilbiss* Elizabeth DeVilbiss, Sunni Mumford, Lindsey A. Sjaarda, Matthew T. Connell, Keewan Kim, James L. Milk, Enrique F. Schisterman, (NIH)

While it is well established that preconception folic acid supplementation can prevent approximately 70% of neural tube defects, much existing research between maternal folate status and other reproductive outcomes has been conducted among sub-fertile women of low folate status. Our objective was to examine associations between pre-conceptional folate and homocysteine and reproductive outcomes in a population of healthy and fertile folate-replete women at high risk for pregnancy loss. All 1,228 women enrolled in the Effects of Aspirin in Gestation and Reproduction (EAGeR) trial, a block-randomized, double-blind, placebo-controlled trial conducted in 2007-2011, had 1-2 previous pregnancy losses and no documented infertility. Participants were allocated 400 µg/day folic acid supplements and were attempting pregnancy for up to 6 menstrual cycles. Restricted cubic splines of weighted log-binomial regression models were used to estimate relative risks (RR) and 95% confidence intervals between serum folate and plasma homocysteine for anovulation, pregnancy, pregnancy loss, and live birth. Relative risks were defined relative to median values for folate (40 nmol/L) and homocysteine (6.0 µmol/L) in U.S. populations of reproductive-aged women. Adjusted models accounted for age, BMI, previous number of losses, and parity. Serum folate measurements were characteristic of a folate-replete population (median: 58.2 nmol/L). No relationships were found between serum folate and any reproductive outcome or between plasma homocysteine and anovulation or pregnancy. Higher homocysteine values were associated with higher risks of pregnancy loss corresponding to reduced probability of live birth (pregnancy loss RR = 1.36 [1.00, 1.86] and live birth RR = 0.86 [0.76, 0.99], for women above 11.2 μ mol/L -95th percentile), though verification of these findings in fertile, folate-replete women is now needed.

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ASSOCIATIONS BETWEEN DELIVERY MODE AND CHILD DEVELOPMENT AT 20 MO OF AGE IN THE REPUBLIC OF SEYCHELLES Alexis E. Zavez* Alexis E. Zavez, Sally W. Thurston, Matthew D. Rand, Conrad F. Shamlaye, Edwin van Wijngaarden, (Department of Biostatistics and Computational Biology, University of Rochester)

Introduction: Over the past several years, caesarean section (CS) rates have increased around the world, mostly due to an increase in elective rather than medically necessary CS. Some studies suggest that birth by CS may be related to certain health and developmental conditions. In a large prospective cohort we examined the association between mode of delivery and eight measures of child development. Methods: The Seychelles Child Development Study Nutrition Cohort 2 is an observational study in the Republic of Seychelles. Children were evaluated at 20 mo of age on eight development outcomes using the Bayley Scales of Infant Development II (BSID-11), the MacArthur Bates Communicative Development Inventories (CDI), and the Infant Behavior Questionnaire-Revised (IBQ-R). Multivariable linear regression evaluated the relationship between delivery mode (CS v. vaginal) and each development outcome, while controlling for child sex and age, socioeconomic status, maternal age, and family status. Results: Of the 1351 complete observations, 241 (17.8%) were delivered by CS. Delivery mode was not associated with BSID-11 or CDI outcomes, but was associated with IBO-R surgency. Specifically, compared to vaginal delivery, children born with CS delivery demonstrated higher IBQ-R surgency scores (β: 0.108, 95% CI: 0.004 - 0.212, p = 0.042). High surgency scores indicate higher activity and positive emotion, but can also suggest difficulty with self-regulation and lower inhibitory control. Discussion: Although we observed an association between mode of delivery and child temperament, our study does not strongly support the notion that CS birth is associated with early-life child development. However, given the inconsistent literature and because the prevalence of CS births will likely continue to increase worldwide, further research on CS and child development is needed.

AN INTEGRATED DATA SYSTEM FOR SCHOOL HEALTH: PATTERNS OF HEALTH SERVICE USE AMONG NEW YORK CITY CHILDREN 2006-2013 Gerod Hall* Gerod Hall, Sophia Day, Kevin Konty, (NYC Department of Health and Mental Hygiene)

Aims: To characterize the quantity and diagnoses associated with hospital inpatient and emergency department (ED) visits for New York City (NYC) public school students enrolled in 2006 to 2013. Background: In order to inform disease surveillance, environmental risk assessment, and targeted prevention, public health agencies need timely, non-aggregated data from multiple sectors such as healthcare and education. Given their mission to provide student health services, school health agencies are uniquely positioned to integrate and use multi-stream data to respond rapidly to health problems facing children. Methods: The NYC public school enrollment registry was matched to the New York Statewide Planning and Research Cooperative System (SPARCS) for students 4 to 18 years of age in 2006 to 2013. SPARCS collects patient level data on diagnoses, treatments and charges for inpatient and ED visits. The total sample consist of 2,000,057 unique students attending 1,389 schools. For SPARCS matched students, we described inpatient and ED utilization and length of stay in the hospital. We classified principal diagnoses into clinically meaningful categories to assess the most common reasons for health service use. Results: Forty-five percent of students had a least one discharge during the study period. Over the study period, there was 5% growth in ED visits and an 11% decline in hospitalizations. Asthma, mood disorders, epilepsy and appendicitis were the most common reasons for hospitalization. Upper respiratory tract infection, asthma and superficial injury were the most common reasons for ED visits. Conclusions: In this study, integration of school enrollment and hospital discharge databases show key health conditions that contribute to morbidity and health service utilization. For public health agencies, integrated databases will improve casefinding, measurement of health disparities, and targeting of preventive services.

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RATES OF STILLBIRTH FROM 2006 TO 2014 IN GUANGZHOU, CHINA -A POPULATION BASED RETROSPECTIVE STUDY Lifang Zhang* Xiu Qiu, Lifang Zhang, Wanqing Xiao, Jinhua Lu, Songying Shen, Mingyang Yuan, Jia Yu, Li Yang, Huiyun Xiao, Huimin Xia, (Division of Birth Cohort Study, Guangzhou Women and Children's Medical Center, Guangzhou Medical University, Guangzhou, China; Department of Woman and Child Health Care, Guangzhou Women and Children's Medical Center, Guangzhou Medical University, Guangzhou, China; Medical Center, Guangzhou Medical University, Guangzhou, China)

Introduction: Stillbirths cause large global burden in worldwide. It was estimated over 122,000 stillbirths in 2015 in China. Unfortunately, few studies reported the rates of stillbirth in China based on population data. The objective of the study was to report the population-based trends of stillbirth rate (SBR) in Guangzhou, China. Methods: Stillbirth was defined as baby born with no signs of life weighing ≥ 1000 g or after 28 completed weeks of gestation. SBR was calculated as the number of stillbirth per 1000 total (live and stillborn) births. All the data of births from 2006 to 2014 were obtained from the Guangzhou Perinatal Health Care and Delivery Surveillance System. Joinpoint regression analysis was conducted to quantify the changes of SBR in total and in stratification by maternal age (<25, 25-29, 30-34, ≥35 years) and the gender of babies. Average annual percent change (AAPC) was used to indicate change in trends during the research years. Results: There were 9989 cases of stillbirth from 2006 to 2014 in Guangzhou, China. In total, the SBR has decreased from 8.82 to 4.56/1000 total births during the years, with the AAPC of -7.0% (95% CI, -5.3%, -8.6%). For both male and female babies, there were significant decreases from 2006 to 2014 (AAPC for males was -7.6% [95% CI, -5.6%, -9.6%], AAPC for females was-6.3% [95% CI, -4.4%, -8.2%], respectively). More reductions of SBRs were observed in the higher maternal age groups. The SBR of maternities over 35 years old showed the fastest decreasing, which from 15.05/1000 in 2006 to 5.16/1000 in 2014, with the AAPC of -12.6% (95% CI, -9.8%, -15.3%). Conclusion: The rate of stillbirth decreased during 2006-2014 in Guangzhou, China. The underlying contributions for the reduction of SBR will be further explored, which may provide scientific evidence to improve the quality of perinatal health care and prevent more pregnant losses before delivery.

IMPACT OF FLORIDA'S PRESCRIPTION DRUG MONITORING PROGRAM AND PILL MILL LAW ON HIGH-RISK PATIENTS – A COMPARATIVE INTERRUPTED TIME SERIES ANALYSIS Irene Murimi* G. Caleb Alexander, Hsien-Yen Chang, Lainie Rutkow, (Johns Hopkins Bloomberg School of Public Health)

States have relied heavily upon prescription drug monitoring programs (PDMP) and pill mill laws to address the opioid epidemic, yet relatively little is known regarding their effects. We quantified the effects of Florida's PDMP and pill mill law on highrisk patients To do so, we used QuintilesIMS IRx Lifelink data to identify patients receiving prescription opioids in Florida (intervention state, N: 1.13 million) and Georgia (control state, N: 0.54 million). The pre-intervention, intervention, and postintervention periods were: July 2010-June 2011, July 2011-September 2011, and October 2011-September 2012. We identified three types of high-risk patients: 1) concomitant users: patients with concomitant use of benzodiazepines and opioids; 2) chronic users: long-term high-dose opioid users; 3) opioid shoppers: patients receiving opioids from multiple sources. We compared changes in prescribing between Florida and Georgia before and after policy implementation among highrisk/low-risk patients. Our monthly measures included: (1) Average morphine milligram equivalent (MME) per transaction; (2) total opioid volume across all prescriptions; (3) average days supplied per transaction; and (4) total number of opioid prescriptions dispensed. Among opioid-receiving individuals in Florida, 6.62% were concomitant users, 1.96% were chronic users and 0.46% were opioid shoppers. Following policy implementation, Florida's high-risk patients experienced relative reductions in: MME (opioid shoppers: -1.08 mg/month, 95% confidence intervals [CI] -1.62 to -0.54), total opioid volume (chronic users: -4.58 kg/month, CI -5.41 to -3.76), and number of dispensed opioid prescriptions (concomitant users: -640 prescriptions/month, CI -950 to -340). Low-risk patients generally did not experience statistically significantly relative reductions. Thus, compared to Georgia, Florida's PDMP and pill mill law were associated with large relative reductions in prescription opioid utilization among high-risk patients.

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USE OF PROTON PUMP INHIBITORS AFTER AVAILABILITY AS OVER-THE-COUNTER DRUGS. Anna-Therese Lehnich* Anna-Therese Lehnich, Julia Wicherski, Susanne Moebus, Karl-Heinz Jockel, Andreas Stang, (Center of Clinical Epidemiology, University Duisburg-Essen)

Background Proton pump inhibitors (PPIs) are widely used. Some PPI-formulations with low dose became available as over-the-counter drugs in Germany in 2009. We wanted to describe the trend in PPI use due to this changed availability in a population-based study. Methods We used data from the second (2005-2008, n=4157, 49% male, 48-81 years old) and third (2011-2015, n=3097, 49% male, 55-88 years old) examination of the Heinz Nixdorf Recall Study, Germany. Prescription and non-prescription medication taken during the last 7 days were recorded. Via the ATC-codes, we defined drugs against acid-related disorders (A02) and as subgroups: antacids (A02A), PPIs (A02BC) and H2-receptor antagonists (A02BA). We restricted the data set to participants, who took part in both examinations and to observations with overlapping age fractions (55-81years). We estimated age-standardized prevalences and incidence proportions with 95% confidence limits for the intake of different drug groups. Results The agestandardized prevalence of drugs for acid-related disorders increased from 9.8% (95% CI: 8.4-11.2) in 2005-2008 to 13.8% (95% CI: 12.4-15.2) in 2011-2015. During the same period the age-standardized prevalence for PPI-intake increased from 6.9% (95% CI: 5.7-8.1) to 12.5% (95% CI: 11.1-13.9). The incidence proportion of drug use for acid-related disorders was 98 (95% CI: 87-109) per 1000 participants, 89 (95% CI: 79-100) per 1000 participants for PPI use and 5 (95% CI: 3-8) per 1000 participants for antacids and H2-receptor antagonists each. 37% of participants taking antacids or H2-receptor antagonists during the second examination switched to PPIs in the third examination. Conclusion The increased use of drugs against acid-related disorders is mostly driven by the increased use of PPIs. The aging of participants had a minor role. PPIs are the dominant drug group for acid-related disorders and the availability as over-the-counter drugs might has added to this situation.

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KIDNEY FUNCTION, POLYPHARMACY, AND POTENTIALLY INAPPROPRIATE MEDICATION USE IN A COMMUNITY-BASED COHORT OF OLDER ADULTS Alex Secora* Alex Secora, G. Caleb Alexander, Shoshana Ballew, Josef Coresh, Morgan Grams, (Johns Hopkins University)

Background: Chronic kidney disease (CKD) afflicts many older adults, and increases the risk for medication adverse events. Objective: To assess the prevalence and associated morbidity and mortality of polypharmacy and potentially inappropriate medication (PIM) use in a community-based population of older adults, looking for differences by CKD status Methods: We quantified baseline medication and PIM use (from Beers criteria, the Screening Tool of Older People's Prescriptions, and Micromedex[®]) by level of estimated glomerular filtration rate (eGFR) in the Atherosclerosis Risk in Communities study (N=6,392). We used negative binomial and Cox proportional hazards regressions to assess the relationship between polypharmacy, and PIM use, and subsequent hospitalization and death. Results: Mean participant age was 76 (+/-5) years, 59% were female, and 29% had CKD (eGFR 10 medications, and 31% reported a PIM based on their age. On average, participants with CKD reported more medications. A PIM based on kidney function was used by 36% of those with eGFR <30. Over a median of 2.6 years, greater medication use was associated with higher risk of hospitalization and death. PIM use (age- or kidney-based) was not associated with hospitalization or death. While those with CKD had higher absolute risks of adverse outcomes, there was no difference in the relative risks associated with polypharmacy by CKD status. Conclusion: Polypharmacy and PIM use were common with the former associated with higher risk of hospitalization and death; relative risks were similar for those with and without CKD.

1413 S/P

A RECIPROCAL ASSOCIATION BETWEEN LONGITUDINAL TRENDS OF BUPRENORPHINE/NALOXONE PRESCRIBING AND HIGH-DOSE OPIOID ANALGESIC PRESCRIBING Huong Luu* Huong Luu, Svetla Slavova, Patricia Freeman, Michelle Lofwall, (Kentucky Injury Prevention and Research Center, University of Kentucky College of Public Health)

Introduction Buprenorphine/naloxone (BP/N) treatment is recommended as a standard medical treatment for opioid use disorder. Few studies have examined how expansion of BP/N treatment affects opioid analgesic prescribing and vice versa. The purpose of this study was to investigate the relationships between BP/N prescribing and high-dose opioid analgesic prescribing (HDOAP) over time. Methods This longitudinal study used Kentucky All Schedule Prescription Electronic Reporting data, 2012-2015, and structural equation modeling integrated with the cross-lagged panel to evaluate effects of rates of residents with BP/N prescriptions on rates of residents with HDOAP (per 1,000 residents with opioid analgesic prescriptions). HDOAP at the patient level was defined as more than three days with a daily cumulative dose of 100 morphine milligram equivalents or more. For each quarter-county observation, HDOAP rate was used to predict BP/N prescribing rate at the next quarter, and simultaneously BP/N prescribing rate was used to predict HDOAP at the next quarter. Results On average, HDOAP rates in Kentucky decreased by more than 12% (p<0001) and BP/N prescribing rate increased by more than 5% (p<0001) per quarter over the study period. Every oneper-thousand higher HDOAP rate in an earlier quarter was associated with a 0.01/1,000 increase in the BP/N prescribing rate in a later quarter (p= .002). Conversely, a one-unit higher BP/N prescribing rate in an earlier quarter was associated with a 0.03/1000 reduction in the HDOAP rate in a subsequent quarter (p<.0001). Conclusions Our results indicate a significant reciprocal relationship between HDOAP and BP/N prescribing, and a clinically meaningful effect of BP/N prescribing on reducing opioid analgesic prescribing. Future studies on BP/N treatment expansion should take into account this bi-directional association in the context of longitudinal data and evaluate for public health benefits beyond reduction ofHDOAP.

A RANDOMIZED CONTROLLED TRIAL OF A CONTRACEPTIVE INTERVENTION ON MATERNAL AND CHILD OUTCOMES: IS IT EVEN FEASIBLE? Katherine Ahrens* Rob Olsen, Katherine Ahrens, Brittni Frederiksen, Susan Moskosky, (Rob Olsen LLC, George Washington Institute of Public Policy)

Objective: To estimate the sample size required for a randomized controlled trial (RCT) evaluating the effects of a contraceptive intervention on maternal and child outcomes. Method: Parameters for the RCT included: unintended pregnancy rate (7.9% per year in intervention group and 15.4% in control group, based on evidence from Harper et al., 2015), outcome prevalence in control group (from 10% to 90%), impact of an unplanned birth on the outcome (from 5 to 40 percentage points), randomization level (individual- or clinic-level), number of participants enrolled at each clinic (25, 50, or 100 women), and probability of pregnancy leading to live birth (60% or 80%). Power was set at 80% and alpha level was 5%. Results: Under most scenarios, over 1,000 clinics would be needed to detect effects. The scenario that resulted in the smallest required sample size (43 clinics with 4,300 study participants) was a participant outcome with 10% (or 90%) prevalence, high impact of unplanned birth (40-percentage point), individual-level randomization, and high probability of pregnancy leading to live birth (80%). In a more likely scenario, with outcome prevalence of 10% (or 90%), a fairly low impact of unplanned birth (10-percentage points), more feasible clinic-level randomization, and a more realistic probability of pregnancy leading to live birth (60%), the required sample size would be greater (3,761 clinics, even with 100 study participants per clinic). Birth-related outcomes not observable for all study participants (e.g., preterm birth, low birthweight, all child outcomes) would require even larger sample sizes; further, restricting analyses to live births can lead to biased estimates. Conclusions: While RCTs are generally considered the gold standard, these results suggest that the sample size required to detect effects of a contraceptive intervention on maternal and child outcomes is probably too large to be feasible and non-experimental study designs should be considered.

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PREDICTORS OF POSTPARTUM IUD INTEREST WITHIN 6 WEEKS AFTER DELIVERY, AMONG PREGNANT WOMEN AND COUPLES COUNSELLED ON LARC METHODS IN KIGALI, RWANDA Vanessa Da Costa* Vanessa Da Costa, Kristin Wall, (Rollins School of Public Health, Emory University)

Background: The desire to space or prevent future pregnancies is high among postpartum women in Rwanda. However, the use of long-acting reversible contraception (LARC), especially the highly effective and cost-effective copper intrauterine device (IUD), is very low, and rates of unintended pregnancy in postpartum periods are high. This study aims to determine what factors are associated with pregnant women's and couple's interest in receiving a postpartum IUD within 6 weeks after delivery. Methods Pregnant women or couples attending antenatal care (ANC) in Kigali, Rwanda were consented and enrolled in this crosssectional study. After participating in a postpartum LARC counseling session they were interviewed about their demographics, pregnancy behaviors, postpartum LARC knowledge, attitudes, and practices. Additionally, they were asked about their interest in receiving a postpartum IUD within 6 weeks after delivery. Results: 150 pregnant women (103 women alone and 47 couples) consented to participate. 124 (83%) of women or couples were interested in the postpartum IUD while 26 (17%) were not. Lower number of months pregnant (adjusted odds ratio [aOR] 0.81 95% confidence interval [CI] 0.58-1.11), not self-reporting 'physical side effects as a disadvantage' to the IUD (aOR 0.21 95% CI 0.06-0.75), and not self-reporting infection as a disadvantage' to the IUD (aOR 0.19 95% CI 0.04-0.85) were significantly associated with interest in receiving a postpartum IUD. Demographic factors did not predict postpartum IUD interest. Conclusion: Recommendations to increase postpartum IUD uptake include educating pregnant women and couples about the benefits and disadvantages during early stages of pregnancy and addressing client myths and misconceptions about the IUD. This strategy provides pregnant women and couples with detailed knowledge to make an informed decision about their future contraception use, reduce unmet need for family planning, and reduce unintended pregnancy.

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FACTORS DETERMINING THE USE OF INTRACYTOPLASMIC SPERM INJECTION IN WOMEN WITHOUT MALEFACTOR INFERTILITY Xu Xiong* Xu Xiong, Richard P. Dickey, Pierre Buekens, Jeffrey G. Shaffer, Gabriella Pridjian, (Tulane University School of Public Health and Trop)

Background and Objective: Intracytoplasmic sperm injection (ICSI) technique was used to initially treat couples with male factor infertility. Despite questionable evidence of benefits over conventional in vitro fertilization (IVF), ICSI use has markedly increased in recent decades among couples without male factor infertility. The reasons for this increasing trend of ICSI use are unknown. We assessed the frequency of ICSI use and factors associated with the use of ICSI in women without male factor infertility. Methods: A retrospective cohort study was conducted in 83,868 women diagnosed without male factor infertility, using 2006-2010 data from the Society for Assisted Reproductive Technology Clinic Outcome Reporting System (SART CORS). Results: Between 2006 and 2010, overall ICSI use in women without male factor infertility increased from 53.0% to 59.2%. The factors associated with an increased use of ICSI were Hispanic ethnicity (adjusted odds ratio [aOR]: 1.3, 95% confidence interval [CI]: 1.2-1.4), obesity (aOR: 1.1, 95% CI: 1.1, 1.3), those women who had prior history of ART treatments with fresh eggs (aOR: 1.4, 95% CI: 1.3, 1.6 for 4 and more treatments), and women diagnosed with diminished ovarian reserve (aOR: 1.2, 95% CI: 1.2, 1.3) and other factor for infertility (aOR: 1.4, 95% CI: 1.3, 1.5). Multigravida, women with prior history of miscarriages, and women diagnosed with tubal factor infertility were less likely to use ICSI. Conclusions: ICSI procedures were performed among more than half of couples without male factor infertility. Although several demographic and reproductive factors were found to be associated with an increased use of ICSI, the questions remain whether its use is necessary or justified in women without male factor infertility.

1423 S/P

THE ASSOCIATION BETWEEN MATERNAL EDUCATION AND INFANT MORTALITY: A MEDIATION ANALYSIS INTO THE ROLES OF LOW BIRTH WEIGHT, PRETERM BIRTH AND SMALL FOR GESTATIONAL AGE Yongfu Yu* Yongfu Yu, Zeyan Liew, Aolin Wang, Jialiang Li, Jørn Olsen, Sven Cnattingius, Guoyou Qin, Carsten Obel, Bo Fu, Jiong Li, (Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus, Denmark)

OBJECTIVE To estimate the extent to which low birth weight (LBW), preterm birth (PTB), and small for gestational age (SGA) mediate the association between maternal education and infant mortality. METHODS We included all live singletons born in Denmark in 1981-2004 (N=1,384,708). Follow-up started at birth and ended at death, emigration, the day before the 1st birthday, or end of follow-up (December 31st 2005), whichever came first. Maternal education at delivery was categorized as low, medium or high. We used causal mediation analysis by assessing one mediator at a time to estimate natural direct (NDE) and indirect (NIE, mediated by LBW/PTB/SGA) effects of maternal education on infant mortality, further stratified by neonatal deaths and post-neonatal deaths. The proportion of education-related excess deaths mediated through the mediators was reported if MRRs of NDE and NIE were in the same direction. RESULTS MRRs of associations between maternal education (low vs high) and mortality were 1.24 (95% CI: 1.14-1.34) for infant deaths; 1.19 (1.07-1.31) for neonatal deaths and 1.34 (1.17-1.51) for postneonatal deaths. The proportions of education-related (low vs high) excess infant deaths mediated through LBW, PTB and SGA were 76%, 53% and 19% in different mediator model, respectively. The mediating effects of LBW, PTB and SGA were larger for neonatal mortality than postneonatal mortality. CONCLUSIONS The estimated effect of maternal education on infant mortality is partly mediated by LBW, PTB and SGA. The mediating effect was greatest for LBW but excess infant deaths mediated by LBW should largely be due to the mediation of PTB on neonatal mortality. Public health strategies for education-related neonatal mortality in highincome countries may need to address prenatal risk factors of preterm birth and impaired fetal growth. The substantial direct effects of maternal education on postneonatal mortality could reflect persisting education disparities in infant care.

MISSING: A REVIEW OF THE FETAL DEMISE BURDEN ASSOCIATED WITH ZIKA VIRUS Susannah Leisher* Susannah Leisher, , (Columbia University)

Aim: We aimed to summarize available data on the fetal demise burden of Zikaaffected pregnancies. Rationale: In 2015, there were 2.6 million stillbirths, accounting for 4.4% of all global deaths. Despite this burden, global attention to stillbirths has been limited. Evidence has accumulated that Zika virus infection causes multiple adverse outcomes, possibly including fetal demise (stillbirths, miscarriages, abortions), but there has been limited reporting and analysis of these outcomes. Methods: This was a quasi-systematic review (PubMed, Embase, Web of Science; no language limits). Proportions of fetal demise of completed Zikaaffected pregnancies were calculated. RRs for fetal demise among completed, Zikaaffected versus uninfected pregnancies were estimated from cohort data. Results: Seventeen reports included 19,928 pregnant women or infants/fetuses with confirmed, probable or suspected Zika infection. Pregnancy outcomes that included fetal demise were known for 23% (4,492). There were 244 cases of fetal demise (5%). 20% of confirmed as compared to 7% of suspected Zika-affected pregnancies ended in fetal demise. Only one cohort study included asymptomatic as well as symptomatic mothers; the crude risk of fetal demise was nearly 13 times higher for Zika-affected as unaffected mothers (RR 12.76, 95% CI 3.94, 41.37, p-value <0.0001), as compared to a crude RR of microcephaly of 6.63 (95% CI 0.78, 57.83, p-value 0.07). Most studies included only symptomatic pregnant women or infants/fetuses with Zika-related anomalies; misclassification of infection status was possible. Conclusions: Available data on fetal demise associated with Zika virus infection is limited, especially in comparison to other outcomes such as microcephaly, yet there is evidence that fetal demise may be a significant burden of Zika virus infection. Studies of Zika infection outcomes should report on fetal demise

CESAREAN DELIVERY AND POSTPARTUM READMISSION IN THE UNITED STATES Jenifer E. Allsworth, PhD* Jenifer Allsworth, (University of Missouri-Kansas City School of Medicine)

Background: Postpartum readmission is an important measure of quality of care and results in significant preventable medical expenditures, yet recent evidence indicates readmission rates may be increasing. In this study, we examine the rates of postpartum readmission within 30 days overall and among women with cesarean deliveries in the United States. Methods: We examined data from the 2013 and 2014 Nationwide Readmission Databases (NRD). The NRD is a nationally representative survey of discharges that includes data from approximately 70 million discharges (weighted) from 21 (2013) - 22 (2014) states. Postpartum and cesarean deliveries were identified using International Classification of Diseases, Ninth Revision(Clinical Modification) diagnosis and procedure codes and All Patients Refined Diagnosis Related Groups (APR DRG). Eligible patients included women between the ages of 18 and 50 years who delivered in the first 9 months of the year who were not missing length of stay for their initial hospitalization. Rates and odds ratios estimated using SAS survey procedures to adjust for the survey design characteristics. Results: NRD included 2,564,330 births with 16,610 remissions within 30 days (1.9%) in 2013-2014. Rates of readmission did not increase in 2014 compared to 2013 (odds ratio (OR)=1.00, 95% CI 0.95, 1.06). Women with cesarean deliveries had higher rates of postpartum readmission (1.9% vs 1.7%), = 1.14, 95% CI 1.05, 1.23) overall and after adjustment for number of diagnoses and APR DRG severity of illness (OR=1.19, 95% CI 1.10-1.28). Women whose deliveries followed an elective admission had lower rates (OR=0.81, 95% CI 0.77, 0.85), however rates of postpartum readmission for cesarean deliveries did not differ by elective admission (p=0.71). Conclusion: Rates of postpartum readmission within 30 days were higher among women with cesarean delivery. The differences in readmission rates were not explained by underlying illness or elective admission.

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EVALUATION OF LAB-BASED INFLUENZA SURVEILLANCE SYSTEM IN PAKISTAN, 2017 Dr Nadia Noreen* Nadia Noreen, Dr Mirza Amir Baig, Dr. Rana Jawad Asghar, (FELTP pakistan)

Background: Globally 5-10% of adults and 20-30% of the children are affected by influenza annually. Annual epidemics results in 3-5 million cases and 500,000 deaths. Influenza is a common illness in Pakistan however absence of a robust surveillance system makes assessment of burden of disease an issue. Purpose: Study was conducted to identify key strengths and weaknesses of the system and to make recommendations based on findings. Methods: An evaluative descriptive study was conducted from April to July 2017. The Lab-based Influenza Surveillance System was conducted at the national level. Assessment of qualitative and quantitative system attributes was done utilizing the CDC's Updated Guidelines for Evaluating Public Health Surveillance Systems, 2001. Desk review of literature, departmental documents and reports were also conducted. The stakeholders were identified and interviewed using a semi-structured questionnaire. Findings: The system was found to be simple and easy to operate but less flexible to integrate with other diseases. Data quality was good as 80% of observed forms were completely filled. Timeliness was good as the data takes 24-48 hours from sample collection to report submission to the central level. Acceptability is good as private and public sector hospitals and labs are involved. Sensitivity calculated was 62% and Predictive Value Positive (PVP) was 37.2%. The representativeness of Lab based influenza surveillance system is poor as it is a sentinel surveillance with specific reporting sites strategically placed. Data from all sentinel sites is analyzed at national reference lab where it is summarized to use for planning and management purposes Conclusions: The system is meeting its objectives. Sustainability and stability of the system needs to be improved by allocation of public funds. Extension of the coverage of the system will result in improved representativeness. Regular capacity building of the staff at reporting site will ensure continued quality of reporting.

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COAL FLY ASH AND ASTHMA AMONG CHILDREN 6-14 YEARS OLD Jack Pfeiffer* Jack Pfeiffer, Barbara Polivka, Lonnie Sears, Kristina Zierold, (University of Louisville)

TITLE Coal fly ash and asthma among children 6-14 years old AUTHORS Jack Pfeiffer, MS, Barbara Polivka, PhD, Lonnie Sears, PhD, Kristina Zierold, PhD INTRODUCTION: Coal fly ash is a coal-combustion byproduct composed of particles with diameters less than ten micrometers (PM10) that typically contain a variety of potentially toxic metals which are readily absorbed into the body through inhalation. Relatively little research exists examining the effects of fly ash exposure and health outcomes. This is the first study to examine the association between exposure to fly ash in the home and asthma among children 6-14 years old. METHODS: Fifty-two participants provided data for analysis. Data was collected using personal modular impactors, lift tape samples, and multiple questionnaires. Laboratory methods used to analyze the samples included gravimetric analysis, scanning electron microscopy / energy dispersive x-ray, and proton-induced x-ray emission. Statistical methods used to analyze the data included binomial logistic regression and the likelihood ratio test. RESULTS: Twenty five (48%) participants had previously diagnosed or suspected undiagnosed asthma. Forty-one (79%) participants had fly ash found in their homes. An odds ratio for the association between all asthma and presence of fly ash in the home was calculated to be 12 (p = 0.047, 95% CI=1.03-138), adjusting for gender, the presence of outdoor allergies, guardian-reported breathing issues, elevated dust levels in home, and smoking in the home. DISCUSSION: The findings suggest a clear possibility that asthma can be related to fly ash exposure in the home. While this study had a small sample size, a relationship did exist. Additional research is required to elucidate the exact nature of observed associations.

SCREENING TEST FOR ASSESSMENT OF HEALTH STATE AT RISK IN SUSCEPTIBILITY PHASE ON THE NATURAL HISTORY OF DISEASE AMONG YOUNG-ADULTS FROM A LIGHT OF HEALTH PROMOTION Hideo Yamazaki* Hideo Yamazaki, Soichi Sakabe, Xiao Qing, Minako Danbara, (Tokoha University)

Introduction: Both lifestyle and behavior factors predispose individuals to lifestylerelated diseases (LSRDs). In a practical community health activity based on health promotion, a primary prevention is one of the most effective ways to prevent LSRDs. In general, although young-adults have a low incidence rate at LSRDs, the cumulative exposure to behavioral disadvantage across the life course may be strongly associated with predispose LSRDs. However, an appraisal way for health conditions in a phase of susceptibility based on the theory of natural history of diseases has not been established yet. The purpose of the present study was to examine the validity of a screening test of health state at risk in susceptibility phase on the natural history of disease, the semihealth state, among young-adults in Japan. Methods: A self-report questionnaire consisted of 54 items was administered to university students in Japan between 2015 and 2017. As analyzed data without defect values, 2,873 samples derived from university students. A principal component analysis (PCA) was applied to valid data. Results: The PCA was applied to the sample in order to extract the semihealth index. Then the semihealth index score was calculated by the norm eigenvectors of the first principal component. Furthermore, a distribution of young-adults with the semihealth conditions was determined by using the score. As a result, the prevalence, sensitivity, specificity, positive predictive value, and negative predictive value showed 20.2%, 86.0%, 83.8%, 57.3%, and 95.9%, respectively. Conclusions: This method has shown to be useful for the assessment of the semihealth state among young-adults from a light of health promotion activities.

DOES SOCIAL CAPITAL MODERATE THE ASSOCIATION BETWEEN CHILDREN'S EMOTIONAL OVEREATING AND PARENTAL STRESS? A CROSS-SECTIONAL STUDY OF THE STRESS-BUFFERING HYPOTHESIS IN A SAMPLE OF MOTHER-CHILD DYADS Jennifer Mandelbaum* Jennifer Mandelbaum, Spencer Moore, Patricia P. Silveira, Michael J. Meaney, Robert D. Levitan, Laurette Dubé, (University of South Carolina)

Background: The stress-buffering hypothesis posits that resources accessed via one's social network may attenuate the impact of stress on health Children exposed to parental stress are at greater risk of emotional overeating (EO), yet little research examines how parental social resources affect this relationship. Prior research found evidence for the protective effects of social support; less is known about social capital as a stress buffer. This study aimed to examine whether social resources (social support and social capital) moderate the association between parental stress and children's EO. Methods: The Maternal Adversity Vulnerability and Neurodevelopment Study (MAVAN) is a community-based birth cohort of motherchild dyads. The sample was restricted to dyads at the 72-month assessment (n=84). Relationships among parental stress, EO, social support, and social capital (measured as network diversity) were examined with Poisson regression. Analyses adjusted for sociodemographic and economic variables, as well as parent concerns about children's weight. Results: Bivariate analyses showed parental stress (b=.28), maternal educational attainment (b=-.10), annual household income (b=-.02), and weight concerns (b=.14) were independently associated with children's EO (p<.05). Parental social capital moderated the positive association between greater parental stress and children's EO, such that stress was associated with children's EO only in mothers with low social capital (b=-.12; p<.05). Conclusion: This study brings new insight to the study of social capital by demonstrating the importance of network diversity in buffering the adverse impact of parental stress on children's EO. Findings suggest that social capital may disrupt the transmission of stress from parent to child, thereby playing a potential role in the production and reproduction of health inequalities across generations. Interventions for child health should consider improving parental social capital.

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RURAL CHILDHOOD RESIDENCE AND DEPRESSIVE SYMPTOMS AMONG MIDDLE-AGED ADULTS IN THE UNITED STATES Audrey R. Murchland* Audrey R. Murchland, M. Maria Glymour, Joan A. Casey, Elizabeth Rose Mayeda, (University of California, San Francisco Department of Epidemiology and Biostatistics)

Mounting evidence reveals significant geographic health disparities in the United States. Residence in a rural area during childbood could influence mental health in adulthood through multiple pathways, including educational environment. To examine the associations between rural childhood residence and prevalence of depressive symptoms in midlife, we included U.S. adults ages 50-56 years in the 1998, 2004, and 2010 waves of the Health and Retirement Study (n=8,385). We examined the association of self-reported rural childhood residence with elevated depressive symptoms (>4 out of 8 symptoms to reflect probable diagnostic thresholds) using logistic regression, adjusting for alternative covariate sets and applying sampling weights. To evaluate cohort effects, we examined interactions between birth cohort (1942-1947, 1948-1953, or 1954-1959, selected based on the HRS enrollment design) and rural childhood residence. Across successive birth cohorts, prevalence of elevated depressive symptoms increased (1942-1947: 8.3%, 1948-1953: 12.2%, 1954-1959: 13.9%). In age, race/ethnicity, and sex adjusted models, rural childhood residence was associated with higher depressive symptoms (OR 1.26; 95%CI: 1.08, 1.48). Adjusting for parental education and southern birth substantially attenuated this association (OR 1.11; 95% CI 0.94, 1.31), as did additional adjustment for own education (OR 1.03; 95% CI: 0.87, 1.22). We found no evidence of cohort differences in the estimated effects of rural childhood residence (OR close to null and p>0.45 for all interactions). We found that rural childhood residence was associated with elevated depressive symptoms among middle-aged U.S. residents. Educational environment, both parental education and personal education, appeared to contribute to this disparity. Further research is needed to elucidate life course pathways through which rural residence may influence mental health.

THE RELATIONSHIP BETWEEN SKIN COLOR AND PRETERM DELIVERY IN AFRICAN AMERICAN WOMEN IN THE LIFE-COURSE INFLUENCES OF FETAL ENVIRONMENT (LIFE) STUDY. Jaime Slaughter-Acey* Jaime Slaughter-Acey, Tony N. Brown, Verna M. Keith, Dawn P. Misra, (Department of Health Systems and Sciences Research, Drexel University)

African American (AA) women exhibit persistently higher rates of preterm delivery (PTD, <37 weeks of gestation) than White women. We examined whether racerelated social change (marked by Jesse Jackson's 1984 and 1988 presidential campaigns promoting social justice and racial equality) and skin tone interacted to influence rates of PTD in AA women. We analyzed the 2009-2011 LIFE data comprised of 1410 AA women, age 18-45 years, residing in Metropolitan Detroit, MI. We stratified women by birth cohort: a) born pre-1984 and b) born post-1984. Self-reported skin tone was categorized: light, medium, dark. Descriptive results showed similar PTD rates by birth cohort, pre- vs. post-1984: 16.3% vs. 16.1%. Yet, within each birth cohort, PTD rates varied by skin tone. In the born pre-1984 group, PTD rates were 10.1%, 18.0%, and 20.8% for light, medium, and dark brown women, respectively; the rate for light brown women was similar to the 2010 PTD rate for U.S. non-Hispanic Whites (10.5%, z=0.17 P=0.87). In the born post-1984 group, light brown women had the highest (20.3%) and dark brown women had the lowest (11.9%) rates; the PTD rate for medium brown women was 14.8%. Poisson regression models confirmed a significant interaction between maternal birth cohort and self-reported skin tone predicting PTD (P=0.001); it remained significant net of demographics, place of birth, current residence, parity, life satisfaction, income and education. Results suggest a salubrious association between light brown skin tone (as compared to medium and dark brown skin tone) and the probability of PTD for AA women in the pre-1984 group; however, AA women born post-1984 with medium and dark brown skin tone experienced lower PTD rates than their light brown counterparts. Future research should consider sociopolitical context when investigating the intersectionality of race and skin color in relation to birth outcomes.

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SOCIAL CAPITAL AND HEALTH STATUS: RACE/ETHNIC AND GENDER DIFFERENCES IN THE HEALTH AND RETIREMENT STUDY Ester Villalonga Olives* Ester Villalonga Olives, Yusuf, Ichiro, (University of Maryland)

Social capital involves the resources available through membership in social networks. The association between social capital and health is hypothesized to vary by race/ethnicity and gender, which has not been sufficiently examined. Moreover, a life course perspective of the relation between social capital and health is lacking in the literature. We examined the longitudinal effects of social capital on health status and effect modification by race/ethnicity and gender, controlling for relevant sociodemographic variables. Data were drawn from the Health and Retirement Study, a nationally representative panel study of US adults aged ≥50 years, waves 10 to 14 (year 2006 to 2014). We used fixed-effects longitudinal ordinal logistic regression to assess social capital variables ((a)neighborhood social cohesion/physical disorder and (b) positive/negative social support) with selfreported health status, adjusting for age, education and wealth. Interactions with race/ethnicity and gender were assessed at p <0.05. The sample was 7555, mean age 72 (sd=6.2), 58% female. Higher negative social support and neighborhood physical disorder were related to lower health status (aOR=0.97 (CI 0.95 - 0.99 p<0.01 and aOR=0.99 (CI 0.97-0.99 p=0.05), respectively). Race/ethnicity modified the relationship of neighborhood social cohesion and health status. The negative effect was weaker among African Americans compared to Whites (aOR=0.99 (CI 0.96-1.01 p<0.01)). Gender modified the relationship between positive social support and health status. The positive relationship was stronger for males compared to females (aOR=I.10 (CI 1.06 - 0.15 p=0.03)). We demonstrate that, over one's lifecourse, social capital is causally associated with poorer or greater self-rated health. However, the positive or negative relationship significantly depends on the racial/ethnic or gender group. The construction and reinforce of social capital is crucial for the health status of the elderly population.

MORTALITY PROFILES ACROSS LATIN AMERICAN CITIES IN 10 COUNTRIES: THE SALURBAL PROJECT Usama Bilal* Usama Bilal, Carlos Guevel, Amelia Friche, Maria Fatima Pina, Yvonne Michael, Tania Alfaro, Jaime Miranda, Daniel Rodriguez, Ana Diez-Roux, (Drexel University)

Objective: We studied the variability and predictors of proportionate mortality across major cities of 10 Latin American countries. Methods We used population and vital registration data for 2015 from Argentina, Brazil, Chile, Colombia, Costa Rica, El Salvador, Guatemala, Mexico, Panama and Peru. We defined cities as urban agglomerations with a population above 100,000 as of 2010 (n=363). We aggregated deaths using WHO's Global Health Estimates to 7 groups infectious (ID), maternal/neonatal/nutritional (MNN), cancer, cardiovascular, other noncommunicable (NCDs), accidental injuries, and violence. We redistributed deaths attributed to ill-defined causes using conditional mean imputation by age, sex, country and year. We used linear mixed models to quantify the variability in proportionate mortality (defined as 1-ICC). We evaluated city- (population and growth per year over the last 5 years) and country-level (Gross Domestic Product [GDP] per capita) predictors of proportionate mortality. Results: Cardiovascular (28%) and other NCDs (30%) were the most common causes of death, followed by cancer (18%) and ID (11%). The within-country variability in proportionate mortality was highest for violence and accidents (46%), and lowest for ID (28%). Larger cities had a lower proportion of MNN and accidental injury deaths (-0.08% and -0.15% per 1 million people), while growing cities had a higher proportion of accidental and violent injury deaths (0.89% and 0.83% per 1% increase in population per year). Cities in countries with higher GDP per capita had a higher proportion of cancer and cardiovascular deaths (0.62 and 0.72 per thousand USD), and a lower proportion of MNN, accidental and violent deaths (-0.21, -0.23 and -0.42 per thousand USD). Discussion: This study confirms significant variability in the mortality profiles of Latin American cities, and points to some predictors of this variability to be studied in further research.

SOCIAL

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RACE, HOUSEHOLD FINANCIAL DEBT, AND HEALTH BEHAVIORS IN THE UNITED STATES Brice Batomen* Brice Batomen, Arijit Nandi, Elizabeth Sweet, (Mcgill University)

Household financial debt has more than tripled since the 1980s in the United States Debt has the potential to influence health behaviors and, to the extent that patterns of indebtedness might vary by race/ethnicity, to mediate racial inequalities in health. Few studies, however, have examined these pathways. In this study, we used data from a nationally-representative sample of over 10,500 adults aged 25 years and older surveyed biennially between 1999 and 2015 as part of the Panel Study of Income Dynamics to examine whether debt mediates racial inequalities in physical activity, smoking, and alcohol consumption. Using inverse probability weighted marginal structural models accounting for birth year, gender, educational attainment, and childhood self-rated health, the proportions of non-whites who reported smoking, heavy drinking, and physical activity were, respectively, 2.3 (95% CI=0, 4.9), 4.3 (95%CI=2.7, 6), and 8.8 (95%CI=5.8, 11.2) percentage-points less likely than among whites Additionally, the probability of the mediator, having total household financial debt in excess of household wealth, was one (95%CI= -1.5, 4) percentage-point higher among non-whites compared to whites. However, reporting household debts in excess of wealth was not associated with smoking, heavy drinking, or physical activity, using marginal structural models accounting for lagged time-varying confounders, including region of residence, family composition, marital status, employment status, health insurance coverage, and prior health, including the incidence of chronic condition. We decomposed the relation between debt and health behaviors into the indirect component mediated by having household debts in excess of wealth and the direct component through other mechanisms. Results do not support the hypothesis that household debt in excess of wealth mediates observed racial inequalities in health behaviors.

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GENDER AND RACE SPECIFIC DISPARITIES IN MEASURES OF SOCIAL CONTEXT: RESULTS FROM A NATIONALLY REPRESENTATIVE SAMPLE Jared Durieux* Vinay K. Cheruvu, Jared Durieux, (College of Public Health, Kent State University, Kent, OH, 44242)

Understanding gender and race specific disparities in housing insecurity and food insecurity as social determinants of health (social context) may help develop targeted interventions to effectively reduce such disparities and thereby improve health outcomes. The objective of this study is to use recent nationally representative data to understand the gender and race specific disparities with respect to housing insecurity and food insecurity. Cross-sectional data from the 2011-2015 Behavioral Risk Factor Surveillance System (BRFSS) were used for this study (n = 284,047). Housing insecurity and food insecurity were used as measures of social context. Weighted prevalence estimates of housing insecurity and food insecurity along with corresponding 95% confidence interval (CI) were computed. Logistic regression was used to determine gender and race specific disparities in housing insecurity and food insecurity. Statistical analysis accounted for complex sampling design of the BRFSS and adjusted for the relative impact of select sociodemographic factors including income. The estimated prevalence of housing insecurity only was 13.9% (95% CI: 13.6 - 14.2), food insecurity only was 5.4% (95% CI: 5.2 - 5.5), and both housing insecurity and food insecurity was 18.2%(95% CI: 17.9 - 18.5), correspondingly. The estimated prevalence of both housing insecurity and food insecurity was highest among the Hispanics (29.9%) followed by American Indian / Alaskan Natives (27.1%), African Americans (24.3%), and Caucasians (15.1%). Asians reported lowest insecurity with housing and food (12.8%). Compared to males, females were more likely to report both housing and food insecurity (21.0% vs.15.3%). Findings from the current study suggest significant gender and race specific disparities in measures of social context. Researchers should develop targeted invention programs to address and effectively reduce these disparities and help improve the health outcomes

A TEMPORAL AND GEOSPATIAL ANALYSIS OF PREHOSPITAL NALOXONE ADMINISTRATION IN A MIDSIZED NEW YORK COMMUNITY Molly McCann* Molly McCann, James Brodell, Courtney Marie Cora Jones, Heather Lendhardt, Micheal Meyer, Jeremy Cushman, (University of

Rochester School of Medicine and Dentistry)

Objective: The opioid epidemic is an ongoing crisis in many communities. Understanding the frequency and distribution of naloxone administrations among first responders is a critical component to overall epidemic surveillance. This study aims to describe the community wide administrations of naloxone by first responding agencies. Methods: As part of routine quality assurance, each unique prehospital naloxone administration was collected and reported by first responding agencies-Emergency Medical Services (EMS), fire and law enforcement, from Jan 1 2014-July 31 2017. Data included: administering agency, date, time, location of use, age and gender of the patient, and the amount and route of administration. Geospatial distributions were pictorially generated using converted geographical coordinates. Results were analyzed using descriptive statistics. Results: During the study period, 2,174 individuals received naloxone by one of the aforementioned first responding agencies. Average patient age was 40 years (Range: 0-99 years), with males receiving almost twice the administrations of females (1,418 to 720, respectively). Intranasal was the most common route of administration, accounting for over half of all administrations (1,638, 47.6%). More than half of patients (56.8%) received more than one dose, with a maximum dose of 12 mg administered to a single patient. Naloxone administrations occurred most frequently on Friday and Saturday, with heavy concentration in the area's urban center. Conclusion: The opioid epidemic is an ongoing public health concern frequently encountered by first responders, highlighting the need for community wide surveillance. Information gained can be used to allocate resources and develop targeted public health interventions within high risk communities.

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FREQUENCY OF CANNABIS USE AND NONMEDICAL USE OF PRESCRIPTION PAIN RELIEVERS IN ADOLESCENTS AND ADULTS IN THE UNITED STATES, 2002-2014 Samantha S.M. Drover* Devika Chawla, Samantha S.M. Drover, Alan Kinlaw, Shabbar I. Ranapurwala, (University of North Carolina at Chapel Hill)

Introduction: Widespread speculation about the role of cannabis use as a 'gateway' to other drug use has impacted U.S. federal cannabis regulations. In this study, we examined the association between frequency of cannabis use and nonmedical use of prescription pain relievers (NMUPPR). Methods: We conducted a cross-sectional study using nationally representative data of US adolescents and adults (age ≥ 12 years) from the National Survey of Drug Use and Health (NSDUH) during 2002-2014 (n=703,732). We categorized self-reported cannabis use as: never; occasional (in past year but not past month); semi-regular (1-9 times in past month); regular (≥10 times in past month). We compared prevalence of self-reported pastmonth NMUPPR across exposure categories. To control confounding and account for NSDUH sampling design, we constructed weights by multiplying inverse probability-of-exposure weights to NSDUH-defined sampling weights. We used these weights in log-binomial models to estimate standardized prevalence ratios (sPR), with robust variance estimators to obtain 95% confidence intervals (CI). Results: The weighted distribution of cannabis use was 59.6% never, 34.3% occasional, 3.0% semi-regular, and 3.2% regular use. Weighted prevalence of pastmonth NMUPPR, by exposure group, was 0.7%, 1.6%, 7.0%, and 12.4%, respectively. Compared to never cannabis users, prevalence of past-month NMUPPR was similar for occasional users (sPR 1.01, 95% CI 0.86-1.18), but higher for semi-regular (sPR 2.87, 95% CI 2.33-3.54) and regular (sPR 4.20, 95% CI 3.42-5.16) cannabis users. Conclusions: Occasional cannabis use, which characterized 84.9% of cannabis users, was associated with the same prevalence of NMUPPR as never use, whereas cannabis use on a semi-regular or regular basis was associated with higher prevalence of NMUPPR. Future research should leverage longitudinal designs and examine heterogeneity across subpopulations to further assess the link between cannabis use and NMUPPR.

1461 S/P

CORRELATION BETWEEN E-CIGARETTE USE MEASURES IN U.S. ADULTS, NESARC-III 2012-2013 Maria A. Parker* Maria A. Parker, Jennifer L. Pearson, Andrea C. Villanti, (University of Vermont)

Introduction: With the increasing popularity of electronic cigarette (e-cig) use in the United States (U.S.), it is important to know if individuals can accurately report what they are using. We explore several measures of e-cig use with recent national data. Methods: Interviews were conducted between 2012-13 for the National Epidemiologic Survey on Alcohol and Related Conditions III (n=36,309; NESARC-III). Adults who used e-cigs/e-liquid during the last year (≤ 18 years old; n=1,229) were asked about length of use, quantity (i.e., cartridges, drops), nicotine concentration, and duration (days). Pearson correlations of e-cig measures were compared between past-month e-cig users (n=610) and non past-month e-cig users (n=619), and then among past-month e-cig users by frequency of use (i.e., infrequent [≤3 days/month], moderate [1-6 days/week], daily). Results: Correlations between all e-cig use measures were low (r≤0.5), and lowest for non past-month ecig users. Among past-month users, the highest correlation for infrequent users was between length of use and quantity (cartridges; r=0.2). For moderate users, there was modest correlation between length of use and duration (r=0.5). In daily users, correlations were generally higher than infrequent and moderate users and greatest between length of use and duration (r=0.3). There was no significant difference for e-cig measures on length of use, quantity (i.e., cartridges, drops), nicotine concentration, and duration (days) by frequency of use in past-month users (p's>0.05). Conclusions There is low to moderate correlation across e-cig measures in e-cig users, suggesting low reliability of these measures in a large, national survey. Accuracy of e-cig measures increases with greater frequency of use. Findings suggest detailed e-cig measures may be more appropriate for studies of e-cig users than population samples, and will need to be examined further to determine whether revisions are necessary in future waves of the NESARC-111.

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FROM DSM-IV TO DSM-V ALCOHOL-USE DISORDERS AMONG UNIVERSITY STUDENTS FROM LEBANON: EPIDEMIOLOGICAL AND CLINICAL IMPLICATIONS Lilian Ghandour* Lilian Ghandour, Sirine Anouti, (American University of Beirut)

A total of 1155 university students selected from 8 large private and public universities in Lebanon participated in an anonymous self-filled survey in May 2016. Data on DSM-IV and DSM-V criteria of alcohol-related disorders were gathered from the 582 past-year drinkers, of which 203 (34.88%) were screened for DSM-V any alcohol-use disorders (AUD) and 377 (64.78%) for abuse/dependence (64.6% abuse, and 8.25% dependence). Of the 203 diagnosed with DSM-V any AUD, 58% had mild, 21% moderate, and 21% severe alcohol-related problems. Both DSM-IV and DSM-V classified 199 students (34% of the sample) and 197 (33.8%) as having AUD-negative and AUD-positive, respectively. Still, a total of 180 students (31.8%) were AUD-negative as per DSM-V, but were positive for DSM-IV abuse (but not dependence), mostly driven by the 'hazardous use criterion'. The 6 students who were AUD-positive according to DSM-V but not DSM-IV had reported positively on the newly added criterion of "craving". Of the 191 students who had a score of 1 on DSM-V-defined AUD, only 5 (2.62%) met the DSM-IV criterion of 'legal problems' (excluded in DSM-V). Overall percent agreement was 68% (kappa=0.41). Nonetheless, using a summation score for DSM-IV abuse and dependence criteria (range 0-11), and DSM-V any AUD as the 'reference', the area under the ROC curve was 0.9895, and a cut-off of 2+ for DSM-IV abuse/dependence yielded a sensitivity and specificity of 96.55% and 98.68%, respectively. In this university sample of young adults, DSM-5 diagnostic criteria do not seem to inflate prevalence rates of AUD as compared with DSM-IV. A substantial percentage of young adults who don't meet DSM-V criteria of any AUD may still be a source of harm to themselves and others due to their driving, or operating machinery in general after having had too much to drink.

ASSOCIATION BETWEEN MEDICAL MARIJUANA LAWS AND PRESCRIPTION OPIOID OVERDOSE DEATHS: A COUNTY-LEVEL ANALYSIS FROM 2002 TO 2015 Alvaro Castillo-Carniglia* Alvaro Castillo-Carniglia, William Ponicki, Paul Gruenewald, Julian Santaella-Tenorio, June H. Kim, David S. Fink, Corey Davis, Silvia S. Martins, Veronica Pear, Stephen G. Henry, Garen J. Wintemute, Katherine M. Keyes, Magdalena Cerdá, (Violence Prevention Research Program, University of California, Davis)

Background: It has been argued that alternative ways to manage pain, such as marijuana, can decrease the use of POs, so that states that legalize medical marijuana and make it more available may see a reduction in opioid-related harm. Few studies have examined this problem, and all of them consider data at the state level, thus ignoring local patterns of variation in the impact of state laws. We examined the association between the implementation of MML, including the adoption of legal medical marijuana dispensaries (MMD), and county-level fatal overdose involving POs. Methods: We used spatiotemporal Bayesian Poisson models to estimate the effect of the law in the same year and up to three years after enactment, using data from 2002 to 2015, in 49 US states (Alaska was excluded). Models were adjusted for time-varying demographic and socioeconomic characteristics of the counties and co-occurring policies at the state level. Models also accounted for county-varying linear time trends and state fixed effects. Results: The implementation of MML was associated with an elevated risk of fatal PO overdoses (Rate Ratio [RR]=1.23; 95% Credible Interval [CI]: 1.18, 1.28) beginning 1 year after implementation. The effects of MML implementation in the second and third years post-implementation were: RR = 1.38 (95%CI: 1.32, 1.44), and RR = 1.54 (95%CI: 1.46, 1.62), respectively. The adoption of MMD was associated with lower rates of PO overdose. In the same year, and up to the third year following implementation, the RRs were from 0.92 (95%CI: 0.88, 0.96) to 0.83 (95%CI: 0.80, 0.87). Conclusions: MML enactment was associated with higher rates of PO fatal overdoses at the county level. However, in states where MML included provisions to open MMD there was a decrease in the rate of PO fatal overdoses following enactment of this provision. This suggests that the reduction in PO overdose associated with marijuana legalization may be specific to states that allow dispensaries.

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TRENDS IN PREMATURE DEATH RATES FROM DRUG OVERDOSES: THE USA COMPARED TO 23 OECD COUNTRIES FROM 2001 TO 2014 Yingxi Chen* Yingxi Chen, Meredith S Shiels, Neal D Freedman, Ana Best, Diana Withrow, Susan Spillane, Sahar Khan, Amy Berrington de González, (NIH National Cancer Institute)

Background: The USA is experiencing a public health crisis due to drug overdoses, which is now the 10th most common cause of death, surpassing breast cancer. International comparisons in trends can provide insight into the potential drivers of these trends. We compared the trends in premature mortality rates due to drug overdose in the USA to 23 countries of the Organization for Economic Co-operation and Development (OECD) from 2001 to 2014. Methods: We estimated agestandardized premature mortality (age 25-64 years) rates for drug overdose in the 24 OECD countries with available comparable data in the WHO Mortality Database. Drug overdose deaths were defined using ICD-10 codes X40-X44 (unintentional), X60-X64 (suicide), X85 (homicide), Y10-Y14 (undetermined). We used Joinpoint regression to estimate annual percent changes (APCs) in rates. Results: There were 623,593 drug overdose deaths in the 24 OECD countries from 2001 to 2014. Whilst the rates increased during this time period for men and women in most of the countries (APC ranging from -2.82 to +4.94%/year), there were decreases in Hungary, Germany, Latvia, and Portugal. In 2014, the USA had the highest premature drug overdose mortality rate (23.4/100,000), followed by Estonia (15.1 /100,000), while Portugal had the lowest rate (0.8/100,000). Conclusion: The overall trend of increased deaths from drug overdoses in OECD countries shows this is a growing, international public health issue. Comparisons of the trends and rates across countries with very different public health policies may help provide insights into strategies for preventing these deaths.

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LONGITUDINAL CORRELATES OF NON-FATAL OVERDOSE AMONG OPIOID-USING FEMALE SEX WORKERS IN BALTIMORE CITY: THE SAPPHIRE STUDY Ju Nyeong Park* Ju Nyeong Park, Sean T. Allen, Michele Decker, Katherine Footer, Noya Galai, Steve Huettner, Brad Silberzahn, Susan G. Sherman, (Johns Hopkins Bloomberg School of Public Health)

Background: Opioid overdose mortality has surged in recent years. Non-fatal overdose is a well-established predictor of fatal overdose among people who use drugs however there are no longitudinal studies among high-risk populations such as opioid-using female sex workers (FSW). This study examines the longitudinal correlates of non-fatal overdose among opioid-using FSW. Methods: The Sex workers And Police Promoting Health In Risky Environments (SAPPHIRE) study is an ongoing cohort study of street-based FSW in Baltimore, Maryland. We collected data at 3-month intervals across multiple domains including demographics, drug use, overdose and naloxone. Longitudinal correlates were modeled using marginal logistic regression with generalized estimating equations (GEE). Results: 180 opioidusing FSW were observed over 543 follow-up visits. Mean age at baseline was 36 and 70% were white (non-Hispanic). 60% were unstably housed (stayed at ≥ 2 places, past 3 mo.), 75% injected drugs, 84% smoked crack, 56% used heroin, 26% misused prescription opioids. One in four (25%) experienced ≥1 non-fatal overdose during follow-up, two overdoses (1%) were fatal. Naloxone was administered at 73% of recent overdoses mostly by EMS (58%) or a family member/peer (33%). Longitudinal correlates of non-fatal overdose were age (OR=0.96,0.93-1.00), perceiving that drugs were "laced with fentanyl" (OR=2.91,95%CI=1.33-6.36), daily injecting (OR=1.97,95%CI=1.06-3.67) and unstable housing (OR=2.43,95% C1=1.16-5.10). Fentanyl seeking was not associated with non-fatal overdose (OR=0.81,95% C1=0.28-2.30). In multivariable analysis, perceiving fentanyl in drugs remained significantly correlated with overdose (aOR=2.65,95%CI=1.11-6.29). Conclusions These data demonstrate that street-

(aOR=2.65,95%C1=1.11-6.29). Conclusions These data demonstrate that streetbased female sex workers who misuse opioids experience high rates of nonfatal overdose and are at high risk for fatal overdose. Interventions that target fentanyl usage and unstable bousing among FSW are urgently needed. PRACTICAL TRANSPORTABILITY: A VIRTUAL TWINS APPROACH FOR VARIABLE SELECTION Megha L. Mehrotra* Megha L. Mehrotra, M. Maria Glymour, Daniel Westreich, Elvin Geng, David V. Glidden, (University of California, San Francisco)

To transport an effect estimate from a source to a target population, researchers must measure effect measure modifiers whose distributions differ between the two populations. Causal graphs used for transportability identify a set of variables sufficient to transport an effect estimate to the target population, but this set may include variables that are unnecessary for a given scenario: for example, a variable may be necessary to transport a risk ratio but not a risk difference, or vice-versa. With finite resources, measuring an unnecessarily extensive set of variables may be impractical in real-world applications. We developed an algorithm to isolate the necessary and sufficient variables from those identified by a causal graph. We used a Virtual Twins approach incorporating ensemble learning and Lasso variable selection to identify which covariates contribute to effect heterogeneity on the scale of interest. Using inverse-odds of selection weights estimators (IOSW) in 2500 simulations, we compared the performance of the algorithmically selected covariate set to the full set of variables identified by the causal graph. We assessed the algorithm's performance in real-world data using an IOSW logistic regression to transport the results of the iPrEx study from the Peru to the Ecuador site, and compared the transported estimated effect of randomization on infection to the observed treatment effect. In simulations, the algorithm reduced mean-squared error of the IOSW estimator of the risk difference (ΔMSE : -0.056 (95%CI [-0.064, -0.050]) and did not increase percent bias (-2.6% 95%CI [-9.8%, 4.5%]). In iPrEx, 9 of the 22 variables in the sufficient set were selected by the algorithm to transport the study results from Peru to Ecuador; transported estimates resembled the observed treatment effect in Ecuador (transported RR 0.51 (95%CI [0.31, 0.85]) vs. true RR 0.53 (95%CI [0.24, 1.15])). Variable selection algorithms can improve the efficiency of transport estimators.

EXOGENOUS ESTROGEN INCREASES VITAMIN D BINDING PROTEIN CONCENTRATION Quaker Harmon* Quaker Harmon, Andrew Hoofnagle, Donna Baird, (NIEHS)

Increasing awareness of the importance of adequate vitamin **D** has ignited interest in determinants of 25-hydroxyvitamin D [25(OH)D] and the role of the vitamin D binding protein (VDBP). Previous work has reported 1) differences in VDBP concentration by VDBP isoform, 2) associations between genetic variants in the VDBP gene (GC) and the concentration of 25(OH)D, and 3) increased VDBP concentration with use of exogenous estrogen. However older monoclonal immunoassays for VDBP had significant measurement error. We re-evaluate these findings using a valid VDBP assay in African Americans who have a high risk of vitamin D deficiency. We used a sample of 100 black women (age 24-36) from the Study of Environment, Lifestyle & Fibroids (SELF) to 1) quantify the concentration of VDBP and 25(OH)D using LC-MS/MS, 2) identify the isoforms of VDBP, and 3) examine differences in VDBP concentrations by isoform and by exogenous estrogen use. Differences were assessed using ANOVA without adjustment. In this population common isoforms of VDBP were Gc1f/Gc1f (51%), Gc1f/GC1s (22%) and Gc2/GC1f (22%). Mean VDBP concentration was 266 ug/ml and mean 25(OH)D was 16.0 ng/ml, neither differed by VDBP isoform (p=0.2 and p=0.9 respectively). Women using exogenous estrogen (combination birth control) (N=40) had elevated VDBP (322 ug/ml) compared to those not using exogenous hormones (N=60) (230 ug/ml, p<0.001). These findings support previous associations between exogenous estrogen and increased VDBP, although the biological relevance of this finding is unclear. Earlier reports of an association between VDBP isoforms and the concentration of VDBP are likely due assay error. Although GWAS studies have suggested that functional polymorphisms in GC are associated with 25(OH)D we do not find evidence that VDBP isoforms themselves are associated with 25(OH)D. Previously identified associations in vitamin D biomarkers must be re-evaluated using valid assays in populations of interest.

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PRETERM DELIVERY AND THE MATERNAL LIPID PROFILE DURING AND 7-15 YEARS AFTER PREGNANCY Baiyang Sun* Baiyang Sun. Claudia Holzman, Mamie Bertolet, Janet M. Catov, (Department of Epidemiology, University of Pittsburgh; Magee-Womens Research Institute)

There is little information on trajectories of maternal lipids measured in pregnancy and years later, particularly comparing trajectories of women with full-term delivery (FTD) and preterm delivery (PTD). We examined relationships between lipids, measured at two time points, and PTD, using POUCHmoms, a sub-cohort recruited in pregnancy and reassessed at follow-up, 7-15 years post index birth. We included 648 women having lipids (total cholesterol [TC], HDLc, LDLc, triglycerides [TG]) measured at 16-27 weeks' gestation and at follow-up. We used generalized linear models to compare each lipid between delivery outcomes (108 spontaneous PTD [sPTD], 51 indicated PTD [iPTD], and 489 FTD [referent]) and considered both mid-gestation and follow-up lipid levels. Changes from mid-pregnancy to follow-up were also compared. Models were adjusted for gestational age at blood draw, race, age, pre-pregnancy BMI, and parity. We additionally adjusted for mid-pregnancy lipids z-score, follow-up time, and lifestyle factors when comparing follow-up levels and changes. Compared with FTD, women with sPTD had 9.6% (p=0.01) higher TG, similar TC, HDL, and LDL during pregnancy, but had 4.2% (p=0.02) higher TC, 6.9% (p=0.01) higher LDL, and similar TG and HDL at follow-up. In contrast, iPTD had 5.5% (p=0.06) lower TC, similar TG, HDL, and LDL at mid-pregnancy, but had 19.1% (p=0.01) higher TG, similar TC, HDL, and LDL at follow-up. Average declines (mg/dL) in TC (37.6 vs. 45.9, p=0.03) and LDL (8.1 vs. 15.7, p=0.01) were less in sPTD than FTD, while declines in TG were less following iPTD (43.7 vs. 73.3, p=0.07), even after accounting for mid-pregnancy level. In conclusion, lipids were associated with PTD differently at mid-pregnancy and at follow-up. Blunted trajectory of lipids from mid-pregnancy to follow-up in the PTD group may reflect an impaired lipid adaptation to pregnancy compared to FTD, which may in part explain the excess risk of later cardiovascular diseases in women with PTD.

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VALIDITY OF MORTALITY RECORD LINKAGE OF MOTHERS FROM THE COLLABORATIVE PERINATAL PROJECT Anna Z. Pollack* Anna Z. Pollack, Cuilin Zhang, Edwina H. Yeung, Pauline Mendola, Katherine L. Grantz, Sunni L. Mumford, James L. Mills, Enrique F. Schisterman, Stefanie N. Hinkle, (Department of Global and Community Health, George Mason University)

Background: Studies linking large multiracial, US pregnancy cohorts with mortality data are needed to address questions about the implications of pregnancy on life course health. We examined the feasibility and validity of linking the Collaborative Perinatal Project (CPP), a large US prospective cohort study of pregnant women (1958-1965), to death records from US state vital statistics via the National Death Index (NDI) (1979-2016). Methods: Essential NDI variables were manually abstracted for CPP mothers (n=48,197). Linkage was completed through 2016. NDI vital status was compared to two other sources: the social security death master file (SSDMF n=40,405), and a manual search by expert genealogists (random sample n=1250). Agreement between the NDI and both the SSDMF and expert genealogists was estimated among those considered deceased and alive at the end of follow-up. NDI true matches were considered deceased. Agreement analyses were conducted for women with abstracted data for NDI linkage and who survived delivery. As proof of concept of the reliability of this linkage, we examined associations between NDI mortality and smoking [high (>1 pack/d)/low/never (ref)] using Cox proportional hazard regression, adjusting for marital status, race, income and age at last CPP pregnancy. Results: NDI variables were successfully abstracted from the CPP on 96.4% of women. NDI vital status agreement with the SSDMF was 82.4% (95% CI: 81.6, 83.1) for deceased, and 79.7% (95% CI: 79.3, 80.2) for alive. NDI vital status agreement with expert genealogists was 80.2% (95% CI: 76.1, 84.3) for deceased and 88.4% (95% CI: 86.1, 90.7) for alive. Smoking was associated with mortality as expected, [high HR=1.96 (95% CI: 1.88, 2.05), low HR=1.41 (95% CI: 1.36, 1.47)]. Conclusion: Linking the historic CPP with the NDI was feasible with reasonable agreement on vital status. This finding facilitates opportunities to examine pregnancy, long-term health and mortality in a US cohort.

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JAPANESE ENCEPHALITIS VACCINATION IN PREGNANCY AMONG US ACTIVE DUTY MILITARY WOMEN Zeina G Khodr, Zeina G Khodr, Anna T Bukowinski, Richard N Chang, Gia R Gumbs, Susan C Farrish, Ava Marie S Conlin, (The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc.)

Japanese encephalitis (JE) is a flavivirus transmitted through mosquito bites and endemic to regions in Asia and the Western Pacific. JE vaccination (3-dose series ≤2011, 2-dose series ≥2009) is an inactivated vaccine required among US service members deployed to and stationed in regions endemic to JE. The current JE vaccination formulation used in the United States has been shown to be safe in pregnancy through animal models, but epidemiologic studies are lacking. We conducted a descriptive analysis to determine the prevalence of JE vaccination in pregnancy among active duty military mothers. The study population included 163,596 pregnancies to military mothers that ended in live deliveries and occurred from 2003-2014. Pregnancies were captured by the Department of Defense Birth and Infant Health Research program and linked to immunization records. Women who received JE vaccination in pregnancy were compared with those who did not. Descriptive analyses compared characteristics between vaccinated and unvaccinated mothers. There were 446 mothers vaccinated in pregnancy: 415 in the first trimester and 31 in the second/third trimester. Half (231 of 415) received their initial dose in pregnancy. Also, 69 (of 415) received >1 vaccine in pregnancy. Of the mothers who received multiple JE vaccinations in pregnancy, only 1 received a dose from both the 3- and 2-dose formulations. Most mothers were vaccinated with the 3-dose (69.1%) versus 2-dose (30.9%) formulation. Vaccinated mothers were more likely to be younger, unmarried, in the Marines, of enlisted rank, and in an occupation other than health care or combat. These mothers were also more likely to have received other non-recommended vaccines in pregnancy. Understanding the characteristics of women who receive the JE vaccination in pregnancy may help guide future policy. Given the increasing number of military women, vaccine safety in pregnancy is a priority for protecting military families.

INVESTIGATING GEOPHAGY AMONG PREGNANT WOMEN IN MWANZA, TANZANIA Shelby Yamamoto* Shelby Yamamoto, Shahirose S. Premji, Elias C. Nyanza, Ola Jahanpour, MIGHT collaborators, (University of Alberta)

Geophagy, the intentional consumption of soil, is common especially among pregnant women in some low- and middle-income settings. Soils may contain a variety of non-nutritive components such as heavy metals and microbes or substances that interfere with gastrointestinal absorptive processes, posing health risks to pregnant women. Several hypotheses regarding the practice have been proposed but very few have examined the role of maternal stress. The practice of geophagy may help to alleviate stress during gestation from perceived dietary or other pregnancy-related concerns. In this exploratory study, we evaluated several measures of maternal stress (general anxiety, Pregnancy-Related Anxiety Scores and Perceived Stress Scores) in relation to geophagic behaviour in early pregnancy in 227 pregnant women (12 to 19 weeks gestation) using penalized (LASSO) regression recruited from two hospitals in the Nyamagana district of Mwanza City, Tanzania. Geophagy was reported by 24.7% of the pregnant women. Maternal stress appeared not to play a role in participants' geophagic behaviour. Treatment of the symptoms of nausea or vomiting during pregnancy (adjusted OR= 3.71, 95%CI: 1.78 to 7.75, secondary or higher paternal education level (adjusted OR=0.36, 95%CI: 0.17 to 0.76) and antenatal hospital site (adjusted OR=3.12, 95%CI: 1.43 to 6.83) were associated with geophagy. Given that relatively little has been done to examine geophagy in relation to the public health risk it may pose to pregnant women, further investigation is warranted.

PHYSICAL EXERTION IMMEDIATELY PRIOR TO PLACENTAL ABRUPTION: A CASE-CROSSOVER STUDY Harpreet S Chahal* Harpreet S Chahal, (University of Toronto, Harvard TH Chan School of Public Health)

Background: While there is consistent evidence that episodes of physical exertion are associated with an immediately higher risk of heart attacks and ischemic strokes, the effect of episodes of physical exertion on the acute risk of placental abruption (PA)- "an ischemic placental disorder" - has not been studied. We assessed the risk of PA immediately following episodes of physical exertion. Methods: In a multicenter case-crossover study, we interviewed 663 women within 72 hours of experiencing PA at 6 hospitals in Peru, South America between 2013 and 2015. We asked women about their frequency of physical exertion during the week before PA and the intensity of their exertion. We compared physical exertion in the hour before symptoms of PA to their usual frequency of physical exertion over the prior week. Results: Among 352 women who engaged in moderate or heavy physical exertion in the week before PA, 34 women reported having engaged in moderate or heavy physical exertion in the hour before the onset of PA. Compared to times with light or no exertion, the risk of PA was 7.8 (95% CI 5.5, 11.0) times greater in the hour following moderate or heavy physical exertion. The RR was higher following heavy exertion (RR=13.7, 95% CI: 7.0, 26.5) compared to moderate exertion (RR=6.0, 95% CI: 4.0, 6.0; P-homogeneity=0.04). The RR of PA within an hour of moderate or heavy physical exertion was lower for women who habitually engaged in moderate or heavy physical activity more than 3 times per week in the year before pregnancy (RR=3.0, 95% CI: 1.6, 5.9) compared to more sedentary women (RR=17.3, 95% CI: 11.3, 26.7; P-homogeneity < 0.001) and the RR was higher among women with preeclampsia/eclampsia (RR=13.6, 95% CI: 7.0, 26.2) than among women without (RR=6.7, 95% CI: 4.4, 10.0; P-homogeneity=0.07). Conclusion: The risk of PA onset is transiently elevated in the hour after physical exertion and is higher among more sedentary women and women with preeclampsia/eclampsia.

LB003 S/P

AMBIENT PESTICIDE EXPOSURE DURING PREGNANCY AND RISK OF CEREBRAL PALSY: A CALIFORNIA STATEWIDE STUDY Zeyan Liew* Zeyan Liew, (Department of Epidemiology, Fielding School of Public Health, UCLA)

Background: Cerebral palsy (CP) is a group of permanent and non-progressive movement and posture disorders affecting about 2-3 per 1,000 births. The etiology of most CP cases remains unexplained. Disruptions of maternal hormone function during pregnancy have been shown to increase the risk of CP. We investigated whether in-utero exposure to pesticide compounds with endocrine disrupting effect is associated with CP risks. Methods: We assessed records from the Department of Developmental Services (DDS) and identified 6,851 CP cases born between 1998 and 2007 in the state of California. For each CP case, we randomly selected 1:10 matched controls from California birth certificates. Pregnancy trimester-specific ambient pesticide exposure estimates were created using a GIS model that links residential addresses at delivery reported on birth certificates to the California Pesticide Use Reporting (PUR) system. The PUR system contains comprehensive information on the type, date, and location of agricultural pesticide applications in California since 1974. In our analysis, we focused on 32 frequently used pesticide compounds that were considered suspected endocrine disruptors in the Pesticide Action Network database. We estimated odds ratios (OR) and 95% confidence intervals (CI) for CP following pesticide exposures, adjusting for maternal age, education, foreign-born status, DDS regional center, birth year, and child's sex. Results: First trimester exposure to the 32 pesticide compounds was associated with elevated CP risks (OR=1.08, 95% CI 1.00-1.18) compared with the unexposed. The effect estimates appear to be stronger among female offspring (OR=1.21, 1.05-1.38), in spastic CP sub-phenotypes (OR=1.13, 95% CI 1.01-1.26) and bilateral CP cases (OR=1.12, 95% CI 1.01-1.24). Conclusions: Early life exposure to pesticide compounds with endocrine disrupting effect was related with risks of CP. Future work to evaluate individual pesticides or chemical mixtures is recommended.

LB002 S/P

AIR POLLUTION AND PRETERM BIRTH IN CALIFORNIA: ASSESSMENT OF CRITICAL EXPOSURE WINDOWS Paige Sheridan* Paige Sheridan, (UCSD)

Background: Exposure to air ambient fine particulate matter <2.5 µm (PM2.5) air pollution during pregnancy is associated with preterm birth, a leading cause of infant morbidity and mortality. Results from previous studies attempting to identify etiologically relevant exposure periods of vulnerability have been inconsistent, possibly due to limitations from the treatment of preterm birth as a binary outcome, without considering time-varying exposure over the gestation period. The objective of this study is to identify critical exposure windows for the effect of PM2.5 exposure on risk of preterm birth. Methods: All live singleton births in California from 2005 - 2010 were linked with air pollution monitoring data by zip code using an inverse distance weighting approach to create a retrospective cohort that includes both birth and air pollution data (n= 2,288,995). Average weekly PM2.5 (µg/m3) exposure levels were assigned by week of gestation for each pregnancy. Gestational age was treated as a time-to-event outcome where each pregnancy enters the risk set at the 27th week and exits at the 37th week. Associations between PM2.5 exposure and preterm birth were assessed using distributed lag models with a random effect at the zip code level to account for spatial clustering. Results: The prevalence of preterm birth in this population was 8.5%. The average PM2.5 exposure across gestation among full term and preterm births was 13.7 µg/m3 and 13.9 µg/m3, respectively. Periods of vulnerability associated with PM2.5 exposure were identified at the end of the first trimester and end of the second trimester. Conclusions: Identifying windows of vulnerability is highly informative in the context of adverse birth outcome prevention efforts These results extend our knowledge about the existence of specific exposure periods during pregnancy that have the greatest impact on preterm birth.

LB004 S/P

PRENATAL MATERNAL DEPRESSION, EXPOSURE TO TRAFFIC, AND CHILD ACUTE LOWER RESPIRATORY ILLNESSES Jill Hahm* Jill Hahm, (The Harvard T.H. Chan School of Public Health, Boston MA)

Acute lower respiratory illnesses (ALRI) are the leading cause of global childhood morbidity and mortality. Risk factors for infant death from ALRI begin before birth, but mechanisms are unclear. Prenatal maternal distress and exposure to air pollution are two potential factors that may affect the developing immune system, and increase risk of ALRI in early life. The aim of this study was to examine the association of prenatal maternal depression with ALRI in the first three years of life, and to consider if this association is modified by prenatal exposure to air pollution. We studied women recruited in early pregnancy during 1999-2001 into the Project Viva longitudinal cohort (N = 1584). Women reported depressive symptoms in midpregnancy (Edinburgh Postnatal Depression Scale) and depression history by questionnaire. We geocoded addresses, and calculated distance from home to nearest major roadway. Information on ALRI was collected by parental report on an annual questionnaire at age 1 or 2, or at the early childhood interview (median age 3.3). We examined associations of maternal depression with number of ALRI, and effect modification by residential proximity to a major roadway during pregnancy, using negative binomial and relative risk regression analyses. After adjustment for potential confounders and pathway variables, including maternal demographics, adverse birth outcomes, and child environment, number of ALRI in the first three years of life was higher in ever vs. never depressed women (rate ratio 1.35, 95% CI 1.09, 1.61). Proximity to road and mother's depression were independent predictors of respiratory illness, but a test for interaction between these exposures was nonsignificant (rate ratio -0.11, 95% CI -0.71, 1.13). The risk associated with depression is robust and independent of mother's smoking, birth complications, breastfeeding, and child daycare attendance.
DOES DELIVERY MODE INFLUENCE INFANT WEIGHT GAIN AND ADIPOSITY OVER THE FIRST YEAR OF LIFE? Mingyu Zhang* Mingyu Zhang (Johns Hopkins Bloomberg School of Public Health)

Background: Potentially driven by the lack of mother-to-infant transmission of microbiome at birth, Cesarean section (C-section) delivery has been associated with higher offspring risk of overweight or obesity in childhood and adulthood. Yet, no studies have examined when delivery-mode differences in adiposity begin to emerge. In this study, we examine differences in infant adiposity trajectories from birth to 12 months by delivery mode. Method: From 2013 to 2015, we recruited pregnant women into the Nurture Study and followed up 666 infants. We ascertained maternal delivery method and birth weight from medical records. We measured weight, length, and skinfolds (subscapular, triceps, abdominal) when infants were 3, 6, 9 and 12 months of age. The main outcome, infant weight-forlength z-score, was derived based on the WHO Child Growth Standards. We used linear regression to detect the difference at each time point and used linear mixed models to examine the growth rate for infant weight and adiposity trajectories. We controlled for maternal age, race, marital status, education level, household income, smoking status, maternal pre-pregnancy body mass index, and child birth weight. Results: 179 children (31.8%) were delivered by C-section. From birth to 12 months, the rate of increase in weight-for-length z-score was 0.02 units/month (p=0.03) greater for C-section delivered than vaginally-delivered children. As a result, compared to vaginally delivered infants, C-section delivered infants had higher weight-for-length z-score (0.26 units, 95% CI 0.05-0.47), subscapular skinfolds (0.42 mm, 95% CI 0.12-0.73), and triceps skinfolds (0.27 mm, 95% CI 0.09-0.95) at 12 months. Conclusion: Compared to vaginal delivery, C-section was associated with greater offspring rate of weight gain in the first year and differences in adiposity that emerge as early as 3 months of age. Screening C-section delivered infants for excess weight gain may help guide primordial prevention of obesity later in life.

LB007

TEACHING REPRODUCIBILITY IN EPIDEMIOLOGY: A NEW COURSE FOR FUTURE EPIDEMIOLOGISTS Tarik Benmarhnia* Tarik Benmarhnia, (University of California, San Diego)

There is growing concern among epidemiological researchers about the reproducibility of published results. It is imperative that PhD students develop the skills to conduct transparent and reproducible research. Yet, to our knowledge, PhD programs in Epidemiology do not typically incorporate such training into their curriculum. We designed a new course to introduce students to the concept of reproducibility in epidemiologic research and develop their knowledge of the critical information that needs to be provided in the methods section or supplemental material to allow others to reproduce their results. Common methodological errors were also discussed as important contributing factors to irreproducible research. We organized the course into two phases. In phase one, we selected five papers published with a dataset in Plos One or Plos Medicine (2016-2017), assigned each paper to a group of 3-4 students, and asked each group to reproduce the paper's tables and figures by analyzing the data according to the information provided in the paper. In phase two, each group was asked to develop another research question, write the methods section (and supplemental material) to address their question, analyze the data, and generate tables and figures of their results. Then, a different group of students was asked to analyze the data and reproduce the results using to the information provided by the first group of students. During the first course, our students found several critical reproducibility issues (which sometimes altered the paper's conclusions) and identified common methodological mistakes, such asp-hacking and the "Table 2 fallacy". We will present the course structure, findings from the first course, and students' feedback on the course. We expect this course to serve as a model for developing similar courses in other PhD programs, and ultimately help contribute to training the next generation of epidemiologists to conduct transparent and reproducible research.

LATE BREAKER

PREGNANCY DURATION AND RISK OF OVARIAN AND ENDOMETRIAL CANCER Anders Husby* Anders Husby, (Department of Biomedical Data Science, Stanford University and Department of Epidemiology Research, Statens Serum Institut)

BACKGROUND: Full-term pregnancies markedly reduce a woman's risk of both ovarian and endometrial cancer, but little is known about the effect of shorter pregnancies, such as induced abortions, on these two cancers. METHODS: We established a cohort of all Danish women born from January 1, 1935, and linked information on induced abortions, childbirths, surgical procedures (incl. hysterectomies and oophorectomies), socioeconomic factors and cancer from nationwide registries by use of unique personal identification numbers. Relative risk of ovarian and endometrial cancer by duration of pregnancy were estimated by competing risk analysis using log-linear Poisson regression. RESULTS: Overall, 8117 cases of ovarian cancer and 7980 cases of endometrial cancer occurred among 2.3 million Danish women during 61.1 million person-years of follow-up. For primiparous women, we found the shortest pregnancies (induced abortions ≤12 weeks) were associated with a relative risk of 0.78 (95% CI, 0.69 to 0.90) of ovarian cancer, while the longest pregnancies (pregnancies lasting 36+ weeks) were associated with a relative risk of 0.58 (95% CI, 0.52 to 0.64). Comparatively, short pregnancies were associated with a relative risk of 0.54 (95% CI, 0.46 to 0.64) of endometrial cancer, while long pregnancies were associated with a relative risk of 0.50 (95% CI, 0.45 to 0.56). For multiparous women, we found the corresponding relative risks for short and long pregnancies to be respectively 0.94 (95% CI, 0.89 to 0.98) and 0.77 (95% CI, 0.73 to 0.81) for ovarian cancer, and 0.82 (95% CI, 0.78 to 0.86) and 0.76 (95% CI, 0.72 to 0.81) for endometrial cancer. Adjustment for socioeconomic differences did not modify the results. CONCLUSION: Our findings indicate that the protective effect of pregnancy on endometrial and ovarian cancer risk have separate underlying mechanisms, as pregnancy duration influences risk reduction of the two cancers differently.

LB008 S/P

BIAS ADJUSTMENT TECHNIQUES ARE UNDERUTILIZED IN HIV SEXUAL RISK ESTIMATION Nguyen Khai Tran^{*} Nguyen Khai Tran, (Department of Epidemiology and Biostatistics, Dornsife School of Public Health, Drexel University)

Background: Valid measurement of HIV infection among men who have sex with men (MSM) is critical for intervention planning and resource allocation. Sexual minority research concerning HIV risk often relies on proxy exposures of sexual behaviors such as sexual orientation and partner gender. Inferring high risk sexual behaviors (i.e., condomless anal intercourse) from these proxies inaccurately capture HIV risk, but few studies have attempted to correct for this bias. Methods: A systematic review of methods for estimating risk of HIV infection among MSM, published Jan 2015 to Dec 2017. A priori, we selected 12 leading journals in areas of HIV infection/diseases, medical research, and epidemiological methods. We applied pre-determined inclusion criteria: 1) exposure of condomless anal intercourse between men assessed through proxy variables and 2) their risk for HIV acquisition. We summarized methodologic practices for addressing exposure misclassification. Results: Among 3,923 articles initially included, we identified 26 studies in which high risk sexual behavior was assessed from proxy variables, including sexual orientation or gender of partners: 31% (n=8) did not acknowledge exposure misclassification; 61% (n=16) discussed misclassification of sexual behavior as a potential limitation, however, among these studies, no attempts were made to correct misclassification; and 8% (n=2) explicitly considered this information bias and conducted a Bayesian approach to correct for misclassification. Conclusion: Without analytic correction, HIV risk estimation in recent epidemiological studies may be inaccurate. While it is preferable to reduce exposure misclassification during data collection, we recommend using analytic techniques to correct for misclassification around sexual identity and behaviors when potentially misclassified risk data have been previously collected or if detailed collection of risk data is not practical.

CONDUCTING CASE-CONTROL STUDIES USING SURVEY DATA WITH COMPLEX SAMPLING DESIGNS: A SIMULATION STUDY Catherine X. Li* Catherine X. Li, (University of California, Berkeley School of Public Health)

The case-control study design requires identification of an appropriate study base from which to draw controls. Population-based surveys such as the American Community Survey and National Health and Nutrition Examination Survey may represent possible sources from which to draw controls for case data arising from large sections of the population. However, these surveys have complex sampling structures and survey weights that could lead to biased estimates of measures of association if not accounted for properly in analyses. The best approach for incorporating survey-based controls in case-control studies is currently unknown. We used a simulation approach to study the performance (bias, variance, mean squared error) of different approaches to estimating measures of association from case-control studies with controls drawn from survey data with sampling weights. We simulated population data with representative demographics and a known exposure-outcome relationship. We then applied a range of survey sampling approaches (probability, cluster, stratified, and complex; matched and unmatched; varying case-to-control ratios) to the data, and tested methods for incorporating these survey-based controls and their sampling weights (e.g., weighted regression, dataset expansion) to estimate the OR or IDR in cumulative or density-sampled casecontrol studies, respectively. We compared estimator performance over 2000 simulations. Preliminary results suggest that estimates of the OR for cumulative casecontrol study designs obtained using weighted logistic regression are unbiased (<0.5% relative bias). This was true for all sampling designs considered and for varying case-to-control ratios. The results suggest that unbiased estimates may be obtained with controls drawn from survey data with complex sampling structures when weights are accounted for. The knowledge generated from this study could inform the design of future studies for a wide range of health exposures and outcomes

LB011 S/P

A DOUBLY ROBUST APPROACH TO EVALUATING THE IMPACT OF NATURAL EXPERIMENTS USING SYNTHETIC CONTROLS Roch A Nianogo* Roch Nianogo, (UCLA Fielding School of Public Health)

Natural experiments are often difficult to evaluate because it is difficult to find appropriate exposure control groups Propensity score matching (PSM) and synthetic controls are two methods that have been used to address this issue. The latter can be implemented via inverse-probability-of-treatment-weighting (IPTW). Both methods are subjects to model misspecification and require the untestable assumption of no uncontrolled confounding among others. In this study, we demonstrate how to generate synthetic controls using the parametric g-formula and use a doubly robust estimation that combines PSM and g-computation (PSM-Gcomputation) in an attempt to minimize biases that can arise from model misspecification. We implemented the PSM using a 'nearest available neighbor' to select appropriate controls from the pool of available unaffected communities, matching them to be as similar as possible in their observed characteristics. Then we applied the parametric g-formula to generate synthetic controls. Finally, we estimated the average treatment effect among the treated (ATT). Synthetic controls are effectively constructed via g-computation by applying the consistency and conditional exchangeability assumptions using the intuitive stacking approach. In the absence of uncontrolled confounding, IPTW, g-computation and PSM-gcomputation consistently estimate the ATT. Third, the doubly-robust estimation yields consistent estimate when either the exposure or the outcome model is correctly specified. It is possible and desirable to implement synthetic controls via gcomputation as it produces more efficient and stable estimates of the ATT. This study demonstrates that a doubly-robust estimation approach combining gcomputation/PSM is a viable solution to the problem of model misspecification when using synthetic (exposure) controls to compute potential outcomes of the treated had they, contrary to fact, been subjected to no or a well-defined alternative treatment.

THE BALANCED CASE-CROSSOVER DESIGN Tarik Benmarhnia* Tarik Benmarhnia, (University of California, San Dlego)

The case-crossover (CCO) design is an efficient way to identify associations between transient exposures and incidence of acute health outcomes. The CCO design is very popular, especially in environmental epidemiology, and many variations in the design have been proposed. An important advantage of the CCO is the ability to control for the influence of measured and unmeasured confounders that remain constant in the subject (time fixed variables). Indeed, this is true because each included case is compared to herself at another time. Yet, there may be time-varying confounders that still require consideration. For example, specific weather patterns may confound the relationship between daily air pollution and myocardial infarction. To deal with time-dependent covariates, different CCO approaches have been proposed, including: the symmetric bidirectional CCO (in which two control days are selected to be equidistant to the event day); or the timestratified CCO (in which one or several control days are selected-usually the same day of the week). However, both approaches rely on an arbitrary or pseudo-arbitrary choices to select control days. Yet, it is possible to exploit collected information on time varying confounders and adjust for them. We propose a "balanced CCO" design that relies on inverse probability weighting (IPW) of time-varying confounders to consider potential control days. We hypothesize that this method will improve the validity and precision of CCO inference when compared to exiting approaches in the presence of time-varying confounders. We provide theoretical arguments, and results from a simulation study of air pollution health effects, which quantify the direction and magnitude of bias that may result from selecting control days using bidirectional, time-stratified, and balanced approach. Finally, we demonstrate the implementation of these 3 design strategies using data on the impact of daily exposure PM 2.5 on preterm births in California.

LB012

CORRESPONDENCE OF SELF-REPORTED BIRTH CHARACTERISTICS WITH BIRTH RECORDS IN A WEB-BASED PROSPECTIVE COHORT STUDY Lauren A. Wise* Lauren A. Wise, (Department of Epidemiology, Boston University School of Public Health)

Objective: In a study that recruits and follows subjects via the Internet, we assessed the extent to which self-reported data on birth characteristics agreed with birth records. Methods: Self-reported data were derived from Pregnancy Study Online (PRESTO), a North American web-based preconception cohort study. Eligible women were aged 21-45 years, trying to conceive, and not receiving fertility treatment. Women completed online questionnaires at baseline and bimonthly for up to 12 months or until pregnancy, whichever came first. Pregnant women completed 3 additional questionnaires: one at 8-12 weeks' gestation, one at 32 weeks' gestation, and one 6 months post-delivery. We obtained birth records from states with the largest numbers of subjects (MA, CA, PA, TX, MI, and FL). Questionnaire and birth record data were linked, and agreement between the two data sources was assessed for completed gestational weeks at delivery (GW) and birth weight (BWT). Self-reported GW was computed from birth and due dates Results: During 2014-16, 87% (265/305) of women who reported singleton births and resided in states providing birth records were successfully linked. Among these women, 84.2% reported the same GW as the birth record and 97.2% reported GW within 1 week of the birth record. Self-reported preterm birth (GW<37 weeks) agreed with birth records for 100% (18/18) of women. When GW was categorized as <34, 34-36, 37-38, 39-41, and ≥42 weeks, self-reported GW agreed with birth records for 100% (5/5), 100% (13/13), 95% (41/43), 96% (175/182), and 75% (3/4) of women, respectively. Agreement was similar when women reported GW directly, but lower when GW was computed as the difference between last menstrual period and birth dates. Self-reported low birth weight (<2,500 grams) agreed with birth records for 93% (14/15) of women. Conclusion: Self-reported data from a web-based cohort study showed high agreement when compared with birth records, particularly for preterm birth.

NOVEL GENETIC LOCI LINKING EARLY AND LATER LIFE CARDIOMETABOLIC AND ANTHROPOMETRIC TRAITS Fasil Tekola-Ayele* Fasil Tekola-Ayele, (Epidemiology Branch, DIPHR, NICHD)

Background: Previous studies have shown correlations of early growth and childhood traits with the development of cardiometabolic diseases and anthropometric traits in later life. Genetic variants that influence both traits may underlie these associations. Methods: Using genome-wide single nucleotide polymorphism (SNP) data contributed by five Consortia studies, we implemented a unified statistical approach to test for pleiotropy and enrichment of functional loci in 75 pairs of traits consisting five early life (ELTs) including birth weight, birth length, birth head circumference, childhood body mass index, and childhood obesity and fifteen later life traits or diseases (LLTs) including adult body mass index, waistto-hip ratio, waist circumference, height, fasting plasma glucose, fasting plasma insulin, glycated hemoglobin, insulin secretion, insulin sensitivity, coronary artery disease, myocardial infarction, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol, total cholesterol, and total glycerides. Results: Pleiotropic genetic effects were significant for 73 out of the 75 ELT-LLT pairs (P<5 x 10-4); functional deleteriousness was significantly higher for SNPs associated with both an ELT and a LLT compared to SNPs associated with neither trait or only one trait for 69 ELT-LLT pairs (P<5 x 10-4). In addition, 142 loci were associated with both traits in ELT-LLT pairs at a false discovery rate of 5%; 40 out of the 142 loci were novel. Variants with birthweight-reducing effect were associated with higher risk of type 2 diabetes, myocardial infarction, and coronary artery disease. For 18 novel loci, the lead SNPs were cis-eQTLs which are associated with the expression of genes in tissues implicated in cardiometabolic diseases. Conclusions: This first comprehensive investigation of pleiotropy found shared genetic variants that contribute to the associations between early and later life cardiometabolic and anthropometric traits.

LB022 S/P

FACTORS ASSOCIATED WITH PARENTAL REASONS FOR NO-INTENT TO VACCINATE MALE ADOLESCENTS WITH HUMAN PAPILLOMAVIRUS VACCINE: NATIONAL IMMUNIZATION SURVEY – TEEN 2011-2016 Miraides F. Brown* Miraides F. Brown, (Kent State University)

Research on understanding parental reasons for "no-intent" to vaccinate male adolescents is limited. Therefore the goal of this study is to Identify : 1) sociodemographic factors associated with parental "no-intent" and reasons for such decision for their 13-17 year old unvaccinated males to receive the human papillomavirus (HPV) vaccine series; and 2) factors associated with and parental reasons for "no-intent" for the Human Papillomavirus vaccine among male adolescents with physician recommendation. Data from 2011-2016 National Immunization Survey -Teen were used in this study. Parents with "no-intent" to vaccinate their adolescent sons were asked to indicate reasons for their decision. Five domains based on responses were identified as barriers to initiate the HPV vaccine series: 1) Safety and Effectiveness Concerns; 2) Systemic Barriers; 3) Vaccine Misinformation; 4) Lack of Knowledge about the Vaccine; and 5) Sociocultural Barriers. The no-intent to initiate HPV series rate decreased from 68% to 58% from 2011 to 2016. Number of people in household and 2016-survey year were significantly associated with Safety and Effectiveness Concerns. Mother's education (some college or higher) was significantly associated with Safety and Effectiveness Concerns, Systematic Barriers, Vaccine Misinformation, and Lack of Knowledge. Provider recommendation increased from 7.8% to 36.4%. Among parents with provider recommendation, number of people in the household, higher education, and unmarried were significantly associated with no-intent. Lack of knowledge was a significant reason among mothers with less than high school, Black non-Hispanic, and Hispanic mothers with provider recommendation. 46.6% of those with provider recommendation indicated Vaccine Misinformation as a barrier for not initiating HPV vaccine

USING TIME AND MOTION STUDIES TO IMPROVE THE LATENT TUBERCULOSIS INFECTION (LTBI) CASCADE OF CARE Hannah Alsdurf* Hannah Alsdurf, (McGill University)

Background: According to the World Health Organization, tuberculosis (TB) is the number one cause of death due to an infectious disease each year, killing more people than HIV/AIDS. It is further estimated that 25% of the world has latent TB infection (LTBI), the state of having been infected but not having active TB disease. Although there is preventive treatment for people with LTBI. It has been shown that fewer than 20% of those who are eligible complete treatment. The aim of the ACT4 cluster randomized trial is to systematically evaluate and strengthen LTBI programs in different settings. Methods: A method of observing a healthcare worker (HCW) continuously throughout their entire workday and recording each minute of activity was performed at all ACT4 trial sites. This process, called a continuous time and motion (TAM) study was used to determine the proportion of time each HCW spends with distinct types of patients. TAMs are considered the gold-standard for micro-costing studies, and were used to determine the costs to the healthcare system of increasing HCW time spent delivering LTBI services. Results: The proportion of time HCW currently spend on LTBI related activities ranged from no time at all, in Indonesia and Ghana (0%), to approximately 25% of time in Canadian clinics. On average, nurses spent 25% of their time on LTBI related activities, while doctors and other healthcare workers spent 15% and 10%, respectively. Conclusions: Initial study results highlight the variability in the proportion of time spent on LTBI activities across different countries, mainly due to whether the local TB program identifies close contacts of active TB disease. Scale-up of LTBI activities will require financial support from the local health system for increases in HCW workload.

LB023 S/P

THE ASSOCIATION BETWEEN ABUSE HISTORY IN CHILDHOOD AND SALIVARY RHYTHMS OF CORTISOL AND DHEA IN POSTMENOPAUSAL WOMEN Olivia R. Orta* Olivia R. Orta, (Harvard T.H. Chan School of Public Health)

Background: A history of child abuse (CA) can impact the hypothalamic pituitary adrenal (HPA), with consequences across the life course. Thus, we evaluated the association between CA history and two key hormones of the HPA axis (cortisol and its antagonist dehydroepiandrosterone (DHEA)) among postmenopausal women. Methods: In 2013, 233 women from the Nurses' Health Study II were asked to provide 5-timed-saliva samples over one day, immediately upon awakening, 45 minutes, 4 hours, and 10 hours after waking, and before going to sleep; 217 provided ≥4 samples and completed a Revised Conflict Tactics Scale for CA history and severity in 2001. CA severity scores were derived by combining self-reported emotional, physical, and sexual abuse prior to the age of 18, and ranged from 0 (none) to 6 (most severe). Saliva samples were assayed using a competitive chemiluminescence immunoassay. Piecewise linear mixed models compared diurnal rhythms of cortisol, DHEA, and its ratio (i.e., slopes between collection points) between participants with CA scores of 4-6 (n=72) versus 0-3 (n=145). Models ad justed for collection characteristics, health status, sleep quality, and medication/hormone use. Results: Cortisol rhythms did not differ comparing women with high CA scores (4-6) to women with low CA scores (0-3). However, compared to women with low CA scores, women with high CA scores had blunted early declines in DHEA (i.e., less steep declines;% difference (%D)= 8.7, 95%CI=2.0, 15.9), steeper evening declines in DHEA (%D=-4.2, 95%CI=-6.4, -1.9), and steeper overall declines in DHEA across the day (% D=-1.8, 95%CI=-3.5, -0.2). Additionally, the cortisol to DHEA ratio was lower at awakening (%D=-25.1, 95%CI=-43.6, -0.7), and the evening decline of this ratio was blunted (%D= 2.8, 95% CI 0.4, 5.1). Conclusion: In postmenopausal women, CA was associated with differences in diurnal rhythms of DHEA but not cortisol, suggesting an enduring impact on compensatory stress-response mechanisms.

ASSOCIATIONS BETWEEN CURRENT AND CUMULATIVE MARIJUANA USE AND CHANGES IN COGNITIVE PROCESSING SPEED AND FLEXIBILITY FOR 17-YEARS IN HIV-SEROPOSITIVE AND HIV-SERONEGATIVE MEN IN THE MULTICENTER AIDS COHORT STUDY Chukwuemeka Okafor* chukwuemeka okafor, (Division of Infectious Diseases, David Geffen School of Medicine at University of California, Los Angeles, 10833 Le Conte Avenue, Los Angeles, California 90095-1688, USA)

Background Marijuana use is common in the U.S, yet the association of current and long-term use on cognitive function is unclear. Objective To determine associations between current and cumulative exposure to marijuana and changes in cognitive processing speed and flexibility. Methods We used data from 788 HIV-seropositive (HIV+) and 1,132 HIV-seronegative (HIV-) men in the Multicenter AIDS Cohort Study. Current and cumulative (1 use-year= 365 days of use) marijuana exposure were the predictor variables. Cognitive processing speed was assessed using the Trail Making Test A (TMTA) and Symbol Digit Modalities Tests (SDMT) and cognitive flexibility was assed using the Trail Making Test B (TMTB). Linear mixed-models was used to estimate associations between marijuana exposure and cognitive function over a 17-year period. Inverse probability of attrition weighing was used to address selective attrition resulting from dropout/death. Models were adjusted for sociodemographic factors, cardiovascular factors, current and cumulative substance use and HIV disease clinical indicators. Results Among HIV+ men only, current daily marijuana use was significantly associated with a greater annual percentage rate of decline in the TMTA (-0.67, 95% confidence interval [CI]: -1.31, -0.02; p=0.03) and SDMT (-0.21, 95% CI: -0.39, -0.02; p=0.02). We found no significant association with cumulative marijuana exposure on any cognitive function test. Among the HIV- men, we found no significant association with current marijuana use and cognitive function. However, we found each 5 marijuana use-years was significantly associated with decline on the TMTA (-0.17, 95% CI: -0.33, -0.00, p=0.04). Conclusion Current daily marijuana use is associated with slowed cognitive processing speed among HIV+ men. Overall, the findings do not indicate clinically meaningful detrimental impact of marijuana use in these cognitive domains in either HIV+ or HIV- men.

LB026 S/P

CLASSIFICATION OF SUB-GROUPS OF COPD AND EMPHYSEMA CASES DEFINED ON CT SCAN AND SPIROMETRY: COPDGENE STUDY Woori Kim* Woori Kim, (Johns Hopkins Bloomgberg School of Public Health)

Introduction: Imaging manifestations of COPD include emphysema and small airway obstruction. The objective is to classify subgroups of COPD and emphysema cases defined on CT scan and spirometry and to assess epidemiologic characteristics. Method: COPDGene is a population-based cohort study, comprising of African Americans and Non-Hispanic Whites with a minimum of 10 pack-years smoking history. A total of 8327 subjects were included. Emphysema was quantified as percent emphysema and visually scored. Eight subgroups were defined based on the presence or absence of quantitative emphysema (percent emphysema>5%), presence or absence of visual emphysema, and presence or absence of COPD as GOLD Stages 2, 3, or 4. To compare means and proportions in variables among subgroups, ANOVA and chi-squared tests were performed. Result: Among 3448/8327 (42%) COPD patients, 2729 (79%) had visual emphysema. The discordant cases who had visual but not quantitative emphysema, and vice versa were 910 (26%). Among 4879/8327 (58%) subjects without COPD, 1536 (31%) had visual emphysema. The discordant cases who had visual but not quantitative emphysema, and vice versa were 1572 (32%). The distributions of epidemiologic variables were significantly different among these subgroups (P<0.001). COPD patients with emphysema defined on both quantitative and visual measures were the oldest sub-group (65.28 (7.84) years), had the highest smoking exposure (56.41 (28.51) pack-years), and the highest proportion of reporting exacerbations in the past year (25%). Regardless of COPD status, subjects without emphysema were more likely to be current smokers than subjects with emphysema. Conclusion: This study provides a classification of COPD and emphysema cases defined on CT scan and spirometry in a large cohort of smokers. We observed discordant cases of 1) COPD and emphysema and of 2) visual and quantitative emphysema. There is a significant difference in epidemiologic characteristics among these subgroups.

LB025 S/P

THE INCREASED PREVALENCE OF OVERWEIGHT AND OBESITY AND THEIR INFLUENCING FACTORS AMONG RURAL CHINESE ADULTS Chang Rui* Chang Rui, (Fudan University)

Objective: To explore the epidemiological status of overweight and obesity and their influencing factors among rural Chinese adults. Methods: Random cluster sampling was used to select 8 rural communities in Deqing, China, and a cross-sectional survey was conducted in 2006-2008, 2011-2012 and 2013-2014, respectively. Data were collected by questionnaires, physical examination and laboratory tests. Overweight and obesity were grouped by body mass index (BMI). Overweight and obesity was defined as 24kg/m2≤BMI<28kg/m2 and BMI≥28kg/m2, respectively. Logistic regression was applied to explore the influencing factors of overweight/obesity and estimate adjusted odds ratio (aOR) and its 95% confidence interval (CI). Results: Totally, 6562 eligible subjects were recruited in 2006-2008, 11763 in 2011-2012, and 10904 in 2013-2014. The prevalence of overweight and obesity were significantly increased as 22.23%, 29.97%, 28.18% (x2trend=43.99, P<0.01) and 3.15%, 3.67%, 4.46% (x2trend=19.75, P<0.01) in 2006-2008, 2011-2012 and 2013-2014, respectively. The Logistic regression showed that the overweight/obesity were statistically related to older age (aOR 40-59.9 years=1.53, 95%CI:I.39-I.68; aOR 60-79.9 years=I.40, 95%CI:I.26-I.56; aOR≥80 years=1.11, 95%CI:0.95-I.29), non-famer (aOR=I.10, 95%CI:I.03-I.18) and higher family income level (a OR medium level=1.02, 95%CI:0.94-1.10; aOR high level=1.25, 95%CI:1.11-I.41) after the adjustment of covariates. Conclusions: The prevalence of overweight and obesity increased over years among rural Chinese adults. Older age, non-farmer and higher family income level were important influencing factors for overweight/obesity. It should be taken to control the overweight and obesity for rural Chinese adults.

LB027 S/P

SEX-SPECIFICITY IN THE ASSOCIATION OF MATERNAL CORTISOL WITH NEWBORN BIRTH WEIGHT: A SYSTEMATIC REVIEW AND META-ANALYSIS Stephana Cherak* Stephana Cherak, (University of Calgary)

Studies exploring the effect of maternal stress on fetal development show an association between increased maternal stress and adverse birth outcomes. A frequently proposed mechanism is heightened concentrations of maternal cortisol. It is commonly hypothesized that heightened concentration of maternal cortisol may affect birth weight in a sex-specific manner. To add clarity to the growing body of literature, this systematic review and meta-analysis reports empirical findings on sexual differences in the association between maternal prenatal salivary cortisol and newborn birth weight. Searches for relevant papers published up until November 2017 were run in MEDLINE, EMBASE, PsycINFO, and CINAHL. We only included data from measurements of salivary cortisol to prevent rendering of the review unsuitable for meta-analysis. For every maternal-fetal dyad, an area under the curve with respect to ground of maternal cortisol was calculated to determine a Pearson's correlation coefficient with a continuous measure of newborn birth weight pooled across all stages of gestation. To examine a potential sexual discrepancy, a meta-analysis was performed on separate sex-specific correlations. Nine studies with a total of 1,606 maternal-fetal dyads demonstrated a negative correlation between pooled maternal salivary cortisol and birth weight (-0.24, 95% CI -0.28, -0.20). Subgroup analysis by fetal sex of the pooled correlation between salivary cortisol and birth weight was performed with the following correlations found: -0.25 (95% CI -0.30, -0.21, p<0.001); female -0.23 (95% CI -0.27, 0.19, p<0.001). The findings of this review highlight specific gaps in the literature on the relationship between maternal prenatal salivary cortisol and newborn birth weight. Heightened concentration of maternal prenatal salivary cortisol appeared to associate more strongly with lower birth weight in male fetuses, indicating increased male vulnerability to heightened concentration of maternal cortisol.

EXTENDED MORTALITY FOLLOW-UP OF A COHORT OF WORKERS EXPOSED TO ACRYLONITRILE Stella Koutros* Stella Koutros, (National Cancer Institute)

Background/Objectives: We extended the mortality follow-up of a cohort of 25,460 workers employed at eight U.S. acrylonitrile-producing or using facilities by 21 years. Based on 8,124 deaths and 1,023,921 person-years of follow-up, we evaluated the relationship between occupational exposure to acrylonitrile and mortality. Methods: Standardized mortality ratios using deaths through December 31, 2011 were calculated. Personnel records, work histories, and monitoring data were used to develop quantitative estimates of exposure to acrylonitrile. Adjusted hazard ratios (HR) were estimated by Cox proportional hazards regression. Results: All-cause mortality and mortality from all cancer was significantly less than expected compared with the general population. Internal analyses by cumulative and average exposure revealed elevated risk of cancer of the lung and bronchus (N=808 deaths) and bladder (N=55 deaths). The HR for lung cancer was significantly elevated in the highest quintile of cumulative exposure (1.40, 95%CI 1.11-1.78, p-trend=0.04) compared to unexposed workers; average exposure was associated with a small nonsignificant increased risk (HR=1.20, 95%CI 0.95-1.52). Average exposure was associated with a significantly elevated risk of bladder cancer; workers in the top tertile had an HR=2.89, 95% CI 1.35-6.18, p-trend<0.01 compared to the unexposed, while cumulative exposure was associated with a non-significant increased risk (HR=1.37, 95%CI 0.65-2.90). Significant HRs were not observed for other smokingrelated outcomes. Conclusions: Extended mortality follow-up of the largest cohort of acrylonitrile-exposed workers provides some evidence of a possible association between high exposure to acrylonitrile and cancers of the lung and bladder.

LB030 S/P

THE COST OF HEPATITIS B INFECTION IN SOUTH KOREA FROM 2002 TO 2015 Dahye Baik* Da-hye Baik, (National Cancer Center Graduate School of Cancer Science and Policy)

The economic evaluation is needed to utilize the limited medical resource efficiently. South Korea has high prevalence of hepatitis B virus(HBV) infection and the policies in anti-viral medication treatment has been changed recently. However related research has not been studied for the past 10 years. The objective of this study is to estimate the economic burden of hepatitis B infection and figure out the trend of changes in its cost during 2002-2015. Data from National Health Insurance Service (NHIS) claims data were used. To identify the cases, we used the ICD-10 code B16 for acute hepatitis Band B17.0, B18.0 and B18.1 for chronic hepatitis B on the basis of a primary diagnosis in the data. This study was carried out from societal perspectives which contain both direct cost and indirect cost. In terms of transportation cost, caregiver costs and opportunity costs lost as a result of medical care or premature death, we used the data from Korean National Health and Nutrition Examination Survey (KNHANES), Korea Health Panel(KHP) and Korean Statistical Information Service (KOSIS). The annual direct cost for acute and chronic hepatitis B increased to 129.8 million dollars in 2015 from 32.6 million dollars in 2002. As the number of patient in acute hepatitis B has been decreased annually, the direct cost also decreased to 1.9 million dollars in 2015 from 5 million dollars in 2002. Whereas the direct cost for chronic hepatitis B has consistently increased to 127.8 million dollars in 2015 from 27.6 million dollars in 2002. Among health care cost, the average proportion of copayment was 41%. In terms of chronic hepatitis B, outpatient cost was about 13 times higher than inpatient cost in 2015. Both of the health care costs per patient for acute and chronic hepatitis B have upward trend. The burden of chronic hepatitis B infection has been increased in South Korea. The cost related to chronic hepatitis B infection is required to be lessened

A MULTIDIMENSIONAL TYPOLOGY OF SOCIAL NETWORKS OF OLDER ADULTS: THE NATIONAL SOCIAL LIFE HEALTH AND AGING PROJECT (NSHAP) Talha Ali* Talha Ali, (University of Michigan)

Epidemiologic research demonstrates protective effects of social networks for latelife health and well-being. However, having more relations does not always imply more support, and previous scholarship, which examines either structural (e.g., number of relations, diversity in relations) or functional (e.g., emotional closeness, support) aspects of social networks, but not both, fails to capture the complexity of social networks Unlike prior studies that used crude summary measures consisting of a few items to characterize social networks, our objective was to identify distinct network types among older adults by simultaneously considering the structure, function, and quality of relationships. We also identify sociodemographic and healthrelated predictors of membership in these network types. Participants included 3,005 adults aged 57-85 years at baseline in 2005-2006 from the National Social Life, Health, and Aging Project (NSHAP). Using latent class analysis, participants were classified into five social network types: (1) diverse-supportive network with partner absent (16%); (2) restricted, family-centered network with partner absent (11%); (3) diverse, supportive network with partner present (31%); (4) average network with partner present (15%); (5) partner-centered network (26%). Results of multinomial logistic regression showed that older adults with networks high in diversity of relations and social support were more likely to be younger, female, less educated, and reported fewer chronic conditions than older adults with restricted and less supportive networks. This study extends existing literature by including several important dimensions of social relationships and utilizing the more novel latent class approach, where previous studies employed various clustering procedures, to construct older adults' social network types. Identification of major network types among older adults can inform development of relevant risk assessment tools and interventions.

LB031

INCREASED RISK OF PREMATURE AND EARLY MENOPAUSE IN WOMEN WITH OVERWEIGHT IN EARLY ADULTHOOD Seung Ah Choe* Seung Ah Choe, (CHA University)

Premature or early menopause is known to be associated with increased risk of cardiovascular disease, osteoporosis and neurodegenerative disorders. Overweight and obesity in adolescence and early adulthood is associated with earlier puberty, menstrual disorders, postmenopausal breast cancer as well as cardiovascular disease in adulthood. The purpose of this study was to explore the possible effect of early adulthood body weight on the timing of natural menopause. Data from the Korean Genome and Epidemiology Study (KoGES) conducted from 2004 to 2013 were used. Among the women who reported their menstrual status, those who naturally experienced menopause < age of 40 years were classified to have premature menopause and 40-45 years were to have early menopause. Recalled body weight at the age of 18-20 and self-reported body weight and height were used for computing early adulthood and current body mass index (BMI). Potential confounding factors such as age at menarche, parity, age at first child birth, level of education, early onset of smoking, alcohol use and year of birth were included in the analysis Korean women who aged ≥ 45 year at the time of survey and born between 1930 and 1970 were included in the analysis. A total of 80,664 women were included in the final analysis excluding iatrogenic or premature menopause. The prevalence of premature and early menopause was 0.6% and 2.9%, respectively. Pearson correlation coefficient between BMI in early adulthood and current BMI was 0.31. Women who were overweight during their early adulthood showed higher odds for premature menopause (OR= 1.69, 95% CI: 1.00, 2.86) and early menopause (OR= 1.46, 95% CI:1.12, 1.91) compared to the other BMI groups, independent of confounding factors including current BMI classification and age at menarche. This finding suggests potential long-term effect of body weight during early adulthood on female reproductive lifespan.

PARENT OF ORIGIN EFFECTS FOR COMMON VARIANTS IN FOLATE, HOMOCYSTEINE AND TRANSSULFURATION PATHWAYS AND RISK OF OBSTRUCTIVE HEART DEFECTS IN A LARGE POPULATION-BASED STUDY Wendy N. Nembhard* Wendy N. Nembhard, (University of Arkansas for Medical Sciences)

Background: The etiology of obstructive heart defects (OHD) is unknown but is likely due to relationships between genetic variants, epigenetic factors and environmental exposures. Most research has focused on the association between OHD and maternal and infant genetic variants, prenatal environmental exposures and their interaction. Little is known about the potential paternal genetic influence on risk of OHDs. We examined parent-of-origin effects in transmission of alleles in the folate, homocysteine, or transsulfuration pathways on risk of OHDs in offspring. Methods: Data on 569 case families of liveborn infants with OHDs born October 1997-August 2008 from the National Birth Defects Prevention Study were used to conduct a family-based case only study. Maternal, paternal and infant DNA was genotyped using an Illumina® Golden Gate custom single nucleotide polymorphism (SNP) panel. Relative risks (RR), 95% CI, and the likelihood ratio tests from the loglinear model were used to determine the parent-of-origin effect of 877 SNPs on 60 candidate genes in the folate, homocysteine, and transsulfuration pathways on the risk of OHDs. Bonferroni correction was used for multiple testing. Results: We identified 3 SNPs in the transsulfuration and 1 SNP in the folate pathway that were statistically significant after adjusting for multiple testing. The RR of OHDs for a child who inherited a paternally derived copy of a allele from a SNP in genes involved in the transsulfuration pathway ranged from 0.30 (95%CI: 0.17-0.53; P=9.80×10-6) to 0.34 (95%CI: 0.20-0.58; P=3.77×10-5) compared to inheriting a maternal copy of the allele. Relative risk of an OHD for a child that inherited a paternally derived copy of the G allele of the rs6812588 SNP in the RFC1 gene in the folate pathway was reduced compared to inheriting a maternal copy of the same allele (RR=0.11; 95%CI: 0.04-0.29; P=9.16×10-7). Conclusion: Paternal genetic variants in these pathways may be protective for OHDs.

LB034 S/P

OBSTETRIC RISKS BY MATERNAL AGE ACCORDING TO RACE: A POPULATION-BASED STUDY IN THE UNITED STATES Laura Schummers* Laura Schummers, (Harvard T. H. Chan School of Public Health)

Objective: To estimate absolute risks of birth outcomes in the United States according to maternal age at first birth for all women and separately by maternal race. Methods: Using Cohort Linked Birth and Infant Death Files available through the National Center for Health Statistics, our study population included all births in the United States from 2004-2011. We estimated absolute risks of each outcome at each maternal age from 15 to 45 years using logistic regression. We modeled maternal age flexibly to allow curvilinear shapes and plotted risks to illustrate the shape of the risk curve for each outcome. Risks were modeled in the overall population and stratified by race. Results: In the overall population, multiple gestations, cesarean delivery, and stillbirth risks were lowest at young maternal ages with linear or quadratic increases with age. Curves for preterm birth, small-forgestational age, neonatal mortality, and postneonatal mortality were u- or j-shaped, with nadirs between 20 and 30 years, and elevated risks at both younger and older maternal ages. In race-stratified analyses, the shapes of the curves were generally similar across races. Risks increased for all women for all outcomes after age 30. Within racial groups, increased risks at young maternal ages were most pronounced for non-Hispanic white and Asian/Pacific Islander women, for whom young childbearing was least common. Conversely, risks at older ages were most pronounced for black and American Indian/Alaska Native women for whom delayed childbearing was least common. In addition to having the highest baseline risks, risks for black women increased most steeply with age after 30 years. Conclusion: Obstetric risks for first births were lowest from age 20-30 for women of all races. While slopes of increase at younger and older ages varied by racial group, the overall shapes of the risk curves were similar for all women.

GEOGRAPHIC VARIATION IN VPTB RISK AMONG HISPANIC WOMEN AS INDICATOR OF SPATIALLY VARYING RISK ENVIRONMENTS Kaitlyn K Stanhope* Kaitlyn K Stanhope, (Emory University)

A growing share of US births are to Hispanic mothers (23.3% in 2016). Hispanic women are a diverse and geographically disperse population, facing unique contextual stressors, including hostile sub-federal immigration policy climates. Geographically varying social and regulatory contexts may produce spatial variation in experienced stress, which may result in spatial variation in very preterm birth (VPTB) risk for Hispanic women. Research on the impact of context on perinatal health among Hispanic women is limited. Quantifying unexplained variation in VPTB risk after control for individual risk determinants will allow for inference about the possible role of place-based social and regulatory contexts. The goal of this analysis is to determine if VPTB risk among Hispanic mothers varies across US states and counties and if variation remains after control for individual risk factors. Data from the 2004, 2005 and 2011-2014 US natality files were used to fit a series of multilevel, generalized linear models with random effects for state and county. For each model, the pseudo-intraclass correlation coefficient (pseudo-ICC) quantifies unexplained within- and between-state variation in risk. County/year combinations with less than 100 eligible births were excluded. 3,429,004 births to Hispanic women in 627 counties and 40 states were included. 1.5% (51,009) were very preterm. Across states, VPTB rates ranged from 1.0% to 2.7% (median:1.6 IQR: 1.5-1.8). For the empty model, the pseudo ICC was 0.0117 for state and 0.0556 for county. After including individual predictors (age, parity, marital status, education, year, US/foreign born), the pseudo-ICC declined less than 1% for county (0.0544) and not at all for state (0.0131). Residual geographic variation in Hispanic women's VPTB risk above and beyond individual factors supports the hypothesis that geographic context is a determinant of VPTB risk for Hispanic women.

LB035 S/P

EPIDEMIOLOGICAL CHARACTERISTICS OF ACUTE RESPIRATORY INFECTIONS ASSOCIATED WITH RESPIRATORY SYNCYTIAL VIRUS-DAMANHOUR, EGYPT, AUGUST -2014 TO AUGUST-2016 Saly wagdy* Saly Wagdy, (MOHP-Egypt)

Background: Acute respiratory illness (ARI) poses a substantial human risk. Globally RSV was associated with 33,8 million episodes of Respiratory Syncytial virus (RSV) associated acute lower respiratory infection (ALRI) in children under five. This represents 22% of all ALRI episodes in young children of them 96% were in developing countries. Hospital admission was needed in 3.4 million young children developed RSV associated ALRI of which 91% occurred in developing countries Methodology: A hospital based ARI surveillance in three governmental referral hospitals in Damanhour district was conducted in 2014-2016. Oropharyngeal /nasopharyngeal swabs from eligible patients were tested for RSV byreal-time reverse transcriptase polymerase chain reaction. Surveillance data was stratified by age groupand analyzed using Microsoft Excel 2013. Results: RSV was identified inl 1% (458/4010) of cases. Age median was10 months(31days - 90 years). Children under five years had significantly higher RSV infection82%(376/458, P0.05). RSV fatality was 0.2 %(1/458). Conclusions: RSV is a main cause of ARI in rural children underfive years. RSV clinical presentation ranges from mild to severe including ICU admission and death. Further researchis needed to detect RSV burdenand assist control efforts

DOES THE RELATIONSHIP BETWEEN INTERPREGNANCY INTERVAL AND ADVERSE PREGNANCY OUTCOMES VARY BY MATERNAL AGE? Laura Schummers* Laura Schummers, (Harvard T.H. Chan School of Public Health)

Background: Interpregnancy interval (delivery to conception) <12 months is associated with higher risks of adverse outcomes. Relationships between interpregnancy interval and outcomes may vary by maternal age due to differences in pregnancy intention or biological interaction between interpregnancy interval and age, though differences are not well understood. Methods: We analyzed all pregnancies in British Columbia from 2004-2014 to women with ≥2 singleton pregnancies, with the first resulting in a live birth. We evaluated severe maternal morbidity (ventilation, ICU admission, organ failure, death), small-for-gestational age (SGA), fetal-infant composite (stillbirth, infant death, very SGA, delivery <28 weeks), spontaneous and indicated preterm delivery. Stratified by maternal age at pre-interval birth (20-34; ≥35), we calculated adjusted risk ratios (RR) comparing predicted risks at 6- and 18-month intervals for each age group, and examined 95% confidence intervals for overlapping across groups to assess effect modification. Results: Our study population included 148,543 births. We found increased risks of severe maternal morbidity at 6-month interpregnancy intervals for women ≥35 (aRR: 2.6 [95% CI 2.3, 2.9]), but not for women 20-34 (aRR: 1.1 [95% CI 1.0, 1.4]). The increased in spontaneous preterm delivery risk at 6-month interpregnancy intervals was greater for women 20-34 (aRR 1.7 [95% CI: 1.6, 1.7] than women ≥35 (aRR 1.4 [95% CI 1.4, 1.4]. Risks according to interpregnancy interval did not vary by age for other outcomes. Conclusions Short interpregnancy intervals are associated with increased maternal and infant-fetal risks for women 20-34 and for women 35 or older at index birth. This paper provides novel information to motivate delaying subsequent pregnancies to allow for 12 to 24-month interpregnancy intervals for all women.

LB038 S/P

LITERACY AND CONTRACEPTIVE USE AMONG WOMEN IN SWAZILAND Ewinka Romulus* Ewinka Minerva Romulus, (Arcadia University)

Contraceptive usage is an important component of maternal health with potential benefits for positive health outcomes. However, many women fail to use any contraceptives resulting in adverse effects. Literacy has been identified as an important predictor of well-being but little research has evaluated its role in contraceptive use. This study examined the relationship between literacy and use of contraceptives among women in Swaziland. Data for this study obtained from the most recent Demographic and Health Survey (DHS) in Swaziland that was conducted in 2006. Women (n = 4,923) were asked about contraceptive use (modern method versus not modern method or none) and as well as the covariates of education, age, marital status, wealth status, urban/rural setting, and presence or absence of an STI. Literacy was measured by an indication of being able to read at least a full sentence (yes/no). Logistic regression models were used to examine literacy and contraceptive usage adjusting for all covariates. Data analysis was weighed and analyzed using SPSS V.25. In all, 70.2% of women reported using a modern form of contraceptive. Women who were literate were more likely to use a form of modern contraceptive method (OR= 4.942, 95 % CI= 4.337, 5.631) in comparison with women who were not literate. Higher literacy among women increases the likelihood of using modern contraceptive methods. Future research is needed to substantiate the relationship between literacy and use of contraceptives. Effective strategies should be investigated to incorporate literacy into contraceptive public health initiatives.

LB037 S/P

INTERRACIAL COUPLES AND BREASTFEEDING INITIATION IN THE UNITED STATES Jordyn Wallenborn* Jordyn Wallenborn, (University of California Berkeley)

Background: In the past decade, interracial couples have steadily increased in the United States. In 2015, approximately 17% of marriages in 2015 were between spouses of different races. Despite research demonstrating that interracial couples receive less social support and are more likely to separate, few studies have investigated health outcomes of children born to these couples. This study aims to investigate the relationship between interracial couples and breastfeeding initiation. Methods: Data from the 2014 Vital Statistics Natality Birth database were analyzed. Data were restricted to singleton births and infants with no congenital malformations. Racial composition of parents were categorized as non-Hispanic (NH) white, NH black; Hispanic; NH white/NH black; NH white/Hispanic; and NH black/Hispanic. Breastfeeding initiation was categorized according to information from the child's birth certificate file (yes; no). Multiple logistic regression was used to generate crude and adjusted odds ratios and 99% confidence intervals. Results: After adjusting for confounders, all interracial couples with at least one Hispanic parent had reduced odds of breastfeeding non-initiation. Interracial white and black parents had 22% higher odds of breastfeeding non-initiation. The highest odds of never breastfeeding were observed among intraracial black parents, who had 77% higher odds of breastfeeding non-initiation compared to intraracial white parents. Conclusion: Breastfeeding non-initiation continues to pose the greatest risk for infants with at least one black parent. Examining how couples cope with stress and family networks may increase our understanding of disparities in breastfeeding noninitiation for interracial couples.

LB039

TRENDS IN PREVALENCE AND CONTROL OF HYPERTENSION ACCORDING TO THE 2017 ACC/AHA GUIDELINE Kirsten S. Dorans* Kirsten S. Dorans, (Tulane University School of Public Health and Tropical Medicine)

Background: Hypertension is a major risk factor for cardiovascular disease and allcause mortality. Compared with prior guidelines, the 2017 American College of Cardiology/American Heart Association hypertension guideline recommends lower blood pressure thresholds for defining hypertension, for initiating antihypertensive medication, and for antihypertensive medication treatment goals. Methods To better understand potential impacts of the 2017 guideline, we studied trends in mean systolic and diastolic blood pressure, prevalence and burden of hypertension, and proportion of controlled hypertension in the U.S. adult population ages ≥20 from 1999 through 2016. To test for temporal trends, we used weighted least squares regression models and used piecewise regression to test for changes in trends over time. We used data from 38,276 adults from the National Health and Nutrition Examination Survey. Results: Age-standardized prevalence of hypertension decreased over time, from 48.4% in 1999-2000 to 45.4% in 2015-2016. However, absolute burden of hypertension consistently increased, from 87.0 million in 1999-2000 to 108.2 million in 2015-2016. Age-standardized proportion of controlled hypertension among adults receiving antihypertensive pharmacologic treatment increased from 1999-2000 (25.6%) to 2015-2016 (43.5%). There was not consistent improvement in control throughout the full period among non-Hispanic blacks, individuals ages ≥60, or those with diabetes, chronic kidney disease or high CVD risk. Conclusions Based on the 2017 guideline, from 1999 to 2016, agestandardized prevalence of hypertension decreased and the proportion of control among those treated for hypertension improved. However, absolute hypertension burden increased. Among those treated, the control rate did not consistently improve in all subgroups. These data emphasize the need of continuous efforts for the prevention and control of hypertension in the U.S. general population.

TWO-YEAR IMPLEMENTATION RESULTS FROM A COMMUNITY PARK-BASED MENTAL HEALTH PROMOTION AND VIOLENCE PREVENTION PROGRAM TARGETING AT-RISK MINORITY YOUTH Emily M. D'Agostino* Emily M. D'Agostino, (Miami-Dade Department of Parks, Recreation and Open Spaces)

In 2015, over 4,000 juvenile arrests (incidence rate of 679.2 per 100,000) were made in Miami-Dade County, Florida. Simultaneously, there was an upward trend in community violence that includes >30% increase in youth shootings (45 vs. 60 events in 2014 and 2015, respectively). The Fit2Lead mental-health promotion parkbased program was designed to provide daily mental/emotional/physical health and wellness activities and communication/problem solving skills training for at-risk youth through an interdisciplinary collaboration between the Miami-Dade County Parks, Juvenile Services, and Public Schools Departments, University of Miami and Florida International University, and community-based organizations. Fit2Lead is a free program offered afterschool Monday-Friday at 12 Miami-Dade County parks to youth (n=405) ages 12-14 in high-needs neighborhoods. We examined the effects of Fit2Lead on neighborhood youth violence from 2015-2017. Juvenile arrests were tracked over two years of Fit2Lead implementation across zip codes matched by (1) park; and (2) baseline youth crime and sociodemocraphic factors. Regression models were fit to test the association of Fit2Lead implementation (binary variable) and change in number of juvenile arrests by zip code, adjusting for area-level gender, age, poverty, race/ethnicity, and year. The study population was 50% male, 61% Hispanic, 28% non-Hispanic black, and 35% lived below the federal poverty line. After covariate adjustment(s), zip codes where Fit2Lead was implemented showed a significant mean reduction in youth arrests per year compared to zip codes where the program was not implemented (β = -21.6; 95%CI -29.60, -13.69, p<.001). These findings suggest that park-based programs have potential to offer an ideal, yet often underutilized setting to promote mental/emotional health and build resilience among at-risk youth.

LB042

WIDE-SCALE POPULATION THINKING INSTRUCTION IN HIGH SCHOOLS TO REDUCE HEALTH DISPARITIES Emily M. D'Agostino* Emily M. D'Agostino, (Miami-Dade Department of Parks, Recreation and Open Spaces)

Following the bicentenary of John Snow's birth in 2013, Fine et al. called for obligatory epidemiology instruction in high schools to promote wide-scale science literacy and ultimately population health. However, five years after the bicentenary, evidence is lacking documenting the broad expansion of high school epidemiology education beyond the realm of extracurricular STEM competitions. How can we inspire more students to connect personally with the field of epidemiology? Is "mainstream" secondary school epidemiology an attainable goal, and how might it be realized? Population thinking is a skill that all youth can achieve as a way to initiate epidemiology education, and also increase potential for STEM discipline success in underrepresented students, expand the public health workforce, and reduce health disparities. This study examines growth in science literacy skills in youth (N=90) from three high schools where population thinking is being taught. Analyses from the first cohort of data collection (ongoing) among students in classes that do and do not use this framework will be compared. Methods for population thinking instruction, including having students learn initially from individual and collective community experiences, critically analyzing local health problems, and ultimately engaging in dialogue with community members and policy makers to effect change will be discussed. Also, parallels will be drawn to other youth development frameworks to explain how population thinking may promote critical thinking and problem-solving related specifically to health disparities reduction, including participatory action research, positive youth development, food and environmental activism, photovoice, and empowerment education. Presenting science literacy findings and instructional strategies for population thinking in secondary schools may have practical benefits for wider dissemination of epidemiology instruction at the high school level.

THE ASSOCIATION BETWEEN ALCOHOL CONSUMPTION AND DEPRESSION AMONG ADULT INDIVIDUALS RESIDING IN BRAZIL: THE EFFECT-MODIFYING ROLE OF GENDER AND AGE GROUPS. Cristina Oancea* S. Cristina Oancea, (University of North Dakota, School of Medicine and Health Sciences, Grand Forks, ND, USA)

Background: Previous research conducted in North America and Europe has shown that alcohol is a depressant that can lead to long term mental health problems. There is limited literature investigating the association between alcohol consumption and depression (DE) in South American countries such as Brazil. The purpose of the current study is to investigate the association between binge drinking (BD), heavy drinking (HD), and DE, among adults residing in Brazil. Methods: Adult respondents to the 2013 Brazilian National Health Survey (2013-BNHS) were included in the study. The association between BD, HD and DE was investigated using weighted and adjusted multivariable linear regression models. Adjustment was made for age, gender, race, marital status, education, insurance and smoking. The effect modifying role of age group (18-39, 40-59, 60+ years old (YO)) and gender was examined. Results: Out of the final study sample of 59,402 Brazilians, 47.2% were 18-29 YO, 18.2% were 60+ YO and 52.4% were females. The prevalence of BD was 13.8%, of HD was 3.2% and of DE was 7.6%. There was a significant weighted and adjusted association between BD and DE among females 18-39 YO (OR=1.5, 95%CI: 1.1-2.0) and 40-49 YO (OR=0.6, 95%CI: 0.4-0.8). There was a significant weighted and adjusted association between HD and DE among males 18-39 YO (OR=1.83, 95%CI: 1.18-2.84) and 40-59 YO (OR=2.46, 95%CI: 1.5-4.1). Conclusions: The possible protective factor of BD for DE among middleaged Brazilian females needs to be further investigated and understood. Longitudinal research is needed to provide further evidence of associations found in this study. Public health policies must consider the different alcohol drinking patterns among young and middle-aged Brazilians to effectively target the heavy alcohol drinkers, to reduce the possible harmful consequences of heavy alcohol consumption.

LB043

PRELIMINARY ESTIMATES OF LIFETIME CANCER PREVALENCE IN AGING VIETNAM VETERANS Aaron Schneiderman* Fatema Z Akhtar, (VA Post Deployment Health Services, Epidemiology Program)

Background: VA conducted the 2016-2017 Vietnam Era Health Retrospective Observational Study (VE-HEROeS) to research health status of surviving veterans who served between 1961 and 1975 using 3 comparison groups based on military service status during the Vietnam War: Vietnam veterans (VV) who served in Vietnam, Laos, or Cambodia, era veterans (EraV) who served elsewhere during the Vietnam War, and non-veterans (NV) from the US population born before 1958. Objective: Estimate prevalence of self-reported cancers in an aging veteran population (VV and EraV: mean age 70 years) and in NV. Design: We mailed paper surveys to a probability-based sample of 42,393 veterans from the USVETS dataset and 6,885 eligible NV at randomly selected US residential households. The final sample included 6,735 VV, 12,131 EraV, and 4,530 NV. Methods: Data were weighted to match age/sex distributions of comparison groups with VV and to adjust for non-response. We computed weighted percentages and their associated 95% confidence intervals. Results: Nine of twelve cancers showed a pattern of highest prevalence in VV and lowest in NV. These cancers demonstrate this relationship non-Hodgkin's lymphoma (VV: 1.6% (1.2-2.0); EraV: 1.1% (0.9-1.4); NV: 0.9% (0.5-1.3)); thyroid (VV: 0.9% (0.6-1.1); EraV: 0.6% (0.4-0.9); NV: 0.3% (0.1-0.5)); and testicular (VV: 0.5% (0.3-0.7); EraV: 0.4% (0.2-0.5); NV: 0.2% (0.1-0.4)). Conclusion: Most cancers showed a monotonic pattern with military service status with highest prevalence in VV and lowest in NV. This finding suggests that Vietnam service is a risk factor for disease. Further analyses will adjust for key risk factors such as body mass index (BMI), cigarette smoking and alcohol use, military characteristics, and comorbidities.

PRENATAL EXPOSURE TO PERFLUOROALKYL SUBSTANCES AND BIRTH OUTCOMES; A POOL ANALYSIS IN THE DANISH NATIONAL BIRTH COHORT Qi Meng* Qi Meng, (Department of Epidemiology, Fielding School of Public Health, University of California, Los Angeles (UCLA))

Background: Perfluoroalkyl substances (PFASs) are widespread persistent organic pollutants. Animal studies indicated that in-utero PFAS exposures affect fetal growth, but findings from human studies are still inconclusive; few studies have evaluated adverse birth outcomes primarily due to small sample size. Methods: We conducted a pooled analysis using data of 3,535 mothers and infant pairs from three sub-samples originating from the Danish National Birth Cohort (DNBC). Each subsample has 1398, 545, and 1592 mutually exclusive births respectively. All subsamples have first trimester maternal plasma concentrations of PFOS and PFOA, and 4 additional PFAS (PFHxS, PFNA, PFHpS and PFDA) were measured in subsample 2 and 3. PFAS measures were analyzed as continuous variables after naturallog (LN) transformation or categorized into tertiles. We estimated the changes in birth weight (grams) or gestational age (days), the odds ratios (OR) and 95% confidence intervals (CI) for infants born preterm (< 37 gestational week) or low birth weight (< 2500 gram). A range of potential confounders were included and the sampling weights of each sub-sample were accounted in statistical analyses. Results: We estimated that each LN-ng/ml increase in PFOS, PFOA and PFHpS was associated with a 64g, 74g or 80g decrease in average birth weight. However, only PFOS was positively associated with the risk of low birth weight, i.e. the adjusted ORs for Ln-PFOS and low birth weight was 1.92 (95% CI 1.03, 3.58). Several PFASs (PFOS, PFOA, PFNA, and PFHpS) were also associated with a small decrease in the gestational age at delivery, but no apparent associations were found for any PFAS and preterm birth risk. Conclusion: Our pooled analyses demonstrated that several prenatal PFASs are inversely associated with birth weight and gestational age, and prenatal PFOS exposure is associated with low birth weight. Our findings strengthen the evidence that in-utero PFAS exposures affect fetal growth.

LB046

IMPACT OF CANNABIS USE ON POST STROKE OUTCOMES: INSIGHTS FROM THE NATIONWIDE INPATIENT SAMPLE (NIS) STUDY Rikinkumar Patel* Rikinkumar Patel, (Arcadia University)

Background: Cannabis use increases the risk of stroke as it is associated with physiological mechanisms that exacerbate stroke prognoses such as increased cerebrovascular resistance. No previous studies have been conducted to evaluate hospitalization outcomes in relation to cannabis use among stroke patients. Purpose: To study the relationship between cannabis use, inpatient stay, care utilization, and costs among stroke patients Methods: We used Nationwide Inpatient Sample from the Healthcare Cost and Utilization Project from year's 2010-2014. We identified Stroke and Cannabis use disorder as the primary and secondary diagnosis, respectively using ICD-9-CM codes. We used binomial logistic regression model to generate adjusted odds ratios (aOR) to assess inpatient outcomes. Results: The study analyzed 36,001 inpatient stroke admissions in patients aged 12-35. Cannabis users (CU) were more likely to present with dysphasia (aOR=1.988) and facial weakness (aOR=I.610). Higher proportion of CU (42.2% vs. 35.8%) had hospitalization >3 days (median) and greater risk of longer inpatient stay (aOR=I.1188) compared to non-CU-users. In addition, 51.3% CU had hospitalization charges >\$30,692 (median) and more likely of higher inpatient charges (aOR=I.105). CU were more likely to utilize Thrombolytic (aOR=1.363) and Thrombectomy (aOR=2.150). Despite of utilization of advanced treatment modalities, in-hospital mortality was higher in CU (1.6% vs. 1.5%; p-value= 0.044). CU had higher odds of being discharged to acute-care hospital (aOR=I.108). Conclusion: Our study contributes to a body of evidence suggesting on the negative impact of cannabis use in stroke. Cannabis use is associated with prolonged inpatient stay, utilization of invasive treatment modalities, and thereby increases healthcare cost and mortality. Further research to support development of integrated-care-models for early diagnosis and treatment of Cannabis use disorder to improve quality of healthcare.

RISK OF SUICIDE AMONG US VETERANS OF BOSNIA/KOSOVO UN PEACEKEEPING MISSION Tim Bullman* tim bullman, (US Department of Veterans Affairs)

Studies of veterans have reported conflicting results relative to suicide risk associated with deployment to a conflict theater. This study examined for the first time the risk of suicide associated with serving as part of a peacekeeping mission in Bosnia/Kosovo, comparing the post-military service mortality of 53,320 veterans who were deployed to Bosnia/Kosovo between 1995 and February 2002 to that of 117,267 veterans who served in the military between 1995 and 2002, but were not deployed to Bosnia/Kosovo. All veterans separated from active duty between 1995 and 2002. Any veteran who was deployed as part of other peace keeping missions, the first Gulf War, or Operations Enduring Freedom and Iraqi Freedom was excluded. Using Standardized Mortality Ratios (SMR)s the observed number of suicides in both cohorts were compared separately to the expected based on the US general population. Risk of suicide associated with deployment was assessed using a Hazards Ratio (HR) generated by Cox Proportionate Hazard Model. Follow-up began on end date of last data capture for non-deployed and end date of last deployment for deployed. End of follow-up was the earlier of either date of death or December 31, 2014. There were 200 suicides among deployed veterans, Rate=25.5/100,000 person years at risk (PYR), and 563 suicides among nondeployed, Rate=3 I.3/100,000 PYR. Both deployed and non-deployed veterans had excesses of suicides when compared to the US population, SMR=I.24; (95% confidence interval (CI), 1.07-1.42) and SMR=I.53; (95% CI,1.41-1.66) respectively. Deployment to Bosnia/Kosovo was not associated with an increased risk of suicide, HR=0.84; (95%, C.I., 0.72-1.00). This is the first study to assess suicide risk among Bosnia/Kosovo veterans specifically or any US veterans of a peacekeeping mission. These findings support other studies that have concluded military service in general rather than deployment specifically is associated with increased risk of suicide.

LB047 S/P

ARBOVIRAL INFECTION IN PEACE CORPS VOLUNTEERS: IMPROVED POPULATION HEALTH SURVEILLANCE FOR EMERGING INFECTIOUS DISEASES Rennie Ferguson* Rennie Ferguson, (Peace Corps)

Quantifying the burden of arboviral infections such as dengue, chikungunya, and Zika virus disease in long-term traveler populations is challenging given fluctuating geographic distributions of disease agents, vectors, and hosts, as well as limitations in laboratory testing capabilities in many settings. Peace Corps Volunteers serve overseas, typically for 27 months, and receive health care from Peace Corps Medical Officers. Monitoring cases of dengue among Volunteers has been a priority for Peace Corps for several years, given the potential severity of disease. In 2015, interest grew in additionally tracking cases of Zika virus disease and other arboviral infections in the Volunteer population. To better assess arboviral infections in Volunteers, the Peace Corps Epidemiology and Surveillance Unit leveraged capabilities in the electronic medical record, PCMEDICS. Combining diagnostic and procedural codes with a select list of reportable conditions allowed for improved surveillance of arboviral infections in the face of a rapidly changing disease landscape. In January-December 2016, the rate of arboviral infections (dengue, chikungunya, and Zika) was 1.57 cases per 100 Volunteer-Trainee years (95% CI 1.28-1.89). In comparison, the preliminary rate was 0.36 cases per 100 Volunteer-Trainee years (95% CI, 0.22-0.57) in January-September 2017; the difference was statistically significant (p<0.05). The proportion of arboviral infections due to confirmed Zika virus disease decreased from 7.48% to 5.26%. Well-defined case inclusion/exclusion criteria and the electronic medical record have allowed for improved data collection and reporting on meaningful differences in the burden of arboviral disease in the Volunteer population.

THE RISK OF HIGH BLOOD PRESSURE IS ASSOCIATED WITH HIGH BLOOD PRESSURE AMONG CLOSE, BUT NOT DISTANT, SOCIAL TIES Todd Sponholtz* Todd Sponholtz, (Boston University School of Medicine)

The spread of cardiometabolic risk factors, such as obesity and diabetes, within social networks has been reported; however, hypertension has been little studied. We investigated this question using 29 years of data in the Framingham Offspring Study (FOS). Participants' social ties were compiled using administrative information: family and friends (potential contacts for participant tracking), neighbors (geocoded home addresses), coworkers (place of employment). Blood pressure was measured twice by trained study personnel at each FOS exam and averaged. High blood pressure was defined as systolic blood pressure ≥130 mm Hg, diastolic blood pressure ≥80 mm Hg, or current use of antihypertensive medication. ORs and 95% CI for the association of alters' (i.e. the social ties') obesity status and high blood pressure at the prior exam with ego (the focal individual) were estimated using logistic regression adjusted for exam and ego age, sex, and obesity status We accounted for multiple observations of the same ego using generalized estimating equations The analysis included 3065 FOS participants. The ORs for the associations of alters' high blood pressure at the previous exam with incident high blood pressure among egos were 1.39 (95% CI: 1.15, 1.61), 1.33 (95% CI: 0.97, 1.83), and 1.44 (95% CI: 1.27, 1.64) for spouses, friends, and siblings, respectively. Ego incident high blood pressure was not associated with the prior exams' blood pressure status among neighbors living within 25 m (OR: 1.07, 95% CI: 0.79, 1.44) or coworkers (OR: 0.95, 95% CI: 0.82, 1.10). Spousal obesity was associated with elevated risk of high blood pressure (OR: 1.20, 95% CI 0.98, 1.48), but this was not the case among other social ties examined. Our data suggested associations of ego incident hypertension with the hypertension status of close social ties. Lack of associations with neighbors' and coworkers' status implies little influence by weak ties or shared neighborhood and work environments.

ARE US VIETNAM WAR VETERANS DIFFERENT? VE-HEROES: A NATIONAL SURVEY OF CURRENT HEALTH Victoria J. Davey* Victoria J. Davey, (Office of Research & Development)

Background: The Vietnam Era Health Retrospective Observational Study (VE-HEROeS) evaluates the current physical and mental health of surviving Veterans who served in Vietnam, Cambodia, and Laos (VV) and compares them to veterans who served elsewhere (EraV) and to US non-veterans (NV). This is the first large scale study focusing on overall health in 30 years. Methods: A mail survey was administered from November 2016-March 2017. We selected a random sample of 45,067 living veterans from a frame of 9.87 million military members who served from 1961-75. US NV born before 1958 were recruited in a two-stage process from 300,000 US households. Survey questions asked about demographics, military service location (for veterans), perceptions of current health, clinician-diagnosed illnesses, occupational and environmental exposures, and health of offspring. Data were weighted to match age/sex distributions of comparison groups with VV and to adjust for non-response. Results We received complete responses from 18,886 veterans (46.3% after removal of recent decedents); 6,735 VV and 12,131 EraV. From the second stage sample of 6.885 US civilians, 4,530 were complete (66.0%). Weighted, unadjusted data revealed 28.8% of VV reported very good or excellent health compared to 40% of EraV and 56% of NV; many health conditions were most prevalent in VV. Weighted descriptive and generalized linear model techniques, adjusted for demographics, military characteristics and relevant risk factors, will be used in further analyses. Conclusions: VE-HEROeS is the largest comparative and comprehensive study of the health of VV, EraV, and NV in 30 years, conducted as aging-related diseases become prevalent in these cohorts. Comparisons between VV, EraV, and NV will allow assessment of differences in self-reported exposures and current health, and may guide policy and practice important to these Veterans.

MULTIGENERATIONAL LOW BIRTHWEIGHTS AMONG AUSTRALIAN ABORIGINAL INFANTS: IS THERE ANY EVIDENCE OF FETAL PROGRAMMING? Alison Gibberd* Alison Gibberd, (The University of Sydney)

Low birthweight (BW) is common among Aboriginal infants. BW is correlated across generations due to the transmission of genetic and environmental factors. Another cause may be fetal programming, where a fetus' response to a hostile uterine environment leads to poorer adult health and, in turn, a poorer uterine environment for her offspring. If so, Aboriginal people would be disproportionately affected, following years of low BW and chronic disease. Identifying a causal relationship between maternal BW and offspring BW is complex. However, we can gain insights using several family-based approaches. WA has the only database of family relationships in Australia. We used linked birth, hospital, and mental health records of 12,865 Aboriginal singletons born 1998 to 2011 in Western Australia (WA) whose mother linked to a WA birth record from 1980 onwards, and their parents' records. 17% of births were small for gestational age. Using a linear regression model with a generalised estimating equation approach for offspring BW z-score (BWZ), the coefficient for maternal BWZ was 0.17 (95% CI: 0.14, 0.20), compared to 0.13 (95% CI 0.10, 0.16) for paternal BWZ. The difference in coefficients (0.03 [95% CI: -0.01, 0.08]) provides only limited support for the fetal programming hypothesis, particularly when issues such as non-paternity are considered. Other associations with offspring BWZ were much larger, including maternal smoking (-0.39 [95% CI: -0.45, -0.34]). After restricting the sample to cousins with shared maternal grandparents (fixed-effects model), the motheroffspring association was fully attenuated (-0.01 [95% CI -0.07, 0.05]), suggesting transmission of maternal genetic and environmental factors alone can explain the association, though the 95% confidence interval was wide. Both approaches indicate fetal programming has a limited role in the persistently high rates of low BW among Aboriginal infants compared to other risk factors in the current pregnancy.

LB051 S/P

THE EFFECT OF INTRAUTERINE EXPOSURE TO MATERNAL METABOLIC DISORDERS ON OFFSPRING ANTHROPOMETRY IN A PREDOMINANTLY AFRICAN AMERICAN COHORT Danielle Stevens* Danielle Stevens, (Medical University of South Carolina)

Introduction: In the US, the incidence of maternal metabolic disorders during pregnancy is climbing. Little is known about the long-term health effects of this exposure on offspring health. Furthermore, significant disparities exist in the prevalence of metabolic disorders during pregnancy, with non-Hispanic Blacks (NHB) being disproportionately affected. Despite this, minorities tend to be unrepresented in studies examining the long-term offspring outcomes of an obesogenic intrauterine environment. Thus, the current study proposes to examine the impact of maternal metabolic disorders during pregnancy on offspring anthropometry in a predominantly African American cohort. Methods 11,815 patients with data recorded in the MUSC Perinatal Information System were linked for follow-up of anthropometric outcomes to the electronic medical record. Generalized linear models were run to examine the impact of maternal prepregnancy BMI and diabetes during pregnancy on offspring BMI percentile, heightfor-age-percentile, and weight-for-age percentile. Results 4,746 offspring (mean age of 8.6 years, 64.3% NHB) were included in final analyses 7.7% and 35.3% of offspring were exposed to DM and obesity, respectively. There was no significant difference in the mean BMI percentile of offspring at follow-up among those exposed to maternal diabetes versus unexposed (p=0.93). However, mean BMI percentile of offspring at follow-up was significantly different among offspring exposed to maternal overweight (61st percentile) and obesity (68th percentile) as compared to normal weight mothers (53rd percentile, p<0.01). Similarly, mean weight-for-age percentiles were significantly elevated among offspring exposed to maternal overweight and obesity as compared to normal weight mothers (59th, 62nd, and 70th percentiles, respectively, p<0.001), but not for comparisons by maternal diabetes status (p=0.8).

ESTIMATED PREVALENCE OF LIFETIME CIRCULATORY SYSTEM DISEASE FROM THE 2016-2017 VIETNAM ERA HEALTH RETROSPECTIVE OBSERVATIONAL STUDY (VE-HEROES) Erick Ishii* Erick Ishii, (VHA Patient Care Service/Post Deployment Health/Epidemiology Program)

Background: The health status of surviving veterans who served during the Vietnam Era (1961-1975) is a topic that still deserves continued investigation.VE-HEROeS is a nationwide study designed to compare the health of veterans who served in Vietnam, Cambodia, or Laos (VV), veterans who served elsewhere during the Vietnam Era (EraV), and similarly aged non-veteran (NV) U.S. residents who never served in the military (born before 1958). Objective: Investigate the estimated, selfreported prevalence of circulatory system disease (CSD - hypertension, ischemic heart disease, stroke) in an aging veteran population (VV and EraV: mean age 70 years) and in NV. Design: Probability-based sample of 42,393 veterans from the USVETS dataset and 6,885 eligible NV at randomly selected US residential households were mailed paper surveys. The final sample consisting of returned surveys included 6,735 VV, 12,131 EraV, and 4,530 NV. Methods: Data were weighted to match age/sex distributions of comparison groups with VV and to adjust for non-response. Weighted percentages and their associated 95% confidence intervals were computed for the sample. Results: CSD showed a pattern of highest prevalence in VV and lowest in NV. The prevalence of each of the specified CSD conditions was: hypertension (VV: 70.9% [69.7-72.1]; EraV: 66.2% [65.1-67.3]; NV: 60.5% [58.6-62.4]); ischemic heart disease (VV: 24.4% [23.5-25.3]; EraV: 18.7% [17.9-19.5]; NV: 16.0% [14.6-17.4]); stroke (VV: 8.4% [7.8-9.0]; EraV: 7.4% [6.7-8.0]; NV: 6.4% [5.3-7.5]). Conclusion: Overall, CSD showed a pattern associated with military service. VV had the highest prevalence of CSD, followed by EraV, with the lowest in NV. This finding suggests that Vietnam service is a possible risk factor for CSD. More analyses will be conducted adjusting for major risk factors such as body mass index (BMI), cigarette smoking and alcohol use, military factors, and comorbid conditions.

LB054

THE HEALTHCARE COSTS OF NEIGHBORHOOD SOCIOECONOMIC DEPRIVATION Katherine J. Sapra* Katherine J. Sapra, (Centers for Medicare & Medicaid Services)

Background: Individuals with lower socioeconomic status (SES) have higher healthcare costs and worse health outcomes and may benefit from targeted interventions to improve these outcomes. However, collecting individual SES data often is impractical, and claims do not capture these data. As an alternative, we investigate whether neighborhood socioeconomic deprivation, measured from readily-available patient address data, predicts healthcare costs for Maryland Medicare beneficiaries. Methods: We evaluate neighborhood socioeconomic deprivation using the area deprivation index (ADI), a validated composite measure of deprivation available for all US census tracts; higher ADI values indicate greater deprivation. We update the ADI using the most recent (2015) American Community Survey data and rescale for census block groups in Maryland. Beneficiaries are assigned the ADI value of their home address. We evaluate healthcare costs using total cost of care (TCOC) per beneficiary, comprising 2015 Medicare Part A and B expenditures obtained from claims data. TCOC is regressed on ADI quintile and hierarchical condition categories (HCC) score, inclusive of health and demographic factors, in adjusted models. Results: ADI is available for 3,883 block groups in Maryland home to 635,892 Medicare beneficiaries. ADI is significantly (pvalue<0.05) associated with TCOC. Unadjusted (Q1 \$8,742, Q2 \$9,376, Q3 \$10,266, Q4 \$10,950, and Q5 \$12,324) and adjusted (Q1 \$9,552; Q2 \$9,831; Q3 \$10,196; Q4 \$10,568; Q5 \$11,182) TCOC increase with increasing ADI. Among the least healthy beneficiaries (highest HCC quintile), the impact of ADI is most prominent: 27% (\$5,900) higher TCOC for highest versus lowest ADI quintile. Conclusion: Beneficiaries living in neighborhoods with greater deprivation have greater healthcare costs, even after risk ad justment for individual-level health and demographic factors. Providers may consider using ADI to identify patients for targeted interventions.

LB053

DIET QUALITY AND MORTALITY: COMPARISON OF ESTABLISHED DIET INDEXES IN AN EASTERN POPULATION Maryam Hashemian* Maryam Hashemian, (NCI)

Background: Several dietary scores have been defined to evaluate the dietary quality, the Healthy Eating Index (HEI), the Alternative Healthy Eating Index (AHEI), the alternative Mediterranean diet (AMED), the Dietary Approach to Stop Hypertension (DASH), and the World Cancer Research Fund (WCRF) score. However, the association between diet quality and mortality have not been widely evaluated in eastern part of the world with different dietary pattern. In this study, we evaluated the association between diet quality and mortality in the Golestan Cohort Study, a prospective study in Iran. Methods: We used data from the 50,045 participants were enrolled in the Golestan Cohort Study from 2004-2008 and followed until 2017. Dietary scores were extracted from a validated food frequency questionnaire and were computed and divided into five categories. A Cox adjusted hazards model was used to estimate hazards ratio (HRs) and 95% confidence intervals (CIs) of overall and specific-cause mortality. The lowest categories were used as references. Results: During 10.6 years of follow up, 4,424 were reported to have died. Participants with highest dietary scores compared with lowest dietary scores, had a significantly decreased risk of mortality across AHEI, AMED, DASH, and WCRF scores (HR C5 vs C1=0.88, 95% C1=0.80-0.97, HR C5 vs C1=0.80, 95% CI=0.70-0.91, HR C5 vs C1=0.77, 95% CI=0.70-0.86 HR C5 vs C1=0.79, 95% CI=0.70-0.90, respectively), and marginal significant decrease risk of mortality across HEI (HR C5 vs C1=0.91, 95% CI=0.82-1.01). Conclusion: These results demonstrate that various indexes of diet quality were inversely associated with overall mortality. This study has a public message, that dietary guidelines designed for the American population may be beneficial for other populations.

LB055 S/P

RECOVERING FROM SELECTION BIAS IN THE EFFECT OF PLACE ON BIKING WHEN RESTRICTED TO SMARTPHONE USERS Michael D Garber* Michael D Garber, (Emory University)

Smartphone-generated data are now used for research in many areas, including bicycling for health and transportation. It is unclear if reliance on these data sources results in selection bias in etiologic studies of infrastructure on biking behavior. Objective: Using empirical estimates from a validation study, our goal was to assess, quantify, and recover from potential selection bias in a theoretical scenario in which (1) the aim was to evaluate the effect of a new protected bike lane on the amount of biking along a corridor and (2) available data were restricted to those generated by cyclists who used smartphone apps to record the rides. Methods: We conducted an intercept survey at various locations in Atlanta, GA between June 2016 and April 2017 to ask participants (n=99) about socio-demographics, bike-riding habits and routes of common rides, and whether they use smartphone apps (e.g. Strava) to record their rides (n, yes=34; n, no=56). Using results from this study, we estimated parameters for structural causal models in a proposed directed acyclic graph (DAG) relating the protected bike lane with ridership. We then simulated a dataset using the simcausal package in R and attempted to recover from the selection bias using inverse-probability-of-selection weighting. Results: In the simulated data (n= 10,000,000), the average causal effect (ACE, a risk difference) of the protected bike lane on ridership was 0.39761. When restricted to app users, the ACE was 0.39787, representing a very slight selection bias away from the null. The ACE in the inverse-probability-of-selection weighted data was 0.39777, slightly closer to the original unbiased value. Conclusion: Selection bias due to restriction to smartphone users in an empirically-informed simulated study of infrastructure on biking behavior was very minimal. Inverse-probability-of-selection weighting recovered some, but not all, of the bias at 10,000,000 observations.

GENETIC PREDISPOSITION FOR NEURODEVELOPMENTAL DISORDERS AND AUTISTIC SYMPTOMS: THE ROLE OF NEUROMOTOR DEVELOPMENT DURING INFANCY Fadila Serdarevic* Akhgar Ghassabian, (New York University School of Medicine)

Impaired infant motor development is a risk indicator for autism. We examined whether neuromotor development during infancy meditates the association between genetic predisposition to neurodevelopmental disorders and childhood autistic symptoms. Neuromotor development (tone, responses, and other observations) was assessed during home visits in 1921 infants (2-5 months) from European ancestry. We calculated polygenic risk scores (PRS) for autism spectrum disorder (ASD), and attention-deficit/hyperactivity disorder (ADHD), using genome-wide association study (GWAS) summary statistics. Parents rated autistic symptoms in their children at age 6. We performed mediation analysis with 99 % bias-corrected bootstraps CIs, applying 1000 bootstrap samples to identify the indirect effect of ASD- and ADHD-PRS on childhood autistic traits through infant neuromotor development. PRS for ASD was associated with higher scores in overall infant neuromotor development [(GWAS P value threshold (PT) <0.5) : 0.08, CI: 0.03, 0.13, p=0.01], in particular low muscle tone (PT < 5) < 0.5: 0.06, CI: 0.2, 0.11, p=0.01]. ADHD PRS was associated with less-optimal senses (PT<0.01 : 0.05, CI: 0.01, 0.09, p=0.02). ASD and ADHD PRS were each associated with autistic symptoms. Mediation analysis suggested that 11% (95% CI: 0.01, 0.50, p=0.03) of the association between genetic predisposition for autism and autistic symptoms is mediated by overall neuromotor development, in particular low muscle tone. We observed an indirect effect of ADHD PGRS on autistic symptoms through senses in boys only. Neuromotor assessment in infants with high genetic risk for ASD and ADHD might help identifying vulnerability to early symptoms and be the target for interventions. Future analyses using genetic information on motor development should test if this association is indeed causal.

LB058

ASSOCIATION BETWEEN PARTICIPATION IN EXTRACURRICULAR ACTIVITIES AND PERCEIVED RISK OF HARM FROM SMOKING AMONG ADOLESCENTS: NSDUH, 2016 Ruchi Bhandari* R. Constance Wiener, (West Virginia University)

Introduction: Perceived risk of harm is inversely associated with substance use behavior. Modifying risk perception in adolescence through school-based activities can be useful in smoking prevention. Purpose: The objective of this study is to identify association between school-based extra-curricular activities and perceived degree of risk of harm of smoking ≥ 1 pack of cigarettes daily among adolescents. Methods Data were obtained from 2016 National Survey on Drug Use and Health (NSDUH) on adolescents aged 12 to <18 years who responded to the question regarding their perception of degree of risk of harm (no/slight, moderate, great) from smoking ≥ 1 pack of cigarettes daily (outcome variable), and participation in number of school-based extra-curricular activities. Ordinal logistic regression model controlled for age, sex, race/ethnicity, income, metropolitan status, insurance, smoking status, enjoyment of dangerous behavior, and parental expression of pride. Analysis was adjusted for strata, study design, sample weights, and conducted with SAS® version 9.3. Results: Of the 4,269 participants, 47.1% were females, approximately half were non-Hispanic white, proportionately divided in age-groups. About 16% had already smoked before the age of 18 years; 17.5% reported not participating in any extra-curricular activity at school; and regarding their perception 10.6% reported no/slight, 20.2% moderate, and 69.3% great risk of harm from smoking. In ordinal logistic regression analysis, adolescents who had not participated in any extracurricular activities compared with 3 or more were more likely to report that they perceived no/slight harm from smoking one or more packs of cigarettes daily (Adjusted OR=I.88; 95% CI: 1.50-2.34). Conclusion: Participation in structured extra-curricular activities at school may help increase risk perception of harm from smoking, and thereby, lower the initiation and use of substance use among adolescents.

LB057 S/P

MATERNAL EXPOSURE TO LEAD AND ITS RELATIONSHIP TO BIRTH OUTCOMES IN SAN FRANCISCO NEIGHBORHOODS Chinomnso Okorie* Chinomnso Okorie, (Health and Equity Lab, San Francisco State University)

Background: Preterm birth rates in California are on the rise. This trend is disproportionately displayed in communities of color and low income neighborhoods. In fact, women who live in the southeast neighborhoods of San Francisco (SF) have the highest rates of premature births, and deliver more babies of low-birth weight. Such babies have a higher risk of mortality and increased risk for negative health later in life. Therefore, every effort must be made to ensure pregnant women live in a healthy environment. However, some women in lowincome neighborhoods do not live in adequate housing and may be exposed to environmental toxins. In fact, toxins like lead have been shown to affect fetal development, and maternal exposure to lead may contribute to the high rate of preterm birth outcomes in some SF neighborhoods. Purpose: This study aims to measure the levels of lead found in bio-specimens of human hair collected in SF neighborhoods with high rates of preterm birth outcomes (i.e. 'hotspots'). Approach: Human hair absorbs lead and can be used to measure exposure to this toxin at the individual-level. Moreover, hair collected from beauty salons that primarily cater to local residents can be used to measure neighborhood-level exposure. Therefore, hair samples collected from ~30 beauty salons in SF were used as biospecimens to determine possible human exposure to lead in the neighborhoods where they were collected. Lead concentrations were determined using a mass plasma- atomic emission spectrometry. Results: We expect to find some lead in human hair collected from 'hotspot" neighborhoods with high rates of preterm birth outcomes in the San Francisco. Conclusion: Evidence of lead exposure in 'hotspot' neighborhoods may at least partially explain their higher rates of preterm birth outcomes. This knowledge can then be used to eliminate maternal exposure to lead in these neighborhoods, thereby reducing the number of preterm births and decreasing associated health disparities.

LB059

REPORTING EFFECTS ANALYSIS OF WEN BY CHAZ DEAN, INC. CLEANSING CONDITIONER: EXAMINATION OF THE FDA ADVERSE EVENT REPORTING SYSTEM Andrew Monnot* Andrew Monnot, (Cardno ChemRisk)

The Food and Drug Administration (FDA) maintains an adverse event reporting system with data collected from users of various food, beverage, and cosmetic products. Recently, there have been concerns regarding alleged health effects among users of WEN by Chaz Dean (WCD) cleansing conditioners, including hair loss, hair breakage, and dermal irritation. The objective of this analysis was to analyze the temporal trends in reported adverse event data specific to WCD cleansing conditioners before and after media coverage of alleged health effects in 2014. Publicly available data were extracted from the FDA Center for Food Safety and Applied Nutrition (CFSAN) Adverse Event Reporting System (CAERS) from 2004 to 2016. Data were restricted to WCD specific products, and were further limited to potential cleansing conditioner products. A total of 1,086 adverse events were reported among the products that fit the study inclusion criteria. The most prevalent reported adverse events were alopecia, pruritus, trichorrhexis, and rashes. 82.2% of the adverse events were reported to occur between 2014 and 2016. Additionally, based on the available of company sales records, a subset of adverse event data (2005 to 2015) was analyzed using negative binomial regression. The rate of adverse event reporting after 2014 was statistically significantly higher in comparison to the rate of adverse event reporting before 2014, adjusting for the number of cleansing conditioner units sold per year. Findings suggest the potential for a halo effect, where negative news media may alter reporting behaviors due to societal shifts in product-specific risk perception.

DISPARITIES IN THE USE OF SPECIALTY MENTAL HEALTH SERVICES BETWEEN LATINOS, AFRICAN-AMERICANS AND NON-LATINO WHITES IN NEW YORK CITY IN 2013-2014. Annell Ovalles* Annell Ovalles, (CUNY Graduate School of Public Health and Health Policy)

Racial/ethnic disparities in access to health care in the United States are well documented. As it relates to access to mental health services, while Latinos and African Americans are more likely to experience depression and anxiety, compared to non-Latino Whites, these populations have less access to specialty mental health services and receive poorer quality of care. In this study, we evaluated whether these national trends in specialty mental health care are also evident in New York City (NYC), a large urban center characterized by unparalleled cultural and ethnic diversity. Data source was the 2013-2014 NYC Health and Nutrition Examination Survey (NYC HANES), which surveyed a probability sample of 1524 NYC adults' ages 20-97. Specialty mental health care was defined as treatment received by a psychologist, psychiatrist, or any mental health professional in mental health settings. Participants self-identified their race/ethnicity, yielding a sample of 390 Latinos, 340 African Americans, and 513 non-Latino Whites. Weighted logistic regression was used to compare the use of mental health specialty care between these racial/ethnic groups in NYC, with relevant background characteristics adjusted for. Specialty mental health treatment use was reported by 13.1% of Latinos and 12.4% of African Americans, compared to 19.3% of non-Latino Whites (p<.001). Latinos and African Americans have lower odds of receiving specialty mental health treatment (OR=0.41, 95%CI:0.20-0.84 and OR=0.29, 95%CI:0.15-0.57). We identified substantial disparities between ethnic/racial groups in their use of specialty mental health services in NYC. While this may partly be due to lower rates of health insurance, higher levels of stigma and a culturally insensitive health care system, further investigation is needed to help better understand and address this gap, as the health, social and economic cost of Latinos and African Americans underutilizing mental health specialty services is substantial.

LB062

ARE YOUR JEANS TOO TIGHT? EVIDENCE OF AN ASSOCIATION WITH UNEXPLAINED VULVAR PAIN (VULVODYNIA) Bernard L Harlow* Bernard L Harlow, (Boston University School of Public Health)

Clinicians anecdotally note that women seen for vulvar pain symptoms have a history of wearing tight fitting clothing. Earlier studies have shown that wearing tight clothing can increase the risk of candidiasis and urinary tract infections. Given that both of these factors seem to be more prevalent in women with vulvodynia, we sought to determine whether tight fitting clothing is associated with vulvodynia independent of gynecological infections. A history of wearing thong underwear, tight fitting jeans or pants, and spandex shorts was assessed in 234 women with clinically diagnosed vulvodynia and 234 randomly selected similarly aged controls residing in the Minneapolis-St. Paul Metropolitan area. Women self-reported the frequency of wearing this type of clothing the year before their first onset of vulvar pain and a comparable time period among the frequency-matched controls. No association was seen with wearing either thong underwear or tight fitting spandex shorts. However, wearing tight fitting jeans 4 times per week or more was associated with a 2.9 fold odds of vulvodynia compared to those who never reported wearing tight fitting jeans. After controlling for age, anxiety, history of urinary tract infections, and history of gynecological infections, the association was attenuated but remained strong (OR=2.1, 95%CI 1.1-3.8). We observed a significant test of trend with a 17% increase in risk with each increasing category of frequency (95%CI 1.0-1.3). Our findings suggest that tight fitting jeans may increase the risk of vulvodynia, perhaps by creating a more suitable environment for genitourinary infections. However, a more thorough mediation analysis will be needed to determine a better understanding of the temporal pathway.

LB061 S/P

THE IMPACT OF UNCONVENTIONAL NATURAL GAS DEVELOPMENT ON ACUTE MYOCARDIAL INFARCTION HOSPITALIZATIONS AMONG ELDERLY POPULATION: EVIDENCE FROM PENNSYLVANIA Linxi Liu* Linxi Liu, (University of Rochester)

Introduction: Since 2000, unconventional natural gas development (UNGD) has rapidly increased in the United States, especially in Pennsylvania's Marcellus Shale. Community concerns regarding UNGD include the potential health effects of increased UNGD-related air pollution. Since reduced air quality is a risk factor for acute myocardial infarctions (AMI), we hypothesize that UNGD could increase AMI risk among the elderly population. Methods: We develop a novel county-level database of AMI inpatient hospitalizations, UNGD well locations, and regional sociodemographic information to examine the associations between UNGD and AMI hospitalizations over time. We use a linear model in a difference-indifferences quasi-experimental design to assess changes in AMI hospitalization rates in highly exposed counties (top 15% of drilling activity) to less exposed counties. In sensitivity analyses, we test our results across numerous cutoffs for well density, drilling timing, and secular events. Results: We find that highly exposed counties demonstrate an additional 3.35 (95%CI: 0.68-6.02) hospitalizations per 10,000 people. The effect size for other time cutoffs range from 2.68 (95% CI: 0.11 to 5.25) to 3.18 (95% CI: 0.63 to 5.73). Our estimates are robust to multiple sensitivity analyses. Conclusion: A high density of UNGD wells increases AMI hospitalizations among the elderly population. This phenomenon requires further study to replicate this effect and investigate mechanism behind the increase in AMI in these areas.

LB063 S/P

THE ROLE OF BENZATHINE PENICILLIN GIN PREDICTING AND PREVENTING ALL-CAUSE ACUTE RESPIRATORY DISEASE IN MILITARY RECRUITS Jacob Ball* Jacob Ball, (University of Florida & Army Public Health Center)

Acute respiratory disease (ARD) is responsible for approximately 27,000 missed training days annually among US military recruits. Since the 1950s, the US military has used benzathine penicillin G (BPG) prophylaxis to prevent streptococcal infections in recruits. After a 12-year manufacturing freeze, the adenovirus vaccine was re-introduced in 2011, resulting in drastic decreases of all-cause ARD. Here, we explore the impact of adenovirus vaccine and BPG prophylaxis on ARD dynamics in military recruits. (Figure 1). We fit and cross-validated a random forest model (RF) and a Poisson regression model (PR) to ARD case counts from 23 years of the 26-year time series, and held out three years for external model validation. Trainee population size, installation, availability of BPG prophylaxis, adenovirus vaccine availability and month were predictors. Model fit was assessed by comparing the root mean squared error of the RF to the PR. Variable importance measures and incidence rate ratios (IRR) were extracted from the RF and PR, respectively, for each of the covariates. The RF out-performed the PR on average by 10% across allfolds. Trainee population size, the months of January and February, all eras of adenovirus vaccine availability were among the most important predictors of ARD from the RF, with BPG as the 8th most important (Table 1). BPG was a protective factor against all-cause ARD (IRR=0.65; 95%CI: 0.63, 0.67), but less so than either the old or new adenovirus vaccine which had IRRs of 0.42 (95%CI: 0.42, 0.43) and 0.11 (95%CI: 0.11, 0.12), respectively (Table 2). These results suggest that BPG is moderately predictive of, and significantly protective against ARD. Further work should be done to examine the cost-effectiveness of BPG this new era of ARD epidemiology.

HIV-RELATED KNOWLEDGE, ATTITUDES AND BEHAVIORS AMONG THE GENERAL POPULATION IN A HIGH-RISK COUNTY IN THE UNITED STATES Candice Collins* Candice Collins, (East Tennessee State University)

Information is lacking on what the general population knows about HIV and what their attitudes are towards the disease and those living with HIV, which may affect the transmission of HIV. The purpose of this study was to assess the HIV-related knowledge, attitudes and behaviors (KAB) among the general population of a highrisk county in Northeast Tennessee. A cross-sectional survey was administered to assess KAB variables After obtaining data, exploratory factor analysis and Cronbach's alpha were conducted to ensure reliability and validity. Knowledge and attitudes had three subscales on sex, blood, and blood products, mother to child transmission, and other knowledge and responsibility and blame, social contact, and anticipated stigma. Descriptive statistics were conducted on sociodemographic variables and individual KAB questions. Kruskal-Wallis, Wilcoxon and Bonferroni tests were used to determine differences between mean KAB scores among sociodemographic variables Spearman's correlation was conducted to determine association between KAB scores. Finally, multiple logistic regression was conducted with dichotomized KAB variables. Of the 322 participants, 92.6% had heard of HIV, 43.5% knew that HIV could not be transmitted by mosquitos, 82.9% felt that people talked badly about people living with HIV, and 67.8% of participants had never tested for HIV. Participants aged 25-34 were 7.29 times more likely to have a high level of HIV knowledge when compared to those 18-24 (95% CI: 2.04-26.08). Having had a HIV/STI educational program also lead to a higher level of HIV knowledge (OR: 1.77; 95% CI: 1.06-2.96). Participants with a higher education and higher income level had significantly lower stigmatizing attitudes than those who had completed high school or below or had an income of <\$20,000, respectively. Interventions are needed to increase levels of knowledge and decrease stigmatizing attitudes within this high-risk county.

LB066

PLASMA METABOLOMICS REVEAL NOVEL METABOLITES IN EARLY PREGNANCY IN ASSOCIATION WITH GESTATIONAL DIABETES RISK Cuilin Zhang* Cuilin Zhang, (NICHD, National Institutes of Health)

Background: Although metabolomics may shed light on the etiology of diabetes in pregnancy, prospective studies on their roles in gestational diabetes (GDM) etiology are sparse. We aimed to longitudinally examine metabolomics (both targeted and non-targeted) and GDM risk in a matched case-control study of 107 GDM and 214 non-GDM women in a multi-racial pregnancy cohort. Methods: GDM diagnosis was based on Carpenter & Coustan Criteria. Twenty-two amino acids were quantified using plasma collected at gestational weeks (GW) 10-14, 15-26, 23-31, and 33-39. In addition, 331 primary metabolites were quantified by GC-TOF mass spectrometry. Adjusted odds ratios (aORs) of GDM related to metabolites were estimated using conditional logistic regression adjusting for GDM risk factors. The present report focuses on findings using plasma in early pregnancy 10-14GW. Results: Alanine levels in GW 10-14 were significantly higher in GDM women than controls (mean: 30.5 vs. 27.6 umol/dl) and were positively related to GDM risk; aORs across increasing quartiles were 1.00, 1.69, 2.86, and 3.05 (P for trend=0.02). By contrast, asparigine and glycine levels were lower in GDM, and were inversely related to GDM risk; aORs across increasing quartiles were 1.00, 0.92, 0.74, and 0.48 (P = 0.045) for asparagine and 1.00, 0.42, 0.36, and 0.24 (P < 0.001) for glycine. In addition, based on non-targeted approach, isocitric acid were positively related to GDM risk; aORs across increasing quartiles were 1.00, 1.30, 1.04, and 2.32 (P = 0.002). We also identified two unknown metabolites that were strongly and inversely related to GDM risk (aORs were 1.00, 0.52, 0.18, and 0.11, and 1.00, 0.33, 0.12, and 0.06 respectively; both P for trend < 0.001). Conclusion: Our study revealed several novel metabolites that may be implicated in the early pathogenesis of GDM. These findings might provide new insights into GDM etiology.

PHYSICAL EXERTION IMMEDIATELY PRIOR TO EARLY PRETERM DELIVERY: A CASE-CROSSOVER STUDY Harpreet S Chahal* Harpreet S Chahal, (University of Toronto, Harvard TH Chan School of Public Health)

Background: Investigation of the effects of physical exertion on preterm deliveries has yielded mixed results; observational studies on occupational exertion have more consistently documented increased risks, while studies of leisure time activities generally document reduced risks of preterm delivery. The aim of the present study was to explore the association between episodes of physical exertion and the transient risk of early preterm delivery. Methods We conducted a case-crossover study of 722 women interviewed during hospital stay for early preterm delivery (defined as delivery before 34 weeks gestational age) between March 2013 and December 2015 in seven Peruvian hospitals. Eligible participants were identified by reviewing admissions logbooks for the emergency room, labour and delivery, and surgery. Results The relative risk (RR) of early preterm delivery was 5.8-fold higher (95% confidence interval [CI]: 3.2 - 7.9) in the bour following moderate or heavy physical exertion (exertion causing deep breathing or panting, overheating, and sweating respectively) compared to periods of lower exertion or rest, and returned to baseline in the hours thereafter. Women who reported engaging in moderate or heavy physical exertion more than 3 times per week in the year before pregnancy experienced a 4.1-fold increased risk (95% CI: 2.8, 6.0) with each bout of moderate or heavy physical exertion, as compared with a 15.3-fold risk (95% CI: 9.1, 25.8) among more sedentary women (P-homogeneity < 0.01). Moderate or heavy physical exertion was more strongly associated with delivery preceded by premature rupture of membranes (RR=8.4, 95% CI: 5.6-12.6) as compared with spontaneous early preterm delivery (RR=3.5, 95% CI: 2.1 - 5.9, P-homogeneity < 0.01). Conclusions Within 1 hour of episodes of moderate or heavy physical exertion, there is an increased risk of early preterm delivery, particularly among women with sedentary behavior.

LB068

SPATIO-TEMPORAL AND BIG DATA ANALYSIS OF RUBELLA IN CENTRAL CHINA, 2006–2016: GEOGRAPHIC, SEASONAL PATTERNS, AND ESTIMATION OF TRANSMISSIBILITY ZP Xiao* Sheng Li, (City University of New York)

Background: Rubella is a mild or asymptomatic viral respiratory infection. Decades of increasing vaccination and public health responses have led to dramatic declines, but rubella remains persistent in China. Understanding the spatio-temporal pattern and its driving factors of rubella are of great public health significance. Big data analysis is a useful tool to handle large size of surveillance data and to inform prevention via classifying the high-risk groups. This study aims to decipher the dynamics of rubella in Henan, the most populous province in China. Methods Comprehensive individual rubella case data, including epidemiologic links, vaccination, from a fever rash syndromic surveillance system was collected between 2006 and 2016. Social, demographic and economic statistics, weather variables were also collected. First, we performed comprehensive spatial temporal analysis in R. Wavelet analysis was performed to identify the seasonality. Multiple levels of maps and hot-spot analysis were developed to identify the region with high risk. A novel Bayesian regression model was developed to assess the impact of spatial and temporal factors. Second, we implemented big data analysis to classify the driving factors and high-risk groups. Results and Conclusions: Approximately 20,000 rubella cases were diagnosed from over 100,000 patients with fever rash. Annual pattern of rubella exist at provincial level, but became irregular at local levels. Multiple levels of maps and hot-spot analysis show that rubella prevalence decreased throughout the whole region but was persistent particularly in mountain regions. The Bayesian spatio-temporal model confirmed significant spatial and temporal drivers Finally, the deep learning algorithm classifies the high-risk groups and identifies the important driving factors such as vaccination.

THE INFLUENCE OF NEIGHBORHOOD CHARACTERISTICS ON SOCIAL PARTICIPATION IN CANADIAN AND LATIN AMERICAN OLDER ADULTS: FINDINGS FROM INTERNATIONAL MOBILITY OF AGING STUDY (IMIAS) Afshin Vafaei* Afshin Vafaei, (Lakehead University, Canada)

Background: Participation in social activities tend to decrease in old age and its impact on physical and mental health of older adults is well documented. Perceived neighborhood characteristics may influence the levels of social participation. Methods: We obtained data of 1721 community-dwelling older adults living in Canada, Brazil, and Colombia from 2014 wave of the International Mobility in Aging Study. Social participation was defined by the frequency of participation in seven activities from the social domain of the validated Late Life Disability Instrument. Participants also rated three physical and social environment characteristics of their neighborhoods: community barriers, perception of safety, and social capital; all measured via validated scales. Multilevel linear regressions mixed models with random intercepts were fit to examine potential associations of interest with accounting for the clustering effects of neighborhoods after adjustment for demographic and health status variables. Intraclass Correlation Coefficient was calculated to quantify variations in the levels of social participation across neighborhoods. Results: In Latin America between-neighborhood differences explained 5% of the variance in the levels of social participation, but the corresponding value in Canada was only 1.5%. In the fully adjusted models, none of the measured neighborhood factors were related to social participation in Latin America and in Canada only social capital was a significant contributor (Beta coefficient=0.17; 95%CI=0.05-0.28). Better physical health and cognition were related to higher social participation in all participants; however, socio-demographic factors of education and income were significant predictors only in Latin America. Conclusion: Patterns of social participation vary across different settings. In Canada, living in more cohesive neighborhoods enhances social participation whereas in Latin America individual factors are more important.

LB071 S/P

FACE-TO-FACE AND CYBERBULLYING VICTIMIZATION: MEASUREMENT THROUGH TWO DATA SOURCES Collin Calvert* Collin Calvert, (University of Minnesota)

Background: Traditional face-to-face bullying may propagate to online bullying, but research on this relationship is limited. Our purpose is to estimate the association between face-to-face bullying and cyberbullying victimization. Methods Bullying victimization data were collected from two sources: a survey administered in the fall and spring 2015, and app-driven weekly surveys. We recruited 167 students from two Iowa middle schools to complete the semester surveys. Indicators of face-toface bullying and cyberbullying were constructed from survey items measuring frequency of various forms of victimization. A sub-sample of 75 students equipped their smartphones with an app that collected electronic messages and weekly surveys about online bullying victimization. Two multivariable models estimated the association between face-to-face bullying at baseline and online bullying at followup: 1) a logistic model of online bullying, and 2) a Poisson model of the weekly rate of victimization. Results: At baseline, 28.4% (46) experienced face-to-face bullying. At follow-up, 7.3% (11) reported experiencing cyberbullying. Among the smartphone subsample, 26.7% (20) reported face-to-face bullying at baseline while 4.6% (3) reported experiencing cyberbullying at follow-up. Students who reported face-to-face victimization had greater odds of being cyberbullied at follow-up (OR: 4.61; CI: 1.13, 18.89). In the smartphone subsample, students who were bullied faceto-face at baseline had a greater rate of cyberbullying victimization than students who were not bullied face-to-face (IRR: 3.59; CI: 2.00, 6.45). Conclusions: There is an association between face-to-face bullying and cyberbullying. Bullying is not limited to the school environment and may spill into bullying online, with larger audiences of witnesses.

SEX-SPECIFIC ASSOCIATION BETWEEN ALCOHOL CONSUMPTION AND INCIDENCE OF HYPERTENSION: A SYSTEMATIC REVIEW AND META-ANALYSIS OF COHORT STUDIES Afshin Vafaei* Afshin Vafaei, (Lakehead University, Canada)

Background While the relationship between heavy alcohol consumption and an increased the risk of hypertension is well documented, the sex-specific risk associated with low levels of alcohol intake is unclear. Methods We searched Medline and Embase for original prospective cohort studies on the association between average alcohol consumption and incidence of hypertension. RRs were pooled with inverse-variance weighting using DerSimonian-Laird random-effect models to allow for between-study heterogeneity. Between-study heterogeneity was investigated with random-effects meta-regressions. Results Twenty studies with 361,254 participants (125,907 men; 235,347 women) and 90 160 incident cases of hypertension (32,426 men; 57,734 women) met our inclusion criteria. Pooled results showed that women drinking 1-2 drinks/day (12 grams pure ethanol/standard drink) were 21% less likely to develop hypertension compared to men (RR= 0.79, 95%CI: 0.67-0.93). In men, a dose response association was observed: compared to nondrinkers the relative risk for hypertension was 1.19 (95%CI: 1.07-1.31, I2 = 59%), 1.51 (95%CI: 1.30-1.76), and 1.74 (95%CI: 1.35-2.24) for consumption of 1-2, 3-4, and 5 or more drink/day, respectively. In women, there was no increased risk for 1-2 drinks/day (RR = 0.94, 95%CI: 0.88-1.01, I2 = 73%), and an increased risk for consumption beyond this level (RR=1.42, 95%CI: 1.22-1.66 for 3 drinks or more/day). No differences were observed for age, race, and region subgroups; however, these analyses had low statistical power. Conclusions Pooled analysis of data obtained from high-quality cohort studies showed any alcohol consumption increases the risk for hypertension in men. Contrary to earlier meta-analyses, we did not find evidence for a protective effect of alcohol consumption in women. Low consumption of alcohol (1-2 drinks/day) did not show any effect on the occurrence of hypertension in women; however, an increased risk was evident for higher consumption levels.

LB072 S/P

TWO TEST APPLICATIONS OF THE LIST EXPERIMENT TO REDUCE UNDER-REPORTING OF ABORTION: RESULTS FROM MALAWI AND SENEGAL Ruvani Jayawcera* Ruvani Jayawcera, (Ibis Reproductive Health/University of California, Berkeley)

Current methodologies to estimate abortion incidence and prevalence are timeintensive, complex, and often rely on incomplete data. Furthermore, directly asking women about their abortion experience has been found to result in under-reporting. This under-reporting is likely magnified in contexts where abortion is highly stigmatized and/or legally restricted. Accurate estimates of the size of the population affected are essential to developing targeted and effective programs, policies, and interventions to increase access to safe abortion and to improve individual health. The List Experiment is a method designed to increase reporting of sensitive or stigmatized behaviors, and has been applied to the measurement of abortion only a handful of times. To test the utility of this method further for measuring lifetime abortion prevalence, we applied the List Experiment methodology in two contexts where abortion is legally restricted and abortion data are limited: Malawi and Senegal. These analyses used data from a cohort study on sexual and reproductive health decision making in rural Lilongwe District, Malawi, and a population representative study of family planning experiences in four regions of Senegal. List Experiment results from Malawi yielded an estimate of the lifetime prevalence of abortion of 1.1% (95% CI: 0, 7.1), while results from Senegal estimate that 3.1% (95% CI: 0-10.4) of the population has ever intentionally terminated a pregnancy. Given that the current estimated annual abortion rate is 38 abortions per 1,000 in Malawi and 17 abortions per 1,000 women in Senegal, our estimates from the list experiment are likely underestimates. It is possible that given the legal repercussions in both countries for disclosing abortion, as well as high levels of abortion stigma, respondents may not have felt comfortable disclosing whether or not they had had an abortion even within the list format.

ANALYSIS OF THE ASSOCIATION BETWEEN VECTOR-BORN DISEASES AND SOCIAL DETERMINANTS IN COLOMBIA THROUGH LOG-GAUSSIAN COX PROCESSES Mabel Carabali* Mabel Carabali, (McGill University)

Dengue is an arboviral infection with highest incidence in tropical and sub-tropical areas. Colombia is Latin America's second most socially unequal country and also suffers an important burden of dengue. Since dengue burden concentrates in low socioeconomic settings, it is important to identify spatial patterns for concentration areas accounting for individual social factors. Although previous studies have used aggregated and area level data, we consider the critical advantage of using individual level location and socioeconomic data to help identify the role of social determinants of health on dengue distribution, while accounting for spatial autocorrelation. Using routinely weekly-collected individual data of 1,793 confirmed cases from the surveillance system in Medellin, Colombia, we estimate the spatial distribution of the individual cases as a function of individual level covariates, such as the patient's health insurance scheme, and other individual socioeconomic covariates. In order to take into account both observed and unobserved variation, we propose a log-Gaussian Cox point process, which is based on a latent random field that describes the intensity (degree of clustering) of the point pattern and allows us to estimate an underlying spatial surface, pointing out regions of higher and lower intensity of disease. The inference procedure is performed within a Bayesian paradigm, which facilitates calculation of the uncertainty of our estimates. We make use of the package r-INLA to obtain samples from the posterior distribution of the parameters of interest. The application of this method allows the identification of disease clustering, while estimating quantitatively the contribution of social factors, the degree of health inequality, and providing recommendations for decision-making on disease control.

LB075 S/P

LACK OF BENEFIT FROM STATIN THERAPY: RESULTS FROM A LARGE US HEALTH RESEARCH NETWORK. Seth Kuranz* Seth Kuranz, (TriNetX, LLC and BU)

Background: Recent studies have questioned the effectiveness of statin therapy for the primary prevention of hypertension/dyslipidemia. The following analysis examined the association between statins and cardiovascular (CV) events using TriNetX, a federated global health research network representing over 44M patient lives. Method: We defined a cohort of US patients aged 65+ with 1+ entry in their electronic medical record (EMR) in 2013. Statin use was defined as 1+ medication code for any statin in 2013. CV events were defined as the first ICD-9/10 code for heart failure, ischemic cardiac events or stroke. Exclusion criteria included CV disease, diabetes, or peripheral arterial disease prior to 2013. A stratified analysis and survival function from a life table provided evidence of the relationship between statin use and CV disease. Results: Of the total number patients aged 65+ in 2013 (n=917,030), 17% had 1+ statin in their EMR. Statin and non-statin users had a similar mean age (78(6) vs 77(9)), while statin users were more likely to be white (81 vs 79%) and male (42 vs 38%). Both groups had comparable levels of cholesterol, HbAlc, and blood pressure at baseline. Compared to non-statin users, statin users had a 22% higher rate of CV events (95% CI: 20-24%), after controlling for confounding. Both groups had an 82% probability of being event-free after four years of follow-up, with more CV events occurring earlier in the study period among statin user. Conclusions: Findings align with results from clinical trials and secondary data analyses questioning the benefit of prescribing statins to older adults who are at moderate risk for CV disease and demonstrate the generalizability of these results to real world settings. The trade-off of addressing selection bias versus the "depletion of susceptibles" will be described. Limitations include the use of EMR to define medication use.

LB074

CUMULATIVE DISASTER EXPOSURE IMPACTS MENTAL AND PHYSICAL HEALTH SYMPTOMS IN A LARGE SAMPLE OF GULF COAST RESIDENTS John A. McGrath* John A. McGrath, (Social & Scientific Systems)

A large body of research has linked disaster exposure to adverse mental and physical health outcomes. Few studies, however, have explored the cumulative impact of exposure to multiple disasters. We examined whether effects of multiple exposures cumulate in a sample of participants from the GuLF Long-Term Follow-up Study potentially exposed to Hurricane Katrina and/or the Deepwater Horizon oil spill (N=8,377). Zero-inflated models (logistic distributions combined with negative binomial or Poisson distributions) were applied to measure cumulative exposure effects on depression (Patient Health Questionnaire-8), anxiety (Generalized Anxiety Disorder-7) and post-traumatic stress (PTS: Primary Care Post Traumatic Stress Disorder Screen). Log binomial regression tested effects on 24 physical symptoms (e.g., upper or lower respiratory problems, irritation of membranes, headache, fatigue, neurologic symptoms) experienced at the time of the spill cleanup, dichotomized into high (experienced 12+ symptoms) vs. low (0-11). Important covariates were adjusted for (e.g., previous mental illness). Having both exposures versus no exposures was associated with significantly higher scores on all three mental health scales; having one exposure significantly increased depression and anxiety scores over no exposures. For the logistic portion of the models, having two versus zero exposures was associated with higher odds of a nonzero score on all three mental health scales: anxiety OR=1.83 (95% CI 1.54-2.19); depression OR=1.56 (95% CI 1.30-1.87); PTS OR=3.29 (95% CI 2.64-4.36). Having one versus zero exposures was associated with higher odds of a nonzero PTS score: OR=1.48 (95% CI 1.18-1.86). The Prevalence Ratio for high physical symptoms was significantly higher for 2 exposures (PR=1.29; 95% CI 1.15-1.45) versus one exposure (PR=1.17; 95% CI 1.05-1.30). Results suggest that effects of disaster exposures are cumulative with long-term consequences for both mental and physical well-being.

LB076

QUALITY OF LIFE AMONG WOMEN FOLLOWING PELVIC MESH PROCEDURES: A SYSTEMATIC LITERATURE REVIEW AND META-ANALYSIS Kevin Towle* Kevin Towle, (Cardno ChemRisk)

Recent concerns have arisen regarding complications, including quality of life implications, following pelvic mesh surgery. The objective of this study was to use the weight of evidence from validated questionnaires (Pelvic Floor Distress Inventory [PFDI] and Pelvic Floor Inventory Questionnaire [PFIQ]) to evaluate changes in quality of life following pelvic mesh procedures. Studies were identified by electronic-database searching of PubMed and Web of Science. We excluded studies that did not report both pre- and post-surgery questionnaire scores, associated measures of error, or respondent sample size. Fixed-effect and randomeffects models were employed to estimate the Hedges' g standardized mean difference (SMD) of pre- and post-operative results. When studies reported scores from multiple time points of follow-up among the same cohort, preference was given to the time point with the longest length of follow-up. In this analysis, a higher SMD represents a higher increase in the quality of life post-surgery. Three hundred and sixty (99.4%) of the abstracted scores reported increased quality of life postsurgery. The meta-SMD for total PFDI scores was 2.81 (95% CI: 2.40-3.21), while the meta-SMD for total PFIQ scores was 2.42 (95% CI 1.99-2.86). Both transvaginal and abdominal surgical approaches were associated with statistically significantly elevated SMDs. For both questionnaires, the colorectal-anal subscales were associated with the lowest relative meta-SMDs, followed by the urinary subscales, and then the pelvic organ subscales. Meta-SMDs for studies restricted to those with more advanced POP-Q scores (≥stage III) were higher than SMDs for studies including all patients. There was a high amount of heterogeneity reported, which could be explored via meta-regression in future research. Overall, these findings suggest that pelvic mesh procedures are associated with increases in quality of life

A REGRESSION TREE FOR IDENTIFICATION OF RISK FACTORS FOR FEAR OF FALLING IN OLDER ADULTS PARTICIPATING IN THE INTERNATIONAL MOBILITY IN AGING STUDY (IMIAS) Afshin Vafaei* Afshin Vafaei, (Lakehead University)

Background: Fear of falling (FOF) in older adults is associated with various physical and mental health outcome and a threat to healthy aging; however, it is not clear who are at higher risks of FOF. Classification and regression tree (CaRT) analysis by simultaneous examination of a large number of predictors can quantify values of each predictor and provides a simple algorithm for identification of vulnerable individuals. Methods: We used data from the International Mobility in Aging Study that includes diverse populations of community-dwelling older adults from Canada, Brazil, Colombia, and Tirana. FOF was measured by the validated scales of Fall Efficacy Scale-International in 2016 and potential risk factors for FOF (identified based on relevant literature: age, sex, education, self-rated health, comorbidity, body mass index, visual impairment, frailty, cognitive deficit, depression, fall history, and mobility disability) were measured in 2014. Utilizing random forest method with 2000 iterations, recursive partitioning with conditional inference tree algorithm was performed to identify FOF risk subgroups. Multiple logistic regression analyses were conducted to estimate the effects of combination of risk factors. Results: CaRT included 12 end groups differing in risk of FOF with a minimum of two and a maximum of five predictors. The first split in the tree involved impaired physical function: respondents with mobility disability had a 82% risk of developing FOF in the 2 years of follow-up, those without mobility disability were further divided into two groups: females aged 70-75 years (risk of 65.3%), and females aged 64-69 years (risk of 45.5%). Other important predictors were education, self-rated health and living with others. Conclusion: This classification tree included different groups based on specific combinations of a maximum of five easily measurable predictors with an emphasis on impaired physical functioning as a risk factor for developing FOF.

LB079 S/P

PATTERNS OF INITIAL PRESCRIPTION OPIOID USE AND RISK OF MORTALITY Hilary A. Aroke, MD MPH* Hilary A. Aroke, (University of Rhode Island)

Background: An initial opioid prescription intended for short term use may lead to chronic opioid use with an associated increased risk of fatal overdose. Objective: To examine the association between the patterns of initial prescription opioid use for non-cancer pain and risk of all-cause mortality among insured opioid-naïve patients in the U.S. Methods: Using de-identified administrative claims data set (Optum Clinformatics® Data Mart; OptumInsight, Eden Prairie, MN) from 2010 to 2015, we identified opioid-naïve (in last 6 months) patients \ge 18 years, not receiving cancer, palliative care, or opioid use disorder treatment. Based on pattern of initial opioid use (6 months after first prescription), patients were categorized either as daily opioid users if patient had > 90 days' supply of opioids or as non-daily users. Multivariable Cox regression models were used to estimate the association of the pattern of initial opioid use with all-cause mortality, adjusting for baseline covariates. Results: A total of 3,226,265 patients were included in the study, of which 3% were daily opioid users; 55% were female; median age was 51 years; median Charlson comorbidity index was 0.0; and mean daily morphine milligram equivalent was 34.20 (95% CI: 34.17-34.21). Patients were followed forup to 5 years (median of 2 years) with a total of 7,146,831 person-years during which 32,550 (1%) died. The crude death rate was 455 deaths per 100,000 person-years. After adjusting for potential confounders, patients who were initial daily users had an increased risk of mortality compared to non-daily users (HR= 2.5; 95% CI: 2.3, 2.7). The hazard of mortality attenuated slightly over time (HR = 1.8; 95% CI: 1.7, 1.9 at 5 years). Conclusion: Incident chronic opioid use was associated with an increased risk of mortality that persisted for up to 5 years after the initiation of opioid therapy.

LB078 S/P

SMOKE-FREE LAWS AND DISPARITIES IN SMOKING CESSATION IN THE UNITED STATES, 2003-2015 Andrea R. Titus* Andrea R. Titus, (University of Michigan)

Significance Smoke-free laws can reduce the burden of tobacco-related diseases, but few studies have examined the relationship between these laws and disparities in smoking cessation. This study examines whether smoke-free laws are differentially associated with cessation by education, race/ethnicity, age, and gender. Methods Data from the U.S. Census Bureau and the American Nonsmokers' Rights Foundation were merged to calculate the percent of the population within corebased statistical areas (CBSAs) covered by smoke-free laws in the workplace and hospitality sector (restaurants and bars). A smoke-free law was considered present if at least 50% of a CBSA was covered. A four-level variable was used to indicate workplace coverage by a smoke-free law, an individual employer policy (selfreported from survey), both, or neither. The hospitality law was modeled separately. The outcome variable was 90-day smoking cessation, derived from data on adult selfrespondents between the ages of 25 and 65 from the Tobacco Use Supplement to the Current Population Survey (2003-2015). Fixed effects logistic regression models were used, with effect modification explored through the inclusion of interaction terms. Results Smoke-free coverage of workplaces by a law or a combination of a law and an employer policy was associated with higher odds of cessation for individuals ages 40-54. Smoke-free law coverage of hospitality venues was associated with higher odds of cessation among individuals ages 55-65. Within this age range, individuals in the "Other" race/ethnicity category had significantly greater odds of cessation due to smoke-free hospitality laws compared to non-Hispanic Whites and non-Hispanic Blacks. None of the interactions between smoke-free law coverage and education or gender were statistically significant. Conclusions Age and race/ethnicity appear to modify the relationship between smoke-free law coverage and smoking cessation.

LB080 S/P

EXAMINING THE "BIRTH WEIGHT PARADOX": DIFFERENCES IN MATERNAL AND NEWBORN CHARACTERISTICS AMONG SMOKING AND NON-SMOKING MOTHERS OF LOW BIRTH WEIGHT INFANTS Maria Sevoyan* Maria Sevoyan, (University of South Carolina)

Several studies from different countries have shown a counterintuitive relationship between mortality in low birthweight (LBW) infants and maternal smoking during pregnancy: mortality among LBW infants born to non-smoking mothers is higher than mortality among those born to smoking mothers. However, little is known about differences in maternal and newborn characteristics in the exposed and unexposed groups. We analyzed data from two cohorts: 18,081 infant-mother dyads from the UK Millennium Cohort Study and 3,281,944 dyads from the US National Vital Statistics System. Maternal and newborn characteristics were compared between smoking and non-smoking mothers using Chi-square test. Prevalence of LBW among smokers was twice as much as the prevalence in non-smokers for both countries (UK: 10.0% vs. 5.3%; US: 11.0% vs. 5.7%). Overall, as compared to nonsmokers, mothers who smoked during pregnancy were more likely to be young white, unmarried, less educated, unemployed, and to have had pregnancy complications. These factors are known to be associated with higher LBW risk. However, other important unfavorable factors were more prevalent among nonsmokers, namely non-smokers were more likely to have: pre-pregnancy diabetes (UK: 4.1% vs 1.5%; US: 1.3% vs 1.2%), pre-pregnancy hypertension (US: 3.8% vs 3.0%), eclampsia (US: 1.1% vs. 0.7%), and gestational diabetes (US: 5.5% vs. 4.1%). Some unfavorable newborn conditions were more prevalent among infants of non-smokers as compared to smokers including preterm birth (UK: 61.2% vs. 52.7%; US: 64.3% vs. 54.1%) and congenital heart disease (US: 0.33% vs. 0.21%). It has been hypothesized that higher prevalence of unfavorable maternal and neonatal factors that are also associated with lower birthweight might explain higher infant mortality among LBW infants born to non-smokers. Future steps following our analysis include quantifying the contribution of each factor to LBW and subsequent mortality among smokers vs. non-smokers.

EVALUATION OF ETHNIC DISPARITIES AND THE POTENTIAL MEDIATORS OF CHIKUNGUNYA DISEASE IN FORTALEZA, BRAZIL Mabel Carabali* Mabel Carabali, (McGill University)

Brazil has the highest burden of Chikungunya virus (CHIKV) in the Americas, with more than 300,000 cases yearly. CHIKV has a relatively low risk of death but imposes a highly disabling acute arthritis and associated long-term complications. We hypothesize that besides biomedical factors; CHIKV's transmission is affected by specific social determinants. To identify these determinants and their role on CHIKV's burden in Fortaleza, Ceara, we used notified data obtained from SINAN (Brazil's surveillance system) to identify drivers of the transmission between 2014-2018. We used multilevel modeling with negative binomial and Poisson links to identify Incidence Rate Ratios (IRRs), including random effects to account for spatial (neighborhood level) and temporal autocorrelations. Social covariates included development index (HDI), ethnicity, education, and other neighborhood characteristics obtained from census data. There were 77,024 confirmed CHIKV cases reported, (649 hospitalized and 158 deaths). The majority of cases were females 47,574 (61.8%), people over 20 years old 77,024 (84.4%), and Non-Whites 58,486 (75.9%) when a third of the population is white. High HDI was associated with 64% lower incidence of CHIK (IRR=0.4; 95%CI=0.3-0.5), while the proportion of black cases (IR R=1.6; 95%CI=1.4-1.7) and people over 20 years old (IRR=2.4; 95%C1=2.0-2.9) showed an increased risk of CHIKV infection. Spatial random effects identified a concentration in the central region of the city. Temporal effects showed higher transmission from March-June of each year with a peak on May (IR R=13.9; 95% C1=11.4-17.1), comparing to January. The unadjusted ethnic disparity was 44 excess cases per 1000 (95% CI=37-51), and adjustment altered this only slightly to 40 (95%CI=33,47). We consider that the observed disparity is related to structural differences in social determinants that deserve further analysis to explore the roles of potential mediators such as differential access to health care.

LB083 S/P

CHARACTERIZING FLU VACCINE EXEMPTION BEHAVIOR AMONG HEALTHCARE WORKERS: PATTERN RECOGNITION ALGORITHMS IN EMPLOYEE HEALTH DATA Morgan M Richey* Morgan M Richey, (University of North Carolina - Chapel Hill)

Background: Annual vaccination of healthcare workers is an important means to reduce transmission of influenza in the healthcare setting. Our institution required annual influenza vaccination starting in 2010, but exemptions due to medical indications or religious/personal beliefs were permitted. With a long term goal of increasing vaccination compliance, we have characterized those who were exempted from vaccination since 2010. Methods: 20,861 employee records at a single institution from 1/1/2010 to 1/1/2017 were retrospectively reviewed for vaccination, employment and demographic information. During this period, declination of influenza vaccination was permitted for the following reasons: allergy to a component of the vaccine, Guillain-Barre syndrome following prior vaccination, another medical condition supported by a physician note, or self-declared religious/personal beliefs. Inconsistent exemption was defined as a pattern of declination consisting of at least 2 changes in reasons given for declination (minimum of 3 declinations) including at least one religious/personal belief exemption. Inclusion criteria therefore included only employees with durations of employment of at least 3 years to allow for identification of the exemption pattern. Results: Over the review period, 921 (4.4 %) of employees declined influenza vaccination. Of these, 457 (49.6%) reported the same reason for declination each time or had a maximum of 1 change, but 464 (50.4%) met our criteria for varying declination characterized as inconsistent. Within the inconsistent group, 73.8% were female, 60.8% were in positions involving direct patient contact, mean age at initial exemption was 43.1 years old, and mean duration of employment was 6.2 years. Conclusion: We have identified and characterized healthcare workers exhibit inconsistent exemption behavior despite a pro-vaccination campaign by institutional leadership.

LB082 S/P

THE PAIN MANAGEMENT INVENTORY: A LATENT CLASS ANALYSIS OF USE OF NON-PHARMACOLOGICAL THERAPIES FOR PAIN Melvin Donaldson* Melvin Donaldson, (University of Minnesota)

We developed and piloted the Pain Management Inventory (PMI)-a checklist of 20 conventional and complementary non-pharmacological health approaches commonly used for pain. The long-term goal of the present study is to facilitate standardized reporting of non-pharmacologic pain management in research. Recent National Guard Veterans from a longitudinal cohort (N=3,843) were invited to participate in a follow-up mailed survey that included the PMI. Respondents indicated whether they used each PMI approach in the past year. We classified each PMI approach into complementary versus conventional and passive versus active. We used latent class analysis to identify similar PMI response patterns and included demographic, pain and psychological covariates as predictors of latent class membership in the model. We calculated the marginal effects of the covariates on class membership and present them as standardized risk differences. The survey response rate was 48.1%. The best-fitting latent class model had 6 classes: low-participation (46.7% of respondents, 95% CI [44.3%-49.1%]), exercise users (23.7% [21.6%-25.7%]), psychotherapy users (5.4% [4.2%-6.6%]), passive complementary users (14.9% [13.1%-16.7%]), active complementary users (5.0% [4.0-6.1%]), and highparticipation multi-modal complementary (4.3% [3.2%-5.3%]). Compared to the low-participation class, chronic pain was associated with passive complementary (difference in RD=0.255 [95% CI: 0.167-0.344]), high-participation multi-modal complementary (0.151 [0.087-0.216]) and psychotherapy users (0.105 [0.027-0.183]), but not the active complementary (0.043 [-0.29-0.115]) or exercise users class (0.065 [-0.046-0.176]). These findings illustrate that adults with chronic pain have high participation in passive complementary therapies and are especially more likely than adults without chronic pain to use multiple modalities. This latent class categorization should be explored further. Future studies will examine the PMI in other patient populations.

LB084 S/P

IMPROVING THE EFFICIENCY OF REACTIVE SCREEN-AND-TREAT FOR MALARIA ELIMINATION IN SOUTHERN ZAMBIA Fiona Bhondoekhan* Fiona Bhondoekhan, (Johns Hopkins Bloomberg School of Public Health)

Background: Malaria screen-and-treat is a reactive case detection strategy where cases detected at health centers trigger community health workers to screen for secondary malaria cases within a 140m radius of the case's house using PfHRP2 RDTs. This study extended the screening radius to 250m to assess if secondary case identification can be improved using environmental features that characterize the immediate surroundings of a house Methods. Participants enrolled from January 12, 2015 to July 26, 2017 completed surveys to capture demographic and householdlevel characteristics. Houses were stratified into malaria positive or negative secondary houses based on residents' RDT and PCR results. Number of animal-pens within 100m radius, elevation difference and distance between houses, and distance to nearest stream, main road, and animal-pen were measured using ArcGIS. Logistic regression assessed the association between environmental risk factors and the odds of a secondary house having a malaria positive resident Results: 165 of 4,202 individuals were malaria positive. Household stratification revealed 488 negative and 45 positive secondary houses. There was a non-significant trend for positive secondary houses to be at lower elevation (mean; SD: 4.6m; 21.1m) (p=0.5) and further from the main road (10,327m; 7328m) (p=0.25), but significantly closer to streams (424.3m; 316.7m) (p=0.006), with category-1 streams as most common nearest stream. Negative secondary houses were 12.7m (p=0.21) closer to index houses. Distance to nearest animal-pen was similar for all secondary houses, with a mean of one pen within 100m (p=0.95). Logistic regression revealed no significant associations. Marginal significance was observed for nearest stream-type, where the adjusted relative odds of a positive secondary house was 2.6 for category-3 streams compared to category-1 streams (p=0.07) Conclusion: Screening houses along streams may be a more efficient reactive screen-and-treat strategy

ESTIMATING THE LONG-RUN RELATIONSHIPS BETWEEN STATE CIGARETTE TAXES AND LIFE EXPECTANCY Emilie Bruzelius* Emilie Bruzelius (Department of Epidemiology, Mailman School of Public Health, Columbia University)

A large body of literature suggests that tobacco control legislation-including fiscal measures such as excise sales taxes-reduces tobacco smoking, and that tobacco smoking confers such high risk of mortality that it may be plausibly related to largescale variations in life expectancy. At the same time, there remains active debate regarding the appropriate methodology for estimating the accumulating impact of tobacco taxes on life expectancy over time. The addictive nature of nicotine means that a tax increase may not immediately induce individuals to guit, and there may be a lengthy induction period between policy exposure increase and eventual cessation. Moreover, unlike discrete policy introductions, which are amenable to difference-indifferences or synthetic control analysis, cigarette taxes are not only continuous, but also increase incrementally over multiple years-complicating the clear separation of pre- and post-policy periods. To overcome these concerns, we borrow from the macroeconomic literature, using a multilevel dynamic panel regression model to examine the relationship between state cigarette tax increases and county-level life expectancy to test the hypothesis that increases in state cigarette excise taxes are positively associated with increases in life expectancy at the county level. We additionally examine whether the relationship between cigarette taxes and life expectancy varies by the sex, income, and rural/urban composition of a county, and whether it is mediated by changes to smoking prevalence. Data on estimated life expectancy at birth for all U.S. counties across the period 1996 to 2012 by sex was merged to state cigarette excise tax rates by year. A multilevel dynamic panel regression model with fixed effects for county was used to assess relations between tax rates and life expectancy, separately estimating short-run and longer-run associations. We found that for every \$1 dollar increase in cigarette tax per pack, county life expectancy increased over the long

LB087 S/P

RACIAL/ETHNIC DISCRIMINATION AND SLEEP DURATION/DIFFICULTIES AMONG WHITE, BLACK AND LATINA WOMEN: FINDINGS FROM THE SISTER STUDY Symielle Gaston* Symielle A. Gaston, (Epidemiology Branch, National Institute of Environmental Health Sciences)

Introduction: Few studies have examined the relationship between discrimination and sleep measures in a diverse sample of women. Methods: To investigate racial/ethnic discrimination and sleep in white, black, and Latina women, we used telephone interview data collected from Sister Study participants (2003-2012) who did not take sleep medications and reported on everyday (e.g., treated as less intelligent/honest) and major (e.g., unfair mortgage lending) racial/ethnic discrimination. Self-reported measures were short sleep duration (50% college educated, 5.0% black, 4.2% Latina), black women most frequently reported everyday and major discrimination (57% and 41% vs. 1.9% and 1.4% [white] and 15% and 6.6% [Latina]) as well as habitual short sleep (44% vs. 18% [white] and 28% [Latina]). Sleep debt was higher among black and Latina women (both 38% vs. 29% [white]). Each additional everyday discrimination event was associated with a higher prevalence of short sleep among black women (PR=1.11 [1.04-1.19]) and sleep debt among Latina women (PR=1.16 [1.02-1.31]). Associations between increasing numbers of major discrimination events and short sleep were seen for all race/ethnic groups white (PR=1.39 [95% CI: 1.18-1.64]), Latina (PR=1.34 [1.05-1.71]), and black (PR=1.10 [1.03-1.19]). Discrimination was not associated with napping or insomnia symptoms. Conclusion: Racial/ethnic discrimination remains common among higher SES racial/ethnic minorities, and associations between discrimination and sleep varied by race/ethnicity.

LB086 S/P

SATELLITE IMAGES AND MACHINE LEARNING CAN IDENTIFY MISSING RURAL COMMUNITIES Emilie Bruzelius* Emilie Bruzelius, (Arnhold Institute for Global Health, Icahn School of Medicine Mount Sinai)

Background: Remote rural populations in low- and middle-income countries have some of the world's lowest rates of access to essential health care services. A persistent barrier to delivery of health services in very rural and remote regions is inability to accurately identify all communities within a catchment area. This difficulty is magnified when census and vital registration data are limited. Methods: Using publicly available satellite imagery, we developed a method for identifying communities in rural settings using a machine learning algorithm that excels at detecting objects within images. We trained the algorithm to detect buildings, and examined clustering of buildings to identify groupings suggestive of communities. The approach was validated in Liberia, by comparing algorithmic results with community location data collected by enumerators and community health workers. Findings The method achieved 86.47% positive predictive value and 79.49% sensitivity with respect individual building detection. The approach correctly identified 451 of the 596 communities that had been identified and registered through the community enumeration process (75.67%), and identified an additional 167 potential communities not previously registered. Several instances of false positives and false negatives were identified. Interpretation: To our knowledge, this study represents the first effort to apply image recognition machine learning algorithms in the context of global health care delivery among rural populations. Results suggest that this approach has potential to enhance community detection in very rural areas; thus enhancing health service delivery.

LB088 S/P

LIVER ENZYMES MIGHT NOT BE ASSOCIATED WITH ADIPOSITY: A MENDELIAN RANDOMIZATION STUDY Junxi Liu* Junxi Liu, (The University of Hong Kong)

Poorer liver function is associated with higher risk of diabetes in Mendelian Randomization (MR) studies. Observationally, obesity is also associated with poorer liver function. However, whether poorer liver function causes obesity thereby contributing to diabetes is unclear. We assessed the association of liver function with adiposity observationally in a unique population with little socio-economic patterning of adiposity and using two sample MR. In the population-representative "Children of 1997" birth cohort, adjusted linear regression was used to assess the associations of alanine transaminase (ALT) and alkaline phosphatase (ALP) at ~17 years with body mass index (BMI)). Using MR, genetic variants predicting ALT, ALP and gamma glutamyltransferase (GGT), were applied to genome-wide association studies (GWAS) of BMI (n=339,224) to obtain unconfounded estimates using inverse-variance weighting. Observationally, higher ALT was associated with higher BMI (0.11 kg/m2, 95% confidence interval (CI) 0.10 to 0.12). Higher ALP was associated with lower BMI (-0.017 kg/m2, 95%CI -0.023 to -0.012). Using MR, genetically higher ALT was associated with lower BMI (-0.09 standard deviation (SD) per 100% change in concentration, 95%CI -0.18 to -0.01). However, genetically predicted ALP and GGT were not clearly associated with BMI. Poorer liver function might not cause obesity, but on the contrary higher ALT might reduce BML Whether ALT contributes to diabetes by reducing the muscle mass requires investigation.

HAS ALTERNATIVE TOBACCO PRODUCT USE INFLUENCED FUTURE CIGARETTE SMOKING INTENTION AMONG CIGARETTE-NAïVE ADOLESCENTS OVER TIME? Natalie Levy* Natalie Levy, (Columbia University Department of Epidemiology)

Aims: Among cigarette-naïve adolescents, research has shown a positive effect between using alternative tobacco products (ATP) and intention to initiate cigarette smoking. From 2011 to 2016, the use of ATP increased among adolescents; however, cigarette smoking among adolescents has decreased over this same time period. In this study, we explored contemporaneous trends in adolescent ATP use and intention to smoke cigarettes in a nationally representative U.S. sample. Methods: We used data from the 2011 - 2015 U.S. National Youth Tobacco Survey. Our analyses were limited to 71,101 cigarette-naïve students aged 9 to 19. We hypothesized that an increasing trend in ATP use would result in an increasing trend in intention to smoke cigarettes (ISC) over time. Weighted logistic regression including time as a fixed effect and the Ismeans function in R were used to predict the overall prevalence over time and prevalence stratified by sex of: 1) ATP use, 2) intention to smoke cigarettes, 3) intention to smoke cigarettes given ATP use. Results: ATP use increased from 2.87% [95% confidence interval: 2.36% - 3.50%] in 2011 to 6.24% [5.62% - 6.93%] in 2015 (p-trend<0.05). The prevalence of ISC declined slightly from 1.70% [1.39% - 2.08%] in 2011 to 0.88% [0.70% - 1.09%] in 2013 (p-trend <0.05), and then remained stable until 2015. The likelihood of ISC was consistently higher in ATP users than non-users in each year, and the prevalence of ISC among ATP users did not change between 2011 and 2015. Among males using ATP, there was a decrease in the prevalence of ISC while among females using ATP, there was a slight increase in the prevalence of ISC. Discussion: There were no increasing trend in ISC among cigarette-naïve ATP users despite an increasing trend in ATP and an increased likelihood of ISC in each survey year among ATP users. Our findings might be explained by differences in the social dynamics of drug use by sex. Funding: CONACYT and Colciencias doctoral scholarships, and R01DA037866.

LB091 S/P

THE GENDER DIFFERENCES IN THE RELATIONSHIP BETWEEN MENTAL HEALTH STATUS, HYPERTENSION, AND EMERGENCY ROOM VISITS IN THE U.S. Sylvia S. Rozario* Sylvia Rozario, (Virginia Commonwealth University)

Background: Hypertension (HTN) is the most important risk factor for cardiovascular mortality; however, cardiovascular mortality rate is higher in women compared to men. Moreover, poor mental health status is more prevalent in women and may be related to higher probability of poor HTN outcomes; thus may increase emergency room (ER) visits in women compared to men. This study aims to find gender difference in the association between mental health status and HTN and the combined effect of mental health status and HTN on ER visits in the U.S. Methods: Household component of 2014 Medical Expenditure Panel Survey was analyzed (Male: n=10,952; Female: n=12,745). Kessler scale for mental health (MH) status (poor, good/excellent), HTN (yes, no), and ER visits (no visit, ≥1 visits) were examined. A combined effect variable for MH and HTN was created. Multiple logistic regression analysis stratified by gender was conducted and adjusted OR with corresponding 95% CI were calculated. Bonferroni correction was used. Results: After adjusting for confounders, person reporting poor MH had significantly higher odds of HTN compared to those who reported good/excellent MH, for both men and women; however, the effect size was greater for women than men (Women: AOR=1.55, 95% CI=1.27, 1.75; Men: AOR=1.39, 95% CI=1.16, 1.68). Further, participants who reported HTN coupled with poor MH had higher odds of having ER visits compared to person who reported no HTN coupled with good/excellent MH in the adjusted analysis, for both men and women; however women had higher effect sizes than men (Women: AOR=3.15, 95% CI=2.48, 3.90; Men: AOR=2.95, 95% CI=2.32, 3.93). Conclusions: There is a significant association between MH status and HTN in men and women. Further, poor MH status coupled with HTN leads to increase ER visits for both men and women. However, measures of association are greater in women than men in both instances. It is important that health professionals are aware of these differences.

LB090 S/P

OPIATE AGONIST THERAPY AND RISK OF HEPATITIS C VIRUS INFECTION: DOES PERCEIVED DOSAGE ADEQUACY MATTER? FINDINGS FROM A 13-YEAR LONGITUDINAL STUDY OF PEOPLE WHO INJECT DRUGS IN MONTREAL, CANADA Andreea Adelina Artenie* Andreea Adelina Artenie, (Université de Montréal, Montréal, Canada)

Background: High dose opiate agonist therapy (OAT) is considered key in reducing risk of hepatitis C virus (HCV) infection among people who in ject drugs (PWID), as it targets cessation of illicit opioid use. Yet, cessation may not resonate with patient aspirations regarding OAT. This study investigates the association between perceived adequacy of OAT dosage and HCV infection risk among PWID. Methods: In a prospective cohort study of initially HCV-uninfected PWID in Montreal (2004-17), participants provided blood samples for HCV testing and filled a behavioral questionnaire at 6 or 3-month intervals. Current OAT enrolment, actual dose (mg) and perceived dose adequacy (adequate/too low/too high) were selfreported at each visit. Time-dependent Cox regression analyses were fit adjusting for age, gender, injection duration and type(s) of opioid(s) injected. Results: Of 513 eligible participants (median age: 34.1; 80.6% male), 168 acquired HCV over 1509.6 person-years (p-y) of follow-up [HCV incidence: 11.1/ 100 p-y (95% CI: 9.5-12.9)]. For the 1590/3421 total study visits during which participants reported OAT, dosage was perceived adequate in 73.3%, too low in 20.9% and too high in 5.8%. Correlation was modest between perceived dose adequacy and actual dose. Past-month in jection drug use proportions were similar across visits (no OAT: 67.8%, OAT perceived adequate: 72.2% or too high: 71.0%), except when OAT was perceived too low (85.5%). Compared to those not on OAT, PWID who were and perceived their dose as adequate were less likely to become HCV infected (aHR: 0.60; 95%CI: 0.39-0.92), but not those who perceived it too low (aHR: 0.89; 0.53-1.51) or too high (aHR: 0.85; 0.26-2.71). Conclusion: Compared to those not on OAT, PWID who were on OAT and perceived their dose as adequate were less likely to become HCV infected, despite being as likely to report injection drug use. Findings emphasize the need for flexible approaches to OAT dosage in achieving HCV prevention.

LB092 S/P

LONGITUDINAL COURSE OF DISASTER-RELATED MAJOR DEPRESSIVE DISORDER AMONG A PROSPECTIVE SAMPLE OF ADULT CHILEAN NATURAL DISASTER SURVIVORS Christina Griffin* Christina Griffin, (University of Central Arkansas)

The aim of this study is to prospectively investigate the role that pre-existing psychiatric disorders play in developing major depressive disorder (MDD) after a disaster among a cohort of Chilean adults. Data from a prospective 5-wave longitudinal cohort (years 2003-2011) of Chilean adults from 10 primary care health centers were used (N=1,708). At baseline (2003), participants completed the Composite International Diagnostic Interview (CIDI), a comprehensive psychiatric diagnostic instrument. In 2010, the sixth most powerful earthquake (and subsequent tsunami) on record struck central Chile. One year later (2011), the depressive disorders module of the CIDI was administered. Stabilized inverse probability censoring and exposure weights (IPW; by age, gender, education, marital status, and family history of psychiatric disorders/suicide) were constructed to identify the predisaster psychiatric predictors of post-disaster MDD. Among the 314 individuals (18.4% of the total sample) who developed post-disaster MDD, 104 (33.1%) had predisaster MDD. Marginal structural logistic regression models (with IPW and robust error variance estimators) indicated that pre-disaster bipolar I (3.81; 1.89-7.66), OCD (2.59; 1.08-6.22), and dysthymia (2.54; 1.71-3.77) were the strongest predictors of post-disaster MDD. Additional analyses to further examine the independent effect of pre-disaster MDD on post-disaster MDD are underway. This study presents a unique opportunity to examine the effects of a natural disaster on MDD among adults who had undergone a structured psychiatric diagnostic interview in a large sample prior to being exposed to one of the most powerful earthquakes in history. This study's findings have the potential to inform targeted public health interventions and allocate resources to those at highest risk for developing postdisaster MDD

GENERALIZABILITY OF ARAB AMERICAN HEALTH OUTCOMES: RESULTS FROM A POPULATION-BASED SURVEY IN CALIFORNIA Nadia N. Abuelezam* Nadia N. Abuelezam, (Boston College William F. Connell School of Nursing)

Introduction: On January 26, 2018 the U.S. Census Bureau decided not to incorporate a Middle East and North African (MENA) identifier on the 2020 Census making the study of Arab American (AA) health outcomes difficult. A number of strategies have been used to identify AAs from databases including surname algorithms, identifying place of birth, and using Arabic language as a marker for heritage. Little work has been done to understand the generalizability of inferences from each of these strategies. Methods: Using data from the 2003-2016 California Health Interview Survey (CHIS) we examined differences in prevalence of self-reported chronic diseases and social determinants among AAs identified by place of birth, parents' place of birth, and language spoken at home. We compared estimates to results for non-Hispanic Whites in CHIS and other population-based surveys. Results: AAs identified by parents' country of birth have lower overweight and obesity (43.2 vs. 61.2%), unemployment (22.1 vs. 35.9%), poverty (6.2 vs. 17.2%), and hypertension (11.4 vs. 17.6%) prevalence than those born in an Arabic speaking country suggesting disparities across immigration generation. AAs identified by Arabic language use are living in poverty (16.2 vs. 6.2%) and have higher diabetes prevalence (8.7 vs. 8.1%) compared to those with a parent born in an Arabic speaking country. Self-reported hypertension (11.4%-17.6%) and heart disease prevalence (3.3-4.6%) among AAs is consistently lower than in non-Hispanic Whites in CHIS (29.6% and 8.2%, respectively) and lower than data on AAs from the National Health Interview Survey. Conclusions: The methods used to identify AA populations from hospital, state, or national databases may not be generalizable to the wider AA community in the United States. Understanding the needs of and identifying solutions for this population relies on our ability to identify AAs properly. Without the MENA identifier on the 2020 Census, AAs remain a difficult population to identify.

LB095 S/P

COMPLIANCE WITH RECOMMENDED TREATMENT FOR SURVIVORS OF SEXUAL ASSAULT SEEN AT EMERGENCY DEPARTMENTS, 2002-2015 Elizabeth Lowery* Elizabeth Lowery, (Division of Epidemiology, Department of Family Medicine and Population Health, Virginia Commonwealth University)

Background: Survivors of sexual assault have low levels of follow-up with providers. Treatment for sexually transmitted diseases (STDs), hepatitis B vaccine, and emergency contraception are generally recommended at the initial health care visit. However, the level of provider adherence to treatment guidelines is under investigated. Objective: To evaluate compliance with recommendations for treating survivors of sexual assault during emergency department visits. Methods: Data from the 2002-2015 National Hospital Ambulatory Medical Care Survey (NHAMCS) were analyzed. Sexual assault was determined using reason for visit, diagnosis, and cause of injury codes (rape, sexual abuse, or adult sexual abuse). STD Treatment Guidelines were issued in 1998, 2002, 2006, and 2010. Compliance was measured against the Guidelines in effect for each survey year and included recommended antibiotic treatment for chlamydia, gonorrhea, bacterial vaginosis, and trichomonas; hepatitis B vaccine; and provision of emergency contraception. Race/ethnicity (white, other), region (northeast, midwest, west, south), and age were tested for association with increased compliance. Results: Of the 453,354 emergency department visits over the fourteen-year period, 487 were for sexual assault and 420 (86.2%) of the sexual assault visits were made by women. Nineteen (3.9%) visits resulted in treatment that complied with the STD treatment recommendations. Hepatitis B vaccine was given in 7 (1.4%) visits and emergency contraception was provided in fourteen (3.3%) of the visits by women. No visits resulted in full compliance with the CDC Guidelines. Age was significantly associated with receipt of emergency contraception (OR 1.14, 95% CI 1.044-1.257). Conclusion: This study demonstrates that survivors of sexual assault may not be receiving clinically appropriate preventive care. Additional guidance to health care professionals should be considered to improve health care management of sexual assault survivors.

THE ASSOCIATION OF GARLIC INTAKE AND TOTAL CANCER INCIDENCE/MORTALITY AND SPECIFIC CANCERS IN THE PLCO COHORT Zeinab Farhat* Zeinab Farhat, (Department of Epidemiology and Environmental Health, School of Public Health and Health Professions, University at Buffalo, State University of New York, Buffalo, NY)

Garlic contains organosulfur compounds that explain its observed protective effect against cancer. Epidemiological studies have indicated increasing evidence for high intake of garlic and reduced risk of cancers including colorectal, stomach, lung, esophageal, and breast cancer. However, limited research exists for other cancers including prostate, liver, and kidney cancers. Using data from the Prostate, Lung, Colorectal, and Ovarian (PLCO) trial, we prospectively assessed the association between garlic intake and total cancer incidence and mortality in the US population. The analysis consisted of 58,441 participants in the intervention arm who completed a valid dietary questionnaire that assessed frequency of garlic intake over the past 12 months. Participants were followed up for a median of 12.4 years. Hazard ratios (HRs) were calculated from cox proportional hazards model and adjusted for known confounders including age, sex, study center, and smoking variables. Among all eligible participants, 31.77% consumed garlic <1 time/month, 45.06% consumed garlic ≥ 2 times/month and ≤ 4 times/week, and 23.17% consumed garlic ≥ 5 times per week. Highest intake of garlic was not significantly associated with the risk of all cancers combined (HR=0.96, 95% CI: 0.90, 1.03) nor with total cancer mortality (HR= 0.95, 95% Cl: 0.84, 1.08). Interestingly, for prostate cancer, those who consumed garlic ≥2 times/month and ≤4 times/week had a 15% decreased risk (HR= 0.85, 95% CI: 0.77, 0.94) and those who consumed garlic ≥5 times per week had a 40% decreased risk (HR= 0.60. 95% CI: 0.53, 0.69) of prostate cancer (Ptrend<0.0001). While we did not observe an association with garlic intake and all cancers, we observed a significant 40% decreased risk of prostate cancer among those who consumed garlic ≥5 times per week. Our results and previous in vitro studies show compelling evidence for protection of garlic against prostate cancer.

LB096 S/P

ALL-CAUSE MORTALITY IN BREAST CANCER SURVIVORS COMPARED TO CANCER-FREE WOMEN: RESULTS FROM A COMMUNITY-BASED COHORT Cody A. Ramin* Cody A. Ramin, (Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland)

Background: Most studies on mortality in breast cancer (BC) survivors have been conducted among cases only. Therefore our understanding of the impact of BC and its treatment compared to other chronic diseases on long-term survival is limited. Methods: We compared all-cause mortality in 628 women with early stage BC and 3,140 age-matched women without BC (i.e., cancer-free) in CLUE II, a prospective community-based cohort with over 20 years of follow-up. We calculated multivariable adjusted HRs (95% Cls) for all-cause mortality using Cox proportional hazards regression. Models were stratified by tumor characteristics, age at diagnosis, and time since diagnosis. Results: Over a median follow-up of 10.4 years, 916 deaths were identified (217 in survivors, 699 in cancer-free). The leading causes of death among women with BC were cancer (41%) and cardiovascular disease (CVD) (20%) compared to CVD (29%) and cancer (17%) among women without BC. Overall, BC survivors had a higher hazard of death compared to cancerfree women (HR=1.79, 95% C1=1.53-2.09); this elevated hazard remained irrespective of stage and estrogen-receptor status, and persisted 15 years after diagnosis. All-cause mortality remained elevated at a steady state among survivors diagnosed at age <70 years compared to cancer-free women of similar age (pinteraction=0.28). However in survivors diagnosed at age ≥70 years, all-cause mortality increased over time compared to their cancer-free peers (pinteraction=0.05). CVD deaths were proportionally higher in survivors diagnosed at age ≥70 years compared to those <70 years. Conclusion: Our results suggest that BC survivors have higher long-term mortality compared to the general population, supporting the need for continued surveillance. Elderly survivors may also need additional preventive strategies, particularly for CVD, to reduce mortality.

CONCURRENT RELATIONSHIP OF OBJECTIVELY MEASURED PHYSICAL ACTIVITY AND CARDIORESPIRATORY FITNESS ON TWO DIFFERENT MEASURES OF OBESITY IN U.S. ADULTS Peter D. Hart* Peter D. Hart, (Montana State University - Northern)

Background: Few population-based studies have examined the relationship of both physical activity (PA) and cardiorespiratory fitness (CRF) on the growing health problem of obesity. The purpose of this study was to examine the concurrent relationship of PA and CRF on two different measures of obesity. Methods: This study used data from adults 20-49 years of age participating in the 2003-2004 National Health and Nutrition Examination Survey (NHANES). Moderate-tovigorous PA (MVPA, min/day) was objectively determined by use of accelerometer and participants were categorized into low or high groups using the median. CRF (ml/kg/min) was assessed using a submaximal treadmill test and measures were categorized into low or high values by applying age- and sex-specific standards. Using body mass index (BMI), participants were categorized as obese if their values were 30 kg/m2 or greater. Using waist circumference (WC), participants were categorized as obese if their values were greater than 88 (females) or 102 cm (males). Linear regression was used to test for mean CRF differences in study variables. Logistic regression was used to model the relationship between MVPA, CRF and obesity. Results: Participants in the high CRF group had significantly (ps<.05) greater MVPA across all obesity groupings. In BMI obese, neither BMI nor WC were significantly different between CRF groups. However, in WC obese, both BMI and WC were significantly (ps<.05) lower in the high CRF group. Among adults with low CRF, those with low MVPA were more than twice as likely to be obese than those with high MVPA using BMI (OR=2.48; 95% CI: 1.23-5.01) and WC (OR=2.06; 95% CI: 1.29-3.29). Among adults with high CRF, no MVPA and obesity relationship was seen. Conclusion: Results from this study indicate that PA is only related to obesity when CRF is low. Furthermore, high CRF may protect less physically active adults from both overall and abdominal obesity.

LB099 S/P

MORTALITY AND RELIGIOUS BELIEFS, ATTITUDES, AND PRACTICES IN THE GENERAL SOCIAL SURVEY Sarah McKetta* Sarah McKetta, (Columbia University)

The US has seen recent declines in life expectancy in non-Hispanic Whites, but not Blacks. A potential explanation is declining religious attendance and affiliation differentially among Whites. Religious affiliation is associated with lower mortality risk, with mechanisms presumably around social connection, capital, and group activities such as worship. Most research on religion and mortality does not distinguish among religious beliefs, attitudes, and practices, nor how changes over time relate to mortality. Using the General Social Survey-National Death Index (GSS-NDI, N=44,174), we examined the relationship between religion and mortality. We examined religious beliefs (strength of affiliation); attitudes about atheists and premarital sex; and practices (religious attendance). We adjusted for year, sex, race, marriage, education, income, geographic region, region size, and political affiliation. We used Cox proportional hazards regression on complete cases to test religion's relationship to mortality and LOESS regression to examine trends in religious practices over times among Blacks and Whites. We found that the proportion of Black respondents reporting high religious attendance have stayed consistent in 1978-2010, while Whites with high religious attendance have declined in the past decade. Lower attendance had elevated mortality risks compared to those who attended services one or more times per week (HR for once/month 1.07, 95% CI 1.02, 1.13). We found no significant relationship between religious beliefs and mortality, nor religious attitudes and mortality. We conclude that the predominant health-protective characteristic of religion is practices, rather than attitudes or beliefs. Increasing mortality among Whites may be associated with shifts in religiosity attributable to social capital.

ICD-9-CM TO ICD-10-CM TRANSITION AMONG PEDIATRIC MENTAL HEALTH DIAGNOSES Sana Khan* Sana Khan (New York City Department of Health and Mental Hygiene)

In 2015, the United States transitioned from 456 ICD-9-CM mental health diagnosis codes to 706 ICD-10-CM codes, with transition falling within various levels of complexity. It is imperative to examine trends to assess whether these transitions impacted prevalence estimates of pediatric mental health. In this study, we tested the hypothesis that the ICD transition influenced trends differently based on transition complexity for New York City (NYC) pediatric mental health Emergency Department (ED) visits from 2006 through 2016. Using an ICD-9-CM to ICD-10-CM crosswalk from the Centers for Medicare and Medicaid Services, we created categories of transition complexity: (1) 1-to-1: one ICD-9-CM mapped to one ICD-10-CM code, (2) Many-to-1: multiple ICD-9-CM collapsed to one ICD-10-CM code, and (3) 1-to-Many: one ICD-9-CM expanded into many ICD-10-CM codes. NY Statewide Planning and Research Cooperative System data provided census of ED visits from 2006 to 2016 for NYC children under 21 years. Joinpoint Regression calculated trends of proportion of mental health-related ED visits by each category. Annual proportion of all mental health-related ED visits increased significantly by 1.9% from 2009 to 2014, then decreased by 1.3% until 2016. Mood disorder (1-to-1) visits increased significantly by 3.3% from 2010 to 2014, then decreased by 3.0% until 2016. Schizophrenia and psychosis (Many-to-1) visits increased significantly by 1.3% from 2006 to 2013, then by 4.6% until 2016. Substance use (1-to-Many) visits increased significantly by 1.4% from 2006 to 2011, followed by a nonsignificant flat trend until 2016. In this analysis, 1-to-1 diagnoses mirrored overall mental health trends, but trends significantly differed for diagnoses with complex transitions. While we cannot conclude whether these are true changes in prevalence or data artifacts, continued use of this systematic approach to critically examine impact of ICD transition on trends over time is recommended.

LB100 S/P

DIET PATTERNS AND THE RISK OF AGE-RELATED MACULAR DEGENERATION (AMD): THE ATHEROSCLEROSIS RISK IN COMMUNITIES (ARIC) STUDY Shruti Dighe* Shruti Dighe, (Department of Epidemiology and Environmental Health, University at Buffalo, The State University of New York)

Background: Age-related macular degeneration (AMD) is a leading cause of irreversible vision loss among the elderly. Limited studies exist on the association between dietary patterns and incident AMD. Objective: To determine the association between dietary patterns and the 18-year incidence of AMD. Methods: ARIC participants (n=1,278) with retinal photographs taken at both Visit 3 (1993-95) and Visit 5 (2011-13) were graded independently. Those that showed change were graded side-by-side to determine the incidence of AMD (any n=144; early n=117; late n=27). A 66 line-item food frequency questionnaire, administered at Visit 1 (1987-89) and Visit 3, was used to identify 29 food groups. Principal component analysis derived the Western and Prudent diet patterns from the average of visits 1 and 3 food groups. Odds ratios (ORs) and 95% confidence intervals (CIs) for any and early incident AMD by tertiles of pattern scores were estimated with logistic regression, adjusting for age, race, education, total calories, smoking status, and physical activity. Median pattern cutpoints were used for late AMD. Ptrend was estimated using continuous scores. Results: Western and Prudent dietary patterns were identified. The adjusted OR (95% CIs) for any incident AMD among participants in tertile 3 compared to 1 was 1.47 (0.83-2.59) (Ptrend=0.27) for the Western pattern and 1.00 (0.61-1.69) (Ptrend=0.92) for the Prudent pattern. Similarly, no statistically significant associations were found with incident early AMD. For incident late AMD, adjusted ORs (95% CIs) in participants with scores above compared to below the median were 3.06 (1.17-8.02) (Ptrend=0.02), and 0.57 (0.24-1.34) (Ptrend=0.11) for Western and Prudent pattern score, respectively. Conclusions: Diet patterns are not significantly associated with any or early incident AMD; however, a Western pattern may be a risk factor for incident late AMD. This study is limited by its small number of incident cases.

ASSOCIATIONS OF SEROPREVALENT CHLAMYDIA AND HERPES WITH 5-YEAR INCIDENCE OF UTERINE FIBROIDS Kristen Moore* Kristen Moore, (National Institute of Environmental Health Sciences)

Background. For decades reproductive tract infections (RTIs) have been hypothesized to play a role in uterine fibroid development. Previous studies using self-reported history of RTIs had inconsistent findings. Our recent studies took the next step and investigated this hypothesis using serology, an immunological measure of past exposure, and prevalent fibroid data. We focused on herpes simplex virus type 2 (HSV-2) and genital Chlamydia trachomatis (gCT) because prior self-report data suggested a possible association with fibroids, and serology for HSV-2 and gCT is much more sensitive than self-report. The findings for prevalent fibroids were null for HSV-2, but an unexpected protective association was seen for gCT. We now follow-up the prior analyses using prospective data on cumulative incidence of fibroids over a 5-year follow-up. Methods. We used data from a prospective fibroid study that conducted ultrasound examinations to systematically screen for fibroids every 20 months. Participants were African-American women ages 23-35. Age- and multivariable-adjusted binomial regression were used to estimate RRs for the cumulative incidence of fibroids by baseline gCT and HSV-2 status Results. Of 1,300 eligible participants with no fibroids at baseline, 1,275 and 1,225 had unequivocal HVS-2 and gCT serology results respectively, 23% had incident fibroids. There was no significant risk of fibroids for those HSV-2 seropositive (multivariable-adjusted RR: 0.92, 95% CI: 0.75, 1.13) or gCT seropositive (multivariable-adjusted RR: 0.91 95% CI: 0.74, 1.12). Results were similar for sensitivity analyses designed to exclude women with factors found to be protective of fibroids, a birth or Depo-Provera use over follow-up. Conclusions Our data provide no evidence for an influence of HSV-2 or gCT on fibroid incidence. Further investigation is needed to examine possible effects of these infections on fibroid growth, and to extend the work to other RT1s.

LB103

VALIDITY OF SELF-REPORTED RECALL OF EARLY LIFE WEIGHT AND BODY SIZE: A SYSTEMATIC REVIEW Laura N. Anderson* Vanessa De Rubeis, (McMaster University)

Background: Early life weight or body mass index (BMI) may be an important risk factor for many chronic diseases. However, few cohorts of adult disease outcomes have prospectively measured weight in childhood or early adulthood. The primary objective of this study was to systematically review literature on the validity of recall of early life BMI, weight or body size. Methods: A systematic review was conducted by searching four electronic databases; PubMed, ProQuest, EMBASE and Ovid MEDLINE. All search terms were related to BMI, weight, recall and validity. Studies were first screened at title and abstract level, followed by full-text screening for those studies that met inclusion criteria. The reference lists of eligible studies were also screened to identify any other relevant studies. Studies were considered eligible if they evaluated the validity or reliability of self reported recall of BMI, body size, height and/or weight in childhood, adolescence or the young adult period (aged 18 to 30). All studies were screened by two independent reviewers. Results: Data were extracted from 16 eligible studies published between 1990 and 2013. Middle-aged and older adults were asked to recall their weight or body size between 18 to 30 years of age (9 studies) or earlier childhood and adolescence (7 studies). The duration of recall ranged from 5 to 69 years Selfreported recall of BMI or weight was strongly correlated with medical records or prospective assessment in most studies with correlation coefficients ranging from 0.61 to 0.97. Conclusion: Preliminary results of this systematic review suggest that self-reported recall of early life weight may be a valid measure of true weight status in late childhood and early adulthood. These findings may inform future life-course epidemiology studies that are considering the retrospective assessment of selfreported childhood or young adult weight or body size.

TREATMENT FOR DEPRESSION AND ISCHEMIC HEART DISEASES: A MENDELIAN RANDOMIZATION STUDY Mengyu Li* Mengyu Li, (School of Public Health, Li Ka Shing Faculty of Medicine, The University of Hong Kong)

Background Observationally, depression is positively associated with ischemic heart disease (IHD), and selective serotonin reuptake inhibitors (SSR1s), a commonly used antidepressant, have been associated with a lower risk of IHD. However, such associations are open to confounding by indication, socioeconomic position and underlying health status. We used Mendelian Randomization to obtain less confounded estimates of the association of serotonin and physiologically related factors (tryptophan, kynurenine and dopamine sulfate) with IHD. Methods We used principal components analysis to construct genetic instruments from fine mapped genetic variants for serotonin, tryptophan, kynurenine and dopamine sulfate metabolites. We used inverse variance weighting to obtain the association of genetically instrumented serotonin, tryptophan, kynurenine and dopamine sulfate with IHD in the UK Biobank SOFT CAD case (n=<76014)-control (n=<264785) study. Results: Serotonin and tryptophan were not clearly associated IHD (odds ratio (OR) 0.73, 95% confidence interval (Cl) 0.50 to 1.07) and (OR= 0.76, 95%CI 0.25 to 2.31). Kynurenine was positively associated with IHD (OR 2.29, 95% CI 1.53 to 3.43), but dopamine sulfate was unrelated to IHD (OR = 0.99, 95%CI 0.96 to 1.01). Conclusion: Kynurenine, which predicts depressive symptoms, is associated with a higher risk of IHD. Whether kynurenine could be a new target of intervention in IHD, via diet or otherwise, should be investigated.

LB104 S/P

ASSOCIATION OF SUGAR-SWEETENED BEVERAGES CONSUMPTION WITH OBESITY: EVIDENCE FROM THE "CHILDREN OF 1997" BIRTH COHORT Ting Zhang* Ting Zhang, (School of Public Health, The University of Hong Kong)

Background Observationally, sugar-sweetened beverages (SSBs) consumption is associated with greater adiposity in Western children. Whether this association is causal or the result of confounding is unknown. We examined the association of SSBs consumption with subsequent adiposity in the non-western setting of Hong Kong, with different social patterning of beverages consumption and obesity. We also estimated the effect of sucrose (main ingredient of SSBs) on childhood body mass index (BMI) using Mendelian randomization. Methods We examined the associations of SSBs consumption at age 11 years with BMI z-scores, overweight, and obesity at 12-18 years using generalized estimating equations in a populationrepresentative Chinese birth cohort "Children of 1997" (n = 3,628). We also examined the effect of genetically predicted sucrose on childhood BMI using Mendelian Randomization based on a genome wide association study of human blood metabolites (n = 1,960) and the Early Growth Genetics Consortium (n =35,668). Results Compared to no consumption of SSBs consumption, 1-3 times/week (OR 1.89, 95% CI 1.22, 2.93) and 4-6 times/week (OR 2.33, 95% CI 1.28, 4.26), but not daily consumption (OR 0.92, 95% CI 0.35, 2.40), were positively associated with overweight at 12-18 years adjusted for sex, birth order, maternal age and birthplace, parental education and occupation, household income, main caregiver, general health status, and physical activity. SSBs consumption was not associated with BMI z-score or obesity. Mendelian Randomization showed no association between genetically predicted sucrose and childhood BMI (OR 1.00, 95% CI 0.92-1.10 for MR-Egger estimate). Conclusions In Hong Kong Chinese children with less clear socioeconomic patterns of SSBs consumption and obesity, SSBs consumption was only related to overweight but not other adiposity measures. Mendelian Randomization suggests that the association between genetically predicted sucrose and childhood BMI may not be causal.

HUMAN PAPILLOMAVIRUS VACCINE EFFECTIVENESS AGAINST INCIDENT GENITAL WARTS AMONG FEMALE HEALTH-PLAN ENROLLEES, UNITED STATES Megan Schuler* Megan Schuler, (RAND Corporation)

We examined the effectiveness of human papillomavirus vaccination by dose number and spacing against incident genital warts in a cohort of 64,517 female health-plan enrollees in the United States during 2006-2012. Eligible recipients were classified into groups by regimen: 0, 1, 2 (<6 months apart), 2 (\geq 6 months apart), or 3 doses. They were followed until a genital wart diagnosis, loss to followup, or the end of study. Propensity score weights were used to balance baseline differences across groups. To account for latent genital warts before vaccination, we applied 6- and 12-month buffer periods from last and first vaccine dose, respectively. Incidence rates and hazard ratios were calculated using Poisson regression and Cox models. The propensity score-weighted incidence rate per 100,000 person-years was 762 among unvaccinated participants. Using 6- and 12-month buffer periods, respectively, incidence rates were 641 and 257 for 1 dose, 760 and 577 for the 2-dose (<6-month interval) regimen, 313 and 194 for the 2-dose (≥6-month interval) regimen, and 199 and 162 among 3-dose vaccinees; vaccine effectiveness was 68% and 76% for the 2-dose (≥6-month interval) regimen and 77% and 80% in 3-dose vaccinees compared with unvaccinated participants. Vaccine effectiveness was not significant among vaccinees receiving 1-dose and 2-dose (<6-month interval) regimens compared with unvaccinated participants. Our findings contribute to a better understanding of the real-world effectiveness of HPV vaccination

LB107

SUBJECTIVE AND OBJECTIVE SOCIOECONOMIC DISADVANTAGE IN CHILDHOOD AND INCIDENT DEPRESSION IN ADULTHOOD AMONG MIDDLE- TO OLDER-AGED WOMEN IN THE SISTER STUDY Amanda M. Simanek* Amanda M. Simanek, (University of Wisconsin-Milwaukee)

Objective: Early life socioeconomic disadvantage (SD) has been linked to later life depression in a growing number of studies. Understanding of the relative impact of objective versus subjective childhood SD on depression onset in adulthood, and whether these associations are independent of later life socioeconomic factors remains, however, limited. Methods: We examined the association between objective (i.e., highest level of household education at age 13) and subjective (i.e., family income relative to others majority of childhood and childhood food insecurity) SD in childhood and self-reported clinical depression diagnosis among 47,765 women in the prospective Sister Study cohort who were free of depression as of age 30 (mean follow-up 23.9 (± 9.9) years since age 30). We used Cox proportional hazard models with age as time scale to estimate the hazard ratio (HR) and 95% CI for the association between each measure of childhood SD and incident depression, adjusting for women's mother's age at time of birth, household composition at age 13 (two-parent, single-parent, or other), race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic or Other), birth cohort and educational attainment (HS). Results: A total of 8,246 (17.3%) women reported incident diagnosis with clinical depression (mean age of onset 45.0 (± 8.8) years). Women who reported being poor (versus well-off) or experiencing food insecurity in childhood had 1.26 (95% CI: 1.11, 1.42) and 1.36 (95% CI: 1.27, 1.46) times higher hazard rate of depression, respectfully. In contrast, there was no association between highest level of household education at age 13 (HS) and depression onset in adulthood (HR 0.97, 95% CI: 0.91, 1.03). Conclusions: Our findings suggest that perceived SD experienced in childhood may be a more important predictor of depression onset in mid- to late- adulthood than objective measures of childhood SD among U.S. women, independent of educational attainment.

LB108 S/P

DO LONGITUDINAL DYNAMICS OF DRUG USE MATTER? TRAJECTORIES OF COCAINE INJECTION OVER A 5-YEAR PERIOD AND RISK OF HEPATITIS C VIRUS INFECTION AMONG PEOPLE WHO INJECT DRUGS IN A LARGE, URBAN SETTING Andreea Adelina Artenie* Andreea Adelina Artenie, (Universite de Montréal, Montréal, Canada)

Background: Relative to other drugs, recent cocaine injection has been linked with one of the highest risks of hepatitis C virus (HCV) infection among people who inject drugs (PWID). Yet, single-point assessments are often not reflective of longitudinal dynamics of drug use. The aims of this study were to characterize cocaine injection trajectories over a 5-year period in a sample of PWID and to compare HCV infection risks across trajectory groups. Method: In a prospective cohort study of initially HCV-uninfected PWID in Montreal (2011-16), participants provided blood samples for HCV testing and filled a behavioural questionnaire at 3-month intervals. Cocaine injection in the past three months (yes/no) was selfreported at each visit. Follow-up time started at study entry and ended at the time of HCV infection or last follow-up visit, whichever came first. Temporal trajectories of cocaine injection were estimated using group-based trajectory modelling, adjusted for age, gender and duration of injection. HCV incidence rates were calculated using the person-time method, and 95% CI estimated based on the Poisson distribution. Results: 380 PWID were included and contributed 3782 observations during follow-up (mean age at baseline: 40.1; 81.8% male). Four trajectory groups of cocaine injection were identified: sustained high (SH: 30.2%), sustained low (SL: 38.3%), decreasing (D: 22.0%) and variable (V: 9.5%). The HCV incidence rate was highest in the V group (20.1 per 100 person-years (p-y), 95%CI: 11.8 - 31.5), and similar in the other three groups (SH: 9.3, 95%: 6.3 - 13.2; SL: 8.0, 95% CI: 5.5 - 11.3; D: 6.5, 95% CI: 3.7 - 10.6; per 100 p-y). Conclusion: Stable patterns of cocaine injection over time, whether high or low, were associated with similar risks of HCV infection, whereas a variable pattern was linked to the greatest risk. Long-term trajectories of drug use may assist in more accurate identification of individuals with the highest risk of HCV infection.

LB109

INVESTIGATING THE INTERGENERATIONAL CYCLE OF OBESITY AND DISPARITIES: RATIONALE AND DESIGN OF A MULTIGENERATIONAL AGENT BASED MODEL Janne Boone-Heinonen* Janne Boone-Heinonen, (Oregon Health & Science University)

Disparities in childhood and adult obesity persist and are widening over time. Obesity disparities could be transmitted from one generation to the next through biological programming, socioeconomic, or environmental processes that interact dynamically over time. We present the design and rationale of an agent based model (ABM) that simulates the development of obesity within life cycles across multiple generations. The ABM is composed of agents (simulated individuals) who age, grow, and reproduce over time. Agent attributes, processes, and parameters were determined based upon a multidisciplinary review of the evidence on determinants of obesity throughout the life course, including developmental programming by maternal obesity, socioeconomic and environmental influences, and random variation. Agent attributes include age, height and weight, socioeconomic status (SES); location within a healthy or obesogenic environment is a function of their SES,SES and obesity are dynamically related. Female agents of reproductive age have offspring, whose growth occurs as a function of maternal obesity-related characteristics, in addition to environmental factors. Subsequent generations proceed in a similar fashion. The model will be used to investigate the contributions of theorized biological, social, and environmental processes to intergenerational disparities. This knowledge is needed to inform public health policy for the mitigation of the intergenerational cycle of health disparities.

NEIGHBORHOOD DEPRIVATION, DISPLACEMENT AND SELF-REPORTED HEALTH AMONG WORLD TRADE CENTER HEALTH REGISTRY ENROLLEES — NEW YORK METROPOLITAN AREA, 2003–2016 Aldo Crossa* Aldo Crossa, (New York City Department of Health and Mental Hygiene)

When neighborhoods gentrify, long-term residents are often displaced, sometimes to disadvantaged neighborhoods. Few quantitative studies assess the relationship between displacement and health. With data for 54,586 enrollees who participated in two or more data collection waves for the World Trade Center Health Registry, a longitudinal study of persons present in lower Manhattan on September 11, 2001, we examined associations between displacement and self-rated health status. Using a composite measure of neighborhood disadvantage based on population data we categorized all 156 New York metropolitan area Public Use Microdata Areas (PUMAs) as gentrifying, nondeprived, deprived, or declining. Enrollee's address history during 2004-2016 was summarized into categories including displaced (ever moved from gentrifying or nondeprived PUMAs to deprived or declining PUMAs [n = 855]; nondisplaced (moved in another pattern [n = 22,362]); and nonmovers (never moved [n = 28,586]). Using logistic regression with generalized estimating equations, we modeled the odds of reporting fair or poor health at any data collection wave by movement category, controlling for sex, race, age, and ever lived in public housing. Compared with nonmovers and movers who were nondisplaced, the displaced were more likely to be female (50% of displaced; 41% of nondisplaced; and 37% of nonmovers, p <0.01), aged 25-44 years (60% of displaced; 56% of nondisplaced; and 43% of nonmovers, p <0.01) and nonwhite (59% of displaced; 34% of nondisplaced; and 32% of nonmovers, p <0.01). Those displaced had higher odds of reporting fair or poor health, compared with those who were nondisplaced (odds ratio [OR]= 1.30, 95% confidence interval [C1]: 1.16, 1.44); as well as nonmovers (OR = 1.23, 95% CI: 1.11, 1.37) and nonmovers from nondeprived or gentrifying neighborhoods (OR=1.25, 95% CI: 1.13, 1.39). Displacement was associated with worse self-rated health, although displacement reasons should be explored further.

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THE ROLE OF PERCEIVED SOCIAL SUPPORT IN THE RELATIONSHIP BETWEEN MATERNAL RACE AND POSTPARTUM VISIT NON-ATTENDANCE Tamala Gondwe* Tamala Gondwe, (Virginia Commonwealth University School of Medicine)

Background: Postpartum visit (PPV) non-attendance is higher in some sociodemographic subgroups, yet the role of social factors is unexplored. The purpose of this study is to determine if the racial disparity in PPV non-attendance in a study of women with uncomplicated births is mediated by perceived social support. Methods: Data from a randomized controlled trial assessing the effectiveness of shortened time to PPV (3-4 weeks) compared to usual care (6-8 weeks) was analyzed. We assessed maternal race/ethnicity (non-Hispanic (NH) Black vs other) as the exposure, and PPV non-attendance as the outcome. High or low perceived social support during pregnancy was measured at delivery by the Interpersonal Support Evaluation List. Inverse probability weighted marginal structural models were applied to estimate the counterfactual racial disparity in PPV non-attendance with social support as a mediator, adjusting for education (high school vs ≥college), income (≤\$20,000 vs >\$20,000), and marital status (single vs married/other) as mediator-outcome and exposure-outcome confounders. Analyses were conducted in strata of intervention groups. Results: Overall, 364 women enrolled in the study - 183 were assigned to receive PPV at 3-4 weeks (intervention), and 181 to PPV at 6-8 weeks (usual care). Of the 59 women that did not attend their PPV, 76% were NH Black. Accounting for social support as a mediator attenuated the relationship between maternal race and PPV non-attendance from a total effect of 8.9 (OR, 95% CI 3.4-23.1), to a controlled direct effect of 1.7 (aOR, 95% CI 0.4-6.9) in the intervention group. A similar attenuation was observed in the usual care group Conclusion: Perceived social support partially explains the racial disparity in PPV non-attendance in this study. As a modifiable social determinant of health, interventions to improve social support during pregnancy may positively influence maternal postpartum health seeking behavior and reduce health disparities.

LB111 S/P

HIV RISK IN PARTNERS OF MIGRANTS AND NON-MIGRANTS IN RAKAI, UGANDA: AN OBSERVATIONAL COHORT STUDY Jennifer Brophy* Jennifer Brophy, (Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA)

Background: Migration status has been linked to a higher burden of untreated HIV infection throughout sub-Saharan Africa. In Rakai District, Uganda, we have previously shown that migrants have an increased risk of HIV acquisition during the first two years following migration into a new community. However, little is known about in-migrants' sexual partners. Here, we characterized the in-migrants' partner pool and examined their risk for pairing with an untreated HIV-positive partner. Methods: From 1999 through 2016, we continuously surveyed 30 communities in Rakai District, Uganda as part of the Rakai Community Cohort Study (RCCS). In this open population-based cohort study, participants ages 15 through 49 reported on their most recent sexual partners via questionnaires. We compared characteristics of partners of recent in-migrants and residents, stratified by gender. Within a subset of known couples (both members participating in the RCCS), we used log-binomial regression to model the risk of partnership with an untreated HIV-positive partner before and after the introduction and scale-up of antiretroviral therapy (ART), comparing HIV-negative in-migrants with HIV-negative residents. Results: In total, 29,441 participants reported on 116,759 partners. Within both genders, in-migrants' partners were younger and less likely to be marital partners compared to residents' partners. Among 7,558 known couples (through 42,280 observations), we observed a trend of assortative mixing by migration status. HIV-negative in-migrant males (RR = 1.82, 95% CI: 1.44-2.27) and females (RR = 1.62, 95% CI: 1.37-1.91) were more likely to partner with untreated HIV-positive individuals compared to residents irrespective of ART availability. Conclusion: In-migrants are more likely than residents to engage in high-risk partnerships with untreated HIV-positive individuals. These findings highlight the need for HIV prevention programs that capture in-migrants promptly following relocation.

LB113 S/P

LONG-TERM MENTAL HEALTH OUTCOMES FOLLOWING MODERATE TO SEVERE TRAUMATIC BRAIN INJURY: A SYSTEMATIC REVIEW. Mirinda Gormley* Mirinda Gormley, (Virginia Commonwealth University)

Objective: Changes in mental health can be significant following a serious injury, yet few studies investigate the psychological outcomes following moderate-to-severe traumatic brain in jury (msTBI) beyond 12 months. This review explores the longterm psychological outcomes for patients with msTBI. Data Sources: Original studies published through September 15th 2016 from the databases of PubMed, PsychINFO, and CINAHL. Study Selection: Peer-reviewed articles were eligible if outcomes were reported after 12 months and study population met three criteria: (1) sample size ≥ 60 ; (2) ≥ 16 years at in jury; (3) > 50% diagnosed with msTBI. Data Extraction: Two reviewers independently extracted data on study objectives, designs, psychological outcomes, and participants' demographics and injury characteristics. Study size, participation, and attrition rates were extracted for quality assessment. Data Synthesis: Of 13 eligible articles; 2 (15%) had follow-up of 12 months, 3 (23%) between 2-9 years, and 8 (53%) had \geq 10 years; only half (54%) listed the primary outcome as being within the psychological domain. The prevalence of depression, aggression, anxiety and post-traumatic stress disorder (PTSD) was higher in those with msTBI than in the general population. The frequency of symptoms reported for aggression and anxiety appeared to increase with time post-injury, while the frequency of depressive symptoms remained relatively constant throughout time. MsTBI patients reporting more psychiatric problems were often associated with an increased likelihood of cognitive/ behavioral disturbances and maladaptive coping. Conclusions: Understanding the prevalence of psychiatric syndromes in the msTBI population is critical to informing the development of rehabilitation and treatment programs, and the paucity of research in this domain is concerning. Future research is necessary to identify long-term psychological outcomes for patients living with msTBI.

PROSTATE CANCER PROGRESSION AMONG MEN WITH BIOCHEMICAL RECURRENT PROSTATE CANCER: A SIMULATION STUDY Corinne Joshu* Corinne E Joshu, (Johns Hopkins Bloomberg School of Public Health)

Background: 500,000 US men have biochemical recurrent prostate cancer (BCR), which has variable prognosis and no standard treatment. Weight loss among men with BCR may delay cancer progression and improve overall health. We sought to design a randomized clinical trial to test weight loss as a first line therapy for men with BCR. We were unable to find estimates of progression among the full spectrum of men with BCR to determine our required sample size. We conducted a simulation study to estimate the progression frequency among men with BCR in a 12 month period. Methods: We generated 1,000 replicate cohorts from 2,190 men surgically treated at Johns Hopkins Hopsital, who developed BCR, had \geq 3 follow-up PSA values, and received no treatment post-surgery treatment. Mean age was 59, 56% had Gleason pattern 7, 49% had T3a stage, mean follow-up time was 10.9 years, and mean number of PSA values was 8.3. Progression was defined using Prostate Cancer Clinical Trials Working Group criteria of PSA increase ≥25% and ≥2 ng/mL above nadir or detection of metastatic disease. For each replicate cohort, starting PSA value was randomly selected for each man. Each man was eligible for follow-up if his starting PSA value was ≥ 1 ng/mL and he had ≥ 3 subsequent PSA values to allow PSA increase calculation. Eligble men were followed for progression for 12 months. We calculated the frequency of progression in each of the 1,000 cohorts, and report average progression frequency for all cohorts, and 5th and 95th percentiles observed. Results: 73.3% (5th: 70.7; 95th: 75.9) of men with BCR experienced prostate cancer progression at 12 months. Men with a slower doubling time during observation(> 12 months) 50.8% (5th: 46.5; 95th: 55.4) experienced progression. Conclusions: Prostate cancer progression is common among a simulated clinical population of men with BCR. These findings can inform planning for clinical trials designed to test interventions for the full spectrum of men with BCR.

LB116 S/P

THE IMPACT OF POSTPARTUM CARE VISIT ATTENDANCE ON MATERNAL SMOKING BEHAVIOR Timothy Ihongbe* Timothy Ihongbe, (Virginia Commonwealth University)

Introduction Maternal postpartum smoking is a major public health concern. Despite a significant decrease in the prevalence of smoking in the US population, the prevalence of smoking in women after pregnancy has seen a less remarkable decline. The postpartum care visit (PPCV) offers an excellent opportunity for healthcare providers to educate and counsel women on smoking cessation during the postpartum period and prevent relapse in women who quit during pregnancy. This study aims to examine the impact of PPCV attendance on maternal postpartum smoking behavior in US women. Methods Data from the 2012-2013 Pregnancy Risk Assessment Monitoring System (PRAMS) was utilized (N=72,540). Multinomial logistic regression analysis was used to examine the association between PPCV attendance and maternal postpartum smoking behavior, adjusting for confounding and accounting for the complex nature of the data. Results About 90% of women attended their PPCV, and 9.5% continued smoking from pregnancy into the postpartum period, and 5.3% had smoking recidivism. PPCV attendance was associated with lower risk of smoking continuation from pregnancy into the postpartum period (aRR=0.71, 95% CI=0.63-0.79) and smoking recidivism (aRR=0.67, 95% CI=0.56-0.79). Conclusions This study demonstrates that PPCV attendance reduces the risk of maternal postpartum smoking. This highlights the importance of PPCV attendance in addressing maternal postpartum smoking behavior.

STI RATES AND CHANGES IN PUBLICLY-FUNDED REPRODUCTIVE HEALTH CLINICS Nichole Austin* Nichole Austin, (McGill University)

Background: Many people in the United States rely on publicly-funded reproductive health facilities, which provide important access to contraception and screening services. However, the number of these providers has declined in recent years as funding has been diverted or reduced in many states. This trend coincides with a troubling increase in rates of sexually transmitted infections (STIs) - specifically gonorrhea, chlamydia, and syphilis. Existing literature suggests that clinic closures have a meaningful impact on preventive care indicators such as Pap tests and breast exams, but the relationship between closures and STI rates remains unclear. We examined the cumulative impact of recent changes in clinic availability on 2015 STI rates. Methods: We used publicly-available data on state-level counts of publiclyfunded reproductive health clinics and CDC data on STI rates. We used OLS to quantify the association between state-level changes in provider availability from 2010 to 2015 and STI rates in 2015. Since changes in provider availability are likely endogenous, we also used state-level Targeted Regulation of Abortion Providers (TRAP) laws as an instrument. Results: OLS results indicated that, for every oneunit increase in publicly-funded reproductive health providers, the 2015 chlamydia rate decreased by .61/100,000 (-1.49, .28), the gonorrhea rate decreased by .35/100,000 (-.75, .05), and the syphilis rate decreased by .03 (-.10, .03). State-level TRAP exposure demonstrated good instrumental variable properties (F=11.6), but regression results yielded imprecise estimates. Discussion: State-level shifts in publicly-funded reproductive health facilities may have important implications for STI rates, but additional years of follow-up will likely produce more precise estimates. This relationship merits additional research, particularly in light of statelevel funding trends for reproductive health services.

LB117

THE IMPACT OF SLEEP PROBLEMS ON FUNCTIONAL LIMITATIONS IN ADULTS WITH ASTHMA: A POPULATION STUDY Zheng Li* Zheng Li, (Valparaiso University)

Objective: This study aimed to investigate the associations among asthma attack, sleep problems, and functional limitations in adults with asthma. Method: We used 2016 U.S. National Health Interview Survey (NHIS) data to examine the effect of asthma attack and sleep problems on functional limitations including depression, difficulty walking, difficulty remembering/concentrating, and difficulty self-caring. Results: Of adults with asthma (n=2,806), 1,271 (45.3%) had at lease one asthma attack in the past 12 months, and 318 (11.3%) had at lease one visit to an emergency room or urgent care due to asthma. Bivariate analyses showed having at least one asthma attack was significantly associated with poor sleep quality including having difficulty falling asleep, having difficulty staying asleep, having woken up not feeling well-rested, and use of sleep medication (all Ps <.05). Multivariate analyses showed people who reported having at least one asthma attack, shortened sleep duration, and poor sleep quality were more likely to be depressive, have difficulty walking/climbing, have difficulty remembering/concentration, and have difficulty with self-care after controlling for age, gender, race/ethnicity, education, and type of insurance (all Ps<.05). Conclusion: Poorly controlled asthma was associated with more sleep problems and functional limitations. To improve functional status, clinicians need to address sleep problems associated with asthma attack/exacerbation for adults with asthma.

PREDICTORS AND TRAJECTORY OF POST-CONCUSSIVE SYMPTOMS 12-MONTHS POST-DEPLOYMENT IN SOLDIERS WITH AND WITHOUT MTBI Hamid Ferdosi* Hamid Ferdosi, (Defense Health Agency)

Background: While it is believed that symptoms related to deployment-related mild traumatic brain injuries (mTBI) will improve within a few days or weeks in most cases, some service members may continue to experience troubling residual symptoms. In the present study, we report on symptom prevalence and trajectories extended to one year follow-up. Methods This prospective, longitudinal study enrolled active duty Service Members returning from OEF and OIF who were screened for mTBI within a few days of return. Differences in post concussive symptoms between those with deployment related mTBI (n=557) and without mTBI (n=1010) were assessed using the Neurobehavioral Symptom Inventory. Mixed effects models using a missing at random (MAR) approach for missing data were used to evaluate the role of mTBI and other factors on the trajectory of symptoms. Results: A total of 1567 soldiers participated in baseline interviews between 2009 and 2014, of whom 1162 completed at least one follow-up interview. Severe/Very severe symptoms were reported by 48% of mTBI cases and 21% of controls at baseline. Overall, at all time-points, TBI cases were almost twice as likely to report symptoms (adjusted OR=1.7, 95%CI 1.51-1.93, p <0.0001) compared to controls. Three of the four most prevalent baseline symptoms remained associated with mTBI at all time points (sleep problems: OR=2.19; forgetfulness: OR=2.56; and irritability. OR=2.73). Headache was more common in cases than controls at baseline (OR=3.44) although this OR decreased with time due primarily to increasing prevalence of headaches in controls. Conclusion: In this cohort of recently deployed service members, the majority of those who had sustained an mTBI during deployment reported clinically relevant neurobehavioral symptoms over one year follow-up. Symptoms also were reported by a large minority of those who did not sustain a mTBI.

LB120

ASSOCIATIONS OF LONG-TERM AIR POLLUTION EXPOSURE WITH PREVALENT HYPERTENSION AND BLOOD PRESSURE AND EFFECT MODIFICATION BY OBESITY AND ETHNICITY: RESULTS FROM COMPASS. Saira Tasmin* Saira Tasmin, (University of Chicago)

Previous studies evaluating associations between air pollution with hypertension and blood pressure have had mixed results. Moreover, little information exists regarding the effect of interaction of obesity and ethnicity with long-term air pollution exposure on blood pressure and hypertension. The aim of this study is to assess the associations of long-term air pollution exposure with hypertension and blood pressure and investigate effect modifications in these associations by obesity and ethnicity. We are examining the association between long-term (2, 5 and 10 year moving average) air pollutant exposures, prevalent hypertension and blood pressure in 3002 adults enrolled in the ChicagO Multiethnic Prevention And Surveillance Study (COMPASS) so far. The target is to recruit 10,000 participants in the initial phase. The exposures to particles with an aerodynamic diameter $\leq 10 \ \mu m$ (PM10), aerodynamic diameter< 2.5µm (PM2.5) and nitrogen dioxides (NO2) were obtained from spatio-temporal models. We are using logistic regression accounting for repeated measures to evaluate the association between long-term average PM2.5 and self-reported hypertension and linear regression to evaluate the associations between air pollutants and systolic, diastolic pressures. Models are adjusted for a number of potential demographic, health and socioeconomic covariates. Effect modification by obesity and ethnicity will be investigated. We are analyzing the data now and results of the enrolled participants will be reported in the conference.

LB119

WHY WE SHOULD BE MINDFUL OF LEFT TRUNCATION AND LEFT CENSORING IN MILITARY COHORT STUDIES Kathryn Taylor* Kathryn Taylor, (US Army Research Institute of Environmental Medicine, Harvard T.H. Chan School of Public Health, Department of Environmental Health)

In military occupational cohort studies, when selecting the population to study, it is imperative to consider the potential for left truncation and left censoring of meaningful data. The analysis presented here demonstrates a real-life scenario where different accounting of truncation and censoring led to different estimation of effects. We analyzed the hypothesis that cognitive performance as measured by the Armed Forces Qualification Test (AFQT) was associated with mild traumatic brain injury (mTBI) risk between 2002 and 2007. Utilizing data from the Total Army Injury and Health Outcomes Database to analyze medical encounter data on Active Duty (AD) Army personnel, the first cohort analyzed prevalent hires, or everyone who was on AD in the Army between the 2002 and 2007, including those who entered AD prior to 2002 (n=275,637). The second cohort analyzed incident hires, or Soldiers who entered into the Army between 2002 and 2007 (n=35,602). Multivariate logistic regression models were run to estimate the odds ratios (ORs) for the relationship between AFOT scores and mTBI during the study time period. AFQT category 1 (highest scorers) was set as the reference category. Utilizing the prevalent hires dataset, it was determined that lower AFQT score categories were associated with significantly increased odds of having a mTBI (Category 2 OR=2.008 (1.328, 3.035); Category 3 OR=2.503 (1.665, 3.763); Category 4/5 OR=4.104 (2.559, 6.584)). Meaning those who performed worse on the AFQT had a greater odds of experiencing a mTBI. However, these results were attenuated when compared to incident hires (Category 2 OR=3.994 (0.977, 16.330); Category 3 OR=4.470 (1.103, 18.114); Category 4/5 OR=4.522 (0.750, 27.283)). The results of this analysis demonstrate a muting of the effects of AFQT performance on odds of mTBI when risk is evaluated using prevalent hires. Left truncation and left censoring must be considered when analyzing military occupational cohorts to ensure accurate representation of the assoc

LB121 S/P

CURRENT BEHAVIORAL, SOCIOECONOMIC AND DEMOGRAPHIC DETERMINANTS OF LIFETIME HIV TESTING AMONG AFRICAN AMERICANS IN THE SOUTH Kemi Ogunsina* Kemi Ogunsina, (University of Miami)

Background: HIV diagnosis are higher in the Southern region of the United States (US), as 44% of people living with HIV are in the Southern states. A frican Americans experience a higher burden of this disease, constituting 44% of HIV diagnosis in 2016. Improving testing among African Americans is pivotal in reducing HIV-related health disparity. Here, we explore the current predictors of HIV testing among African Americans (AA) living in the South. Methods: A total of 16,093 AA men and women aged 18 to 80 years from nine states with the highest HIV incidence in the South are included in this analysis. We utilize data from the 2016 Behavioral Risk Factor Surveillance System (BRFSS) to conduct a logistic regression analysis, reporting (AORs)and unadjusted odds ratios (ORs), and 95% confidence intervals (CIs) for the association between behavioral, sociodemographic factors and self-reported HIV testing. All analysis was conducted using SAS University Edition. Results Respondents who reported ever receiving HIV test made up 59.7% of the total, among which majority were age 25 to 44 years old (47.2%), with total house hold income less than\$ 35,000 (52.7%). In addition, risky sexual behavior was reported by 10.8%. Lower odds of testing were observed among retirees, students and homemakers (AOR 0.63; 95% CI 0.45-0.88) than employed respondents. Also, respondents residing in Texas than in Georgia (AOR 0.53; 95% CI 0.31-0.90). Higher odds of testing were observed among those with income \geq \$ 75,000 (AOR 2.00; 95% CI 1.30-3.10), also among respondents living in Florida than in Georgia (AOR 1.81; 95% CI 1.71 -2.80). Conclusion: Our findings suggest that activities to increase HIV testing should focus on individuals who are retired, homemakers and students or who earn less than \$35,000. These individuals are at higher risk of not testing for HIV and may be more likely to contribute to the number of new infections.

RACE AND GENDER SPECIFIC LIFESTYLE BEHAVIORS AMONG US ADULTS WITH A HISTORY OF KIDNEY DISEASE: RESULTS FROM A NATIONALLY REPRESENTATIVE SAMPLE Dr. Anusha Yarava* Dr. Anusha Yarava, (Kent State University)

ABSTRACT Background: Chronic kidney disease (CKD) can be exacerbated by unhealthy lifestyle behaviors (e.g. lack of physical activity, smoking, drinking, and improper diet patterns). Several studies have well documented gender and racial disparities in lifestyle behaviors in other populations. However, modifiable lifestyle behaviors with respect to gender and race in a large community sample of adults with a history of CKD have not been studied yet. This study examines gender and racial differences in unhealthy lifestyle behaviors and their relationship with sociodemographic factors among adults with CKD. Methods We investigated the differences in the race and gender specific lifestyle behaviors among the adults with the history of chronic kidney disease using Behavioral Risk Factor Surveillance System (BRFSS) data. Our analysis included subjects (n =67,842) who were followed retrospectively from 2011 - 2015. We analyzed the data using multiple logistic regression method to predict the association between socio demographic factors and unhealthy lifestyle behaviors. We also performed stratified analysis based on gender and race to know the disparities among the lifestyle behaviors. Results: Gender and Race specific differences were found among sociodemographic factors in predicting the unhealthy lifestyle behaviors. These disparities were found among Age, BMI, Health Plan, Primary care provider and Marital status in association with four different unhealthy lifestyle behaviors. Among these, BMI was found to be significant predictor of Physical Activity, Heavy and Binge drinking, whereas lack of access to health in terms of health plan or through primary care provider were found to be significant predictor of Smoking. Conclusion: Using a nationally representative sample, This study is the first to identify gender and race specific sociodemographic factors that are associated with modifiable lifestyle behaviors among adults with kidney disease.

LB123

NUTRITION DURING PREGNANCY: FINDINGS FROM THE NICHD FETAL GROWTH STUDIES - SINGLETON COHORT Jagteshwar Grewal* Jagteshwar Grewal, (Eunice Kennedy Shriver National Institute of Child Health and Human Development)

Maternal diet both before and during pregnancy plays a pivotal role in optimizing maternal and newborn health. Yet, existing research lacks longitudinal data that comprehensively describe maternal diets. Our study aim was to examine diet before and during pregnancy across 4 racial/ethnic groups in a prospective cohort of US women. As part of the NICHD Fetal Growth Studies-Singletons (2009-2013), we studied 1482 healthy, non-obese women with no major pre-pregnancy chronic disease. To assess peri-conception and first trimester diet, women completed a 145-item self-administered Food Frequency Questionnaire at enrollment (8-13 weeks gestation). Next, they completed automated 24-hour dietary recalls at 4 gestational intervals:16-22, 24-29, 30-33, and 34-37 weeks. We examined, across trimesters, unadjusted variations in median (interquartile range (IQR)) caloric intake and energy-adjusted nutrient compositions by 4 self-identified racial/ethnic groups-White, Black, Hispanic, Asian During peri-conception and first trimester, median (IOR) caloric intake was 1976(1450-2747) kcal/day, comprised of 15(13-18)% protein, 32(28-37)% fat, 52(47-58)% carbohydrates, and a glycemic load (GL) of 122(88-179). Consumption levels varied significantly by race/ethnicity: daily caloric intake was highest among Blacks and lowest among Whites (2317 vs. 1773 kcal; p<0.001) with differences driven primarily by refined carbohydrates (GL: 158 vs. 109). At 16-22 weeks, caloric intake was 1924(2430-1499)kcal/day, composed of 16(19-13)% protein, 33(38-27)% fat and 51(58-45)% carbohydrates. Total energy intake was highest among Blacks and lowest among Asians (2153 vs. 1792 kcal/day; p<0.001) due to disparities in fat and protein intake: 34% vs. 30% and 14% vs. 18%, respectively. Compared to 16-22 weeks, maternal diet was similar across the 3 subsequent assessments. In sum, racial/ethnic disparities in diet quantity and composition require further investigation to assess impact on perinatal outcomes.