001-S

MATERNAL ALCOHOL CONSUMPTION AND INFANT CLEFTS: THE ROLE OF ALCOHOL METABOLISM GENE VARIANTS. *A L Boyles, L A DeRoo, A J Wilcox, J A Taylor, A Jugessur, K Christensen, J C Murray, R T Lie (NIEHS, Durham, NC)

Previous studies suggest first-trimester binge drinking (5+ drinks) increases risk of cleft lip (CL) and cleft palate (CP). Furthermore, genetic polymorphisms of alcohol dehydrogenase 1C (ADH1C) have been associated with CL with or without CP in Norwegian and Danish family-based studies. In this Norwegian case-control study we examined maternal drinking (drinks per sitting) and infant clefts among 483 cases and 503 controls, taking into account both maternal and child ADH1C genotypes. We used logistic regression to calculate relative risks (RR) and 95% confidence intervals for clefts by maternal drinking, stratified by ADH1C haplotype. Fast and slow alcohol metabolizing haplotypes were determined by 3 polymorphisms. Compared with abstention, first trimester binge drinking was associated with infant clefts (RR=2.5; 1.3-4.8). There was no increased risk among mothers and children who both carried two copies of the faster metabolizing haplotype (RR=0.9: 0.2-4.1). There was increased risk when the mother or child carried 1 copy (but not 2) of the slower haplotype (RR=5.6, 1.8-17). This risk was highest for CL alone (RR=8.5, 2.4-30). When either the mother or child carried 2 copies of the slow haplotype, the risk of CL alone was increased for both lower-level drinking (1-4 drinks per sitting: RR=2.2, 1.1-4.4) and binge drinking (5+ drinks: RR=1.9, 0.5-7.8). There was evidence of interaction between drinking and combined mother and child haplotypes for CL alone (p=0.03). Results were similar for CP alone. The risk of oral facial clefts associated with first trimester drinking is modified by both mother and child ADH1C haplotypes.

002

LIPID OVERFLOW IS AN EARLY-STAGE PREDICTOR OF TYPE 2 DIABETES. *H S Kahn, Y J Cheng, T J Thompson, G Imperatore, E W Gregg (Centers for Disease Control & Prevention, Atlanta, GA 30341)

Fasting glucose (FG) and BMI (weight/height^2) are known risk factors for future diabetes. Lipid overflow may serve better than FG or BMI as an early-stage predictor of glucose dysregulation. We compared an index of lipid overaccumulation with the conventional markers predicting incident diabetes in a cohort observed up to 14.9 years (Atherosclerosis Risk in Communities study). The 12,822 diabetes-free adults (ages 45-64, 22.9% blacks) had baseline data to compute their lipid accumulation product (LAP, an index requiring fasting triglyceride concentration and a sex-specific estimate of waist enlargement). Incident diabetes was identified in 18.9% through multiple contacts and glucose tests. In proportional-hazard models, the hazard ratio (HR per 1 SD) for diabetes in the full sample (adjusted for age, sex, race, parental diabetes, and hypertension) was 2.24 for FG, 1.80 for LAP, and 1.56 for BMI [all comparisons $p<0.001$]. But when restricted to participants with baseline normal FG (<5.6 mmol/L) the HR was 1.74 for LAP, 1.43 for BMI, and 1.30 for FG [LAP vs. others $p<0.001$]. Among 9,789 participants who were free of diabetes for the initial 8 years of follow-up, those with subsequent incident diabetes were characterized better by high baseline LAP (HR 1.69) than by BMI (HR 1.42) or FG (HR 1.37) [LAP vs. others $p<0.03$]. LAP performed similarly to fasting insulin concentration for diabetes prediction at any interval. Thus, in adults assessed prior to impairment of their glucose homeostasis, an index of accumulated lipid was associated more strongly with future diabetes than was increased weight or glucose. Early stages of glucose dysregulation may be initiated by lipid overflow accompanied by compensatory hyperinsulinemia.

003

DAYTIME NAPPING AND NIGHT SLEEP DURATION AND DIABETES MELLITUS IN THE NIH-AARP DIET AND HEALTH STUDY. *Q Xu, Y Song, Y Park, A Hollenbeck, A Blair, A Schatzkin, H Chen (Epi Branch, NIEHS, Research Triangle Park, NC)

To understand the association between napping/sleeping habits and risk of diabetes, we prospectively examined hours of daytime napping and night sleeping assessed in 1996 in relation to self-reported diabetes with a diagnosis between 2000 and 2005 among 174,781 participants of the NIH-AARP Diet and Health Study. Odds ratios (OR) and 95% confidence intervals (CI) were derived from logistic regression models with adjustment for age, sex, race, education, marital status, smoking, coffee and alcohol consumptions, and general health status. A total of 10 109 cases were included in the napping analysis and 10 139 in the sleeping analysis. Longer day napping was associated with higher occurrence of diabetes. Compared with individuals who did not nap, the multivariate OR was 1.26 (95%CI: 1.20-1.31) for those reporting <1 hour and 1.60 (95%CI: 1.49-1.71) for ≥1 hour of napping (p for trend<0.0001). The association was attenuated after further adjusting for body mass index (BMI), but remained statistically significant. The corresponding ORs were 1.17 (95%CI: 1.12-1.23) for <1 hour and 1.40 (95%CI: 1.31-1.50) for ≥1 hour of napping (p for trend<0.0001). An inverse J-shaped relationship was found between hours of sleep duration at night and diabetes risk. Compared with those who slept 7-8 hours, the OR was 1.49 (95%CI: 1.33-1.66) for participants reporting 5 or fewer hours, 1.12 (1.07-1.17) for 5-6 hours, and 1.11 (0.99-1.24) for 9 or more hours of night sleep. Like the napping analysis, further adjustment for BMI attenuated but did not abolish this association. A joint analysis showed a statistical significant interaction between hours of napping and sleeping on diabetes (p for interaction <0.0001). Among individuals who did not nap during the day, only short hours of sleeping was associated with higher occurrence of diabetes, while among those who napped ≥1 hour per day, both longer and shorter hours of sleeping was associated with higher diabetes risk. Our analysis suggests that longer daytime napping or shorter night sleep are associated with higher risk of diabetes and the associations may be in part mediated by obesity.

004-S

PREVALENCE OF HYPERGLYCEMIA REMAINS LOW IN TRANSFORMING RURAL CHINA. C W Fu, Y Chen, F Wang, X Wang, *Q Jiang (School of Public Health, Fudan University, Shanghai 200032, China)

To describe the hyperglycemic status of adults in transforming rural community of China, a cross-sectional study was carried out in 4 rural communities of Deqing County located in East China. Subjects aged 18 to 64 years old were face-to-face interviewed in their households from September 2006 to May 2007 by trained health workers. Fasting plasma glucose (FPG) was tested. Subjects were considered to have impaired fasting glucose (IFG) if their FPG was in the range from 5.6 to 6.9 mmol/L and to have diabetes mellitus (DM) if FPG was 7.0 mmol/L or more. Among 4516 subjects, the crude prevalences of ITG and DM were 5.4% and 2.2%. Using 2000 China National Population, the age and gender standardized prevalences were 4.2% and 2.1%, respectively. The ratio of DM/IFG was 40.7% on average, ranging from null in the 18-24 year group to 43.8% in the 55-64 year group. In the multinomial logistic regression model, age was significantly associated with increased risks of both IFG and DM (ajusted odds ratio (aOR) with an one-year increase of age: 1.05, 95% confidential interval (CI): 1.03-1.06, and 1.06, 95% CI: 1.04-1.09); subjects in the lowest quarter of family income had a significantly lower risk of IFG compared with those with the highest quarter (aOR: 0.56, 95%CI: 0.38-0.84).The data indicated that there were still relatively low hyperglycemic prevalence and ratio of DM/IFG in adults in Chinese transforming rural communities.

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* = Presenter; S = The work was completed while the presenter was a student

005

COFFEE, ALCOHOL, AND RISK OF TYPE 2 DIABETES IN THE BLACK WOMEN'S HEALTH STUDY. *J R Palmer, D A Boggs, L Rosenberg (Slone Epidemiology Center at Boston University, Boston, MA 02215)

Coffee consumption and alcohol consumption appear to be inversely related to type 2 diabetes risk in Caucasian and Asian populations, but results have not been reported separately for populations of African descent. We assessed the relation of these dietary exposures to diabetes risk in the Black Women's Health Study, a large prospective study of African American women. Approximately 59,000 U.S. black women were enrolled by mailed questionnaire in 1995. Alcohol intake was ascertained in 1995 and updated every two years and coffee intake was ascertained in 1995 and updated once, in 2001. In 12 years of follow-up, 3,655 incident cases of type 2 diabetes occurred among women aged 30 and older. Cox proportional hazard models were used to estimate incidence rate ratios (IRR) and 95% confidence intervals (CI) for various frequencies of consumption, with control for potential confounders, including body mass index and other dietary factors. The multivariable IRR for 2+ cups per day of caffeinated coffee relative to <1cup/month was 0.85 (95% CI 0.77-0.95); there was not a further reduction in IRR for more frequent intakes (e.g., 4+ cups/day). Neither decaffeinated coffee intake nor tea intake were associated with diabetes risk. For alcohol, multivariable IRRs for 1-6 drinks/week and 7+ drinks/week relative to <1 drink/week were 0.85 (95% CI 0.78-0.93) and 0.80 (95% CI 0.67-0.95), respectively. The associations with coffee and alcohol were present within all strata of body mass index. The present findings indicate that both coffee consumption and moderate alcohol intake reduce the risk of type 2 diabetes in African American women, as in other ethnic groups. Mechanisms for the reduction are still unclear.

006-S

AGE AT MENARCHE AND RISK OF TYPE 2 DIABETES: RESULTS FROM TWO LARGE PROSPECTIVE COHORTS. *C He, F-B Hu, D-J Hunter, G-M Louis, M-L Hediger, C Zhang (Harvard School of Public Health, Boston, MA 02115)

With the escalating epidemic of type 2 diabetes mellitus(T2DM)worldwide, the identification of early-life risk factors for T2DM is becoming a priority. Early menarche has been significantly associated with risk factors for diabetes such as excessive adiposity and insulin resistance. However, the association of age at menarche with T2DM risk remains inconclusive. We conducted prospective analyses in two large independent cohorts, the Nurses' Health Study (NHS)I (age 34-59 years) and NHSII (age 26-46 years) among total 201,962 US women without history of chronic diseases at baseline. Among them, 7,963 and 2,739 incident cases of T2DM were documented during follow-up in NHSI and NHSII, respectively. We found age at menarche was significantly and inversely associated with T2DM risk after adjusting for age, race, family history of diabetes, lifestyle and reproductive factors, childhood characteristics including body fatness at age 10, and BMI at age 18 years. Relative risks (95% confidence intervals (CIs)) across the earliest to the latest age at menarche categories ($\leq$11, 12, 13, 14, $\geq$15 years) were 1.18(1.10-1.27), 1.09(1.02-1.17), 1.00(referent), 0.92(0.83-1.01), and 0.95(0.84-1.06) in NHSI (P for trend <0.0001); and 1.40(1.24-1.57), 1.13(1.00-1.27), 1.00(referent), 0.98(0.82-1.18), and 0.96(0.78-1.19) in NHSII (P for trend <0.0001). These associations were substantially attenuated after additionally controlling for adulthood BMI. Our data suggested that earlier age at menarche was significantly associated with increased risk of T2DM in adulthood, with the association being stronger among younger women. This association was largely mediated through excessive body adiposity in adult life.

007-S

SALIENT CHARACTERISTICS FOR RECOMMENDING GLUCOSE TESTING TO IDENTIFY PRE-DIABETIC ADULTS AGED <45 YEARS IN THE UNITED STATES. *E L Evans, R P Ojha, L A Fischbach (University of North Texas Health Science Center, Fort Worth, TX 76107)

We evaluated which characteristics are most important for recommending glucose testing to identify pre-diabetic adults aged <45 years in the United States because the current clinical guidelines suggest several risk factors for pre-diabetes, but the diagnostic value of each may differ. Self-reported data from non-diabetic adults aged 20-45 years (n=3,066) in the United States from combined (1999-2006) National Health and Nutrition Examination Surveys were used in the analysis. Pre-diabetes was defined as fasting plasma glucose of 100.0-125.9mg/dL upon laboratory examination. The full model contained 11 putative diagnostic indicators of pre-diabetes derived from current clinical guidelines and supplemented with prior evidence. The final model was selected using c-trend analysis, which utilizes the concordance (c) statistic for variable selection. Briefly, variable subsets were generated using best subset selection in weighted logistic regression models. The c-statistic of each optimal subset was plotted by the number of variables in each subset using a line graph. The point at which the c-statistic reached a plateau was established as the optimized variable subset. Male gender, BMI>25, hypertension, history of high total cholesterol, and lack of a high school diploma were diagnostic indicators of pre-diabetes (c=0.69, 95%CI 0.67, 0.71). The characteristics identified in our study may be most relevant for recommending glucose testing to identify pre-diabetic adults aged <45 years in the United States, but the modest diagnostic accuracy of the combined variables suggests that other important diagnostic indicators exist.

008

RISK FACTORS FOR INCIDENT DIABETES IN U.S. MILITARY PARTICIPANTS OF THE MILLENNIUM COHORT STUDY. *B Smith, E Boyko, I Jacobson, T Smith, T Hooper, P Amoroso, G Gackstetter, M Ryan, E Barrett-Connor (Naval Health Research Center, San Diego, CA 92106)

Little prospective data exist on the risk of diabetes among persons in active military service. We examined risk of newly-reported diabetes (DM) in members of the Millennium Cohort Study over a 3-yr follow-up period that included the initiation of military conflicts in Afghanistan and Iraq. Study subjects included a random sample of all persons on active service in the U.S. military on Oct 1 2000. Of the 77,047 subjects who agreed to participate by completing a baseline self-administered paper or online survey in 2001, 55,021 (median age 36 yrs) returned a follow-up survey in 2004. Survey questions elicited information on demographics, height and weight, military service, clinician-diagnosed diabetes, and other physical and mental health conditions and lifestyle characteristics. Occurrence and timing of deployment was obtained from electronic DoD data. Odds of DM in relation to exposures of interest were estimated using logistic regression analysis. Of the 51,605 subjects without self-reported diabetes at baseline, 0.9% reported DM at follow-up, a rate of 3/1000 person years. Greater age (odds ratio, 95% confidence limits 1.06, 1.05-1.07), body mass index (1.20, 1.17-1.22), and non-Caucasian ethnicity (1.49, 1.24-1.80) were related to increased odds of DM. Those deployed with and without self-reported combat exposures had a statistically significant lower odds of DM compared with nondeployees. Ongoing analyses are designed to help clarify the associations between exposures due to military service and physical and mental health disorders and incident diabetes in a large military and veteran population while controlling for known diabetes risk factors.

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009

HEART RATE AND MORTALITY AMONG DIABETICS: THE POTENT EFFECT OF DURATION OF DISEASE. *P N Singh, B Patel, P Patel, N Singh (Department of Epidemiology, Loma Linda University, Loma Linda, CA)

The association between elevated heart rate and mortality is well established by numerous population-based studies. Among diabetics, we note that some of the risk factors for mortality (proteinuria, hypertension) raise the possibility that elevated heart rate may decrease survival rates as a manifestation of parasympathetic cardiac autonomic dysfunction. To test this hypothesis we conducted a retrospective cohort study of 2,209 male diabetics from the West Los Angeles VA Medical Center. During 14,916 person-years of follow-up, we identified 716 deaths in our analytic population that exhibited a mean average heart rate was 80 beats per minute (bpm). In age-adjusted proportional hazard analyses we found a direct association between heart rate and mortality (Hazard Ratio[95% confidence interval]=1.0 for $<$ 60 bpm, 0.7 [0.5, 1.2] for 60-79 bpm, 1.6 [1.0, 2.7] for 80-89 bpm, 3.5 [2.1, 5.6] for 90-109 bpm, 8.8 [4.5, 17.3] for $>$ 109 bpm). This association remained even after controlling for body mass index, hemoglobin A1C, hyperlipidemia, hypertension, tobacco use, and microalbinuria. In additive interaction analyses we found that the risk due elevated heart rate ($>$109 bpm) was substantially higher for men who had suffered from diabetes for more than 5 years (Hazard Ratio [95% Confidence Interval] =15.6 [5.8, 41.8]) as compared to men with shorter duration of disease (Hazard Ratio [95% Confidence Interval] =5.6[1.6, 19.7]). These findings were not substantially altered by adjustment for coronary artery disease or congestive heart failure. Our findings identify elevated heart rate as an important risk factor among diabetic men that increases in potency during later stages of the disease.

010

DO ''CONFLICT OF INTEREST'' STATEMENTS IN EPIDEMIOLOGY AND PUBLIC HEALTH SERVE THEIR OSTENSIBLE PURPOSE? *C V Phillips, J E Enstrom, M L Marlow (U Alberta, Edmonton, AB, Canada T6G2L9)

Epidemiology, like all science, has subjective components, and researchers often have preferences that might affect their choices. One tool for recognizing potential motives of researchers should be conflict of interest (COI) disclosures, but in health science they are typically not useful. Following up on our 2008 SER symposium on COI, we explore recent events and discourse. Typically COI statements only report financial relationships. But pet theories, political/religious beliefs, and pleasing colleagues motivate researchers, generally more (and earlier) than research funding. Several recent analyses have pointed this out. Arguably funding is a proxy for relationships, which are a proxy for other beliefs. But we reviewed epidemiology and public health publications, and found a failure to disclose most COIs or provide enough information to infer them. We give examples of rare attempts to provide full disclosure. Like many concepts that become unmoored from their real meanings (war crimes, free markets), COI has been coopted to perpetuate the power structure and deny minority opinions, particularly in politicized behavioral and environmental health research. Relationships that the public health orthodoxy dislikes are used to deny the validity of evidence, while COI-producing relationships with orthodox institutions, even those that openly manipulate the science, are ignored. Clear COIs by members of the orthodoxy need not even be reported; we present recent examples where journals effectively declared this to be their policy. If epidemiology does not address these problems then external criticism will undermine its credibility as has recently happened in some medical research fields.

011

A LONGITUDINAL STUDY OF SERUM CAROTENOID, RETINOL, AND TOCOPHEROL CONCENTRATIONS IN RELATION TO BREAST CANCER RISK AMONG POSTMENOPAUSAL WOMEN. *G C Kabat, M Kim, L L Adams-Campbell, B J Caan, R T Chlebowski, M L Neuhouser, J M Shikany, T E Rohan (Albert Einstein College of Medicine, Bronx, NY 10461)

Data from several, but not all, prospective studies suggest that breast cancer risk is inversely associated with serum/plasma concentrations of carotenoids, and not related to retinol or tocopherols; however, to date studies have only assessed exposure at one point in time. We conducted a longitudinal study of postmenopausal breast cancer risk using the 6% random sample of women in the Women's Health Initiative clinical trials whose fasting blood samples, provided at baseline and at years 1, 3, and 6, were analyzed for α-carotene, β-carotene, β-cryptoxanthin, lycopene, lutein + zeaxanthin, retinol, α-tocopherol, and γ-tocopherol. The association of baseline micronutrients and breast cancer risk was estimated by Cox proportional hazards models. In addition, repeated measurements were analyzed as time-dependent covariates. Among 5459 women with baseline micronutrient values, 191 incident cases of breast cancer were ascertained over a median of 8.0 years of follow-up. After multivariable adjustment, risk of invasive breast cancer was inversely associated with baseline serum α-carotene concentrations (HR for highest vs. lowest tertile 0.55, 95% CI 0.34-0.90), and positively associated with lycopene (HR 1.47, 95% CI 0.98-2.22). Analysis of repeated measurements indicated that α-carotene and β-carotene were inversely associated with breast cancer and that γ-tocopherol was associated with increased risk. Our results add to evidence of an inverse association of specific carotenoids with breast cancer. The positive associations observed for lycopene and γ-tocopherol require confirmation.

012

MAMMOGRAPHIC DENSITY IN AFRICAN AMERICAN, CARIBBEAN AND CAUCASIAN WOMEN. *P Tehranifar, J Flom, M B Terry (Columbia University, Mailman School of Public Health, New York, NY 10032)

Breast cancer risk and prevalence of many breast cancer risk factors vary by ethnicity and acculturation, but it is unclear whether similar variations exist for mammographic breast density, an intermediate marker of breast cancer. We examined ethnic variation in mammographic density in 168 women without a history of breast cancer, undergoing screening mammography (average age = 50.2). The sample consisted of 22% non-Hispanic Caucasian, 44% non-Hispanic African American, 23% Afro-Caribbean, and 10% Caribbean Hispanic. We used generational status as a proxy for acculturation as follows: U.S-born (U.S.-born participants with U.S.-born parents), 2nd generation (U.S.-born participants with foreign-born parents), 1st generation (foreign-born participants). We digitized mammograms and evaluated the proportion of dense area (in percentage) using a computer software. We used multivariable linear regression model to investigate the associations of percent density with race/ethnicity, generational status, current body mass index (BMI, kg/m2) and age. Age and BMI were significantly inversely associated with percent density ($p< 0.001$), with percent density being more than twice higher in normal weight (BMI$<$25) than in obese women (BMI$\geq$30). As compared with African Americans, all other ethnic groups had lower percent density after adjusting for age and BMI, but these differences were not statistically significant. Generational status was not associated with density in the overall sample or among Caribbean women only. In conclusion, we did not observe significant influences on mammographic density by ethnicity and generational status in an urban multiethnic sample.

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013-S

VITAMIN D, FROM DIETARY INTAKE AND SUNLIGHT EXPOSURE, AND BREAST CANCER RISK. *L N Anderson, M Cotterchio, P Brown, J A Knight, R Vieth (Cancer Care Ontario and Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada)

Vitamin D has anti-cancer properties, but the evidence that vitamin D is associated with reduced breast cancer risk is inconclusive. The associations between vitamin D from all sources and breast cancer risk were evaluated in a population-based case-control study. Breast cancer cases aged 25 - 74 were identified through the Ontario Cancer Registry from 2002-2003. Controls residing in Ontario were identified using random digit dialling. Overall, 3,024 cases and 3,420 controls completed a mailed epidemiologic and food frequency questionnaire. An ultraviolet (UV) exposure algorithm was derived to combine time spent outdoors, UV radiation at locations resided, sun protection practices and skin colour. This composite UV exposure variable (a proxy for vitamin D) was derived for 4 periods of life. Multivariable logistic regression analysis was used to obtain odds ratio (OR) estimates for all vitamin D variables. Preliminary results suggest that UV exposure (a proxy for vitamin D) is inversely associated with breast cancer risk during teens (OR for extreme quartiles = 0.80, 95% confidence interval (CI): 0.69, 0.92), 20s-30s (OR = 0.75, 95% CI: 0.64, 0.87), 40s-50s (OR = 0.77, 95% CI: 0.66, 0.90) and 60s-75 (OR = 0.58, 95% CI: 0.45, 0.74). Vitamin D from supplements (OR for >400 versus 0 IU/day = 0.78, 95% CI: 0.63, 0.98), but not food, during adulthood, was inversely associated with breast cancer risk. This study developed a novel measure of vitamin D exposure from sunlight and preliminary findings suggest UV exposure is associated with reduced breast cancer risk. Vitamin D from both sunlight and supplements may be important in the primary prevention of breast cancer.

014-S

A CASE-CONTROL STUDY OF DIETARY PATTERNS AND ENDOMETRIAL CANCER RISK. *R Biel, C Friedenreich, I Csizmadi, P Robson, L McLaren, P Faris, L Cook, K Courneya, A Magliocco (Alberta Cancer Board, Calgary, AB, Canada T2N 4N2)

A population-based case-control study in Alberta, Canada (2002-2006) was used to identify dietary patterns and examine their association with endometrial cancer (EC) risk in 506 cases and 981 controls. Incident EC cases were identified from the Alberta Cancer Registry (67.9% response). Controls were identified via random-digit dialing and frequency-matched to cases on age (31.8% response). Past year dietary intake was assessed with the Diet History Questionnaire. Dietary patterns were identified among controls using factor analysis. Unconditional logistic regression analysis was used to estimate odds ratios (OR) and 95% confidence intervals (CI) for EC risk within quartiles (q) of dietary pattern score. Patterns labelled Plants + poultry, Sweets, Meat + snacks, and Eggs + butter explained 17% of the variance in the dietary data. Adjusted for age and hypertension history, EC risk was elevated for greater intakes of the Sweets (q4:OR=1.36, 95% CI 0.99-1.88) and Eggs + butter (q4:OR=1.34, 95% CI 0.98-1.84) patterns. Body mass index (BMI in kg/m^2) modified the association for two patterns. Risk was significantly elevated with greater intakes of the Eggs + butter pattern for women with a BMI $\geq$25 (q4:OR=1.84, 95% CI 1.28-2.65). Risk reductions were observed for women with a BMI <25 with greater intakes of the Meat + snacks pattern (q4:OR=0.43, 95% CI 0.20-0.90). No reductions in risk were found for the Plants + poultry pattern (q4:OR=1.03, 95% CI 0.75-1.41). Less healthy dietary patterns may be important in increasing EC risk. Recommendations to reduce EC risk should remain focused on encouraging women to maintain a healthy weight and the role of diet should be studied further.

015-S

POLYMORPHISMS IN *CYP1A1, CYP1A2, CYP1B1, IL6R* AND *TNF* IN RELATION TO BREAST CANCER SURVIVAL. *S W Andersen, A Trentham-Dietz, C D Engelman, H G Skinner, M Garcia-Closas, L Titus-Ernstoff, J M Hampton, P A Newcomb, K M Egan (University of Wisconsin, Madison, WI)

Evidence suggests single nucleotide polymorphisms (SNPs) in estrogen-related genes may be related to survival after breast cancer. We evaluated twenty-four SNPs within five estrogen-related genes (*CYP1A1, CYP1A2, CYP1B1, IL6R*, and *TNF*) for associations with breast cancer survival and effect modification by other estrogen-related risk factors. Data arise from a population-based study involving 1,666 White women diagnosed with breast cancer between the years 1995-2000. All women completed risk factor telephone interviews approximately one year after diagnosis. Date and cause of death, were obtained from the National Death Index through December 2005. Approximately 92% (N=1528) of breast cancer cases survived to December 2005, whereas 8% (N=140) were deceased, 6% (N=95) from breast cancer. Cox proportional hazards regression models were used to assess all-cause mortality and for deaths where the underlying cause was breast cancer. Models were adjusted for state of residence and age at diagnosis. No apparent association was found between any of the SNPs or created haplotypes and all-cause, nor breast cancer, mortality. Effect modification by body mass index was observed for a SNP of *IL6-R* (rs4845374) and by smoking status for a SNP of *CYP1B1* (rs162552) (P = 0.02 and 0.03, respectively). Although given the number of tests, interactions may be spurious. Exploration into interactions between the genes investigated and other estrogen-related host factors may be warranted to exhaust the possibility of an association with breast cancer survival.

016

FACTORS ASSOCIATED WITH SURVIVAL TIME AMONG WOMEN DIAGNOSED WITH OVARIAN AS INDEX CANCER VERSUS SUBSEQUENT PRIMARY. *Z Berkowitz, S Rim, L Peipins, S Stewart (Centers for Disease Control and Prevention, Atlanta, GA 30341)

We examined demographic and tumor-related factors affecting survival time in two cohorts of women diagnosed with ovarian as a first (a) versus subsequent primary cancer (b) using data from Surveillance, Epidemiology and End Result (SEER) registries, 1973-2005. For each cohort we used the Kaplan-Meier method to estimate median survival time and Cox regression with nonproportional hazards to estimate 5-year risks of death after diagnoses in multivariate models. We identified 45,044 women in cohort (a) and 3,532 in cohort (b). The estimated median survival time was 36 and 23.8 months for cohort (a) and (b) respectively. Multivariate analyses indicated a decrease in the hazard of death over time in both cohorts. After adjusting for all other variables, localized or regional disease was associated with significantly lower hazard of death than distant disease. Lower hazards of death were also associated with a diagnosis of ovarian cancer in more recent years (1998-2005) than in past years (1977-1997) and with being <50 years of age. Compared with white women, African American women had a significantly higher hazard of death. Time interactions with histology types indicated that compared with serous, hazards of death of all other histology types were highest in the first few months after diagnosis and decreased over time. The hazards of death associated with mucinous, endometrioid or non-adenocarcinoma were lower than that of serous 32-60 months after diagnosis, although statistically significantly lower only for women with primary ovarian cancer. In conclusion, survival analyses indicated similar patterns in both cohorts. Survival has increased over the time period analyzed.

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017

CHANGING INCIDENCE OF SECOND PRIMARY BREAST CANCER IN CALIFORNIA. *S F Marshall, A Ziogas, J Castaneda, E Touslee, H Anton-Culver (Department of Epidemiology, University of California, Irvine, CA 92697)

Improved survival after breast cancer diagnosis may place an increased number of women at risk for a second breast cancer, but changes in incidence are not routinely assessed. Breast cancers diagnosed 1990-2001 were identified from the statewide, population-based California Cancer Registry (CCR). After excluding bilateral cancers and those diagnosed at death, we calculated the annual risk of a second primary breast cancer in the contralateral breast per 100,000 person years within four years of the first diagnosis. Joinpoint regression was used to examine the trend in incidence over ten years. During 769,579 person years of follow-up, 6,252 women were diagnosed with a second primary breast cancer in the contralateral breast within four years of her original diagnosis. The average annual rate was 812.4 second primaries per 100,000 person years. The incidence of second primary breast cancer has declined significantly over the last ten years and the annual average percent change (AAPC) was -3.5 (95% confidence intervals (CI) = -2.0, -5.0). The decline was especially rapid after 1997 at an AAPC of -7.2 (95% CI = -1.4, -12.6). The annual rate was higher for African American and non-Hispanic white women, but the decline in AAPC was stronger for Hispanic and Asian Pacific Islander women. The incidence of second primary breast cancer remains high but it has reduced and although we do not know why this is, it may be due to earlier detection and advances in treatment. Rates have reduced for women of all race/ethnicities but African American and non-Hispanic white women continue to have the highest risks of a second primary.

018

EQUOL STATUS IS INVERSELY ASSOCIATED WITH HISTORY OF ESTROGEN USE IN A SAMPLE OF POSTMENOPAUSAL WOMEN LIVING IN WESTERN NEW YORK. *B J Fuhrman, B E Teter, M Barba, C Byrne, A Cavalleri, B J Grant, P J Horvath, D Morelli, E Venturelli, P C Muti (University at Buffalo, Buffalo, NY 14214)

Equol is a metabolite of the soy isoflavone daidzein. 25-50% of women produce equol after consuming soy. Equol production may modify the effects of soy on disease risk and/or may be a marker of endogenous hormonal milieu. We studied associations of equol producer status with histories of menopause and hormone use in a cross-sectional study of postmenopausal women seeking mammographic assessment in Buffalo, New York. Participants were aged 48-82 years old, and were not current users of hormone replacement therapy (HRT). Equol status was assessed by soy challenge. Data on menopause and hormone use were collected by questionnaire. Logistic regression models were used to evaluate association of these factors with equol status. Women reporting past use of HRT were significantly less likely to be equol producers when compared to never users (OR: 0.37, 95% CI 0.21-0.68). Among HRT users, equol status was inversely associated with unopposed estrogen therapy (ERT) (OR: 0.27, 95% CI 0.12-0.61). Among ERT users, equol producers were significantly older at surgical menopause (OR = 5.83, 95% CI 1.07-31.87). Our findings indicate that past HRT users, and particularly, past ERT users are less likely than other postmenopausal women to produce equol. The cross-sectional design prevents causal inference but further research is warranted to understand the observed associations.

019-S

FETAL GROWTH AND MATERNAL PREMENOPAUSAL BREAST CANCER. *S Nechuta, N Paneth, D Pathak, J Gardiner, E Velie (Michigan State University, E. Lansing, MI)

High fetal growth (birthweight-for-gestational age) may reflect elevation in maternal hormones or growth factors important to breast cancer etiology. We therefore hypothesized that high fetal growth in a women's own pregnancies would be associated with increased breast cancer risk. Past studies have been inconsistent, and all have used birthweight (BW) as a proxy for fetal growth. Only two studies adjusted for gestational age (GA), and no study has directly investigated estimated fetal growth for GA in relation to maternal breast cancer risk. We conducted a population-based case-control study among parous Michigan (MI) women aged $\leq$50 years by linking MI Cancer Registry (1985-2004) with MI Live Birth files (1978-2004). Controls were matched 4:1 on maternal birth year and race. Analyses were based on women with singleton births (7,647 invasive/in-situ breast cancer cases and 28,758 controls). We estimated fetal growth in first births using established BW percentiles for gestational weeks 24-44 (small for GA (SGA) $<$10th, appropriate for GA (AGA) 10-90th (referent), large for GA (LGA) $>$90th). Odds ratios (OR) and 95% confidence intervals (CIs) were estimated by conditional logistic regression, adjusted for age at first birth, parity, education, infant sex, and GA. Breast cancer was not associated with either delivery of an LGA infant (OR = 1.05 95% CI: 0.96-1.15), nor with delivery of an SGA infant (OR = 0.97 95% CI: 0.90-1.05) in the first birth. However, among women $\geq$30 years at first delivery, having an LGA infant was associated with increased risk (OR = 1.25 95% CI: 1.02-1.53). Older women whose first birth is an LGA infant may have increased breast cancer risk, possibly reflecting hormonally-induced growth of preexisting malignant cells.

020

EXERCISE AND QUALITY OF LIFE AMONG BREAST CANCER SURVIVORS. *X Chen, Y Zheng, W Zheng, K Gu, Z Chen, W Lu, X-O Shu (Vanderbilt University, Nashville, TN 37203)

To evaluate the effect of exercise after cancer diagnosis on QOL among breast cancer survivors 3 years after cancer diagnosis in a population-based setting, we recruited 2232 women aged 20-75 with newly diagnosed breast cancer into a population-based cohort study. Exercise was assessed at approximately 6, 18, and 36 months after diagnosis, and a metabolic equivalent task (MET) score in hours per week (MET-hours/week) was derived. A cumulative, weighted exercise-MET score was created for exercise during the 36 months post-diagnosis period. QOL was evaluated by using the General Quality of Life Inventory-74 at 6 and 36 months post-diagnosis. Multiple linear and logistic regression models were conducted to evaluate the association between exercise and QOL with adjustment for clinical prognostic factors and other potential confounders. Approximately 69%, 75%, and 74% of women reported exercising regularly at 6, 18, and 36 months post-diagnosis, respectively. Exercise level at 6 months post-diagnosis was significantly and positively associated with total QOL, physical, psychological, and social well-being at 6 and 36 months post-diagnosis (trend test: all $P<0.05$). The weighted 36-month exercise-MET score was positively associated with total QOL score, and physical, psychological, and social well-being sub-domain scores at 36 months post-diagnosis (all $P<0.05$). Although further adjustment for QOL at 6 months post-diagnosis attenuated the associations, the associations remained significant. Exercise after cancer diagnosis may improve QOL among breast cancer survivors.

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021-S

GENETIC VARIATION IN THE PROGESTERONE RECEPTOR AND AGE AT MENARCHE. *K C Taylor, C M Small, M P Epstein, S L Sherman, W Tang, M M Wilson, M Bouzyk, M Marcus (Emory University, Atlanta, GA 30322)

Background. Age at menarche is an indicator of endocrine function and may be an independent risk factor for reproductive cancers. The progesterone receptor gene (PGR) was previously identified as a candidate gene for age at menarche in a genome-wide linkage study. The PGR Val660Leu variant (PROGINS) has been shown to have a decreased response to progestins in vitro, and has been associated with risk of reproductive cancers. This study examines the association between 31 single nucleotide polymorphisms (SNPs) in the extended gene region of PGR and self-reported age at menarche. Methods. Women office workers ages 18-40 were recruited from 1990-1994. A total of 397 women reported age at menarche and were genotyped for up to 31 progesterone receptor polymorphisms using first-morning urine samples as the DNA source. We fit a semiparametric regression model using the method of least-squares kernel machines, which yields a single global score statistic for assessing the association between all 31 SNPs and age at menarche (N=244). We followed this global analysis with exploratory haplotype block analyses. Results. Genetic variation in PGR was associated with age at menarche in our population, adjusting for race and ethnicity (p=0.05), or restricted to non-Hispanic whites (p=0.03). Of seven identified haplotype blocks, two were significantly associated with age at menarche (p=0.03 and 0.05). One of these included the functional Val660Leu variant, rs1042838. Conclusions. Our results suggest that genetic variation in PGR is associated with age at menarche in this population. Further investigation of this association in a replication dataset is warranted.

022

CYTOKINE GENE POLYMORPHISMS INFLUENCE GASTRIC DISEASE PROGRESSION. A 12 YEAR FOLLOW-UP STUDY. *R M Mera, J Zabaleta, M C Camargo, M B Piazuelo, L E Bravo, P Correa (Vanderbilt University, Nashville, TN 37232)

Recent studies have linked cytokine gene polymorphisms to gastric cancer. The current study evaluated the association of interleukin (IL)10 gene polymorphisms in the progression of gastric lesions in subjects from a high-risk area for gastric cancer in Colombia. We prospectively studied 426 subjects with chronic gastritis. Three common polymorphisms in the IL10 gene were genotyped by TaqMan allelic discrimination assays. Gastric biopsies at baseline and 12 years were evaluated for the presence of lesions in the precancerous cascade: multifocal atrophic gastritis - intestinal metaplasia - dysplasia. Carriers of the ATA haplotype of IL10 (rs1800896/rs1800871/rs1800872) were 1.62 (95% CI: 1.14-2.29) times more likely to progress to more severe lesions than the ACC haplotype. These results were independent of H. pylori status; those positive were 1.78 (95% CI: 1.18, 2.69) times more likely to progress independent of haplotype status. There was no interaction between H. pylori status and the IL10 haplotypes. Anti-helicobacter treatment or supplementation with ascorbic acid and beta-carotene were not significantly related to progression after taking into account H. pylori status. Cytokine gene polymorphisms influence the long-term progression of precancerous lesions independent of H. pylori infection. Genetic variations in the IL10 promoter may influence mucosal cytokine expression determining the clinical course of gastric inflammation. These findings contribute to the understanding of the complex interplay between host and bacterial factors involved in the development of gastric pathology.

023-S

FAMILIAL AGGREGATION OF OLFACTORY IMPAIRMENT AND ODOR IDENTIFICATION IN AN EPIDEMIOLOGICAL STUDY OF OLDER ADULTS. *L Raynor, J Pankow, K Cruickshanks, C Schubert, R Klein, G-H Huang (University of Minnesota, Minneapolis, MN 55454)

The objective of our study was to estimate the genetic contributions to olfactory impairment. The presence of olfactory impairment is relatively common, increases with age, and contributes to quality of life and eating habit changes. Additionally, research indicates that olfactory impairment can be indicative of the presence of cognitive decline. The prevalence of this disorder is likely to increase in our rapidly aging population, making it an important area of public health research. Olfactory impairment was measured using the San Diego Odor Identification Test (SDOIT) at the 5-year follow-up examination for the population-based Epidemiology of Hearing Loss (EHLS) study. Subjects were classified as impaired if they correctly identified fewer than 6 out of 8 odorants. In order to reduce confounding by age, analysis was restricted to subjects who were 60-79 years of age. Familial aggregation was evaluated by heritability estimates, tetrachoric correlations, and odds ratios in 207 sibling pairs from 135 sibships. The prevalence of olfactory impairment was 20.2% overall and was higher in men. After adjustment for sex, age, and smoking, heritability of olfactory impairment was moderate (h^2=0.55), although not statistically significantly different from zero (p=0.09). By contrast, the adjusted heritability estimate for bubble gum, one of the individual odorants, was significant (h^2=0.51, p=0.01). Odds ratios and tetrachoric correlations were likewise statistically significant for the identification of the bubble gum odorant but not for olfactory impairment. Thus, genetic factors may contribute to general olfactory impairment in older adults, but the strength of familial aggregation differs for individual odorants, a finding consistent with prior research.

024

ALAD G177C POLYMORPHISM ASSOCIATED WITH DEATH FROM ALL CAUSES, CARDIOVASCULAR DISEASE, AND CANCER. *D M van Bemmel, Y Li, B Graubard, P Rajaraman; CDC/NCI NHANES III Genomics Working Group (National Cancer Institute, Rockville, MD 20892)

Background: Previous analyses from the National Health and Nutritional Examination Survey (NHANES III) show that blood lead may be associated with all-cause, cardiovascular, and cancer mortality. The δ-aminolevulinic acid dehydratase (*ALAD*) G177C single nucleotide polymorphism (rs180435) affects lead toxicokinetics and may alter the adverse effects of lead exposure. **Objective:** To examine how *ALAD* genotype affects the relationship between lead and mortality. **Methods:** We analyzed 3,349 genotyped NHANES participants who were ≥40 years of age. Using Cox proportional hazards regression analyses, we determined the adjusted hazard ratios (HR) of all-cause, cardiovascular disease, and cancer mortality by ALAD genotype, and by blood lead level (BLL) [<5 ug/dL versus ≥5ug/dL]. We also tested if *ALAD* genotype modified the blood lead level and mortality relationship. **Results:** The overall relative risk for participants with the variant $ALAD^{CG/CC}$ genotype was significantly decreased for all-cause mortality [(HR) = 0.7; 95% confidence interval (95%CI) = 0.5-0.9], and suggestively decreased for cancer mortality (HR=0.6; 95%CI 0.3-1.3] compared to individuals with the common GG genotype. There was some evidence that higher BLLs were associated with increased risk for all-cause (HR=1.3; 95%CI 1.0-1.7,), cardiovascular disease (HR=1.2; 95%CI=0.7-1.9,), and cancer mortality (HR=1.6; 95%CI=0.9-2.7). We observed no convincing interaction effect between *ALAD* genotype and BLL on mortality risk. **Conclusion:** These findings suggest that the $ALAD^{CG/CC}$ genotype may be associated with decreased mortality from all causes and cancer. Further work in larger populations is warranted.

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025

GENETIC VARIATION IN THE NEUROPEPTIDE Y *NPY* GENE IS ASSOCIATED WITH ASTHMA AND ASTHMA SEVERITY.

*M C Aldrich, J R Rodriguez-Santana, W Rodriguez-Cintron, K Beckman, C Eng, P Avila, E G Burchard (Department of Medicine, University of California, San Francisco, CA 94158)

Evidence suggests psychosocial stress may exacerbate asthma morbidity. Exposure to stressful events may result in the release of neuropeptide Y (NPY), which is expressed in the lung airways and found in increased amounts in serum during asthma exacerbations (Pulmonary Pharmacology & Therapeutics 2004; 17: 173-180). Recent research suggests genetic variation in the *NPY* gene may influence stress responses (Nature 2008; 452: 997-1001). A candidate gene association study was conducted to examine the role of *NPY* in physician-diagnosed asthma. Six haplotype tagging single nucleotide polymorphisms (SNPs) and two candidate SNPs were genotyped in 298 Mexican parent-child asthma trios and 394 Puerto Rican asthma trios. Trios were analyzed for single SNP and haplotype associations using the transmission disequilibrium test. Puerto Ricans exhibited a significant association between rs5574 and asthma prevalence (odds ratio (OR) = 1.28, 95% confidence interval (CI): 1.02 – 1.60). Two SNPs, rs16143 and rs5574, were associated with severe asthma (OR = 1.48, 95% CI: 1.11 – 1.96 and OR = 1.44, 95% CI: 1.09 – 1.89, respectively). A haplotype in the single haplotype block identified among Puerto Ricans was associated with asthma prevalence and severity (OR = 0.79, 95% CI: 0.64 – 0.99 and OR = 0.69, 95% CI: 0.52 – 0.92, respectively). Among Mexicans, associations with asthma and *NPY* variants were not statistically significant. Evidence indicates a variant occurring in the *NPY* region may be associated with asthma among Puerto Ricans, suggesting a genetic susceptibility to stress that may differ by race/ethnicity.

026-S

ACHIEVEMENT OF HEALTHY PEOPLE 2010 OBJECTIVES BY MILITARY HEALTH SYSTEM BENEFICIARIES.

*C Reyes, L Hourani, D Creel, K Smith, S Jones, T King (RTI International, Washington, DC 20005)

Purpose: This study examined Military Health System (MHS) beneficiaries' progress toward Healthy People 2010 (HP2010) objectives. Self-reported survey data from the 2008 PHS were used to assess whether the HP2010 goals were met and to analyze the association between sociodemographic characteristics and health outcomes according to HP2010 objectives. **Design:** A representative sample of beneficiaries from the MHS (n = 55,000), stratified by beneficiary category, military Service and TRICARE region, were asked to complete an anonymous mail or web survey. **Measures:** PHS uses questions derived from other major federal surveys (NHIS, BRFSS, etc.), so results can be compared to civilian data. Analysis: Statistical tests included logistic regression models to examine the association between characteristics of MHS beneficiaries and specific health promotion and health risk outcomes identified in HP2010 objectives. **Results:** The study determined the association between sociodemographic characteristics and health outcomes, according to HP2010 health-risk and health-promotion objectives, and the proportion of MHS beneficiaries who met HP2010 objectives. **Conclusion:** MHS beneficiaries did not meet most of the HP2010 objectives, except for goals related to cancer screening and moderate/vigorous physical activity.

027

THE DISPARITIES IN UTILIZATION OF DENTAL SERVICES AMONG ADULTS COVERED UNDER THE TAIWAN NATIONAL HEALTH INSURANCE PROGRAM.

*H L Huang, C H Lee, T M Sun, C M Huang, T Y Wang, Y Y Yen (Kaohsiung Medical University, Kaohsiung 807, Taiwan)

To analyze disparities in the use of dental services among insured Taiwanese aged 35 years and over and examine pertinent factors associated with utilization of those services. Dental care data was extracted from the 2004 National Health Insurance Claim Data, containing approximately 50,319 men and 48,551 women. Outcome was receipt of three categories of dental procedure services (preventive, restorative, and other related services). The disparities between utilization of dental care services and individual characteristics were examined simultaneously, using unordered polytomous logistic regression analysis. The results show that only 30.4% of males and 35.5% of females utilized the plan. Less than 9% of either gender accessed preventive care. After adjusting for covariates, compared to the younger male population, the elderly were least likely to access preventive (adjusted odds ratio (AOR) = 0.49) and restorative (AOR=0.47) services. Corresponding values among women were 0.40 and 0.31 times the odds for using preventive and restorative care. Agricultural workers and fishermen demonstrated significantly lower inclination to utilize the plan for men (AOR= 0.67-0.87) and women (AOR=0.63-0.84). Lower income families (< blue-collar communities rural reside those elderly, families, low-income among particularly rate, utilization dental improving toward forcefully directed should intervention health Public adults. insured exist services care disparities conclusion, In declined. urbanization increased restorative or preventive Use (AOR="0.46-0.88)." category any access likely less>

028

A PREDICTION MODEL TO EFFICIENTLY IDENTIFY EXPOSED OR INFECTED PARTNERS OF PATIENTS DIAGNOSED WITH EARLY SYPHILIS IN SAN FRANCISCO.

*J L Marcus, M H Katz, K T Bernstein, J D Klausner (San Francisco Department of Public Health, San Francisco, CA 94103)

Early-syphilis cases increased 56% in San Francisco (SF) from 2007 (N=354) to 2008 (N=551). SF Department of Public Health interviews diagnosed residents to identify sex partners needing treatment, but resource limitations preclude interviewing all cases. We developed and validated a model to prioritize interviews likely to result in treatment of partners based on information in confidential morbidity reports. We included data from all interviews in 7/04–6/08. We used univariate and multivariate log-linear analysis to model the number of treated partners per interview in a random half of the data. We applied the final model to the other half to assess fit and calculate percentages of treated partners that would be captured by limiting interviews to various types of patients. From 1,340 patient interviews, 1,665 partners were named; 826 (49.6%) of the partners were treated. In multivariate analysis, interviews of patients age <50 years compared to ≥50 years (odds ratio [OR] 1.4, 95% confidence interval [CI] 1.0–1.9), with primary or secondary (P&S) compared to early-latent syphilis (OR 1.4, 95% CI 1.1–1.8), and who were diagnosed at the municipal STD clinic compared to elsewhere (OR 1.7, 95% CI 1.4–2.1) were associated with more treated partners. Applying the model to the validation set yielded similar estimates. Limiting interviews to patients age <50 years would reduce interviews by 14% and capture 92% of treated partners. Limiting interviews to P&S patients would reduce interviews by 35% and capture 68% of treated partners. Health departments should consider using prediction models to efficiently allocate resources while maximizing disease control.

* = Presenter; S = The work was completed while the presenter was a student

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029

ETHNIC DISPARITIES IN SELF-RATED POOR HEALTH AFTER SUBOPTIMAL HEALTHCARE EXPERIENCES AMONG DIABETICS. *O A Arah, K Stronks (Department of Epidemiology, UCLA School of Public Health, Los Angeles, CA 90095-1772)

Ethnicity-related disparities in self-rated general health status have been documented in many settings around the world. Yet, few studies have explored the role of healthcare experiences in ethnic disparities in self-rated health. This study investigated the contribution of suboptimal healthcare experiences to the association between patient ethnicity and their self-rated general health status among diabetes patients. We used data on 5,438 diabetics who responded to a recent cross-sectional survey of their experiences of diabetes healthcare within 24 diabetes-care-networks in the Netherlands. The binary outcome was self-rated poor health (poor/fair versus good/very good/excellent). Healthcare experiences care were measured on six validated scales: doctor communication, nurse communication, diabetes-specific communication, courtesy of other staff, language problems during consultation, and healthcare coordination. Using generalizing estimating equations adjusted for patient demographics, we found that, compared to ethnic Dutch, minority ethnic groups had higher odds of reporting poorer health. For example, for Turks, Moroccans and other non-westerners, the odds ratios (95% confidence intervals) were 2.73 (1.84, 4.06), 3.56 (2.48, 5.10), and 2.01 (1.07, 3.76) respectively. Adjusting for suboptimal healthcare experiences mostly attenuated the disparities. For Turks, Moroccans and other non-westerners, the odds ratios (95% confidence intervals) became 2.81 (1.83, 4.32), 1.84 (1.33, 2.56), and 1.06 (0.85, 1.34) respectively. Hence, suboptimal healthcare experiences might partially explain the ethnic disparities.

030-S

PERCEIVED UNMET HEALTH CARE NEEDS IN THOSE WITH CHRONIC DISEASES DESPITE HIGH RESOURCE USE: A NATIONAL POPULATION-BASED STUDY. *A Metcalfe, J Williams, S Patten, S Wiebe, N Jette (University of Calgary, Calgary, AB, Canada T2N 4N1)

In a setting with universal health insurance it is expected that all individuals would be able to access an adequate level of health care. Using data from the Canadian Community Health Survey (CCHS) cycles 1.1-3.1, this study aimed to determine the prevalence of health resource use and unmet health care needs in the general population and for those with asthma, diabetes, epilepsy and migraine. Logistic regression was used to determine what sociodemographic factors predict unmet health care need. The CCHS is a national cross-sectional survey administered to 400,055 Canadians aged $\geq$12 between 2001-2005. Self-reported information about professionally diagnosed health conditions was elicited. CCHS surveys use a multistage stratified cluster design to randomly select a representative sample of Canadian household residents. Weighted estimates show that those with chronic disease were significantly more likely be hospitalized and to have consulted a health professional in the past year. Weighted estimates show that 11.6% (95% Confidence Interval (CI):11.5-11.8) of Canadians felt they had an unmet health care need in the year they were surveyed, this was significantly higher for those with asthma 17.5% (95% CI: 16.9-18.1), epilepsy 17.9% (95% CI:15.6-20.2) and migraine 21.0% (95% CI:20.4-21.6), despite higher service use. Gender, age, education, martial status and income were all associated with unmet health care needs. Despite significantly higher service use those with asthma, epilepsy and migraine are more likely to have unmet health care needs compared to the general population or to those with diabetes.

031-S

USE OF COMPLEMENTARY AND ALTERNATIVE MEDICINE BY PEOPLE WITH CHRONIC DISEASES: A NATIONAL POPULATION-BASED STUDY. *A Metcalfe, J Williams, S Patten, S Wiebe, N Jette (University of Calgary, Calgary, AB, Canada T2N 4N1)

The use of complementary and alternative medicine (CAM) is becoming more common within Western medicine, but population-based descriptions of its patterns of use are lacking. Using data from the Canadian Community Health Survey (CCHS) cycles 1.1-3.1, this study aimed to determine the prevalence of CAM use in the general population and for those with asthma, diabetes, epilepsy and migraine. Logistic regression was used to determine what sociodemographic factors predict CAM use. The CCHS is a national cross-sectional survey administered to 400,055 Canadians aged $\geq$12 between 2001-2005. Self-reported information about professionally diagnosed health conditions was elicited. CCHS surveys use a multistage stratified cluster design to randomly select a representative sample of Canadian household residents. Weighted estimates show that 12.4% (95% Confidence Interval (CI): 12.2-12.5) of Canadians visited a CAM practitioner in the year they were surveyed; this rate is significantly higher for those with asthma 15.1% (95% CI: 14.5-15.7) and migraine 19.0% (95% CI: 18.4-19.6), and significantly lower for those with diabetes 8.0% (95% CI: 7.4-8.6) while the rate in those with epilepsy is the same as that for the general population. Women are more likely to use CAM services than males (Odds Ratio (OR): 2.06, 95% CI: 1.99-2.13), and a dose-response relationship was found between higher levels of income and education and CAM use. The association between CAM use varies depending on the chronic condition. Further exploration of these varying patterns of use and controlled studies on their risks and benefits are warranted.

032-S

ASSOCIATION BETWEEN PSORIASIS AND MORTALITY: AN EPIDEMIOLOGICAL PROFILE OF MORTALITY AMONG PSORIASIS PATIENTS IN NEWFOUNDLAND AND LABRADOR, CANADA. *N Gladney, D MacDonald, W P Gulliver, K D Collins, R Alaghehbandan, J Dowden (Research and Evaluation Department, Centre for Health Information, St. John's, NL, Canada)

PURPOSE: To examine mortality profiles among psoriasis patients in Newfoundland and Labrador (NL). **METHOD:** Medical records of a cohort of psoriasis patients were linked to the provincial mortality database via unique identifier. Descriptive statistics were generated based on age of death, sex, age of onset, disease severity and genetic markers, for deceased patients from 1989-2006. **RESULTS:** Among 3,226 psoriasis patients, 203 died between 1989 and 2006. The mean age of death was 69.9 years, significantly lower that that of the NL general population (73.9 years, $P<0.001$). The leading cause of death was circulatory system disease followed by neoplasm (38.4% and 37.8%, respectively), with neoplasm being significantly higher for psoriasis patients than that of the general population (27.6%) ($P=0.003$). Circulatory system disease was the leading cause of death among moderate/severe psoriasis patients; neoplasm was the leading cause of death among patients with mild psoriasis. **CONCLUSION:** Although the pattern of underlying cause of death among psoriasis patients and the general population were similar, neoplasms among deceased psoriasis patients was significantly higher than in the general population. Further, the mean age at death for psoriasis patients was significantly younger than that of the general population. Our findings will be used as a basis for future research to broaden the understanding of mortality among psoriasis patients.

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033-S

HOSPITALIZATION AMONG PSORIASIS PATIENTS IN NEWFOUNDLAND AND LABRADOR, CANADA. *N Gladney, D MacDonald, W P Gulliver, K D Collins, R Alaghehbandan, J Dowden (Research and Evaluation Department, Centre for Health Information, St. John's, NL, Canada)

The aim of this study was to investigate hospitalization among a sample of psoriasis patients in Newfoundland and Labrador (NL), Canada. Medical records of a large cohort of psoriasis patients were linked to the provincial hospital separation database via a unique identifier. Descriptive analyses of hospitalized patients were performed based on sex, age of onset, disease severity and genetic markers. Among 3,226 psoriasis patients, 1,494 patients had at least one hospitalization between 1995 and 2006. The mean number of hospital separations per patient was significantly higher for psoriasis patients than the general population (2.8 vs. 2.1, P< 0.001). Female psoriasis patients had a hig her proportion of hospital utilization than male patients (P<0.001); those with late onset of psoriasis had a higher proportion of hospital utilization, compared to those with early onset (52.4% vs. 47.6%, P<0.001), and those with moderate/severe psoriasis had a higher proportion of hospital utilization compared to those with mild psoriasis (54.8% vs. 45.2%, P=0.03). Digestive and circulatory system diseases were the leading comorbidities among hospitalized psoriasis patients (27.4% and 25.8%, respectively). Our findings showed that psoriasis patients were hospitalized more than the NL general population, with a large proportion of them being diagnosed after age 25. Further studies are needed to enhance our understanding of health services utilization among psoriasis patients.

034

THE NATIONAL ONCOLOGIC PET REGISTRY: A DATA SOURCE FOR HEALTH SERVICES RESEARCH. *I F Gareen, B E Hillner, B A Siegel, A F Shields, F Duan, L Hanna, S H Stine, R E Coleman (Brown University School of Medicine, Providence, RI 02912)

As of 2005, the Center for Medicare and Medicaid Services (CMS) approved reimbursement for positron emission tomography (PET) performed for specific indications in nine cancers, but not all cancers and indications were covered due to a lack of adequate evidence of benefit. In 2005, CMS agreed to cover services for diseases and indications for which the evidence of benefit was inadequate, if these services were delivered in the context of a study to evaluate their utility (Coverage with Evidence Development). In response to this new policy, the National Oncologic PET Registry (NOPR) was developed to evaluate the impact of PET imaging on cancer patient management for those cancers and indications without adequate evidence. At PET facilities participating in the registry, referring physicians were asked to complete questionnaires detailing intended patient management before and after PET imaging. NOPR started enrolling participants in May 2006. As of the end of 2008, NOPR had over 1800 participating PET facilities, and more than 115,000 registered patients with more than 20 types of cancer. Indications for NOPR imaging included diagnostic evaluation, staging, detection of suspected recurrence, and treatment monitoring. In this paper, we describe the design of the NOPR, and the issues encountered in implementing the registry. We will address the advantages inherent in using registries to evaluate clinical practice, the potential research questions that can be addressed using the NOPR data, and the limitations of registry data. Finally, we will discuss opportunities for linking these data with CMS databases to validate data supplied to the registry and evaluate clinical outcomes associated with changes in patient management.

035-S

A COMPARISON OF EMERGENCY DEPARTMENT USE BETWEEN U.S.-BORN AND FOREIGN-BORN PATIENTS BY RACE AND ETHNICITY. *E Carlson, F Wilson (University of North Texas Health Science Center, Fort Worth, TX 76107)

We examined the effects of race/ethnicity and U.S. nativity on emergency department (ED) use. Data from the 2005 National Health Interview Survey were used. Sample included respondents who reported race/ethnicity as non-Hispanic White, non-Hispanic Black, or Hispanic, and were aged 18 years or older (n=68,540). 'ED use' was defined as having used the ED at least once in the past year. Logistic regression modeled race/ethnicity and U.S. nativity as predictors of ED use, adjusting for uninsurance, poverty, age, marriage, education, gender, having a usual source of care, and health status. Post-estimation analyses stratified results by race/ethnicity and nativity. ED use among foreign-born was significantly lower than U.S.-born for all races/ethnicities [White odds ratio (OR)=0.58(95%confidence interval (CI) 0.49,0.68); Black OR=0.58(95%CI 0.46,0.71); Hispanic OR=0.58(95%CI 0.47,0.70)]. Among foreign-born patients, Blacks were significantly more likely to use the ED [OR=1.33 (95%CI 1.01,1.66)] than Whites. Among U.S.-born patients, African-Americans had significantly greater odds of ED use compared to Whites [OR=1.33 (95%CI 1.17,1.49)]. Hispanics were not significantly associated with ED use among foreign-born [OR=1.04 (95%CI 0.83,1.26)] or U.S.-born patients [OR=1.04 (95%CI 0.88,1.21)]. Poor health status (compared to non-poor) was associated with the highest odds of ED use [OR=3.35 (95%CI 2.21,5.07)].Blacks reported poor health status one-third more often than Whites and twice the rate of Hispanics. Efforts to mitigate ED use should not focus on patient nativity. Rather, efforts should target underlying causes of poor health status and primary care interventions to prevent the need for emergent care.

036

MEETING THE MENTAL HEALTH NEEDS OF OUR DEPLOYING SERVICE MEMBERS: ASSESSMENT USING SELF-REPORTED SYMPTOM SCREEN AND ELECTRONIC MEDICAL ENCOUNTER DATA. *N Granado, T Smith, B Smith, R Koffman (Naval Health Research Center, San Diego, CA 92106)

Introduction: Combat deployments to the wars in Iraq have been associated with high use of mental health services. Our objective was to estimate the percent of deployed active-duty Navy and Marine Corps members reporting posttraumatic stress disorder (PTSD) symptoms who sought care for PTSD and other mental health conditions within the military health care system. Methods: A total of 108,157 Millennium Cohort Study consenting participants completed the first panel baseline questionnaire (2001-2003), the first panel follow-up questionnaire (2004-2006) and the second panel baseline questionnaire (2004-2006). Deployed active-duty Navy and Marine Corps members with PTSD symptoms were identified, using the Diagnostic and Statistical Manual of Mental Disorders, fourth edition, sensitive criteria. Outpatient and inpatient electronic encounters were evaluated at 1, 3 and 5 years from the date of reported symptoms. Results: Among the deployed active-duty Navy and Marine Corps Millennium Cohort members who reported PTSD symptoms, approximately 5% were diagnosed with PTSD at 1 year, while approximately 8% were diagnosed at 3 and 5 years. When accounting for care sought for all mental health conditions, approximately 23%, 33% and 34% of the participants sought care and were diagnosed at 1, 3 and 5 years, respectively. Conclusion: These data suggest nearly a third of those with PTSD symptoms sought care and were diagnosed with a mental health problem within 5 years of reported symptoms. Military healthcare providers should be commended for the increased care provided and the destigmatization of many of these disorders.

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037-S

UNPLANNED PREGNANCY AS A RISK FACTOR FOR INVOLUNTARY TOBACCO EXPOSURE IN CHILDREN FROM INNER-CITY FAMILIES. *Y Ren, X Chen (University of Massachusetts, Lowell, MA)

Background: Unplanned pregnancy has been related to a number of negative social and health consequences for mothers and children, but no study has ever examined the role of this factor in altering the likelihood of involuntary environmental tobacco smoke (ETS) exposure in children. Methods: Data were derived from a project on tobacco exposure and child lung function, which random sampled 399 mothers who companied their child to Children's Hospital of Michigan, Detroit, MI. In-person interview was conducted to obtain data on ETS exposure in children (if exposed to daily smokers in a close area at home in the past year) from mothers (one child per mother). Results: Among 399 children aged from 6 to 10 (mean=8.0, SD=0.85), 210 (52.6%) were male, 325 (82.1%) were black, 125 (31.3%) were unplanned, and 129 (32.3%) exposed to ETS. Smoking parents (98.5%) were the primary ETS source at home. The ETS exposure rate was 25.6% for planned children and 47.2% (χ^2=18.4, p<.001) for unplanned children. Multiple logistic regression controlling for an array of covariates (maternal age, race/ethnicity, maternal education, income, marital status, age of delivery, number of survival children and children's age, gender, and birth order) indicated that beside the known relationships of marital status, maternal education, and income, unplanned pregnancy was positively associated with ETS exposure (OR = 1.82, 95% CI: 1.10, 3.0). Conclusion: Unplanned pregnancy, a significant problem in the United States, substantially and independently increases the risk of ETS exposure in children. These findings imply the need for consideration of this factor in ETS preventions.

038-S

DOES BCG VACCINATION PROTECT AGAINST THE DEVELOPMENT OF CHILDHOOD ASTHMA? A SYSTEMATIC REVIEW AND META-ANALYSIS OF EPIDEMIOLOGICAL STUDIES. *M El-Zein, M-E Parent, A Benedetti, M-C Rousseau (INRS-Institut Armand Frappier, Laval, QC, Canada H7V 1B7)

Results have been conflicting as to whether Bacillus Calmette-Guérin (BCG) vaccine, a non-specific stimulator of the immune function, protects, predisposes, or is unrelated to the development of childhood asthma. In this systematic review and meta-analysis, we qualitatively and quantitatively appraised the epidemiological evidence. Eligible studies were identified using a search strategy which included a computerized literature search and a manual search of each article's reference list, up to June 2008. The meta-analysis included 24 studies (1 randomized clinical trial, 9 cohort, 5 case-control and 9 cross-sectional studies). Each study was summarized and rated for methodological quality. Pooled odds ratio (OR) estimates and 95% confidence intervals (CI) were calculated using fixed- or random -effects models; if heterogeneity was present, the latter was used. The overall OR using a random-effects model was 0.82 (95% CI: 0.73, 0.93), suggested a protective effect of BCG vaccination on childhood asthma occurrence. A subgroup analysis of 18 studies rated as high or intermediary for methodological quality corroborated this finding; the fixed-effects pooled OR was 0.86 (95% CI: 0.80, 0.94). Subgroup analyses by study design, exposure indicators (BCG immunization, tuberculin response or scar diameter), outcome measures (asthma, current wheeze, or ever wheeze), BCG exposure and asthma ascertainment methods, location, or adjustments for confounders led to similar conclusions. These results strengthen the epidemiological evidence in support of the hypothesis that exposure to the BCG vaccine in early life may influence immune maturation and prevent asthma.

039

WITHDRAWN

040-S

ASSOCIATION BETWEEN SLEEPING HABITS IN EARLY CHILDHOOD AND ORTHOSTATIC DYSREGULATION IN PUBERTY: RESULTS FROM A LONGITUDINAL STUDY. *M Sato, K Suzuki, T Tanaka, N Kondo, Z Yamagata (University of Yamanashi, Chuo, Japan)

Orthostatic dysregulation (OD) such as orthostatic hypotension is becoming the most common disorder of the autonomic nervous system in puberty. It has been suggested that such disorders are caused by irregular lifestyles. This study was conducted to examine whether sleeping habits in early childhood are associated with OD in puberty. The study population comprised 1384 children born in Japan between 1993 and 1998. Sleeping habits were studied in 3-year-olds by asking their mothers to fill questionnaire, and in 2008, i.e. when the children were 10–15 years old, OD symptoms were surveyed with the help of a questionnaire on OD criteria. Data from both questionnaires were successfully obtained for 1151 children (follow-up rate, 83.2%). According to the diagnostic criteria, 8% of the children had OD. Multiple logistic regression analysis was conducted by using sleeping habits as independent variables and OD symptoms as dependent variables. The results indicated that sleeping before 21:00 and after 23:00 put an individual at a significant risk of OD compared to sleeping between 21:00 and 22:00 (odds ratio (OR): 2.2, 95% confidence interval (CI): 1.1–4.2; OR: 1.6, 95% CI: 1.0–2.7). Additionally, it was observed that children who wake up earlier do not exhibit OD symptoms. This study proves that inappropriate sleeping habits in 3-year-olds are risk factors of OD when these children reach puberty (10–15-years old). A remarkably high incidence of OD has recently been observed in Japan, and OD is considered to cause other puberty-related problems such as school truancy. Thus, appropriate sleeping habits in early childhood are important for regulating autonomic function in later life.

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041-S

LONG-CHAIN POLYUNSATURATED FATTY ACIDS FROM BREASTMILK AND FORMULA AND INFANT COGNITIVE DEVELOPMENT. *S A Keim, J Daniels, A M Siega-Riz, N Dole (Univ of North Carolina, Chapel Hill, NC 27599)

Long-chain polyunsaturated fatty acids (LCPUFAs) in formula have been associated with improved visual acuity in infants, but studies have been inconsistent, and it is unclear if benefits persist with age, confer better overall cognition, or benefit other aspects of child development. We examined LCPUFA content (docosahexaenoic, arachidonic acid) of breastmilk and commercial formulas in addition to breastfeeding in relation to cognitive development (Mullen Scales of Early Learning) at 12 months of age in the Pregnancy, Infection and Nutrition Study (n=347). A visit after 3 months postpartum collected data on breastfeeding, types and frequency of formulas fed and obtained breastmilk samples. Analyses used linear regression techniques. 89% of infants were at least partially breastfed. Mean DHA content of breastmilk samples was 0.28% of fatty acids (standard deviation=0.22); mean AA content 0.57% (SD=0.20). Infants exclusively breastfed demonstrated better visual reception, fine motor and overall cognitive development at 12 months than formula fed infants (4-6 pts, approximately one-half SD); differences attenuated upon adjustment for preterm birth, smoking, race/ethnicity, and education. For infants exclusively breastfed, no association was observed between LCPUFA content of breastmilk and developmental outcomes (Mullen Composite in relation to DHA content: β=-1.6, 95% CI:-10.3, 7.1). A variable combining breastmilk LCPUFA and formula LCPUFA concentrations weighted by their relative contribution to infant diet was not associated with developmental outcomes. This study found no evidence of enhanced developmental outcomes related to LCPUFA content of commercial infant formula or breastmilk.

042

ADOLESCENT VACCINATIONS: ASSESSING COMPLIANCE WITH RECOMMENDATIONS. *S Stokley, N Jain, M McCauley, A Cohn (Centers for Disease Control and Prevention, Atlanta, GA 30333)

To determine coverage of 3 recently recommended adolescent vaccines and compliance with receiving vaccines at ages 11-12 years, we analyzed the provider-reported immunization histories of 2947 adolescents 13-17 years of age included in the 2007 National Immunization Survey–Teen. Vaccines assessed include 1 dose of tetanus-diphtheria or tetanus-diphtheria-acellular pertussis vaccine [Td/Tdap], 1 dose of meningococcal containing vaccine [Mening], and 1 dose of human papillomavirus vaccine [HPV]. Outcome measures for all adolescents and by birth cohort include: coverage at time of interview; receipt of vaccines at ages 11-12 years; and, number of unique vaccination visits (for any vaccine) made at ages 11-12 years and 11 years and older. Overall vaccination coverage was 74% for Td/Tdap, 33% for Mening, and, among females, 25% for HPV. Due to timing of vaccine recommendations, only the 1994 birth cohort was eligible to receive all 3 vaccines while 11-12 years of age; 49% received Td/Tdap, 19% received Mening, and 11% of females received HPV at this age. Overall, 49% of adolescents had a vaccination visit while 11-12 years of age and 79% had a vaccination visit on or after 11 years of age. The potential to achieve high adolescent vaccination coverage levels exists, however, efforts are needed to increase simultaneous administration of vaccines during the same visit. Further evaluation is needed to determine how to reach the 21% of teens who did not make a vaccination visit on or after age 11 years.

043-S

PREVALENCE & PREDICTORS OF 6-MONTH EXCLUSIVE BREASTFEEDING AMONG CANADIAN WOMEN. B Al-Sahab, *A Lanes, G Hauser, H Tamim (York University, Kinesiology &Health Science, Toronto, ON, Canada)

Objective: The study aimed to assess the prevalence and predictors of 6-month exclusive breastfeeding among Canadian mothers. Methods: The analysis was based on the Maternity Experience Survey targeting women aged ≥15 years who had singleton live births during 2005/06 in the Canadian provinces &territories. The outcome was exclusive breastfeeding based on the World Health Organization (WHO) definition. Socioeconomic, demographic, maternal, pregnancy and delivery related variables were considered for a stepwise logistic regression. Bootstrapping was performed to account for the complex sampling design. Results: The sample size analyzed was 5615 weighted to represent 66810 Canadian women. While breastfeeding initiation rate was 90.3%, the 6-month exclusive breastfeeding rate was 13.8%. Based on the regression model, having higher years of education, residing in the Northern territories and Western provinces, living with a partner, having had previous pregnancies and giving birth at older age were associated with increased odds of 6-month exclusive breastfeeding. Moreover, smoking during pregnancy, cesarean birth, infant's admission to the intensive care unit and maternal working status before 6 months of infant's age were negatively associated with breastfeeding. Mothers seeking non-physicians for prenatal care and those choosing to deliver at home were more likely to exclusively breastfeed at 6 months (Odds Ratio-OR=1.7, 95% Confidence Interval-CI: 1.2-2.4 &OR=3.4, 95% CI: 1.8-6.3 respectively). Conclusion: The 6-month exclusive breastfeeding rate is very low in Canada. The results constitute the basis for intervention programs aiming to reduce the gap between the current practices of breastfeeding and the WHO recommendation.

044

DO MOTHERS AND FATHERS AGREE ON THEIR CHILD WITH CEREBRAL PALSY QUALITY OF LIFE? *J De La Cruz, E Barredo, D Lora, C-R Pallás (Hosp Univ 12 Octubre, CIBERESP, SAMID, Madrid, Spain)

Objective: To assess the agreement between mothers and fathers proxy reports on their child with cerebral palsy (CP) health-related quality of life (HRQoL). Methods: Participants (n=41 complete pairs mother-father) were recruited through the population-based CP Register of Madrid-DIMAS for the pilot phase of an ongoing study on quality of life and participation. Children were described following Surveillance of Cerebral Palsy in Europe (SCPE) recommendations. Kidscreen-52 was used to report on 10 domains of HRQoL (score from 0 to 100). Children, aged 8 to 16 years, self-reported; parents completed the proxy version independently. For each domain different indicators of Mother-Father agreement were used: intraclass correlation coefficient (CCI), mean absolute, directional and standardised differences, frequency of disagreement (differences > 0.5 SD of the score). Results: CCI was fair (<0.4) for 5 domains, moderate (0.4-0.6) for 3, and good for 2 domains. Mean directional differences were < 2 and not significant except for 2 domains where fathers reported higher scores: social acceptance (SA) (+7), social support (+5). Standardised differences were low (<0.21) for all domains except for SA (0.44). Average frequency of disagreement over all domains was 60%. Comments: Agreement between mothers and fathers reporting on their child with CP HRQoL was overall less than good. Their differences were considered quantitatively not relevant except for 2 domains related to social network where fathers reported higher scores. For research purposes, either the mother or the father may report the parent's view without systematic bias. At the individual level, rarely do both parents provide similar scores.

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045

SOCIAL AND ENVIRONMENTAL STRESSORS IN THE HOME AND CHILDHOOD ASTHMA. *S F Suglia, C S Duarte, M T Sandel, R J Wright (Harvard School of Public Health, Boston, MA)

Both physical environmental factors and chronic stress may independently increase susceptibility to asthma; however, little is known on how these different risks may interact. We examined the relationship between maternal intimate partner violence (IPV), housing quality and asthma among children in the Fragile Families and Child Wellbeing Study (N=2013). Maternal reports of IPV were obtained after the child's birth and at 12 and 36 months. At the 36 month assessment, interviewers rated indoor housing conditions, regarding housing deterioration (i.e., peeling paint, holes in floor, broken windows) and housing disarray (i.e., dark, cluttered, crowded or noisy house). At the same time, mothers reported on housing hardships (i.e., moving more than twice in one year, and hardships in keeping house warm). Maternal-report of physician-diagnosed asthma by age 36 months which was active in the past year was the outcome. Asthma was diagnosed in 10% of the children. In adjusted analysis, an increased odds of asthma was observed in children of mothers experiencing IPV chronically (OR 1.8, 95% CI 1.0, 3.5) and in children experiencing housing disarray (OR 1.5, 95% CI 1.1, 2.0) compared to those not exposed to these risks. In stratified analyses, a greater effect of IPV on asthma was noted among children living in disarrayed or deteriorated housing or among children whose mothers were experiencing housing hardship. IPV and housing disarray are associated with increased early childhood asthma. Cumulative exposure to multiple stressors (i.e. IPV and poor housing quality) may increase children's risk of developing asthma more than a single stressor.

046

AGE AT DIAGNOSIS OF ACUTE LEUKEMIAS IN CHILDREN AND ITS RELATION WITH PARENTS' AGE IN THE CONCEPTION. M L Perez-Saldivar, J Flores, R Bernaldez, M Del Campo, A Martinez, A Medina, M Palomo, R Paredes, L Romero, P Perez, R Rivera-Luna, J De Diego, M Alvarado, V Bolea, M C Rodríguez-Zepeda, G González-Miüller, V Palma, A Fajardo-Gutierrez, *J M Mejia-Arangure (UMAE Hospital de Pediatría, Instituto Mexicano del Seguro Social, México, D.F. México, 06725)

Mother's age higher than 35 years at the moment of the conception has been associated with the risk of developing acute leukaemia (AL) in their offspring. In Mexico has been increased the incidence in AL in the last time and during this time has had a change in the reproductive pattern in the women in the country. The aim of this study was to assess if parents' age during the pregnancy is related with the risk of developing AL in their offspring and with the age at diagnosis of AL in the child. Case-control study was realized, matching by age, gender and social security. All the cases in Mexico City were included during the period from 1999 to 2007. The controls were selected of the hospitals of second level in the same city. Logistic and multiple lineal regression models were done. 550 cases and 550 controls were analyzed in this moment. The mother's age (>35 years old) had an odds ratio (OR) of 0.80 (95% confidence interval, 95%CI, 0.36,1.79). Father's age (>35 years old) the OR was 1.15 (95%CI 0.61,2.15). Neither mother's or father's age were related with the age at diagnosis of AL in their children. In children from Mexico City parents' age is not related with the risk of AL in their offspring or with the age at diagnosis of AL. This study was supported by the IMSS and CONACYT grants.

047

AGE AT DIAGNOSIS AND LEUKOCYTE COUNT AS PROGNOSTIC FACTORS DEPENDING OF CELL LINEAGE OF ACUTE LYMPHOBLASTIC LEUKEMIA IN CHILDREN. R Bernáldez-Ríos, M C Rodríguez-Zepeda, J Shun, J Martín-Trejo, *J M Mejía-Aranguré (Servicio de Hematología, UMAE Hospital de Pediatría, Centro Médico Nacional Siglo XXI, Instituto Mexicano del Seguro Social, Mexico Mexico, 06725)

To assess if the leukocyte count age at diagnosis are prognostic clinical factors of relapse in children with acute lymphoblastic leukeemia (ALL) with T-cell and in children with B-cell precursor ALL. A longitudinal cohort was analyzed in only one hospital from Mexico City, during the period: January 1994 to December 1999. The follow up was from December 2003. The patients were classified by immunophenotyping in B- cell precursor and T-cell ALL. Cox hazards model was realized. 135 children were included. In children with B-cell precursor ALL the age at diagnosis (< 1 year old) had a risk ratio (RR) of 1.93, 95% confidence interval (95% CI) 0.24,15.61. The age at diagnosis (10 years old or higher) had a RR of 3.26 (95%CI 1.30,8.15); leucoyte count higher than 50x109/L had a RR of 3.95 (95% CI 1.44,10.84). In children with T-cell all the RR's were imprecise. The age at diagnosis and leucocyte count as risk criteria apply only to B-cell precursor ALL and have little prognostic value in T-cell disease. This study was supported with IMSS and CONACYT grants.

048-S

THE EFFECTS OF EARLY LIFE GROWTH AND NUTRITION INTAKE ON BONE MINERAL DENSITY AT 5 YEARS OF AGE. *J S Ryu, J W Min, Y W Jeong, E H Ha, Y J Kim, E A Park, H S Park (Department of Preventive Medicine, School of Medicine, Ewha Womans University, Seoul, Korea)

Premature and growth retarded infants are reported to have decreased bone mineral density(BMD) and therefore have higher risk of fracture.Various factors can affect BMD during growth, and calcium is known to be beneficial for bone mineral gain during infancy. In this study, we aimed to compare BMD of low birth weight(LBW) and normal birth weight, and evaluate effect of dietary calcium in children. Parents of 71 children aged 5 years old had agreed to participate, 24 hour diet recall was used to evaluate the nutritional status of the children. Information on birth weight and height was extracted from medical records. BMD was measured at wrists using Peripheral instantaneous X-ray imager(PIXI bone density, Lunar Corporation, Madison, WI,USA). We compared BMD of LBW and normal birth weight infants using student's t-test, ANOVA was used to evaluated BMD and calcium intake. The means level of BMD was not significantly different between LBW and control(LBW:0.2592±0.0528,contrl: 0.2601±0.0382,p-value=0.95). Classified with normal BMD level(defined as the mean-2SD value of BMD between 25th and 75th percentiles group among non-SGA), the proportion of being under the normal range between SGA and Non-SGA was not differ(21.1% non-SGA vs 15.4% SGA). On the other hand, LBW calcium intake were higher significantly difference (LBW:529.3±184.8mg, control:249.9±162.2mg, p-vlaue=0.04). The study suggested that the BMD could catched up at 5 years old among LBW. And the difference on the amount of calcium intake between LBW and control could have beneficial effects on BMD increasing among SGA.

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049

DISCREPANCIES IN IDENTIFYING STILLBIRTHS FROM LINKED POPULATION DATA. *C H Raynes-Greenow, R Hadfield, N Nassar, C L Roberts (University of Sydney, Australia)

The advantages of using linked health data are numerous and well documented. One advantage is that identifying cases from multiple data sources reduces underascertainment, but there is a possibility of inconsistent reporting which may be due to different definitions, collection methods and/or time frames. This study examines the characteristics of stillbirths identified from 3 linked population health datasets, and highlights the issues in identifying true cases. These statewide data collections include; all births ('birth data'); registered perinatal deaths ('deaths'); and all public and private hospital discharges ('hospital data'). Singleton pregnancies resulting in stillbirth,? 22 weeks gestation, from 2001 to 2005 were included. We compared stillbirths identified from each and between the three datasets, and examined the characteristics of these. We identified 2050 stillbirths from the birth data, 1290 from hospital data, and 1969 stillbirths from the death data. Overall there were 1476 stillbirths identified on all three databases, with mean birthweight 1593 grams, mean gestation 30 weeks, and mean maternal age 30 years. Some stillbirths identified on birth data were recorded as neonatal deaths in the death data (n=12). Stillbirths not on all three datasets were more likely to be smaller (mean birthweight= 861grams) and born earlier (mean gestation=23 weeks). These findings highlight inconsistencies in stillbirth reporting and suggest systematic underreporting of stillbirths at the edge of viability which could significantly impact research results.

050-S

THIAZOLIDINEDIONE USE AND ULCERATIVE COLITIS-RELATED FLARES: A CLAIMS DATABASE ANALYSIS. *J Lund, T Stürmer, C Porter, R Sandler, M Kappelman (University of North Carolina, Chapel Hill, NC, 27516)

Thiazolidinediones, a class of oral anti-diabetic medications used to treat type 2 diabetes mellitus, have been shown in animal models and clinical trials to be efficacious in reducing colonic inflammation associated with ulcerative colitis (UC). The treatment goals of UC are not only reducing active inflammation, but also preventing recurrence of inflammation (flares). To date, no clinical studies have evaluated the effectiveness of thiazolidinediones in preventing UC flares. The authors conducted a discrete time hazard analysis examining whether thiazolidinedione use, as compared with use of other oral anti-diabetic medications, was associated with UC-related flares. The analysis was conducted within a population of 454 diabetic patients with UC who were enrolled in one of the 87 health plans captured by the PharMetrics Patient-Centric Database, a longitudinal, administrative claims database covering 33 states across the US from January 2000 - May 2005. A dispensed prescription for oral steroids (standard treatment for UC flares) was the primary outcome. Unconditional logistic regression, stratified by sex and adjusted for region and months of follow-up, was used to calculate odds ratios (OR) and 95% confidence intervals (CI). Among men, thiazolidinedione use was not associated with oral steroid dispensing, OR=0.74 (95% CI: 0.30, 1.82). However, thiazolidinedione use was positively associated with steroid dispensing in women, OR=2.63 (95% CI: 1.18, 5.87). These results suggest a differential effect of thiazolidinediones on UC flares by sex, however further research using a direct measure of the outcome and investigation of potential biological mechanisms for such differences are warranted.

051

CORRECTING FOR NON-RANDOM LOSS TO FOLLOW-UP WHEN ESTIMATING ETHNIC DIFFERENCES IN THE UTILIZATION OF ANTIDEPRESSANT MEDICATIONS: THE MULTI-ETHNIC STUDY OF ATHEROSCLEROSIS (MESA). *J A C Delaney, B E Oddson, R L McClelland, B M Psaty (McGill University, Montreal, QC, Canada)

There is evidence that the utilization of antidepressant medications (ADM) may vary between different ethnic groups in the United States population. The Multi-Ethnic Study of Atherosclerosis study is a population-based prospective cohort study of 6,814 US adults from 4 different ethnic groups. After excluding baseline users of ADM, we examined the relationship between baseline depression and new use of ADM for 4 different ethnicities: African-Americans (n=1,892), Asians (n=803) Caucasians (n=2,623), and Hispanics (n=1,493). Estimates of the association of ethnicity on ADM use were adjusted for age, study site, gender, Center for Epidemiologic Studies Depression Scale (CES-D), alcohol use, smoking, blood pressure, diabetes, education and exercise. Non-random loss to follow-up was present and estimates were adjusted using inverse probability of censoring weighting (IPCW). Of the four ethnicities, Caucasian participants had the highest rate of ADM use (12.3%) compared with African-American (3.7%), Asian (2.4%) and Hispanic (5.9%) participants. Applying IPCW to the Cox model led to a percent difference in the log hazard ratio of 32% for Asian participants, 17% for African-American participants and 31% for Hispanic participants. After accounting for non-random loss to follow-up using IPCW, non-Caucasian ethnicity was associated with reduced ADM use: African-American (adjusted Hazard Ratio (HR):0.48;95% Confidence Interval (CI):0.30- 0.57), Asian (HR:023;95%CI:0.13-0.37) and Hispanic (HR:0.58;95%CI:0.47- 0.67). Ethnicity is associated with new ADM use in this multi-ethnic cohort and this is independent of baseline CES-D depression score. Non-random loss to follow-up needs to be considered when evaluating these associations in a prospective cohort as there is evidence that loss to follow-up is not completely at random.

052

CASE CONTROL STUDY OF STATIN USE AND HIP FRACTURE IN MEN. *S J Jacobsen, J M Shi, K Reynolds, R Haque, T C Cheetham, D K Fithian (Kaiser Permanente Southern California, Pasadena, CA 91101)

Over the past decade, numerous threads of evidence suggest that exposure to hydroxymethylglutaryl-CoA inhibitors (statins) may have beneficial effects on bone health, but few of these studies have been conducted in men. To this end, we sought to estimate the association between statin use and hip fracture in an ongoing case control study of men within a managed care organization. Case subjects included all 7076 men, ages 45 years and older, with an incident hip fracture from 1997-2006. Control subjects were men who were optimally matched to case subjects on age, race and medical center. Electronic information on pharmaceutical use was used to identify the dispensing of statins from 1991 forward. Overall, 1913 of the 7076 (27%) case subjects and 2202 of the control subjects (31%) had used a statin prior to fracture (index) date (Matched Odds Ratio (OR) = 0.80, 95% Confidence Interval (CI) = 0.74, 0.86). The association was strongest among men ages >80 years (OR = 0.69, 95% CI = 0.61, 0.78) as compared to men age 45-59 years (OR = 0.89, 95% CI = 0.70, 1.13). The association in men over 80 years of age was accentuated in African Americans (OR = 0.53, 95% CI = 0.29, 0.98). Adjustment for comorbidity, as measured by the Charlson Index, increased the magnitude of the overall association (OR = 0.66, 95% CI = 0.60, 0.71). These data add to the growing evidence of a protective effect of statins on bone health. While unaccounted confounding by indication may explain these findings, they suggest that statin use may have yet another beneficial consequence for the health of aging men.

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* = Presenter; S = The work was completed while the presenter was a student

053

IMPLICATIONS OF CENSORING IN STUDIES OF MEDICATION ADHERENCE. *A R Patrick, M A Brookhart (Brigham and Women's Hospital, Boston, MA 02120)

Medication adherence is an important public health issue. Little attention has been paid to the longitudinal nature of adherence data and the analytical issues that arise due to censoring and selection bias induced by study design. To explore these issues, we conducted a Monte-Carlo simulation study and an analysis of predictors of statin adherence. We simulated adherence as proportion of days covered (PDC) during two intervals as a function of latent variables (U1, U2) representing patient tendency to adhere. A covariate of interest (X) was modeled as effecting U1, U2, and/or censoring at the end of interval 1, while U1 could be correlated with U2. Simulated and empirical data were analyzed using average PDC during variable-length follow-up, average PDC conditional on full-period survival, and a repeated measures design with and without inverse probability of censoring weights (IPCW). In simulations, variable follow-up analyses were biased when X was strongly associated with censoring (OR=7) and average PDC was associated with censoring causally or through changes in PDC over time (decrease from PDC1 to PDC2 = 0.02, bias = 0.03). The conditional analysis was biased when X (OR = 7) and PDC1 (OR = 0.04) were strongly associated with censoring (bias = 0.035). The repeated measures analysis performed well in most scenarios and was not consistently improved by use of IPCWs due to slight mis-specification of the censoring model. In the data analysis, we found no difference between the repeated measures and IPCW approaches; however these differed slightly from the variable length follow-up and conditional approaches. These findings have implications for the design of studies evaluating predictors of adherence and effects of interventions on adherence.

054-S

MATERNAL PRENATAL SMOKING AND RISK OF SUDDEN INFANT DEATH SYNDROME BY RACE/ETHNICITY. *E F Beaber, G Pocobelli, R S Holmes, B A Mueller (University of Washington, Seattle, WA 98195)

Rates of Sudden Infant Death Syndrome (SIDS) decreased following campaigns in the early 1990s promoting changes in infant sleep position, yet SIDS remains a leading cause of infant death, and prevalence of prone sleep position varies by race/ethnicity. To better estimate the relative risk of SIDS associated with maternal prenatal smoking since the sleep position recommendations we examined this relation by maternal race/ethnicity. This population-based case-control study used linked birth-death certificate data from Montana and Washington states to identify all SIDS deaths from 1995-2006 (n=827). Controls (n=3,326) matched on birth year, state, and race/ethnicity were randomly selected from remaining live births. Logistic regression was used to calculate adjusted odds ratios (aOR) and 95% confidence intervals (CI). There were 619 SIDS deaths in Whites, 59 in Blacks, 66 in Native Americans, 46 in Asians, and 37 in Hispanics. In controls the prevalence of prenatal smoking (ascertained from birth certificates) was greatest in Native Americans (27%), then Blacks (17%), Whites (15%), Hispanics (5%), and Asians (3%). Prenatal smoking was consistently more common in cases than controls; aOR 9.5 (95% CI: 3.1-29.5) in Asians, 3.6 (95% CI: 1.0-12.3) in Hispanics, 3.5 (95% CI: 2.9-4.4) in Whites, 2.2 (95% CI: 1.2-3.9) in Native Americans, and 1.6 (95% CI: 0.7-3.6) in Blacks. Among Whites, aORs did not increase with increasing number of cigarettes per day; because of small numbers we were unable to assess the effect of dose in other groups. Differences in the prevalence of prone sleep position by race/ethnicity may have impacted the magnitude of the aORs, yet in all groups smoking was associated with an increased aOR of SIDS.

055

BIRTH OUTCOMES AND INFANT MORTALITY AMONG FIRST NATIONS, INUIT, AND NON-INDIGENOUS WOMEN IN NORTHERN QUEBEC. *Z-C Luo, R Wilkins, M Heaman, J Smylie, P J Martens, N G L McHugh, E Labranche, F Simonet, S Wassimi, K Minich, W D Fraser (University of Montreal, Montreal, QC, Canada)

Background: In Arctic and near-Arctic countries like Canada, northern regions represent a unique entity climatically, socio-economically and environmentally. There is a lack of comparative data on birth outcomes among Indigenous and non-Indigenous sub-populations within northern regions and compared to southern regions. Methods: A cohort study of all births by maternal mother tongue to residents of northern (2616 First Nations, 2388 Inuit and 5006 non-Indigenous) and southern (2563 First Nations, 810,643 non-Indigenous) Quebec 1991-2001, based on Statistics Canada's linked birth and infant death data. Main outcomes are preterm birth, perinatal and infant death. Results: Births to northern mothers of all the three mother tongue groups were at substantially elevated risks of infant death (adjusted odds ratios (aOR): 1.7-2.9), especially postneonatal death (aOR: 2.2-4.4) as compared to births to southern non-Indigenous mother tongue women after controlling for maternal characteristics (education, age, marital status and parity). Within northern Quebec, births to Inuit mother tongue women were most vulnerable to preterm birth (aOR=1.4) and infant death (aOR=1.6), especially postneonatal death (aOR=2.5); births to First Nations mother tongue women were much more likely to be macrosomic (aOR=2.3) but without elevated risks of perinatal and infant death compared to births to non-Indigenous mother tongue women. Conclusion: There is a pressing need for improving infant health for all northern residents, and for taking into account the substantial differences in birth outcomes among Indigenous and non-Indigenous sub-populations within northern areas when assessing unmet needs and designing programs for improving maternal and infant health in northern regions.

056

MATERNAL IGF-1 LEVELS IN MIDDLE AND LATE PREGNANCY AND FETAL GROWTH. *Z C Luo, E Delvin, A M Nuyt, F Audibert, E Levy, B Shatenstein, C Deal, P Julien, W D Fraser (Department of Obstetrics and Gynecology, Sainte-Justine Hospital, University of Montreal, Montreal, QC, Canada)

OBJECTIVE: Although the effect of fetal IGF-1 on fetal growth is well understood, it remains unclear whether maternal IGF-1 levels are associated with fetal growth. We assessed maternal IGF-1 levels at 24-27 weeks and 32-35 weeks of gestation in relation to fetal IGF-1 levels and fetal growth. METHODS: A prospective pregnancy cohort study. Healthy singleton pregnant women (n=200) were recruited at 24-27 weeks of gestation. Clinical data were collected, and blood samples were taken at 24-27 weeks and 32-35 weeks of gestation and delivery. Venous cord blood samples were collected immediately after birth. RESULTS: Median maternal plasma IGF-1 level rose substantially from 24.3 nmol/L at 24-27 weeks of gestation to 39.4 nmol/L at 32-35 weeks of gestation ($P<0.001$), but were not associated with cord blood IGF-1 levels ($P>0.4$). Birth weight standard deviation (z) scores were positively associated with maternal IGF-1 levels at 24-27 weeks ($r=0.22$, $p=0.01$) and 32-35 weeks ($r=0.17$, $p=0.05$) of gestation, but were not associated with the changes in maternal plasma IGF-1 levels from 24-27 to 32-35 weeks of gestation ($r=0.06$, $P>0.4$). There was a strong correlation between cord blood IGF-1 levels and birth weight z scores ($r=0.46$, $P<0.001$). CONCLUSIONS: Maternal IGF-1 levels are associated with fetal growth. There is a substantial rise in maternal IGF-1 levels from middle to late gestation, but the rise itself is not associated with fetal growth.

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057-S

THE EFFECT OF EARLY OXYTOCIN AUGMENTATION ON LABOR OUTCOMES: A SYSTEMATIC REVIEW. *S Wei, MD, PhD, Z-C Luo, MD, PhD, H Xu, MD, MSc,W D Fraser, MD, MSc (*Department of Obstetrics and Gynecology, University of Montreal, Montreal, QC, Canada H3T 1C5)

Background: Despite oxytocin's widespread use to accelerate labor, there is little consensus regarding its effects on the caesarean section rate and maternal and infant outcomes. Objective: To estimate the effects of early augmentation with oxytocin for delay in labor progress on the caesarean section rate and on indicators of maternal and neonatal morbidity. Methods: A systematic review and meta-analysis of randomized controlled trials were identified from MEDLINE (1966 to December 2008), the Cochrane Pregnancy and Childbirth Group's Trials Register (December 2008) and contacted authors for data from unpublished trials. This review included randomized controlled trials that compared early oxytocin augmentation to conservative management in labor. Data were extracted by two authors independently in duplicate and evaluated for potential sources of bias. Results: In all, nine trials with a total of 1959 women were included. While the results suggest that early oxytocin augmentation results in a modest reduction in the rate of caesarean section (RR 0.85; 95%CI 0.69 to 1.04), the confidence interval includes the null effect.An increased risk of hyperstimulation (RR 2.90; 95% CI 1.21 - 6.94) was associated with early oxytocin augmentation but there was no evidence of an adverse effect on neonatal morbidity. Conclusions: Early oxytocin augmentation of labor may be associated with an increased risk of hyperstimulation, and is relatively safe for the newborns. Keywords: oxytocin, augmentation, caesarean section, labor

058-S

INFLAMMATORY CYTOKINES AND PRETERM BIRTH: A SYSTEMATIC REVIEW. *S Wei, MD, PhD, W D Fraser, MD, MSc, Z-C Luo, MD, PhD (Department of Obstetrics and Gynecology, University of Montreal, Montreal, QC, Canada H3T 1C5)

Background: Preterm birth remains a major perinatal health concern, and its etiology remains poorly understood. Cytokines are involved in inflammatory responses which may lead to preterm birth. There is a need for systematic reviews to assess the associations between various pro- and anti-inflammatory cytokines and preterm birth. Objective: To determine the associations between inflammatory cytokines and the risk of spontaneous preterm birth. Methods: We conducted a systematic review of the published literature identified through PubMed (1966 to January 2009) and the Cochrane Library (January 2009). Observational studies examining the association between inflammatory cytokines and preterm birth and meeting predefined quality assessment criteria were selected. Results: Data from 35 studies involving a total sample size of 8810 participants were assessed. Eight cytokines were assessed: IL(interleukin)-1 alpha, IL-1beta,IL-6,IL-8, interferon (IFN)-gamma, tumor necrosis factor(TNF)- alpha, C-reactive protein (CRP) and IL-10. An increased risk of spontaneous preterm birth was associated with increases in the following cytokines: IL-1 beta (pooled odds ratio (pOR) 3.80; 95% 2.36-6.12), IL-6 (pOR 4.46;95% 3.61-5.51), IL-8 (pOR 9.63;95% 5.65-16.41) and CRP (pOR 1.69;95% 1.38-2.08). There were no significant associations between IL-1á, IFN-gamma, TNF-alpha and IL-10 and preterm birth. Conclusions: These results suggest that certain cytokines (IL-1beta, IL-6, IL-8 and CRP) may play an important role in the pathophysiology of preterm births. Other cytokines are less likely implicated. Keywords: cytokine, inflammatory response, preterm delivery

059

JOINT EFFECTS OF PREPREGNANCY BODY MASS INDEX AND WEIGHT GAIN DURING PREGNANCY ON MACROSOMIA IN SOUTH CAROLINA, 2004–2005. *J Liu, A Dobai, J E Vena (University of South Carolina, Columbia, SC 29208)

BACKGROUND: It is not clear whether prepregnancy body mass index (BMI) of the mother modifies the positive association between gestational weight gain and macrosomia births (>4000g). DATA AND METHODS: We analyzed data from 2004-5 South Carolina birth certificates, restricting to 98,141 women with a singleton live birth. The prepregnancy BMI was grouped as underweight (<19.8), normal (19.8-26.0), overweight (26.1-28.9), obese (29.0-34.9), or very obese (≥35.0). Multiple logistic regression models were used to adjust for confounders. RESULTS: The prevalence of macrosomia in South Carolina was 7%. The percentages of women in each weight gain category (kg/wk) were: 15.7 (very low, <0.12), 5.9 (low, 0.12-0.22), 54.9 (moderate, 0.23-0.68), 9.2 (high, 0.69-0.79), and 14.4% (very high, >0.79). Compared with normal weight women with moderate weight gain, underweight women with very high weight gain, normal weight women with high or very high weight gain had 1.8, 2.0, and 2.6 times higher odds of having macrosomia births, respectively. For overweight women, those with moderate or more weight gain had 1.6, 2.2, and 3.2 times higher odds of macrosomia. However, all obese and very obese women experienced higher odds of macrosomia births. Within each weight category the odds ratios (OR ranges: 1.1-3.1 obese, 1.9-5.6 very obese) increased with rate of weight gain. For underweight and normal weight women, moderate or lower weight gain categories were associated with lower odds of macrosomia. CONCLUSION: Our results indicate that underweight, normal weight and overweight women could lower the risk of macrosomia by gaining low and very low weight during pregnancy. However, for obese women and especially for very obese women, the preconception advice to achieve healthier weight before pregnancy would be more effective than weight gain restriction during pregnancy.

060

LOWER WEIGHT GAIN DURING PREGNANCY CAN REDUCE THE RISK OF GESTATIONAL DIABETES? *J Liu, A Dobai, J E Vena, K Heidari (University of South Carolina, Columbia, SC 29208)

BACKGROUND: It is not clear whether women who gain less weight during pregnancy would lower their risk of gestational diabetes (GDM) especially among women with high body mass index (BMI). STUDY DESIGN: We analyzed data from 2004-5 South Carolina birth certificates, restricting to 98,141 women with a singleton live birth. The estimated rate of weight gain during pregnancy (kg/wk) was categorized as follows: very low (<0.12), low (0.12-0.22), moderate (0.23-0.68), high (0.69-0.79), or very high (>0.79). We categorized prepregnancy BMI as underweight (<19.8), normal (19.8-26.0), overweight (26.1-28.9), obese (29.0-34.9), or very obese (≥35.0). Multiple logistic regression models were used to adjust for confounders. RESULTS: The prevalence of GDM in South Carolina was 4.7%. As the prepregnancy BMI category went from underweight to very obese, the percentages of GDM went up from 2.2, 3.2, 5.1, 6.9, to 10.1% respectively. However the percentages of GDM did not vary much across the categories of weight gain during pregnancy. Compared with normal weight women with moderate rate of gestational weight gain, underweight women with moderate weight gain had lower odds of GDM (adjusted odds ratio (AOR): 0.74, 0.63-0.88), normal weight women with very high weight gain had higher odds of GDM (AOR: 1.23, 1.06-1.42). Overweight, obese and very obese women regardless of their rate of weight gain were associated with increased odds of GDM and the ranges of odds ratios increased monotonically within each weight categories: overweight (1.42-2.61), obese (2.03-2.60), and very obese women (2.98-3.98). CONCLUSION: Our results indicate that to lower the risk of GDM among women with high prepregnancy BMI, efforts should mainly focus on preconceptional weight reduction. It appears that restricting weight gain during pregnancy would have a marginal impact among obese and very obese women.

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* = Presenter; S = The work was completed while the presenter was a student

061-S

THE RELATION BETWEEN MENTAL HEALTH AND PREFERENCES FOR OBSTETRIC CARE AMONG ETHIOPIAN WOMEN. *M Paczkowski, M Kruk, A Tegegn, F Tessema, C Hadley, M Asefa, S Galea (University of Michigan, Ann Arbor, MI 48109)

Decreased utilization of obstetric health care in poor countries may be partially explained by preferences for obstetric care and by heterogeneity for preferences based on mental health among expectant mothers. We conducted a discrete choice experiment among 1006 women from Jimma Zone, Ethiopia, to elicit preferences for obstetric care. Potential centers of obstetric care were described by cost, travel time, provider type, provider attitude and performance, drug/equipment availability, and transport availability. We used major depressive disorder and post-traumatic stress (PTS) as mental health measures. We used Bayesian models to calculate coefficients for preferences for each woman. Linear models were used to investigate heterogeneity for preferences based on mental health. Bayesian analysis results showed that treatment by a doctor [β=2.1 (95% CI: 2.0, 2.2)] and drug/equipment availability [β=3.9 (95% CI: 3.7, 4.0)] were associated with choosing that facility for delivery. Linear models showed that women with depression valued a positive provider attitude [β=0.44 (95% CI: 0.21, 0.68)] and drug/equipment availability [β= 0.61 (95% CI: 0.24, 0.98)] less compared to women without depression. Similar results were obtained for PTS. We found that quality of health care received influenced the decisions of where to deliver among Ethiopian women from Jimma Zone and that preferences for positive provider attitude and drug/equipment availability were lower among women with a mental illness. Further work investigating the role that quality plays in deciding about obstetric care and why preferences for quality vary by mental health is needed.

062

RECURRENCE OF BREECH PRESENTATION IN CONSECUTIVE PREGNANCIES. *J B Ford, C L Roberts, N Nassar, J M Morris (University of Sydney, NSW, Australia)

BACKGROUND: Breech presentation (where the fetus presents by the feet or buttocks) is associated with adverse infant outcomes. Risk of recurrent breech presentation has been rarely investigated. With potential for interventions in subsequent pregnancies it is important for women and clinicians to know the risk of recurrence and the factors associated with recurrence. AIM: Determine population-based rates of occurrence and recurrence of breech presentation at term (37 weeks gestation or later) and risk factors for recurrence in a second pregnancy. METHODS: Data were from longitudinally linked population-based birth and hospital discharge data and included 113,854 women having at least 2 consecutive singleton term pregnancies in New South Wales, Australia, 1994-2002. Breech presentation was determined by the attending midwife/clinician and recorded in birth data. Risk factors for a 2nd consecutive breech delivery (adjusted for other reported factors) are presented with 95% confidence intervals. RESULTS: First-time breech presentation occurred in 4.2% of first pregnancy deliveries, 2.2% of second pregnancies and 1.9% of third pregnancies. The rate of breech recurrence in a 2nd consecutive pregnancy was 9.9%, and in a third consecutive pregnancy (after 2 prior breech deliveries) was 27.5%. First pregnancy factors associated with recurrence included placenta praevia (Adjusted odds ratio [aOR] 2.6,1.3-5.2) and maternal age 35 years or older (aOR 1.3,1.0-1.8). Second pregnancy factors included placenta praevia (aOR 3.2, 1.5-6.8), birth defects (aOR 2.8,1.4-5.7) and female baby (aOR 1.2,1.0-1.5). CONCLUSION: These consistently elevated recurrence rates highlight the need for women with a history of breech delivery to be closely monitored in the latter stages of pregnancy.

063

A NEIGHBORHOOD AND SPATIAL MEASURE OF RACIAL ISOLATION APPLIED TO BIRTHWEIGHT. *R Anthopolos, S James, A E Gelfand, V Berrocal, M L Miranda (Duke University, Box 90328, Durham, NC 27708)

Epidemiologic research has shown that racial residential segregation is associated with poor health outcomes among blacks in the United States. In particular, high levels of racial isolation, a dimension of segregation, have been linked to increased incidence of low birthweight and preterm birth. The spatial nature inherent in isolation, however, is often sidestepped in quantifying the extent to which one racial group is geographically separated from the majority population. Measures tend to be sensitive to the population composition of any one neighborhood, however defined, regardless of the population in surrounding neighborhoods. Moreover, measures are typically aggregated over large geographical areas, masking variation at the local level. To address these shortfalls, we developed a spatial and local measure of racial isolation. Using the North Carolina Detailed Birth Record (1999-2001), we use multiple linear regression to model the effect of racial isolation on birthweight, adjusting for maternal age, education, and parity. Assuming birthweight is spatially patterned, we employ a Conditional Autoregressive (CAR) model to adjust for residual spatial autocorrelation. We show that racial isolation at the neighborhood level is associated with a decrease in birthweight of similar magnitude as the presence of maternal risk factors, including whether a mother has completed high school or is over 40 years of age. There is evidence that birthweight is a spatial process, which suggests the importance of accounting for spatial dependence in estimation.

064

PREGNANCY INTENTION, MATERNAL PSYCHOSOCIAL HEALTH, RISKY BEHAVIORS, AND PREGNANCY OUTCOMES. *P Maxson, M L Miranda (Duke University, Durham, NC 27708)

Birth weight (BW) and gestational age (GA) at delivery are important predictors for infant outcome. Low BW and preterm infants are more susceptible to infant mortality and later health risk. Understanding factors that contribute to risks for low BW and preterm delivery is critical. Pregnancy intention has been linked to poor pregnancy outcomes. We examine pregnancy intention's association with maternal psychosocial health and behaviors, as well as to pregnancy outcomes (BW, GA), using data from a prospective pregnancy cohort study. At this time, 1185 (812 non-Hispanic blacks (NHB), 229 non-Hispanic whites (NHW), 100 Hispanics (H), and 45 Asian; oversampling of NHB intended) women have enrolled in the study. Psychosocial and behavioral correlates were obtained through prenatal surveys; electronic medical records were used to obtain pregnancy and birth outcomes. Unintended pregnancy is strongly ($P<.001$) associated with risky behaviors: smoking, history of drug usage, and previous sexually transmitted infections. Pregnancy intention is also strongly ($P<.001$) associated with psychosocial health: high levels of depression, high perceived stress, low levels of self-efficacy, and low social support. Pregnancy intention is related to gestational age ($P<.001$). Women who stated that they did not want this pregnancy have lower GA at delivery. Unintended pregnancy is associated with a negative constellation of psychosocial indices and risky behaviors. We speculate that assessing for these indicators during prenatal care could elucidate opportunities for intervention. The high level of unintended pregnancies, both nationally (50%) and in our study (78%), as well as psychosocial health correlates are areas in need of public health intervention.

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065-S

PREDICTORS OF PHYSICAL ACTIVITY DURING PREGNANCY. *A Jukic, K Evenson, J Daniels, A H Herring, A Wilcox, K Hartmann (University of North Carolina, Chapel Hill, NC)

Our objective was to identify characteristics predictive of four measures of recreational and any physical activity. Participants in the Pregnancy, Infection, and Nutrition Study were recruited before 20 weeks gestation and reported physical activity at weeks 20 and 28. We used a linear mixed model to identify predictors of the minutes of recreational activity performed and three logistic regression models to identify predictors of being minimally active ($\geq$10 minutes recreational activity at each time point), meeting a modified American College of Obstetricians and Gynecologists (ACOG) recommendation, and performing any physical activity. Predictors of low levels of recreational activity (minimally active) were mostly sociodemographic: race, education, employment, income, body mass and parity. Other types of physical activity were positively associated with minimal activity (child/adult care, outdoor and transportation activity), which might suggest that minimally active women live generally active lifestyles. For higher levels of activity (the ACOG criterion) employment and parity are still important, but behaviors (alcohol and vitamin use) are also predictive, as are external influences (partner support and health professional advice) and prior miscarriage. Child/adult care activity and indoor activity were positively associated with meeting the ACOG criterion. Demographic variables predicted any physical activity only in univariate analyses suggesting that they are unimportant if behavioral or psychological characteristics are accounted for. Predictive characteristics depend on the type, amount and timing of physical activity; this should be considered in studies of activity and pregnancy outcome.

066-S

THE ASSOCIATION BETWEEN FIRST TRIMESTER VAGINAL BLEEDING AND MISCARRIAGE. *R Hasan, D D Baird, A H Herring, A F Olshan, M L Jonsson Funk, K E Hartmann (University of North Carolina, Chapel Hill, NC 27599-7435)

Vaginal bleeding is a common symptom of the first trimester of pregnancy. We sought to evaluate the association between first trimester bleeding and miscarriage. Women enrolled during early gestation in *Right from the Start*, a community-based study, and provided detailed bleeding data for the first trimester by telephone interview. We used discrete-time hazard models to evaluate the association between bleeding and miscarriage, not including bleeding episodes that were temporally associated with miscarriage. The effect of the presence and heaviness of bleeding was modeled, both with and without adjustment for covariates (maternal age, prior miscarriage, and smoking status). Exploratory regression tree analyses were used to evaluate the relative importance of other bleed characteristics (duration, associated pain, color, gestational timing). Of 4510 participants, 1204 (26.8%) reported some bleeding or spotting, and 517 miscarriages were observed. Eight percent of participants reported heavy bleeding episodes. When we evaluated any bleeding, including episodes of spotting, the unadjusted relative odds (OR) of miscarriage for women with bleeding was 1.1 (95% confidence interval [CI] 0.9, 1.3). However, women with heavy bleeding had a nearly three-fold elevated risk compared to women without bleeding (OR 3.0, 95% CI 1.9, 4.6). Adjustment for covariates did not materially change estimates. Exploratory analyses suggested that women with heavy bleeding accompanied by pain accounted for most of this elevated risk. To conclude, heavy bleeding in the first trimester, especially when accompanied by pain, is associated with higher risk of miscarriage. Spotting and light episodes do not predict pregnancy loss.

067

A PROSPECTIVE STUDY OF PRE-GRAVID CONSUMPTION OF SUGAR-SWEETENED BEVERAGES AND THE RISK OF GESTATIONAL DIABETES MELLITUS. *L Chen, F B Hu, W C Willett, E Yeung, C Zhang (LSUHSC, New Orleans, LA)

Several recent studies have linked higher consumption of sugar-sweetened beverage (SSB) with the risk of type II diabetes and insulin resistance among middle- or old aged adults. Studies regarding habitual SSB consumption on glucose intolerance among pregnant women, however, are lacking. The objective of this study is, thereby, to prospectively explore the relationship between pre-gravid SSB consumption and gestational diabetes mellitus (GDM) risk. This analysis included 13,475 eligible women who reported at least 1 singleton pregnancy between 1991 and 2001 in the Nurses' Health Study II. The cumulative average intake of SSB (including sugar-sweetened cola, other sugar-sweetened carbonated beverages, and fruit punch) before pregnancy was used to represent long-term pre-gravid beverage consumption. GDM was self-reported and validated by medical record review in a sub-sample. Cox proportional hazards model with multivariate adjustments was applied to examine the association of SSB consumption with GDM risk. Eight hundreds and sixty incident GDM cases were identified during 10 years of follow-up. After the adjustment of age, race, parity, physical activity, smoking, alcohol intake, pre-pregnancy BMI, and total energy intake, SSB consumption was significantly and positively associated with the GDM risk (P for trend: 0.01). Compared with women who consumed less than 1 serving/month, those who consumed $\geq$ 5 servings/week had a 22% increased GDM risk (Relative risk = 1.22; 95% confidence interval: 1.04-1.44). Among SSB, sugar-sweetened cola was positively associated with GDM risk (P for trend: 0.008), while no association was found for other sugar-sweetened beverages (P for trend: 0.87). Findings from this study suggested that pre-pregnancy SSB consumption, in particular sugar-sweetened cola, might be positively associated with GDM risk.

068

PREGNANCY WANTEDNESS IN LATINA ADOLESCENTS. *C Rocca, A Hubbard, A Minnis (University of California, Berkeley, CA 94720)

High teen pregnancy rates among Latinas in the United States are often attributed to higher desire for pregnancy. Using data from a prospective cohort of 213 Latinas aged 14-19, we examined whether pregnancy wantedness mediated the relationships between socio-economic status, acculturation, and partner characteristics and subsequent pregnancy. We used multivariable logistic regression with a generalized estimating equation approach in the mediation analysis. We also used a population intervention model, an extension of marginal structural models, to calculate a causal attributable risk and estimate the hypothetical effect that an intervention that removed pregnancy wantedness would have on pregnancy rates. Over the 2-year study, 53 pregnancies occurred (1-year cumulative incidence=10.8%). Most (77%) were unwanted. Pregnancy wantedness did not mediate the relationship between any risk factors and pregnancy. However, in the model predicting pregnancy, wantedness was by far the strongest predictor of pregnancy (adjusted odds ratio (aOR)=16.0; 95% confidence interval (CI): 5.0-50.7). The only other important factor was having a mother who had been a teen mother (aOR=2.8; 95% CI: 1.0-8.2), though it was not associated with wantedness. Living in crowded conditions was associated with wanting pregnancy (aOR=6.5; 95% CI: 2.1-20.8) but not with pregnancy itself. Removing wantedness from the population was estimated to reduce teen pregnancy rates by 19%. Wanting pregnancy did not appear to mediate the relationship between risk factors and teen pregnancy; instead it may be an important risk factor in its own right. Although most pregnancies were unwanted, interventions focused on reducing the desire for pregnancy may have a measurable effect.

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069

THE ROLE OF PARENTAL EARLY-LIFE AND PROXIMAL RISK EXPOSURES ON LOW BIRTH WEIGHT IN OFFSPRING. *A Gavin, C Maas, K Hill, D Hawkins (University of Washington, Seattle, WA 98105)

This study examines the relative contributions of adult vs. early life maternal risk exposures to subsequent low birth weight in their offspring. Data are drawn from The Seattle Social Development Project (SSDP) and the SSDP Intergenerational Project. SSDP is a 24-year longitudinal study that has followed 808 youth from elementary school (1985) to adulthood with the goal of understanding prosocial and antisocial development across the lifespan. Many of the panel members have given birth, and the project follows these children. Three generations-the original youth (designated ''G2''), their G1 parent, and their G3 children - form the samples for the analyses. Using structural equation modeling, this paper examines the main effects of parental exposures to child abuse/neglect and G1 poverty during G2's adolescent period on birth weight outcomes in their G3 children. The study also examines whether these early life risks contribute independently to low birth weight in the next generation, or whether their effects are mediated through proximal maternal risks including G2 depression, G2 age at birth of G3 offspring, G2 substance use, and G2 family instability. Initial findings from a confirmatory factor analysis ($\chi 2$ (38) 65.31, $p = .004$, CFI = .97; TLI = .91, RMSEA = .065) indicate mediated associations between G3 premature birth ($r = .63$, $p < .001$) and G3 low birth weight through G1 and G2 risk factors. To our knowledge, this is the first three-generational study to examine both distal and proximal risk factors of low birth weight.

070

ARE WOMEN WHO CHANGE RESIDENCE WHILE PREGNANT AT INCREASED RISK OF ADVERSE BIRTH OUTCOMES? S Brown, R Hoskins, E G Marshall, C Weisel, D J Roe, *D Wartenberg (University of Medicine and Dentistry of New Jersey, Piscataway, NJ 08854)

Several studies have reported that as many as 30 percent of pregnant women move (i.e., change their residence) during pregnancy. We investigate whether changing residence is associated with increased rates of adverse birth outcomes. Using Washington State singleton birth certificates with complete covariate data 1992-2004 (N=921,162), we found that a greater percentage of women with term low birth weight (LBW), preterm delivery (PTD) and small for gestational age (SGA) babies moved while pregnant compared to mothers of babies without these outcomes (differences of 4% - 8%). After adjustments for maternal socio-demographics and pregnancy risk factors, we found that, compared to non-mobile mothers, the odds ratios (ORs) for LBW and SGA births from mobile mothers were slightly elevated overall. We also found that a move anytime during pregnancy modified the effect of primaparity on LBW, SGA and PTD. In short, among primiparous births, movers were less likely to have adverse outcomes than non-movers. Among multiparous births, movers were slightly more likely to have adverse birth outcomes. There are several possible explanations for these findings. Differences between movers and non-movers may be due to unmeasured sociodemographic differences among mothers which, in turn, are predictive of moving; they may be due to the local environment, the stress of moving, stresses that led to the change in residence (kinship support; another child) or other unknown combination of factors. Further investigation is needed to validate these findings and explore possible etiologies

071-S

THE EFFECT OF PM EXPOSURE ON BWT. *S Gray, S Edwards, M L Miranda (Duke University, Durham, NC 27708)

The link between air pollution (AP) exposure and adverse birth outcomes is of public health concern due to the relationship between low BWT and childhood and adult diseases. As exact exposure is difficult to obtain, surrogate measures of AP exposure are traditionally used. We explore how different AP exposure metrics affect BWT regression models. We examined the impact of maternal exposure to ambient levels of PM10 and PM2.5 on BWT among infants in NC. We linked maternal residence to the closest monitor during pregnancy for 1999-2003 (n=467,780), restricting the analysis to singleton births with no congenital anomalies. We estimated exposure by averaging county level AP concentrations for the entire pregnancy and each trimester. For a finer spatially resolved metric we calculated exposure averages for women living within 20, 10 and 5 km of a monitor. Multivariate linear regression was used to determine the association between AP exposure and BWT adjusting for confounders including maternal demographics and SES measures, infant sex, gestational age, and birth order. In the county level model an interquartile increase in PM10 and PM2.5 during the entire gestational period reduced BWT by 5.6g [95% CI, 3.6 - 7.6] and 5.1 g (95% CI, 2.9 – 7.3) respectively. This model also showed a reduction in BWT for PM10 (11.6g, 95% CI=5.6-17.6) and PM2.5 (13.4, 95% CI= 8.9 – 17.9) during the third trimester. Proximity models for 20, 10 and 5 km distances showed results similar to the county level models. County level models assume that exposure is spatially homogeneous over a larger surface area than proximity models. The sensitivity analysis showed that at various spatial resolutions there is still a stable and negative association between AP and BWT, despite consistent attainment of federal air quality standards.

072-S

BIRTH WEIGHT DISTRIBUTIONS AND THE RISK FOR LOW BIRTH WEIGHT AMONG MOTHERS IN CALIFORNIA WHO DELIVERED DURING 2001-2003. *M E Flores, R Solorio, K J Hoggatt, M Wilhelm, B R Ritz (Univ. of UT, Salt Lake City, UT 84112)

We examined differences in birth weight among United States-born (USB) Latina (n=252,222), foreign-born (FB) Latina (n=465,777), and non-Latina White (n=448,700) mothers with live, singleton births in California (CA) from 2001-2003. Overall, Whites gave birth to fewer low birth weight (LBW; <2,500g) babies (3.9%) than USB Latinas (5.1%) and FB Latinas (4.4%). The overall mean birth weight among USB Latinas (3360g, standard deviation (SD)=547g) and FB Latinas (3380g, SD=532g) was lower than for Whites (3446g, SD=535). However, among preterm births (<37 weeks) we observed the opposite: the mean birth weight for FB Latinas (2859g, SD=797g) and USB Latinas (2774g, SD=810g) was higher than for Whites (mean=2739g, SD=775g). Latinas, especially FB Latinas, also had the advantage of heavier birth weight distributions and a lower prevalence of LBW for term births among mothers who were <20 years old, less educated, and had public health insurance or no care during pregnancy, compared to Whites with the same characteristics. Compared to Whites, the crude odds ratio (OR) for LBW was substantially lower for FB Latinas (OR=1.13, 95% confidence interval (CI)=(1.11, 1.16)) than USB Latinas (OR=1.30, 95%CI=(1.27, 1.33)) but not lower than Whites, and the adjusted regression results showed a similar pattern. Our findings suggest that in CA the LBW ''Latina epidemiologic paradox'' may only be apparent in comparisons between FB and USB Latinas. Prevention strategies could use this knowledge and target high-risk Latina sub-groups to help reduce the risk for LBW, and by extension infant morbidity and mortality.

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073

HETEROGENEITY OF PRETERM BIRTH SUBTYPES IN RELATION TO NEONATAL DEATH. *A Chen, S A Feresu, M J Barsoom (Creighton University, Omaha, NE 68178)

Preterm birth (<37 weeks of gestation) has three clinical subtypes: preterm labor, preterm premature rupture of membranes (PPROM), and indicated preterm birth, which may represent different etiology and pathophysiology. Studies on neonatal death risk among preterm birth subtypes were few and inconsistent. We investigated their heterogeneity in overall and gestational-age-specific neonatal death risk using 2001 U.S. linked birth/infant death (birth cohort) datasets. For preterm birth subtypes, Generalized Linear Models with log-binomial link were applied to calculate covariates adjusted risk ratios (RRs) of neonatal death, with preterm labor being the referent, at 24-27, 28-31, and 32-36 weeks of gestation. There were 3,763,306 singleton live births at 24-44 weeks of gestation identified in the dataset. PPROM, indicated preterm birth, and preterm labor had neonatal death risk of 2.8%, 1.7%, and 1.2%, respectively. Compared with preterm labor, PPROM had shorter gestational age and lower birth weight, while indicated preterm birth had similar gestational age but lower birth weight. PPROM and indicated preterm birth had higher neonatal death risk at 28-31 and 32-36 weeks of gestation than preterm labor. At 32-36 weeks of gestation, the RR of PPROM was 1.52 (95% Confidence Interval [CI] 1.27-1.82) and of indicated preterm birth was 1.70 (95% CI 1.54-1.89). Additional adjustment of low birth weight status attenuated the RRs but that for indicated preterm birth remained as 1.36 (95% CI 1.23-1.51). PPROM and indicated preterm birth had higher risk of neonatal death than preterm labor, indicating heterogeneity in gestational age, birth weight and gestational-age-specific neonatal death risk.

074-S

MATERNAL MIGRANT STATUS, HIGH BIRTH WEIGHT, AND THE ETIOLOGY OF CHILDHOOD OBESITY IN FIRST-GENERATION AMERICANS. *A M El-Sayed, S Galea (University of Michigan, Ann Arbor, MI 48109)

Childhood obesity, a growing epidemic, is associated with greater risk for the incidence of several chronic diseases. Children of migrant mothers are at higher risk for obesity than children of non-migrant mothers. High birth weight is the most important neonatal predictor of childhood obesity in the general population. To understand the importance of neonatal high birth weight exposure in the etiology of obesity in children of migrant mothers, we assessed the relation between maternal migrant status and risk for high birth weight. Data about all births in Michigan (N=786,868) between 2000-2005 were collected. We used bivariate chi-square tests and multivariate logistic regression models to assess the relation between maternal migrant status and risk for high birth weight. The prevalence of high birth weight among non-migrant mothers was 10.6%; the prevalence among migrant mothers was 8.0% ($p<0.01$). In multivariate regression models adjusted for maternal age, education, marital status, parity, and tobacco use, children of migrant mothers had lower risk (Odds ratio=0.69, 95% Confidence intervals=0.67-0.70) of high birth weight compared to those of non-migrant mothers. Although maternal migrant status has been shown to be associated with greater childhood obesity, children of migrant mothers appear to have lower risk of high birth weight than children of non-migrant mothers. Cultural or behavioral factors in early childhood may therefore play a disproportionately important role in the etiology of childhood obesity in children of migrant vs. non-migrant mothers.

075

SUBSTANCE USE OF PREGNANT WOMEN AND EARLY NEONATAL MORBIDITY FROM THE PUBLIC HEALTH PERSPECTIVE. *I Burstyn, N Kapur, N M Cherry (The University of Alberta, Edmonton, AB, Canada)

There is uncertainty about the extent to which maternal smoking, alcohol consumption, and drug dependence during pregnancy affects early neonatal morbidity and no Canadian data exist on this issue. We conducted a retrospective cohort study in province of Alberta using records held by the Alberta Perinatal Health Program. Apgar scores (<7 at 5 minutes postpartum) and resuscitation measures were available for the entire 2001-2005 period in Alberta (N=191,686), but neonatal intensive care unit (NICU) admissions were consistently recorded only for 2002-2005 (N=154,924). For the three outcomes logistic regression was used to estimate odds ratios (ORs) for self-reported substance use and maternal health before conception. Univariate ORs and population attributable fractions were computed with and without correction for known and suspected extent of under-reporting of substance use. Maternal smoking during pregnancy was the most prevalent risk factor, apparently affecting at least 20% of mother, with the figure being possibly twice as high if we correct for under-reporting. Smoking (ORs 1.2), alcohol consumption (ORs 1.2-1.5) and drug dependence (ORs 1.7-2) of mother during pregnancy were associated with increased risk for each of the markers of early neonatal morbidity ($p<0.05$). Eliminating the most common among these, maternal smoking, can prevent 10-15% of 'cases'. Other factors related to mother's preconception health, despite some strong associations, are responsible of small proportion of cases. We conclude that in preventing early neonatal morbidity among singleton births in Alberta, control of maternal smoking would be an effective strategy.

076

USING PROJECTION SPLINES TO EXPLORE RACIAL DIFFERENCES IN GESTATIONAL AGE DISTRIBUTION AMONG VERY LOW RISK WOMEN. *N Whitehead, J Liu, L Li, J Hsia (RTI International, Atlanta, GA 30341)

Black women are more likely than white women to have poor pregnancy outcomes even if their behavioral and socioeconomic characteristics classify them as very low risk. We investigated racial differences in gestational age and birthweight distributions among very low risk women using data from the Pregnancy Risk Assessment Monitoring System, or PRAMS. Preliminary results showed a peak in gestational age distribution at 29-30 weeks among black women not found among other racial groups. Projection plots comparing gestational age distributions between racial and ethnic groups were non-linear, indicating distributions differ, but this analysis can not tell us whether this peak may be due random differences. We adapted a method that uses projection splines to test for statistically significant differences in the shape, spread and location of distribution for use with complex survey data. Splines fit a regression line using a series of quadratic nodes over the range of x, allowing the slope changes at any node. We used SUDAAN to estimate the percentile distribution of gestational age among the infants of black women and those of white women. We calculated y as the difference between the percentile of the two groups divided by the variance of the difference and assumed y was identically and independently distributed. We compared the distributions by regressing y on the average of the two percentiles, starting with a model with a node every 7 days. We eliminated nonsignificant nodes stepwise until all nodes were significant at an alpha = 0.01. The final model had 6 significant nodes, indicating the gestational age distribution of infants of black women is shaped differently from that of infants of white women.

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077-S

IMMIGRANTS' DURATION OF RESIDENCE IN URBAN ONTARIO AND ADVERSE BIRTH OUTCOMES. *M L Urquia, J Frank, R Glazier, R Moineddin (University of Toronto, Toronto ON, Canada M5T 3M7)

Migrant women contribute to more than one fifth of all live births in the US and Canada. Yet, the relation between length of residence and adverse birth outcomes remains unclear. We tested the 'convergence hypothesis' that states that birth outcomes of immigrants would approach the level observed in the host population with increasing time in the new environment. We linked a Canadian database of migrants who got their permanent residence through 1985-2000 with mother-infant records (2002-2007) of all acute Ontario hospitals. We examined the associations between length of residence (as continuous and in 5-year groups) and singleton low birthweight (LBW) (<2500 grams), preterm birth (PTB) (<37 completed weeks), and small for gestational age (SGA) (<10th percentile), among immigrants (N=83,233). Multilevel logistic models accounted for the clustering of births into maternal countries of birth. Covariate selection was based on directed acyclic graphs. Comparisons with non-immigrants (N=314,237) were also made. After adjustment, duration of residence was linearly associated with increases in LBW and PTB [5-year adjusted odds ratio (95% confidence intervals): 1.08 (1.03-1.13), 1.14 (1.10-1.19) but not in SGA [0.99 (0.96-1.02)]. Recent immigrants (<5 years) had lower risk of PTB (4.7%) than non-immigrants (6.2%) but those with ≥15 years of stay were at higher risk (7.4%). Our findings do not support the convergence hypothesis. The deterioration of birth outcomes of immigrants was driven by a shortening of gestational age with time spent in Canada. Hypothesized pathways involve maternal pre-pregnancy weight, health behaviors, and work conditions. Immigrants' length of residence should be adopted as an indicator for surveillance.

078

A PROSPECTIVE STUDY OF MENSTRUAL CYCLE CHARACTERISTICS AND TIME-TO-PREGNANCY. *L A Wise, E M Mikkelsen, K J Rothman, H T Sorensen, A Riis, K F Huybrechts, E E Hatch (Boston University, Boston, MA 02215)

Shorter cycle length and longer duration of menstrual flow have been associated with lower fertility in previous studies. We examined the relation between menstrual cycle characteristics and time-to-pregnancy (TTP) among 1,248 Danish women with regular cycles enrolled in an internet-based prospective study of pregnancy planners (2006-2008). Menstrual cycle characteristics were self-reported by participants at baseline. Outcome data were updated bimonthly until the report of pregnancy, fertility treatment, loss to follow-up, or end of observation (12 cycles), whichever came first. We estimated fecundability ratios (FR) and 95% confidence intervals (CI) using discrete-time Cox regression with control for age, intercourse frequency, smoking, body mass index, and parity. Cycle length was positively associated with fecundability. Relative to women with an average cycle length (27-29 days), FRs for women with cycle lengths <25, 25-26, 30-31, 32-33, and 34+ days were 0.69 (CI=0.46-1.01), 0.88 (CI=0.66-1.18), 1.01 (CI=0.84-1.21), 1.26 (CI=0.89-1.79), and 1.33 (CI=0.94-1.86), respectively. Compared with women whose cycles became regular within 1 year after the onset of menses, FRs were 0.84 (CI=0.71-1.00) and 0.82 (CI=0.66-1.01) for women whose cycles became regular after 2-3 years and 4+ years, respectively. Women who reported heavy or very heavy flow with 5+ days of bleeding had a longer TTP than women with light or medium flow with <5 days of bleeding (FR=0.76, CI=0.60-0.96). Age at menarche was not appreciably associated with TTP. Our data indicate that shorter cycle length, increased time to cycle regularity, and heavier and longer menstrual flow are associated with reduced fecundability.

079

DECONSTRUCTING THE MORTALITY OF PRETERM BABIES: HOW MUCH IS REALLY DUE TO IMMATURITY? *O Basso, A J Wilcox (Epidemiology Branch, NIEHS (NIH, DHHS), RTP, NC 27709)

Preterm birth is associated with high rates of neonatal mortality and morbidity. Gestational-age-specific mortality rates are sometimes interpreted as the risk that would be faced by a healthy fetus delivered at a given preterm week. However, the observed mortality rate at a given preterm week is inflated by the pathologies that trigger preterm birth. Thus, the observed mortality at a given preterm week is a combination of the effects of immaturity and the problems that have caused preterm delivery. The separate effects of these two types of mortality have not previously been estimated. Using US live births and linked neonatal deaths from 1995 to 2002, we estimate the neonatal mortality of babies born between 24 and 36 weeks of gestation that might be due to immaturity per se. Since one cannot randomly deliver healthy fetuses at various gestational ages, we defined categories of relatively ''healthy'' preterm babies, namely twins and triplets, infants of mothers with pregnancy-induced hypertension, and babies at ''optimum birth weight'' for their gestational age (and thus least likely to have suffered disruptions of fetal growth). We generated gestational-age-specific mortality curves for these categories, and found that 30% to 50% of the mortality of preterm babies is due to the causes of preterm birth rather than to immaturity itself. The true percent may be even higher. These findings have implications for clinicians, who face decisions that balance the risks of early delivery against the risks of ongoing pregnancy.

080

PERIODONTAL DISEASE AND GESTATIONAL DIABETES MELLITUS: A CASE-CONTROL STUDY. *X Xiong, K E Elkind-Hirsch, S Vastardis, R L Delarosa, G Pridjian, P Buekens (Department of Epidemiology, Tulane University, New Orleans, LA 70112)

To examine if maternal periodontal disease is associated with gestational diabetes mellitus (GDM), the authors conducted a case-control study of 53 women with GDM and 106 women without GDM at Woman's Hospital, Baton Rouge, USA. The periodontal examinations were performed by a calibrated dentist who was blind for the diabetic status of the pregnant women. Periodontitis was defined as the presence of any site with a probing depth (PD) ≥4 mm or a clinical attachment loss (CAL) ≥4 mm. Univariable analysis and multivariate logistic regression were performed to examine the association between periodontal disease and GDM. The percentage of periodontitis was 77.4% in women with GDM and 57.5% in non-GDM women, with an odds ratio (OR) and 95% confidence interval (CI) of 2.5 (1.19-5.34). After adjusting for confounding variables of maternal age, parity, race, marital status, education, family income, smoking, alcohol consumption, family history of diabetes, and oral treatment during pregnancy, the adjusted OR and 95% CI was 3.1 (1.40-8.20). The ORs and 95% CIs of GDM comparing the highest-to-lowest quartile of PD and CAL were 2.8 (1.02-7.59) and 3.2 (1.13-9.16). The authors conclude that this study supports the hypothesis of an association between periodontal disease and GDM.

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081

SEVERITY AND DURATION OF NAUSEA AND VOMITING SYMPTOMS IN EARLY PREGNANCY AND SPONTANEOUS ABORTION. *R L Chan, A F Olshan, D A Savitz, A H Herring, J L Daniels, H B Peterson, S L Martin (University of North Carolina, Chapel Hill, NC)

It is estimated that 10-12% of pregnancies end in spontaneous abortions (SAB), loss at <20 completed weeks' gestation. Nausea and vomiting in early pregnancy (NVP) are common symptoms that affect 50%-90% women and vary in severity and duration. We examined the effects of symptom severity and duration on SAB in 2,430 women who were recruited from 3 U.S. cities between 2000 and 2004 in a prospective cohort study. Data were collected through telephone interviews, early gestation ultrasound assessments, and medical records. Discrete-time continuation ratio logistic survival models were used to estimate week-specific SAB associated with the NVP variables. Early pregnancy recruitment captured a higher NVP incidence than previously reported, with 89% reported having NVP [nausea only (35.3%) and nausea and vomiting (53.2%)]. Most women had short (33%) or moderate (28%) symptom duration ($\leq$6 and 7-10 weeks respectively; χ= 8 weeks). SABs were identified in 260 (11%) pregnancies. Having no NVP increased the risk for SAB [Odds ratio (OR) =3.2, 95% confidence interval (CI): 2.4, 4.3], compared to having any symptoms. Increased maternal age strengthened the risk for SAB among women without any symptoms. Longer NVP duration was associated with reduced risks for SAB across all maternal age groups, but the effects were much stronger in the oldest maternal age group ($\geq$35 years) [OR=0.38, 95% CI: 0.24, 0.61 (moderate) and OR=0.15, 95% CI: 0.06, 0.37 (long duration)]. No study has reported the association between NVP duration and SAB; these data could be useful markers of risk for clinicians to consider in monitoring pregnancy and seeking interventions to help reduce the occurrence of SAB.

082

OPTIMAL GESTATIONAL AGE FOR DELIVERY OF TWINS. C Algert, *C L Roberts, W Giles, J Morris (University of Sydney, NSW, Australia)

Morbidity and mortality rates for twins are higher than for singletons, and twins are delivered earlier, on average, than singletons. Studies of delivery by week of gestation have used perinatal mortality as the outcome. This study included all twin pregnancies delivered in New South Wales 2001-2005, and used perinatal mortality/morbidity and maternal morbidity as outcomes. Data were obtained from linked NSW birth and hospital discharge data. An adverse event for either of a twin pair was counted as an adverse outcome for that pregnancy. Perinatal morbidity/mortality could be indicated by ICD10 codes, gestation $\leq$31 weeks, birthweight $\leq$1500 grams, 5 minute Apgar <4, transfer to a hospital with a NICU or perinatal death (fetal or neonatal death). Maternal morbidity included severe adverse outcomes, such as haemorrhage with transfusion. Logistic regression was used to estimate the adjusted odds ratio (aOR) of morbidity/mortality for delivery at 39 weeks compared to delivery at 38 weeks. Covariates included age, parity, hypertension. diabetes, and planned cesarean, induction or spontaneous labor. For nulliparous women, crude perinatal morbidity/mortality per twin pair delivery was 6.3% at 37 weeks, 4.8% at 38 weeks, and rose to 8.0% at 39 weeks. For parity $\geq$1, twin pair morbidity/mortality was 7.7% at 37 weeks, 4.1% at 38 weeks, 3.7% at 39 weeks, and 12% at 40 weeks. Maternal morbidity for nulliparae rose from 5.1% at 38 weeks to 10.2% at 39 weeks, and for parity $\geq$1 rose from 3.4% at 38 weeks to 6.0% at 39 weeks. The risk of perinatal morbidity/mortality for delivery at 39 versus 38 weeks was aOR=1.21 (95% confidence interval [CI] 0.71, 2.07) and for maternal morbidity was aOR=1.93 (95% CI 1.20, 3.13). This study supports delivery of twins by 38 weeks gestation.

083

THE IMPACT OF A BABY BONUS PAYMENT ON BIRTH RATES IN AUSTRALIA. S J Lain, J B Ford, C H Raynes-Greenow, R M Hadfield, J Simpson, J M Morris, *C L Roberts (University of Sydney, Australia)

Background: In 2004 the Australian Federal Government introduced the 'Baby Bonus', a one-off payment upon the birth of a child, with the intention of increasing the birth rate. We aimed to determine whether the Baby Bonus has increased birth rates, if so, to whom, and examine its impact on the healthcare system. Methods: Birth data (numerator) were obtained from a population-based surveillance system of all births in the state of New South Wales, Australia. Population data (denominator) on women aged 15-44 were obtained from the Australian Bureau of Statistics and used to calculate annual birth rates per 1,000 from 1997-2006. Poisson regression was used to compare birth rates in 2005 and 2006 to the trend in birth rates prior to the introduction of the baby bonus, stratified by maternal and obstetric characteristics. Results: The crude annual birth rate had a downward trend from 1997 to 2004, following 2004 this trend reversed with a sharp increase in 2005 and a further increase in 2006. All age-specific birth rates increased after 2004, the greatest increase in birth rate relative to the pre-baby bonus trend was seen in teenagers. Birth rates to women having their first child were not significantly impacted by the introduction of the baby bonus, however rates of third births (or higher) increased across all age, socioeconomic and geographic subgroups. The impact on maternity services included an average annual increase of 500 preterm births and 25,000 infant hospital days for 2005 and 2006. Conclusion: There has been a significant increase in births in NSW since the introduction of the Baby Bonus and this has impacted maternity services.

084

SURVIVAL ANALYSIS APPROACH TO ASSESS ASSOCIATION BETWEEN MATERNAL SMOKING DURING PREGNANCY AND CHILDHOOD OBESITY. *K Suzuki, M Sato, T Tanaka, N Kondo, Z Yamagata (University of Yamanashi, Chuo, Japan)

We previously clarified the association between maternal lifestyle habits practiced during pregnancy, including smoking, and childhood obesity and overweight at 9–10 years of age. In this study, we aimed to demonstrate this association by performing survival analysis. The study population comprised 1644 children born in Japan between 1991 and 1999 and their mothers. First, we performed survival analysis using the Kaplan–Meier method to compare the cumulative rate of childhood obesity and overweight between mothers with and without smoking during pregnancy. In this analysis, we analyzed the data of 1428 children and their mothers (follow-up rate, 86.9%). The result of this analysis showed that the cumulative rate of childhood obesity was significantly different between mothers with and without smoking habits. Subsequently, we calculated hazard ratio (HR) of the effect of maternal smoking during pregnancy on childhood obesity and overweight using the Cox proportional hazard model. In this analysis, we analyzed the data of 1204 children and their mothers (follow-up rate, 73.2%). Maternal smoking during pregnancy was found to be associated with childhood obesity (HR, 2.0; 95% confidence interval (CI), 1.4–2.7). However, no association was observed between maternal smoking during pregnancy and childhood overweight. Our results suggested that the effect of fetal environmental factors on childhood obesity is more pronounced than that on childhood overweight. These results suggested that maternal smoking during pregnancy may be considered as a significant factor while considering the association between fetal environment and post-delivery development.

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085

REPRODUCTIVE AND HORMONAL CHARACTERISTICS IN RELATION TO SARCOIDOSIS IN U.S. BLACK WOMEN. *Y C Cozier, J S Berman, D A Boggs, J R Palmer, L Rosenberg (Slone Epidemiology Center, Boston University Boston, MA 02215)

Sarcoidosis is a systemic, granulomatous disorder of unknown etiology of which pulmonary disease is the most common manifestation. The disease is more common in blacks than whites and in women than men. The predominance of sarcoidosis among women suggests the involvement of hormonal factors. We assessed the association of self-reported sarcoidosis with reproductive factors, hormonal contraception, and female supplement use in the Black Women's Health Study, a prospective follow up of 59,000 US black women aged 21-69 years at entry in 1995. Data on demographic variables, medical and reproductive history are collected biennially through postal surveys. Self-report of sarcoidosis, assessed in a sample of 157 cases, was confirmed for 90%. Information was obtained on age at menarche, parity, age at first birth, age at menopause, and use of oral contraceptives and female hormone supplements. Cox proportional hazard models, adjusted for age, education, and geographic region, were used to estimate incidence rate ratios (IRR) and 95% confidence intervals (CI). During 612,425 person-years of follow up from 1995 to 2007, 384 incident cases of sarcoidosis were reported. The IRR for age at first birth <20 years relative to 25+ years was 1.46 (95% CI: 1.07-1.99). IRRs for all other reproductive and hormonal factors were close to 1.0. These preliminary data do not support an important role for hormonal factors in the etiology of sarcoidosis.

086

CAFFEINE INTAKE AND TIME TO PREGNANCY IN A PROSPECTIVE STUDY OF DANISH WOMEN. *E E Hatch, L A Wise, E M Mikkelsen, K F Huybrechts, A Riis, K J Rothman, H T Sorensen (Boston University School of Public Health, Boston, MA 02118)

Caffeine intake has been associated with small reductions in female fecundability in some but not all studies. Few studies have evaluated the effects of individual caffeinated beverages. We examined the relation between caffeinated beverages and time to pregnancy (TTP) in 1639 women enrolled in an internet-based prospective study of pregnancy planners in Denmark. We used discrete-time Cox regression models to derive fecundability ratios (FR) and 95% confidence intervals (CI) according to time-varying caffeine intake (categorized as <100, 100-199, 200-299, 300-399, and 400+ milligrams (mg)/day), and number of cups per day of coffee, tea, and cola, controlling for age, education, intercourse frequency, body mass index, alcohol intake, smoking, exercise, and last method of birth control. We found small reductions in fertility among women who drank 400+ mg/day, but no consistent association for lower amounts of caffeine (FR and CI: 0.93 (0.77-1.12), 0.83 (0.67-1.02), 1.14 (0.87-1.50) and 0.80 (0.65-0.99) for 100-199, 200-299, 300-399, and 400+ mg/day, respectively, compared with <100 mg). Coffee and cola were associated with lower fertility (FR and CI= 1.04 (0.88-1.22), 0.98 (0.80-1.21), 0.85 (0.65-1.10), 0.80 (0.57-1.14) for coffee and 0.82 (0.70-0.95), 0.96 (0.72-1.28), 0.67 (0.35-1.31), 0.50 (0.11-2.19) for cola, both comparing <1, 1, 2, and 3+ cups/day vs. none), while tea was associated with increased fertility (FR and CI=1.17 (1.02-1.35), 1.10 (0.83-1.44), 1.64 (1.04-2.58), 1.44 (0.70-2.97) for <1, 1, 2, and 3+ cups/day vs. none) in a multivariable model that included all three beverages. Results were similar among 1248 women with regular menstrual cycles.

087-S

DO WOMEN CHANGE BEHAVIOR WHILE ATTEMPTING PREGNANCY? *K J Lum, G M Louis, R Sundaram (NICHD, NIH, DHHS, Bethesda, MD 20892)

In 2006, the Centers for Disease Control and Prevention recommended preconception counseling to increase awareness about risky behaviors (e.g., cigarette smoking and alcohol misuse) and to promote positive lifestyle prior to becoming pregnant. We are unaware of any prospective longitudinal data on changes in behaviors across the periconception window, and the extent to which women intending to change actually do so. In a prospective study of 99 couples planning pregnancy, women were queried at baseline on use of cigarettes, alcohol and caffeine and intention to change these behaviors while attempting to become pregnant. Women reported use in daily diaries until becoming pregnant or up to 12 menstrual cycles at risk for pregnancy. Change in use was calculated relative to baseline and to first cycle to account for reporter bias. Using the Wilcoxon signed-rank test, we found a significant reduction from baseline in cigarette and caffeine use (p=0.02 and p=0.02, respectively) in cycles 6-12 compared to cycles 0-5; a moderately significant reduction was noted from first cycle in cigarette and alcohol use (p=0.06 and p=0.03, respectively) in cycles 6-12 compared to cycles 0-5. This implies that failure to conceive by 6 cycles motivates women to change behavior. Using generalized estimating equations method for correlated data, we estimated effects of intention to change on changes in use, adjusting for parity, age and prior loss. An association between change in average daily use and intention to change was noted (beta= -3.86, p=0.06 for cigarettes, beta=-0.45, p<0.01 for caffeine, and beta= -0.36, p<0.0001 for interaction of alcohol and time beyond 6 cycles). Changes in preconception behavior vary by type of behavior and are dependent on intention to change and time required for conception.

088-S

CORRELATES OF DISCONTINUING PHYSICAL ACTIVITY AT THE ONSET OF PREGNANCY AMONG HISPANIC WOMEN. *V Hastings, R Turzanski Fortner, P Pekow, G Markenson, L Chasan-Taber (University of Massachusetts, Amherst, MA 01003)

Although 30 minutes of moderate exercise most days of the week is recommended by the American College of Obstetricians and Gynecologists during pregnancy, exercise tends to decrease with the onset of pregnancy. Prior studies, however, have often been limited by imprecise measures of exercise and have failed to include Hispanic women who overall report lower exercise as compared to non-Hispanic white women. We examined correlates of failing to meet exercise guidelines in early pregnancy among the 851 participants of Proyecto Buena Salud, an ongoing prospective cohort of pregnant Latina women in Massachusetts. Bilingual interviewers collected information on pre and early pregnancy exercise at a mean gestational age of 13 weeks via the Pregnancy Physical Activity Questionnaire. Logistic regression was used to generate odds ratios using the method of Zhang and Yu to correct for the non-rare outcome. In prepregnancy, 29% of women met exercise guidelines (>10 MET-hrs/wk) while 11% met guidelines in early pregnancy. Mean exercise decreased significantly from 9.8 MET-hrs/wk in pre pregnancy to 3.8 MET-hrs/wk in early pregnancy (p<0.01). Among women who met exercise guidelines in pre-pregnancy, 69% no longer met guidelines in early pregnancy. Highly acculturated women, as measured by the Bidimensional Acculturation Scale for Hispanics, were 30% less likely to meet exercise guidelines than less acculturated women (95% confidence interval 0.40-0.99). Marital status, income, age, education, and smoking were not associated with meeting exercise guidelines. Findings will inform intervention studies designed to sustain activity during pregnancy.

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089-S

A PROSPECTIVE COHORT OF PREGNANT HISPANIC WOMEN AND RISK OF GESTATIONAL DIABETES: DESIGN AND BASELINE CHARACTERISTICS. *V Hastings, R Turzanski Fortner, P Pekow, J Buonaccorsi, N Dole, G Markenson, L Chasan-Taber (University of Massachusetts, Amherst, MA 01003)

Women diagnosed with gestational diabetes mellitus (GDM) are at high risk for future diabetes with rates of GDM consistently higher in Hispanics than non-Hispanic whites. Currently recognized risk factors for GDM are absent in up to half of affected women and studies addressing modifiable risk factors for GDM in Hispanic women are sparse. Proyecto Buena Salud is an ongoing prospective cohort study of Hispanic women in Massachusetts designed to assess physical activity, psychosocial stress, and GDM risk. Bilingual interviewers administer the Pregnancy Physical Activity Questionnaire, Cohen's Perceived Stress Scale, the Trait Anxiety Inventory, and the Edinburgh Depression Scale in early pregnancy (mean=13 wks). Baseline characteristics of the first 851 participants are presented. Women are predominantly young (70% $\leq$24 years), unmarried (88%), and have low levels of education (47% $<$ high school). Women with high acculturation are less likely to live with a partner (odds ratio: 0.6, 95% confidence interval: 0.4-0.9) than women with low acculturation. Few participants meet physical activity guidelines ($>$10 MET-hrs/wk) during pregnancy (11%). Levels of perceived stress (mean 26.4 + 7.1), trait anxiety (mean 41.0 + 10.2), and depressive symptoms (32%) are high. Proyecto Buena Salud represents a high-risk population of pregnant Hispanic women. Findings will inform prenatal behavioral intervention programs designed to address modifiable GDM risk factors.

090-S

PREDICTORS OF SMOKING CESSATION AT THE ONSET OF PREGNANCY IN HISPANIC WOMEN. B Nichols, *R T Fortner, P Pekow, G Markenson, L Chasan-Taber (University of Massachusetts, Amherst, MA 01004)

Few studies have examined factors associated with smoking cessation at pregnancy onset in Hispanic women, one of the fastest growing populations in the U.S. We examined this association among the 851 participants in Proyecto Buena Salud, an ongoing prospective cohort of pregnant women of Puerto Rican or Dominican descent in Western Massachusetts. At enrollment (mean=13 weeks gestation), bilingual interviewers collected self-reported information on cigarette smoking prior to and during pregnancy, as well as sociodemographic, health, and acculturation factors. We used logistic regression to generate odds ratios using methods proposed by Zhang and Yu to correct the risk ratios for the non-rare outcome. A total of 242 (28%) of participants reported smoking prior to pregnancy with 169 (69.3%) smoking $\leq$10 cigarettes per day and 74 (30.7%) smoking $>$10 cigarettes per day. Among these women, 128 (57.7%) reporting quitting at pregnancy onset. Among those who continued smoking with the onset of pregnancy, mean cigarettes smoked/day were 6.0+/-7.5. In multivariable models, women who smoked heavily in pre-pregnancy ($>$10 cigarettes per day) were significantly less likely to quit smoking (relative risk: 0.47, 95% confidence interval: 0.26, 0.75) as compared to light smokers ($\leq$10 per day). Acculturation status, income, depressive symptoms, psychosocial stress, age, marital status, education, and number of children in the household were not statistically significantly associated with smoking cessation at pregnancy onset. Study findings can inform smoking cessation programs among Latina prenatal care patients and target women at risk of continued smoking.

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BIOMARKER OF ACTIVE AND SECONDHAND SMOKE EXPOSURE STRENGTHENS FECUNDABILITY EFFECT ESTIMATES. *M Pearl, O Stitelman, A Hubbard, G DeLorenze, B Eskenazi, J Bernert, M Kharrazi (Sequoia Foundation, Richmond, CA 94804)

Smoking in women is generally acknowledged to decrease fecundability, however studies of fertile women have all relied on self-reported smoking, and the role of secondhand smoke (SHS) exposure remains unclear. Women obtaining pregnancy tests at 40 clinical sites in San Diego County were surveyed and consented to storage of leftover urine from the pregnancy test. Eligible intervals of intercourse without birth control were linked to postpartum surveys of smoking and other risk factors completed at delivery in 14 hospitals, yielding 637 linked risk periods. Urine specimens were analyzed for the nicotine metabolite cotinine using a sensitive tandem mass spectrometry method. Age-adjusted Fecundability Odds Ratios (FORs) were calculated using a proportional odds model censoring waiting times $>$11 months. Fecundability decreased with increasing SHS exposure, with an FOR of 0.63 (95% CI [0.42, 0.95]) for the heaviest SHS exposure relative to the least exposed (urinary cotinine 7.39-99.5 ng/ml vs. $<$.165 ng/ml). The FOR for active smoking (urinary cotinine $>$=100 ng/ml) relative to all non-smokers was 0.76 (95% CI [0.57, 1.01]), and 0.68 (95% CI [0.48, 0.96]) relative to the least SHS exposed. Among women with self-reported pre-pregnancy smoking information (n=403), the FOR for self-reported smoking was 0.83 (95% CI [0.56, 1.21]) compared to 0.76 (95% CI [0.53, 1.09]) defined by cotinine levels, and 0.70 (95% CI [0.45, 1.09]) defined by cotinine and relative to the least SHS exposed. Previously reported smoking effect estimates relying on self-reports and a contaminated non-smoking reference group likely underestimated the impact of tobacco exposure on fecundability.

092

TOBACCO SMOKE EXPOSURE DURING PREGNANCY IN MINORITY POPULATIONS. *M Kharrazi, J Yang, M Pearl, K M Aldous, G N DeLorenze (California Department of Public Health, Richmond, CA 94804)

Studies using objective measures of tobacco exposure during pregnancy are lacking in many minority groups. In this study serum cotinine measured by tandem mass spectrometry was used to assess active smoking rates and levels of secondhand smoke (SHS) during midpregnancy (14-19 weeks gestation) in ten minority populations, compared to cotinine levels in pregnant Mexican Hispanics, Whites, and Blacks. This study analyzed 3966 women who enrolled in the California Prenatal Screening Program between 2000 and 2002 in Southern California. Rates of active smoking (serum cotinine$>$=10 ng/mL) were $<$2% in Asian Indians, Vietnamese, Chinese, Filipinos, and Laotians (similar to Mexican Hispanics), 2-4% in Japanese, Cambodians, and Koreans, and 8-12% in Native Americans and Samoans, (similar to Whites and Blacks). Among non-active smokers (cotinine$<$10 ng/mL), SHS exposure (the geometric mean cotinine value) was less than 0.01 ng/mL in Chinese, Japanese, Filipinos, Asian Indians and Laotians (similar to Whites and Hispanics), 0.01-0.02 ng/mL in Korean, Vietnamese, Native Americans and Cambodians, and greater than 0.02-0.04 ng/mL in Samoans (similar to Blacks). Minority populations that showed a low smoking rate in midpregnancy and a concomittant low SHS exposure were Chinese, Filipinos, and Laotians. Other minority populations that had low or mid-level smoking rates and comparatively high SHS exposure were Vietnamese and Cambodians. These are groups in whom steps to protect pregnant women from SHS were likely not in place or ineffective. This was in contrast to Whites who had high rates of smoking yet very low SHS exposure. These results are valuable in guiding future tobacco prevention efforts.

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PRIMARY INFERTILITY AMONG WOMEN IS ASSOCIATED WITH HERPES SIMPLEX VIRUS TYPE-2 POSITIVITY. P Madhivanan, J Klausner, *P Adamson, A Reingold, K. Krupp (San Francisco Department of Public Health, San Francisco, CA)

Background: The World Health Organization estimates 70 million couples worldwide suffer from infertility. Prevalence is highest in countries with elevated fertility rates. Sexually transmitted infections (STIs) have been identified as the major preventable cause of infertility among women. Our study investigated correlates of primary infertility among women in Mysore, India. **Methods**: From November 2005 through March 2006, sexually active women, aged 15-30 years, were recruited from rural and peri-urban neighborhoods into a cohort study investigating the relationship of vaginal flora and Herpes Simplex Virus Type-2 (HSV-2) infection. Participants were interviewed to collect socio-demographic variables, and underwent a physical examination and laboratory testing for STIs. Primary Infertility (PI) was defined as having been married for longer than 2 years, not using contraception, and not bearing children. A multiple logistic regression model was used to estimate adjusted Odds Ratios (aOR) for selected variables. **Results**: Of the 897 participating women, 113 were identified as PI cases (12.6%, 95% Confidence Interval [95% CI], 10.5-15.0%). PI was highly associated with the presence of HSV-2 antibodies (aOR:3.58; 95% CI:1.95, 6.57). Other variables associated with PI were age (aOR:0.79; 95% CI: 0.74, 0.85), number of unprotected sexual acts (aOR for every ten acts: 1.71; 95% CI: 1.23, 2.37), and post-secondary education (aOR: 3.01; 95% CI:0.98, 9.29). **Conclusions**: The prevalence of infertility among women in this cohort was similar to estimates from other Indian regions. The data show HSV-2 infection is strongly associated with PI in this population of reproductive age women. HSV-2 infection increases susceptibility to other STIs, including HIV. Therefore, screening and treatment for HSV-2 should be a priority at reproductive health clinics, in order to prevent STI transmission and infertility.

094

SOCIO-ENVIRONMENTAL FACTORS ASSOCIATED WITH DELAYED PUBERTAL DEVELOPMENT IN FEMALES: THE ROLE OF PREPUBERTAL TOBACCO AND ALCOHOL USE. *J D Peck, B M Peck, V J Skaggs, M Fukushima, H B Kaplan (University of Oklahoma Health Sciences Center, Oklahoma City, OK 73104)

Alcohol administered to female rats has been shown to suppress puberty-related hormones and delay puberty by interfering with ovarian development and function. Although anti-estrogenic effects of cigarette smoking have also been observed in humans, the effects of early substance use on pubertal development have gone largely unexplored. This study evaluates the association between prepubertal alcohol and tobacco use and onset of puberty. We analyzed data on 3303 females, ages 11-21, from a multigenerational prospective cohort study. Ages at first sign of breast development, body hair growth and menarche were self-reported. Early alcohol and tobacco use were defined as age at first use preceding the age of sexual development and accompanied by regular use. Hazard ratios and 95% confidence intervals were calculated using Cox proportional hazards models. Logistic regression analyses were restricted to females >= age 14 to estimate associations with delayed puberty, defined as no breast development by age 14. Standard errors for all models were corrected to account for correlated observations among siblings. Controlling for age at interview, race, household income, and parent education, prepubertal tobacco (HR=0.9; 95% CI 0.8-1.0) and alcohol use (HR=0.9; 95% CI 0.8-1.1) modestly decreased the probability of breast development. Early alcohol use was more strongly associated with delayed puberty (OR=4.2, 95% CI 1.9-9.3) than tobacco use (OR=2.2; 95% CI 0.9-5.4). These hypothesis-generating results suggest the endocrine-disrupting effects of alcohol and tobacco use may alter the timing of pubertal development. Further investigation is warranted.

095-S

ARE PREVENTIVE PRACTICES ADDRESSED IN GENERAL PRACTITIONER'S CLINICS? *E Ngwakongnwi, B Hemmelgarn, H Quan (University of Calgary, Calgary AB, Canada)

To assess the extent to which general practitioners (GPs) document the need for preventive interventions among patients who are eligible. We randomly selected 40 charts from each of 15 primary care clinics in the city of Calgary for patients who visited the clinics at least twice in 2002-2004. We reviewed 600 charts in total and extracted information on recommendations for cancer screening (mammography, pap smears, prostate specific antigen test, digital rectal examination), immunization (influenza and pneumococcal), and risk factor assessment (cholesterol measurement and smoking cessation). Patients eligible for screening were determined based on the recommendations of the Canadian Task Force on Preventive Health Care, the American College of Physicians and the Canadian Cancer Society to assess. Proportions of documented interventions were calculated. Of the 600 patients, 67% were females. The mean age of study participants was 54 years (STD 13.7). Cholesterol measurement was the most documented intervention, 40.3% within 1 year and 67.4% within the prior 3 years. Preventive screening opportunities least likely to be addressed within the prior 3 years were, pneumococcal vaccination (98.2%), smoking cessation (90.8%),Pap smear (75.2%), Influenza vaccination (69.3%), prostate specific antigen (67.%), breast examination (57%), rectal examination (57.5%). Although patient visits to GP clinics present several opportunities for preventive intervention, actual documentation of the intervention is low (31.8% on average in 3 years). Alternative payment approaches with bonuses for targeted preventive care or incentives that elevate the revenue of GPs may lead to an increase in preventive care interventions to eligible patients.

096-S

ASSOCIATION BETWEEN PREFERRED LANGUAGE OF SERVICE AND ENROLMENT FOR CHILDREN'S MENTAL HEALTH SERVICES. *E Ngwakongnwi, E Fradgley, D Cawthorpe, H Quan (University of Calgary, AB, Canada T2N 4N1)

To assess enrollment into mental health services and its associated factors, we used administrative data of the access and intake system for child and adolescent mental health and psychiatry for Alberta Health Services from 2002 to 2008. Enrollment for children's mental health services is based on a priority criteria score (PCS) that relates to the severity of mental illness and estimates the likely benefits of intervention. Our sample included only children less than 18 years old, referred to the central intake service and admitted, who (parents) reported a preferred language at intake, and who had PCS forms completed. Only first time users were included in analysis (4,549 in total). We stratified our participants into Less English Proficient (LEP) and English Proficient (EP) based on language preference and fluency in English. More males were enrolled compared to females [2,457(54%) vs. 2,092(46%)]. Among males, more LEP children than EP were enrolled (63.3% vs. 53.6%), p=.006. Most of the referrals came from community physicians (31.4% LEP vs. 32% EP). LEP children were less likely to be accepted for treatment than EP children (45.1% vs. 38.1%, risk adjusted odds ratio: 0.59, 95% CI: 0.44-0.80). This relationship occurred only after adjusting for age, sex, single family status, in the presence of referral sources. This finding was even stronger among sicker children, and was also influenced by referral source. Upon enrollment, more LEP children than EP withdrew or declined services (14.3% vs. 10.7%). There is need to review the intake process for children's mental health services. Future studies may assess the validity of the PCS for assessing severity of illness and enrollment.

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RESPONSES TO A SELF-ADMINISTERED QUESTIONNAIRE AND THEIR RELATIONSHIP TO LUNG FUNCTION AND RADIOGRAPHIC PNEUMOCONIOSIS AMONG US COAL MINERS. *M Wang, L Beeckman-Wagner, A Wolfe, E Petsonk (National Institute for Occupational Safety and Health [NIOSH], Division of Respiratory Disease Studies, Morgantown, WV 26505)

Rationale: Respiratory symptom questionnaires (RSQ) are often used in assessing the health of individuals exposed to respiratory hazards. Methods: To investigate the validity of items from a self-administered standardized RSQ, we studied RSQ responses and results of spirometry and chest x-ray films (CXR) among 3376 underground coal miners who had participated in the NIOSH Enhanced Coal Workers' Health Surveillance Program from September 2005 to November 2007. Spirometry was conducted and interpreted in accordance with American Thoracic Society/European Respiratory Society guidelines. CXR were classified for coal workers' pneumoconiosis (CWP) using the International Labour Office system. For each symptom item, individuals who responded 'Yes' were compared to those who said 'No', assessing differences in mean spirometry values, the proportion of abnormal spirometry and CWP, using t-test and Chi-square statistics, respectively. Prevalence ratio regression analysis was performed to investigate associations, controlling for age, smoking, and body mass index. Results: Cough, phlegm, wheeze, shortness of breath (SoB), attacks of SoB with wheezing (SoBWZ), chest tightness (ChT), and doctor-confirmed emphysema (Em) were highly associated ($p<0.0001$) with reduced lung function, increased proportion of abnormal spirometry and CWP. Model results indicated that abnormal spirometry was highly associated with cough, phlegm, wheeze, SoB, SoBWZ, ChT, and doctor-confirmed chronic bronchitis; while CWP was related to cough, SoB, SoBWZ, ChT, and Em. Em was 2 and 3 times more likely in participants with abnormal spirometry ($p=0.0016$) and CWP ($p<0.0001$), respectively. Conclusion: Self-reported respiratory symptoms and illnesses are highly associated with spirometry abnormalities and radiographic CWP. These standardized RSQ items are valid for medical screening and research. Funded By: NIOSH

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RACIAL/ETHNIC DIFFERENCES IN MAMMOGRAPHY USE AND THEIR ASSOCIATION TO DEMOGRAPHIC, SOCIOECONOMIC AND LIFESTYLE FACTORS. *B Pettersen, K Oda, S Knutsen, S Montgomery, (Department of Epidemiology and Biostatistics, Loma Linda University, Loma Linda, CA 92354)

Mammography, despite some acknowledged limitations, is considered an important screening method for early detection of breast cancer. We investigated racial/ethnic differences in self-reported mammography within the last 2 years in a population of 55 670 women 40+ years, The Adventist Health Study -2. Both Blacks and Hispanics were more likely than Whites to have had mammography: Odds Ratio (OR) 1.42 (95% confidence interval (CI): 1.34-1.51) and 1.27 (95%CI:1.12-1.44), respectively. Education and personal income up to 75K were positively associated with mammography in the last 2 years, with ORs increasing from 1.06 to 1.55 and 1.18 to 2.07, respectively [p(trend)test for both <0.001]. Vegetarians were less likely to have had mammography: vegans: OR=0.29 (95%CI:0.27-0.34) and semivegetarians: OR=0.90 (95%CI:0.83-0.98). Older women were more likely to have had a mammogram: OR=1.65 and 2.09 for ages 50-59 and 70-79, respectively [p(trend)test <0.001], while unmarried women were less likely (OR=0.70). Prior cancer and family cancer history were associated with more mammography, OR=1.53 and 1.19, respectively. In this low risk population with focus on healthy lifestyle, we found that individual screening behaviors varied significantly. While lower screening rates by income and education were not surprising, it is often assumed that Whites are more likely to screen and that those with a general prevention orientation would also be more likely to screen. We did not find this to be the case. Health professionals serving women need to understand their patients' preventive profiles especially as adherence to such recommendations may be different than expected.

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''WHEN THE DATA DOES NOT MATCH THE STORY:'' DO TRAUMA HISTORIES AND ADDICTION ISSUES CHARACTERIZE POOR CERVICAL SCREENING UPTAKE AMONG MANITOBA INDIGENOUS WOMEN (CANADA)? *B Elias, M Hall, S Hong, E Kliewer, A Woods (University of Manitoba, Winnipeg, MB, Canada R3E 3P4)

At a national HPV disease secretariat planning and strategy workshop, several Indigenous women commented that HPV surveillance often excludes Indigenous women with trauma histories and addiction issues as they are less likely to have had a recent pap test. This observation was investigated using the Manitoba First Nations Regional Longitudinal Health Survey (2002). Bivariate and multivariate analyses were conducted using items from this survey for 1707 women, 18 years and older. Predictors of having had a pap smear within the last 3 years included socio-demographic characteristics (age, single parent; high school completion), trauma histories (physical, emotional and/or sexual abuse; suicidality, personal and/or intergenerational exposure to a residential school) and behavioral risk factors. Significant predictors at the bivariate level were age, education, abuse history, suicidality history, binge drinking, illegal drug use, and polysubstance use. Using logistic regression, the significant ($p <=0.05$) independent predictors were age 18-34: adjusted odds ratio (AOR)=3.51 (95% CI 2.24-5.49), age 35-49: AOR=2.54 (CI 1.67-3.84), suicidality history: AOR=1.82 (CI 1.20-2.77), and high school completion: AOR=1.52 (CI 1.01-2.28). While the stories presented at the workshop were plausible, quantitative analysis confirmed that women under 50 with high school or equivalent education were more likely to engage screening. Surprisingly, women with a history of suicidality were more likely to have been screened, which suggests that having a challenging past is not always a barrier, as thought by these women and contrary to what the literature suggests.

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CHARACTERIZING ADDICTION BEHAVIORS OF RESIDENTIAL SCHOOL SURVIVORS AMONG MANITOBA (CANADA) INDIGENOUS POPULATIONS. *B Elias, M Hall, S Hong, A Woods, J Mignone, J Sareen (University of Manitoba, Winnipeg, MB, Canada R3E 3P4)

Potential predictors of addiction behaviors among residential school survivors (RSS) was investigated using data from the Manitoba First Nations Regional Longitudinal Adult Health Survey (RHS) (subsample n=611). Addiction behaviors included smoking, binge drinking, illegal drug use, and polysubstance use (2 or more of smoking, drinking, and/or illegal drug use). Covariates included age, gender, marital status (partner/no partner), multigenerational residential school exposure (parents/grandparents who also attended residential school), emotional, physical, and/or sexual abuse history, suicidality history, high school completion/equivalent, and employment. Bivariate and logistic regression analyses ($p <= 0.05$) identified potential predictors of addiction behaviors among RSS. Age <50 was a significant independent predictor of all addiction behaviors. Most significant was the risk for binge drinking among those age 28-39: adjusted odds ratio (AOR)=5.76 (95% CI 2.59-12.84) and also illegal drug use: AOR=4.88 (CI 2.33-10.23). Males were at greatest risk for binge drinking: AOR=2.59 (CI 1.19-5.64), and polysubstance use: AOR=2.17 (CI 1.09-4.30). Not having a partner also predicted binge drinking: AOR=2.31 (CI 1.18-4.51), and suicidality history also predicted illegal drug use: AOR=2.82 (CI 1.49-5.35). In summary, younger males were particularly at risk for binge drinking and polysubstance use. The risk of illegal drug use was higher for those with a history of suicide, and especially so for those age 28-39. Not having a partner increased the risk of binge drinking, especially for younger males.

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* = Presenter; S = The work was completed while the presenter was a student

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SO WHAT BEST DESCRIBES ADDICTION BEHAVIORS OF NON-RESIDENTIAL SCHOOL SURVIVORS IN THE MANITOBA (CANADA) INDIGENOUS POPULATIONS? *B Elias, M Hall, S Hong, A Woods, J Mignone, J Sareen (University of Manitoba, Winnipeg, MB, Canada)

Potential predictors of addiction behaviors for Indigenous individuals who had not attended residential school were investigated using data from the Manitoba First Nations Regional Longitudinal Adult Health Survey (RHS) (subsample n=2343). Addiction behaviors included smoking, binge drinking, illegal drug use, and polysubstance use (2 or more of smoking, drinking, and/or illegal drug use). Covariates included age, gender, marital status (partner/no partner), multigenerational residential school exposure (parents/grandparents who attended residential school), abuse history (emotional, physical, and/or sexual), suicidality history, high school completion/equivalent, and employment. Bivariate analysis and logistic regression analyses were used to identify predictors of addiction behaviors ($p <= .05$). Age < 50 was a significant independent predictor of all addiction behaviors. The most significant was for those age 18-27 in terms of smoking: adjusted odds ratio (AOR)=5.20 (95% CI 3.50-7.72), binge drinking: AOR=7.72 (CI 5.09-11.72), illegal drug use: AOR=6.32 (CI 2.54-15.70, and polysubstance use: AOR=9.45 (CI 4.72-18.91). Not having a partner and suicidality history also increased the risk of all addictions. Male gender increased the risk of binge drinking: AOR=1.72 (CI 1.27-2.34) and illegal drug use: AOR=2.03 (CI 1.50-2.75). Lack of employment slightly increased the risk of smoking, illegal drug use and polysubstance use, as did abuse history for illegal drug use and polysubstance use. Overall, young adults are particularly at risk for all addiction behaviors. The very high AOR for polysubstance use (9.45) highlights the preponderance of multiple addiction behaviors in this population.

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MEDIATION, MODERATION, AND COMBINATIONS OF THE TWO: A REVIEW OF METHODOLOGICAL CONCEPTS IN ESTABLISHING MECHANISMS OF ACTION IN ALCOHOL RESEARCH. *M Subbaraman, L A Kaskutas (Alcohol Research Group, Emeryville, CA 94608)

Understanding moderators and mediators of exposures' effects on outcomes can often elucidate the processes of how exposures incite outcomes. Furthermore, establishing mechanisms of action is crucial to understanding how exposures, such as treatment, affect outcomes. Here we review the methods used in analyzing mediation and examine how they have been used in the alcohol field. We first describe the differences between moderators and mediators as well as the most commonly used ways to analyze their presence, such as the Baron and Kenny method and Sobel's test. We then explain why some of these methods often break down in terms of power and Type I error, and suggest alternate strategies for analysis. We also discuss situations in which both mediation and moderation are present, as well as the idea of multiple mediators. We then offer practical strategies for detecting these phenomena. We conclude with various examples of mediation analysis methods that have been used in alcohol research, in addition to critiques of the strategies employed.

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EMERGENCY DEPARTMENT-INITIATED TOBACCO CONTROL: A RANDOMISED CONTROLLED TRIAL IN URBAN OUTPATIENTS. *B Neuner, E Weiss-Gerlach, P Miller, P Martus, D Hesse, C Spies (Charite–Universitaetsmedizine, Berlin, Germany)

Emergency department (ED) patients show high smoking rates. We investigated the effects of ED-initiated tobacco control (ETC) on the 7-days abstinence at 12 months. A randomized-controlled intention-to-treat trial (Trials Registry no.: ISRCTN41527831) was run in 1,044 patients in an urban ED. ETC consisted of on-site counseling plus up to 4 telephone booster sessions. Controls got usual care. Analysis was by logistic regression. At baseline, 1,012 study participants had complete baseline screening (60.7% males, median age 30 years, (range 18 – 78), median daily cigarette use 15 (range 1 – 60)). ETC (median time 30 (range 1 – 99) minutes) was administered to 472 (91.7% out of 515) randomized study participants. At follow-up, 685 study participants (65.6% of 1,044) could be contacted. Overall, 73 out of 515 (14.2%) in the ETC group were abstinent, whereas 60 out of 529 (11.3%) controls were abstinent (Odds ratio adjusted for age and gender: 1.31 (95%-confidence interval (0.91 – 1.89), p=0.15). Subgroup analysis in patients with complete baseline screening showed odds ratios of ETC versus usual care in unmotivated, respectively ambivalent, respectively motivated smokers of 0.89 (95%-confidence interval (0.50 – 1.58), respectively 1.32 (95%-confidence interval (0.70 – 2.51), respectively 2.47 (95%-confidence interval (1.07 – 5.72)), p for trend = 0.14, and a negative effect of nicotine dependency (per point in the Fagerstroem Test for Nicotine Dependency: odds ratio: 0.81 (95%-confidence interval (0.74 – 0.88)). Although ETC in the form of on-site counseling and up to 4 telephonic booster sessions showed no overall effect on tobacco abstinence after 12 month, motivated smoker seem to benefit. The study was funded by the German Cancer Foundation, Bonn, Germany (Grant 106730).

104-S

SOCIETAL-LEVEL DISAPPROVAL OF ALCOHOL AND SMOKING AS PREDICTORS OF FUTURE INDIVIDUAL-LEVEL USE AMONG HIGH SCHOOL SENIORS IN THE U.S. FROM 1976–2007. *K Keyes, J Schulenberg, P O'Malley, G Li, D Hasin (Columbia University, New York, NY)

The aim of this study was to determine whether aggregate-level student disapproval of alcohol and cigarette smoking in a given year predicts future individual-level use of alcohol and cigarettes. Data were drawn from Monitoring The Future, a nationwide survey of seniors conducted yearly, 1976-2007; total N=527,582. Dichotomous outcomes included: $\geq$1 drink in the past 30 days, and $\geq$1 cigarette in the past 30 days. Main predictor variables were the percentage of students strongly disapproving of adults drinking 1-2 drinks daily, and adults smoking $\geq$1 packs/day. The percentage of high school seniors strongly disapproving was tested in logistic regression with time lags of 1, 3, and 5 years. Covariates included percentage of students using the outcome substance in the year disapproval was measured, sex, race, and parental education. There were significant inverse relationships with alcohol disapproval at 5-years, 3-years, and 1-year, with 3-year disapproval evidencing the strongest effect. Each percentage point increase in aggregate disapproval decreased odds 3 years later of drinking by 11% (Odds Ratio [OR]=0.884, 95% C.I. 0.880-0.888). Conversely, cigarette disapproval was weakly positively associated with smoking at 1- and 3-years later (ORs 1.009 and 1.007, respectively), and not associated with cigarette use 5 years later (OR=1.001, 95% C.I. 0.998-1.003). These findings suggest that societal-level disapproval of drinking among adolescents is an important determinant of future trends in alcohol use, but that change in adolescents' attitudes regarding smoking is not an indicator of trends in use.

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SOCIOEPIDEMIOLOGY OF SMOKING AMONG CAMBODIAN AMERICANS IN LONG BEACH, CALIFORNIA. *R Friis, M Forouzesh, A Safer, C Garrido-Ortega, C Wankie, P Griego, K Trefflich, K Kuoch (Health Science Department, California State University Long Beach, Long Beach, CA 90840)

This study examined the prevalence and correlates of cigarette smoking among Cambodian Americans in Long Beach, CA, home to the largest community of Cambodians outside Cambodia. Although smoking is believed to be highly prevalent in this population, prevalence data are lacking or incomplete. A stratified random sample of respondents (n = 680) was obtained from census tracts with high concentrations of Cambodian Americans. A cross-sectional survey collected data on demographic characteristics, tobacco use history, quit attempts, and readiness for cessation programs. Cigarette smokers were defined as persons who had smoked 100 cigarettes or more during their lifetime. Smokers (ever-smokers) included quitters and current smokers. The prevalence (%) of ever-smokers was 22.3%; the corresponding sex-specific prevalences were 39.0% and 10.0% for males and females, respectively. The mean age of ever-smokers was 51.5 years (range = 18 to 94 years) and for males and females was 52.8 years and 47.1 years, respectively (p = N.S.). A multivariate logistic regression analysis examined predictors of ever-smoking status. Predictor variables included age, gender, marital status, and education. The odds of ever-smoking were 0.4 times (95% CI = 0.2 - 0.9) lower in the 18 to 40 age group than in the 65 and older age group (reference category) but not significantly different in the 41 to 64 age group. The odds of ever-smoking were 11.9 times (95% CI = 6.6 - 21.4) higher among males than among females. The odds of ever-smoking were 4.4 times (95% CI = 2.2 - 8.8) higher among those with less than a high school education in comparison with those who had higher levels of education. The odds of ever-smoking for married persons were 1.9 times (95% CI = 1.1 - 3.6) higher than for single persons. We concluded that ever-smokers tended to be male, married, have less than a high school education, and be over 40 years of age.

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HOW SCHOOL-LEVEL PROFILES OF RISK RELATE TO ADOLESCENT SUBSTANCE USE. *M Cleveland, M Greenberg, M Feinberg (Pennsylvania State University, University Park, PA 16802)

The current study used latent class analysis (LCA) to examine if subgroups of school contexts can be identified based on school-level prevalence of risk and protective factors for adolescent substance use. The sample included 48,641 students in grades 6,8,10 and 12 from 192 schools. Aggregated school-level measures of student perceptions of individual, peer, family, and community factors served as indicators of the LCA models. Two district-level census measures (% families eligible for free lunch and % single parent families) were also used as indicators. First, a series of LCA models were compared to determine the most parsimonious interpretation of patterns of risk and protective factors among the schools. The results indicated that a four-latent class model provided the best fit to the data, suggesting that schools could be characterized by high levels of protection with low levels of risk (24%); average levels of risk and protection (50%); low levels of community protective factors (22%); and high proportion of students with favorable attitudes toward antisocial behavior (5%). Next, membership in the school subtypes was linked to school-level prevalence rates of recent (past 30 days) and lifetime use of alcohol, cigarettes, and marijuana via multinomial logistic regression. The high protection/low risk latent class served as the reference class. The results indicated that latent school subtype membership was significantly associated with school-level recent and lifetime prevalence rates of all three substance types (all Odds Ratios > 1.0, ps < .001).

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PHARMACY AND NEIGHBORHOOD LEVEL CHARACTERISTICS ASSOCIATED WITH EXPANDED SYRINGE ACCESS PROGRAM SUPPORT AND SYRINGE CUSTOMER UTILIZATION. *N Crawford, S Blaney, S Amesty, C Fuller (New York Academy of Medicine, New York, NY)

The Expanded Syringe Access Program (ESAP) allows the sale of non-prescription syringes to injection drug users (IDUs) to reduce transmission of infectious disease. Studies consistently show racial disparities in pharmacy use by IDUs. To understand individual pharmacy and neighborhood level predictors of ESAP support and pharmacy use by IDUs we combined census tract data with baseline pharmacy data from the Pharmacies as Resources Making Links to Community Services (PHARM-Link) study. Eligible pharmacies 1) sell syringes without requirements, 2) have $\geq$1 new syringe customer/month, and 3) have$\geq$1 new syringe customer become a regular customer/month. 390 pharmacists, non-pharmacists owners and technicians enrolled from 118 pharmacies located in 129 census tracts in Bronx, Brooklyn, Queens and Manhattan. Multilevel adjusted analyses showed that pharmacists were significantly more likely to support ESAP compared to technicians (p=0.047). Pharmacies with more ESAP customers/month were more likely to support ESAP (p<0.01). Neighborhood income, proportion minority and foreign-born nor neighborhood disadvantage and deprivation measured by the Townsend index influenced individual ESAP support. However, IDU pharmacy use was associated with being located in a high drug activity neighborhood (p=0.049) and low neighborhood household income (p=0.040). Although ESAP use is higher in low-income neighborhoods where drug use is prevalent, more research is needed to determine if lack of support in some pharmacies deters syringe purchases among IDUs and how to subsequently increase ESAP support, specifically among technicians.

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POLYMORPHISMS OF GNB3 AND TPH1 GENES AND POSTPARTUM DEPRESSION. *R Xie, G He, M Walker, S W Wen (University of Ottawa, Ottawa, ON, Canada K1H 8L6)

Genetic factors have been generally implicated in the etiology of depressive disorder. Postpartum depression (PPD) is a subtype of major depression. From this perspective, we hypothesized that both GNβ3C825T and TPH1 polymorphisms increase the risk of PPD. This study aims to examine the association between PPD and polymorphisms of GNβ3 and TPH1 genes. Between February and September 2007, we conducted a prospective cohort study in Changsha, Hunan, China. Here we reported the results of a case-control study nested to this cohort to assess the association of PPD with polymorphisms of GNβ3 and TPH1 genes. For each PPD case, we selected two subjects without PPD, matched by hospital at childbirth (same) and age (within 5 years). Ligase Detection Reaction was used to measure GNβ3 rs5443 single nucleotide polymorphisms (SNP) and TPH1 rs1800532SNP polymorphisms. We included 43 PPD cases and 86 controls in the final analysis. No differences were observed in frequencies of rs5443SNP genotypes and alleles between PPD cases (CC=23.30%, C/T=51.2%, TT=25.6%, C=48.84%, T=51.16%) and controls (CC=30.20%, C/T=39.50%, TT=30.20%, C=50.00%, T=50.00%) (P>0.05). Among PPD cases, gene expressions were not associated with age, neurotransmitters plasma levels, and EPDS total score or subunit scores (P>0.05). No differences were observed in rs1800532SNP genotypes and alleles between PPD cases (AA=18.60%, A/C=46.5%, CC=34.90%, A=41.86%, C=58.14%) and controls (AA=19.80%, A/C=58.10%, CC=22.10%, C=48.84%, T=51.16%) (P>0.05). Among PPD cases, gene expressions were not associated with age, neurotransmitters levels, and EPDS total score or subunit scores (P>0.05). We conclude that there appears no association of PPD with GNβ3 rs5443SNP polymorphism or TPH1 rs1800532SNP polymorphism.

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NEUROTRANSMITTERS AND POSTPARTUM DEPRESSION IN A COHORT OF CHINESE WOMEN. *R Xie, G He, M Walker, S W Wen (University of Ottawa, Ottawa, ON, Canada K1H 8L6)

To examine the associations between postpartum depression (PPD) and neurotransmitters, we conducted a nested case-control study between February and September 2007 in Hunan, China. For each PPD case, we selected one subject without PPD, matched by hospital at childbirth (same) and age (within 5 years). We used high performance liquid chromatogram (HPLC) to measure serotonin (5-HT), hydroxyindoleacetic acid(5-HIAA), dopamine(DA), 3,4-dihydroxyphenylacetic acid(DOPAC), homovanillic acid(HVA), norepinephrine (NE) along with 3-methoxy-4-hydroxyphenylglycol (MHPG) plasma levels, and enzyme-linked immunosorbent assay test (ELISA) to measure Orphanin FQ (OFQ), Neuropeptide Y(NPY) and Substance P(SP) plasma levels. We compared the means (SDs) of the measured neurotransmitters between PPD cases and controls. 42 PPD cases and 42 controls were included in the final analysis. The results showed that 5-HT (7.21±2.06ug/L versus 8.25±2.24ug/L), 5-HIAA (3.82±1.34ug/L versus 4.53±1.77ug/L), and NPY (6.14±0.97 versus 6.66±0.79ng/ml) levels were significantly lower in PPD cases than that in controls ($P<0.05$), while plasma NE (60.53±10.52 versus 55.04±11.99) and SP (884.15±246.78 versus 771.45±267.54) levels were significantly higher in PPD cases than that in controls ($P<0.05$). There were no differences in plasma 5-HIAA/5-HT, MHPG, DA, HVA, DOPAC, and OFQ levels between the two study groups. Among PPD cases, there were negative correlations between EPDS score with plasma 5-HT ($r=-0.41$, $P<0.01$) and NPY ($r=-0.36$, $P<0.05$) levels, while there were positive correlations between EPDS score with plasma NE ($r=0.37$, $P<0.05$) and SP ($r=0.44$, $P<0.01$) levels. Also there was a negative correlation between NPY and NE ($r=-0.36$, $P<0.05$). We conclude that changes in plasma 5-HT, 5-HIAA, NPY, NE, and SP levels are strongly associated with PPD.

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RACE DIFFERENCES IN RATES OF WOMEN'S VIOLENT REVICTIMIZATION. *S E Parks, K Kim, N Day, M A Garza, C Larkby (Western Psychiatric Institute and Clinic, Pittsburgh, PA 15213)

There are few prospective studies of revictimization. Despite evidence of racial differences in rates of both childhood maltreatment (CM) and adult violent victimization (AVV), the existence of racial differences in the relation between CM and AVV remains unclear. The aims of this study were to: 1) determine whether the association between CM and AVV differed by race; 2) examine whether mediators of the CM-AVV relation (social support, substance use, adult household size/structure, and psychological status) differ by race; and 3) determine whether sociodemographic variables (marital status, age, household income, employment status, educational attainment) moderate the CM-AVV relation within each race. The data were from two longitudinal studies in the Maternal Health Practices and Child Development project. Measures included maternal psychological, social, and environmental factors, demographic status, and substance use. Race-stratified logistic regressions were conducted. Mediation was tested using the Baron and Kenny method. Moderation was tested by examination of the significance of mediators in the CM-AVV relation depending on the level of selected demographic variables (age, income, employment, marital status, education). In logistic regression models, the rates of revictimization (CM followed by AVV) among women who experienced CM did not differ statistically between African Americans and Caucasians. There were no significant mediators for African American women. Baseline marijuana use was a significant, partial mediator for Caucasian women. A history of any CM was associated with increased odds of experiencing AVV for both races. Mediators in the CM-AVV relation differ by race, and may have implications for intervention.

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SPOUSAL SEXUAL VIOLENCE, HIV, AND SEXUALLY TRANSMITTED INFECTIONS: AN EVALUATION OF DEMOGRAPHIC AND HEALTH SURVEY DATA—ZIMBABWE (2005–2006), MALAWI (2004), AND KENYA (2003). *C L Mattson, S Settergren, J Sabatier (Centers for Disease Control and Prevention, Atlanta, GA 30333)

To estimate national prevalence and to evaluate the association of spousal sexual violence (defined as forced sexual intercourse or other sex acts) with HIV infection and with self-reported symptoms (ulcer or discharge) or diagnosis of STIs, we evaluated cross-sectional, household survey data from Demographic and Health Surveys among ever-married women in Zimbabwe (n=4,718), Malawi (n=1,894), and Kenya (n=1,872). We estimated prevalence and used multivariable logistic regression for complex survey data (with appropriate sample weights and design effects) to evaluate the association between spousal sexual violence, HIV, and STIs. Prevalence, by variable and country, were: HIV infection, 25.7% (95% confidence interval [CI]=23.9–27.5) in Zimbabwe, 14.7% (CI=13.0–16.4) in Malawi, and 10.3% (CI=8.7–11.9) in Kenya; spousal sexual violence, 13.7% (CI=12.5–15.0), 13.4% (CI=12.2–14.5) and 14.7% (CI=13.3–16.1), respectively; STIs, 10.8% (CI=9.5–12.0), 8.4% (CI=7.6–9.2), and 4.7% (CI=4.1–5.4), respectively. Spousal sexual violence was not directly associated with HIV infection, but was associated with STIs in Zimbabwe (adjusted odds ratio [AOR] = 2.2, CI=1.7–2.8), Malawi (AOR=3.2, CI =2.1–4.8), and Kenya (AOR=3.0, CI =1.6–5.3). HIV infection prevalence was high in all three countries, and spousal sexual violence was consistently associated with STIs. As HIV services increase, linkages between violence prevention and HIV/STI programs should be strengthened.

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RACIAL/ETHNIC DIFFERENCES IN ASSOCIATION BETWEEN BODY FAT DISTRIBUTION AND SERUM LIPID PROFILES AMONG REPRODUCTIVE AGED WOMEN. *G M M Hosain, M Rahman, A Berenson (University of Texas Medical Branch, Galveston, TX 77555)

To examine racial/ethnic differences in association between body fat distribution and serum lipid profiles, we conducted secondary data analyses on 204 Black, 257 Hispanic and 247 White women, aged between 16 and 33. Pearson correlation and multivariable linear regression were used to examine the racial/ethnic differences. All fat distribution variables (total fat, percent body fat, trunk fat, trunk-to-limb fat ratio and leg-to-total fat ratio) were significantly correlated with total cholesterol (TC) ($r= 0.14$ to 0.26), triglyceride (TG) ($r= 0.13$ to 0.46), high density lipoprotein (HDL) ($r= -0.13$ to -0.34), TC:HDL ($r= 0.20$ to 0.50) and atherogenic index of plasma (AIPlog10) ($r= 0.16$ to 0.49). Multiple regression analyses also showed significant associations between body fat distribution variables and lipid profiles after adjusting for total body lean mass, and demographic and lifestyle variables. Models with interaction terms between race and body fat variables showed significant difference between Black and Hispanic, and between Black and White women with regard to the relationship between some of the body fat distribution variables (i.e. total fat, % body fat, and total trunk fat) and lipid profiles (TG, TC:HDL ratio and AIPlog10). A distinct trend was observed in both bivariate and multivariate analyses: Black women showed relatively weaker association than White and Hispanic women. In many cases the differences were statistically significant. These findings suggest that a better understanding of these disparities may help clinicians to offer race/ethnic specific counseling for women at risk of cardiovascular disease based on their body fat distribution.

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POLYCYSTIC OVARY SYNDROME, BODY MASS INDEX AND OUTCOMES OF ASSISTED REPRODUCTIVE TECHNOLOGIES. *H A Beydoun, L Stadtmauer, M A Beydoun, H Russell, Y Zhao, S Oehninger (Eastern Virginia Medical School, Norfolk, VA 23501)

The purpose of the study is to examine the effects of polycystic ovary syndrome (PCOS) and body mass index (BMI) on selected indicators of in-vitro fertilization (IVF) or intracytoplasmic sperm injection (ICSI) treatment success. A retrospective cohort study was conducted using existing data on 69 IVF/ICSI treatment cycles undergone by PCOS women and an individually matched sample of 69 IVF/ICSI treatment cycles undergone by non-PCOS women at a major fertility treatment center. BMI (kg/m2) was analyzed as a continuous and categorical (< 25, 25-29.9,≥30) variable. Results indicated that PCOS was directly associated with the number of oocytes retrieved. Irrespective of PCOS status, continuous BMI was inversely associated with total and mature oocytes retrieved. Multiple linear regression analyses indicated no significant effects of PCOS or continuous BMI on the number of mature oocytes fertilized per mature oocyte retrieved or inseminated. Similarly, multiple logistic regression analyses suggested no significant effect of PCOS and continuous BMI on the odds of pregnancy, miscarriage or live birth. Furthermore, categorical BMI did not influence process and outcome measures of IVF/ICSI treatment success. PCOS and continuous BMI appear to have significant and distinct effects on early stages but not on later stages of IVF/ICSI treatment.

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PREDICTORS OF HIGHER BONE MINERAL DENSITY LOSS AMONG DEPOT MEDROXYPROGESTERONE ACETATE USERS. *M Rahman, A Berenson (University of Texas Medical Branch, Galveston, TX)

Objectives: Depot medroxyprogesterone acetate (DMPA) adversely affects bone mineral density (BMD), but predictors of higher BMD loss among the users have not been examined yet. This study investigated the role of sociodemographics, body mass index (BMI), life style variables, past use of hormonal contraceptives, and close relatives with shorten height or broken bone on BMD loss among DMPA users of multiethnic origin. Methods: BMD was measured at the lumbar spine and femoral neck every 6 months in 240 white, black, and Hispanic women using DMPA. For the analysis purpose, an arbitrary value of ≥5% BMD loss from the baseline value after 24 months of DMPA use at any one of the two sites was considered as the higher BMD loss. Logistic regression analysis was used to examine the factors predictive of ≥5% BMD loss at lumbar spine or femoral neck. Results: Of the initial 240 DMPA users, 95 completed 24 months of follow-up. Forty-five of the 95 DMPA users (47.4%) had ≥5% BMD loss at the lumbar spine or femoral neck. Multivariable logistic regression model showed that ≥5% BMD loss at the lumbar spine or femoral neck was associated with current smoking (adjusted odds ratio [OR] 3.46, 95% confidence interval [CI], 1.09-10.98), calcium intake (in 100 mg) (OR 0.78, 95% CI, 0.62-0.98), and parity (OR 0.48, 95% CI, 0.28-0.84). Age, race/ethnicity, previous contraceptive use and BMI were not associated with higher BMD loss. Conclusions: Calcium intake protects against higher BMD loss. Smoking increases BMD loss. BMD loss among DMPA users may be reduced by smoking cessation and higher calcium intake.

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MEASURING NON-CONTRACEPTIVE USE OF THE LEVONORGESTREL INTRAUTERINE SYSTEM IN A MANAGED CARE SETTING. *A Pressman, F Sinclair, D Postlethwaite, K Maloney (Kaiser Permanente, Oakland, CA 94612)

Levonorgesterel Intrauterine System (LNG-IUS) is commonly prescribed for its non-contraceptive benefits, yet these effects have not been quantified. We performed a retrospective observational study at Kaiser Permanente Northern California. The study cohort consisted of female health plan members, age 18-55, with abnormal uterine bleeding and dysmenorrhea who were prescribed LNG-IUS between 2002 and 2006. Computerized databases and medical record review provided data for us to measure utilization in the year before and after LNG-IUS insertion for these 1192 subjects. Using simple plotting techniques and matched pair t-testing, we summarized the patterns of change around the index date of LNG-IUS insertion. We found that in the year after the LNG-IUS insertion compared with the year before, women averaged 1.5 fewer routine labs, ($p < 0.01$), and 1.1 fewer hormone prescriptions ($p < 0.01$). Pelvic ultrasounds, hysteroscopic procedures and endometrial biopsies were also significantly fewer, but changes were not clinically meaningful. In addition, emergency room visits for bleeding and pain and office visits for anemia decreased slightly. Excluding women who delivered a baby in the year prior to LNG-IUS insertion, gynecologic office visits decreased by 1.0, ($p < 0.01$). In a managed-care system, use of the LNG-IUS in women with abnormal bleeding and dysmenorrhea is associated with non-contraceptive benefits. In the first year after insertion, women with LNG-IUS had significantly lower utilization of both inpatient and outpatient gynecologic services than in the year prior to insertion. These methods can be extended to measure long term effects of the LNG-IUS.

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HIGH MAMMOGRAPHY RATES &IMPACT ON LATE STAGE BREAST CANCER DIAGNOSIS. *R Haque, J Schottinger, M Kanter, C Avila, R Contreras, V Quinn (Kaiser Permanente Southern California, Pasadena, CA 91101)

Kaiser Permanente Southern California had the highest mammography rate in the U.S. reaching 90% in 2007. Despite the success in improving screening rates in this health plan of 3 million members, the percentage of women diagnosed with late stage breast cancer (BCa) (stage III, IV) remained stable (11%, N=270) in 2007. We conducted this study to identify correlates of late stage diagnosis and understand the impact of the enhanced screening implementation guidelines. The nested cross-sectional study compared women diagnosed with late stage disease versus those with early stage disease (stages I, II) in a cohort of 10,580 BCa patients from 2003-2007. Electronic information on tumor characteristics and healthcare utilization were extracted. We used logistic regression to estimate adjusted odds ratios (OR) and 95% confidence intervals (CI). Factors positively associated with late stage diagnosis in univariate analyses included lack of recent mammography, worse tumor features, and 80+ years of age (P<0.01 for all). Factors significantly associated with late stage in the multivariate model included lack of recent mammography screening (OR=1.4, 1.1-1.6) and worse tumor features including high grade (grade 3, OR=2.6, 1.9-3.4), positive lymph nodes (OR=53.5, 39.9-71.7), and HER2+ tumors (OR=1.4, 1.1-1.7). Targeting older women and those without a recent mammogram may further lower late stage diagnoses. However, given the health plan's previous efforts to enhance screening, a ceiling effect may limit additional benefit. Further efforts to decrease late stage diagnosis may include improving interpretation of mammograms or enhanced BRCA testing.

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DIABETES, BODY SIZE, CIGARETTE SMOKING AND ALCOHOL CONSUMPTION IN RELATION TO INCIDENT GLAUCOMA IN THE BLACK WOMEN'S HEALTH STUDY. *L Rosenberg, L A Wise, R G Radin, J R Palmer, J M Seddon (Slone Epidemiology Center, Boston, MA 02215)

Primary open angle glaucoma (POAG), a leading cause of blindness, occurs at least 3 times as commonly among African Americans as among white Americans. We assessed type 2 diabetes, body size, smoking, and alcohol consumption in relation to incident POAG in the Black Women's Health Study, a follow-up study of 59,000 U.S. black women. In 12 years of follow-up, we confirmed 483 incident POAG cases by medical records. Cox regression analyses that controlled for confounding factors were used to estimate incidence rate ratios (IRR) and 95% confidence intervals (CI). IRRs were increased for type 2 diabetes vs. absence of diabetes (IRR =1.56, CI 1.16-1.92) and current vs. never drinking (IRR= 1.32, CI 1.06-1.64), and there were nonsignificant positive associations with waist circumference, waist-to-hip ratio, and current smoking of 15+ cigarettes per day. Associations were stronger among women aged <50 (133 cases of POAG): IRR=1.89 (CI 0.99-3.59) for type 2 diabetes; 2.45 (CI 1.45-4.16) for body mass index 35+ vs. <25 kg/m2; 2.51 (CI 1.05-6.01) for waist circumference 35+ vs. <29 inches; 1.83 (CI 1.06-3.16) for waist-to-hip ratio 0.85+ vs. <0.72); 1.69 (CI 1.13-2.52) for current vs. never drinking; and 2.16 (CI 1.12-4.14) for current smoking of 15+ cigarettes per day vs. never smoked. The p-values for age interaction with body mass index, waist circumference, and alcohol consumption were <0.05. The results suggest that diabetes, overall or central obesity, alcohol consumption, and smoking are risk factors for POAG, particularly at young ages. The higher prevalence of obesity and type 2 diabetes among African American women may contribute to the black/white disparity in POAG.

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FAT MASS IS DETRIMENTAL TO BONE MASS IN YOUNG ADULT WOMEN. *S Zagarins, A Ronnenberg, S Gehlbach, R Lin, E Bertone-Johnson (University of Massachusetts, Amherst, MA 01003)

Low peak bone mass during young adulthood is associated with an increased risk of osteoporosis and fracture. Body mass has consistently been identified as an important predictor of bone mass, but the relative contributions of lean mass (LM) and fat mass (FM) are unclear because existing studies are limited by the use of size-dependent measures of bone mass. We used data from our cross-sectional study of normal weight, healthy women (n=186) aged 18-30 years to examine the relationship between bone mass and body composition. Bone mass measures were calculated using dual-energy x-ray absorptiometry (DXA), and included bone mineral content (BMC) in grams and both areal (g/cm^2) and volumetric (g/cm^3) estimates of bone mineral density (BMD). LM, FM, and body fat percentage (BF%) were also measured using DXA. Other factors, including physical activity and smoking, were measured by self-report. Mean age (standard deviation), body mass index, and BMD were 21.6 (3.2) years, 22.8 (2.9) kg/m^2, and 1.16 (0.08) g/cm^2, respectively. In age-adjusted linear regression, LM was positively associated with BMC and with areal and volumetric estimates of BMD ($p<0.01$), while FM and BF% were inversely associated with volumetric BMD ($p<0.01$). Results adjusted for physical activity and other factors were unchanged. After adjustment for frame size, a one kilogram increase in LM was associated with a 16 gram increase in BMC ($p<0.01$), while a 1% increase in BF% was associated with a 10 gram decrease in BMC ($p<0.01$). These findings suggest that the relationship between bone mass and body composition is not explained solely by weight-bearing mechanisms. While LM benefits bone mass, FM may be detrimental to bone mass in young women.

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RELATIONSHIP OF TRAUMA HISTORY AND PREMENSTRUAL SYNDROME AMONG FEMALE VETERANS. *B McKinnon, J Torner, R Wallace, S Johnson, A Sadler (University of Iowa, Iowa City Veterans Affairs Medical Center, Iowa City, IA 52242)

Prior research has pointed to an association between a history of traumatic events and premenstrual syndrome (PMS) in women. The objective of this study was to further investigate the relationship between trauma and PMS among female veterans, a population with high rates of sexual and physical abuse, as well as combat-related exposures. We conducted a case-control study of 502 women veterans under the age of 52 who were associated with the Iowa City Veterans Affairs Medical Center. Trauma history, gynecological health, mental health (including posttraumatic stress disorder), and other variables were obtained through telephone interview. Cases were women who had moderate to severe PMS as defined by validated criteria and controls were women without PMS. The prevalence of PMS was 14.3%. Thirty three percent of subjects reported a completed sexual assault, 29% a combat-related trauma, and 86% a non-combat related trauma. Factors significantly associated with PMS ($p<0.05$) in the univariate analysis were: attempted, completed, and number of rapes during a woman's lifetime; rape before age 18; rape during military service; childhood sexual abuse; and number of non-combat related traumas. Childhood physical abuse and combat-related trauma were not associated with PMS in univariate analyses. In our final multivariate model, lifetime completed sexual assault was associated with PMS (odds ratio =2.42, 95% confidence interval = 1.33-4.40). Findings from this study among female veterans indicate that a history of trauma, particularly sexual trauma, is associated with moderate to severe PMS. Further study is warranted to confirm temporal relationships and causal mechanisms.

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PERSONAL HYGIENIC BEHAVIORS AND BACTERIAL VAGINOSIS (BV). *M Klebanoff; for the Vaginal Flora Study Group (NICHD, NIH, Bethesda MD 20892)

Vaginal douching is strongly associated with BV, but whether it is a cause or result of BV remains unknown. The association between BV and other personal hygienic behaviors is less studied; if subtle BV symptoms caused douching then other hygiene behaviors (genital powder, spray, etc) might also be more common among women with BV. Lack of association between non-douching hygiene behavior and BV (ie specificity of association with douching) would argue against reverse causation. This cross-sectional analysis is from the Longitudinal Study of Vaginal Flora. 3620 women had 13,587 visits where behavior and BV (Nugent score) were assessed. After adjusting, by logistic regression with GEE, for demographic and sexual behavior factors, neither type of underwear (nylon vs cotton Odds Ratio (OR) 1.1, 95% CI 0.9-1.3), menstrual protection (tampons vs pads OR 1.0, 95% CI 0.9-1.2; pads and tampons vs pads 0.9, 95% CI 0.8-1.1), nor daily use of hygiene spray (OR 1.1, 95% CI 0.95-1.3), powder (OR 1.0, 95% CI 0.9-1.1) or towlettes (OR 1.2, 95% CI 0.97-1.6) were strongly associated with BV; OR for less than daily use were intermediate between none and daily. OR for daily vs less than daily bathing and showering were 1.1 (95% CI 1.03-1.2) and 1.1 (95% CI 0.99-1.2). Douching remained associated with BV (OR for weekly or greater vs never 1.4, 95% CI 1.2-1.6) and was not impacted by adjustment for other hygienic behavior, while ORs for most hygiene behaviors were reduced by adjustment for douching. Douching is highly associated with BV but other hygiene behaviors are not strongly associated with BV. These findings argue against the association between douching and BV being due to reverse causation.

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THE ASSOCIATION BETWEEN BONE TURNOVER AND BLOOD LEAD LEVELS AMONG WOMEN, NHANES 1999–2002. *L W Jackson (Case Western Reserve University, Cleveland, OH, 44110)

It has been hypothesized that during periods of high bone turnover such as adolescence, pregnancy, and menopause that blood lead levels (BLLs) may increase as lead is released from bone; however, no previous studies have directly examined the association between markers of bone turnover and BLLs. Using NHANES 1999-2002 data, we examined the association between two markers of bone turnover (bone-specific alkaline phosphatase (BAP) and n-telopeptides (NTX)) and BLLs across five groups of women: premenopausal aged 12-19 years (n=601), premenopausal 20 years or older (n=1599), pregnant (n=467), late perimenopausal (n=72), and postmenopausal (n=1929). Using survey methods, the percent increase in BLLs was examined according to tertiles of BAP and NTX with unadjusted and adjusted linear regression. Mean (geometric) BLLs across groups were 1.00, 1.15, 0.83, 1.65, and 1.86 ug/dL, respectively. Among postmenopausal women, we observed a significant percent increase in BLLs with BAP (tertile 2 vs. 1: 9%, 95% confidence interval (CI): 1,16; tertile 3 vs. 1: 19%, CI: 14,25) and NTX (tertile 2 vs. 1: 15%, CI: 8,21; tertile 3 vs. 1: 23%, CI: 17,30) after adjusting for age, calcium, hormone use, smoking, alcohol use, race, hysterectomy, body mass index, and NHANES year (r-squared for model=0.31). Similar significant associations were observed among premenopausal 20+ and perimenopausal women; however, there were no significant increases in BLLs in the premenopausal 12-19, or pregnant groups. This analysis provides the first evidence that BLLs may increase with increasing bone turnover among pre-, peri-, and post-menopausal women. This could have important clinical implications given the growing list of adverse health effects associated with BLLs in adults.

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PREVALENCE AND SEVERITY OF UNDIAGNOSED URINARY INCONTINENCE IN WOMEN. *L P Wallner, S Porten, R T Meenan, M C O'Keefe Rosetti, E A Calhoun, A V Sarma, J Q Clemens (University of Michigan, Ann Arbor, MI)

Urinary incontinence (UI) is a highly prevalent condition in aging women that results in significant morbidity. Less than half of women who suffer from UI seek treatment resulting in a significant proportion of clinically relevant UI remaining undiagnosed. Therefore, the purpose of this study was to quantify the prevalence of UI in undiagnosed women in a managed care population. 136,457 women ages 25-80 enrolled in Kaiser Permanente Northwest who were free of genitourinary diagnoses including UI were included in this study. 875 of the 2,118 women who were mailed questionnaires ascertaining information on demographic and UI characteristics completed the survey. A chart review of the 234 women who reported moderate to severe UI was performed. The prevalence of undiagnosed UI was 53% in the preceding year, and 39% in the preceding week. The prevalence of undiagnosed stress, mixed and urge incontinence were found to be 18.7%, 12.0% and 6.8%. Quality of life was found to significantly decrease with increasing UI severity. Only 5% of the 234 chart reviewed women were found to have physician documented UI. Among this managed care population of women, the prevalence of undiagnosed UI was found to be 53% in the past year and 39% in the past week. These results suggest that a significant proportion of women are suffering from urinary incontinence that remains undiagnosed. Efforts should be made to encourage women and physicians to initiate conversations about UI symptoms in order to decrease the unnecessary burden of this disease.

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INFLUENCE OF MOTHER'S INTRAUTERINE EXPERIENCE ON OFFSPRING BIRTH WEIGHT. *E Rillamas-Sun, M F Sowers (University of Michigan, School of Public Health, Department of Epidemiology, Ann Arbor, MI 48109)

Low birth weight is the strongest predictor of infant mortality and morbidity. Little is known about the impact of the maternal fetal environment (e.g. grandmaternal factors) on offspring birth weight. This study examines the relationship of grandmother's pregnancy history with grandchildren's birth weight. Three generations of data are available from women in the Michigan Bone Health and Metabolism study who provided information about their mother's pregnancy characteristics and their own pregnancy history, including the birth weight of their own children. To account for family clustering, generalized linear mixed models were used to evaluate the association of grandmother's pregnancy characteristics on grandchildren's birth weight. Mothers exposed to cigarette smoke in utero had offspring whose birth weight was, on average, 133 grams heavier compared to mothers not exposed to cigarette smoke in utero ($p<0.05$). Grandchild birth weight was, on average, 127 grams heavier among grandmothers who were at least 30 years old at birth compared to grandmothers who gave birth at ages 20-25 years ($p<0.10$). These findings support the hypothesis that there are intergenerational and fetal programming effects on birth weight. Since follicle formation in women occurs in utero resulting in a finite number of oocytes at birth, these results may be consistent with programming effects at the follicular level.

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LONGITUDINAL EFFECTS OF ENDOGENOUS TESTOSTERONE ON LIPIDS IN WOMEN. *E Rillamas-Sun, M F Sowers (University of Michigan, School of Public Health, Department of Epidemiology, Ann Arbor, MI 48109)

Hyperandrogenic women often have elevated triglyceride and decreased high-density lipoprotein (HDL) levels, suggesting that high levels of endogenous testosterone may be related to a poorer atherogenic profile. However, the effect of endogenous testosterone on lipids is unknown in women with neither androgen excess nor deficiency. This study examines the longitudinal effect of total testosterone (T) and bioavailable testosterone (FAI) on lipids (HDL, low-density lipoproteins (LDL), total cholesterol, triglycerides) over 13 years in 423 women, aged 24-44 at baseline, of the Michigan Bone Health and Metabolism study who had serum testosterone measures at baseline and at the annual visit 13 follow-up. Generalized linear mixed models were used to test the effect of T and FAI on lipids over time. After adjusting for exogenous hormone use and smoking status, the overall mean change in cholesterol and triglycerides over time was 0.103 (95%CI: 0.176, 0.030) and 1.002 (95%CI: 1.003, 1.001) mg/dL, respectively, for every 1 ng/dL rise in T. The effect of T on LDL strengthened over time; at baseline, LDL was lower by 0.247 mg/dL for every 1 ng/dL increase in T, but at visit 13, it decreased to 3.644 mg/dL for every 1 ng/dL rise in T. For every 1 unit rise in FAI, the overall mean increase in LDL was 1.454 mg/dL (95%CI: 2.168, 0.739) and in triglycerides it was 1.088 mg/dL (95%CI: 1.115, 1.061). The effect of FAI on cholesterol varied over time; at baseline, cholesterol was higher by 3.135 mg/dL for every 1 unit rise in FAI, but at visit 13, it increased to 23.54 mg/dL. Neither T nor FAI had a statistically significant effect on HDL. In women, endogenous testosterone levels may be associated with worsening lipid profiles that may become more severe over time.

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TRENDS IN MENOPAUSAL HORMONE THERAPY USE: UNITED STATES, 2001-2006. *K Brett, E Hing (National Center for Health Statistics/CDC, Hyattsville, MD 20782)

After increasing through the 1990's, use of menopausal hormone therapy (HT) began decreasing after the Women's Health Initiative (WHI) halted one trial arm in 2002, finding health risks exceeded benefits. Recent debate on whether risks associated with current HT use are limited to women 10 or more years beyond menopause may reverse this trend. Trends in HT use were analyzed using data from the National Ambulatory Medical Care Survey and the National Hospital Ambulatory Medical Care Survey. Considering the 112,236 sample visits by women 40 years and over to office-based physician and hospital outpatient departments in 2001-2006, we defined HT visits as those in which an HT drug was mentioned. SUDAAN was used to control for the complex sampling design. The rate of HT visits declined significantly from 41.4 per 1000 in 2001 to 17.6 per 1000 in 2004, and then leveled off at 18.5 per 1000 in 2006. Using logistic regression, we identified an important interaction between provider type and year, where the odd ratio (OR) of HT mentions in visits to obstetrician/gynecologists compared to other physicians in 2001 was 3.4 in 2001 and increased to 4.2 and 4.5 in 2002 and 2003 compared to 0.8 and 0.5 for other providers in those years. After 2003, the obstetrician/gynecologist OR decreased to 2.8 while there was no significant change in the OR for other physicians after 2003. This suggests that most physicians were less likely to prescribe HT immediately after the inital WHI results were released but obstetrician/gynecologists modified their prescribing practices later. HT use appears to have leveled out in 2004-2006 at about half the 2001 level. Additional research on the demographics of new HT prescriptions is warranted.

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PREGNANCY AND DELIVERY CHARACTERISTICS OF WOMEN WITH VULVODYNIA. *R Nguyen, B Harlow (University of Minnesota, Minneapolis, MN 55454)

Vulvodynia is characterized by vulvar burning, rawness, or localized pain on contact. Each year approximately 1 in 50 women develop vulvodynia symptoms. Despite a reported average age of 19 for primary vulvodynia, little is known about its affect on reproduction. To determine whether pregnancy outcomes or delivery characteristics differ between women with and without vulvodynia, we analyzed data from a study that included 242 cases and 242 controls. The International Society for the Study of Vulvovaginal Disorders criteria defined cases, while controls had no lifetime history of vulvar pain. Controls were matched to cases on age (within five years) and community. Reference age for cases and matched controls equaled the case's age at vulvar pain onset. We limited analyses to the pregnancies after reference age. Overall, 208 (96 cases, 112 controls) women had at least one pregnancy. After controlling for marital status, there was an indication that women with vulvodynia were less likely to become pregnant (adj. OR = 0.68, 95% CI: 0.44, 1.1). Among those who became pregnant, no difference between cases and controls in the total number of pregnancies (p-value=0.36) nor in rates of liveborn infants (61% vs. 67%, p-value=0.43) existed. Pregnant case women had twice the rate of cesarean sections but this was not significant (adj. OR = 2.1, 95% CI: 0.83, 5.1). Of the women delivering vaginally, cases were more likely to still have vulvar pain related to delivery 2 months postpartum, independent of time actively pushing (adj. OR = 4.8, 95% CI; 1.5, 15). Our data indicate no consistently clear effect on fertility among women with vulvodynia, but those who proceed to deliver vaginally may have increased risk for vulvar pain related to delivery well into the postpartum period.

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REPORTS OF INTIMATE PARTNER VIOLENCE AND EXPERIENCE OF HURRICANE KATRINA. *E W Harville, C Taylor, X Xiong, H Tesfai, P Buekens (Tulane University, New Orleans, LA 70112)

Previous studies have indicated that child abuse and divorce rise in the aftermath of disasters. 120 postpartum southern Louisiana women were interviewed about their experience of Hurricane Katrina. 2 or more serious experiences was considered ''severe experience of the hurricane''. At six months postpartum, women completed the Conflict Tactics Questionnaire. Frequency tabulations and log-Poisson regressions were used to examine the association of hurricane experience with various behaviors. Within the previous 6 months, 94% of women reported their partner's explaining or compromising at least once; 80% insulting, swearing, or yelling; 95% showing respect or care; 12% pushing, slapping, or shoving; 8% punching, kicking, or beating up; 12% destroying something or threatening to hit; 5% being forced to have sex; and 15% insisting on sex without a condom. Similar proportions reported the same behaviors towards their partner. Severe experience of the hurricane was not associated with compromise or showing respect (adjusted relative risk (aRR) 0.97, 95% confidence interval (CI) 0.86-1.08 and 1.05, 0.97-1.14; adjusted for age, parity, race, income, education, marital status). However, severe experience of the hurricane was associated with several other tactics: insulting or yelling (aRR, 1.19, 95% CI, 1.02-1.39); pushing or shoving, 1.61, 0.86-3.02; punching or kicking, 3.24, 1.04-10.04; destroying property, 2.06, 0.82-5.17; forced sex, 2.61, 0.65-10.56; sex without a condom, 3.04, 1.37-6.75. If replicated, these results would indicate experiencing natural disaster raises risk of domestic violence. This has important implications for the health of families, and should be examined in larger studies and using other data sources.

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ACASI AND FACE-TO-FACE INTERVIEWING YIELD INCONSISTENT REPORTS OF SPOUSAL VIOLENCE AMONG YOUNG WOMEN IN URBAN INDIA. *S Rathod, A Minnis, K Subbiah, S Krishnan (University of California, Berkeley, CA 94720)

Audio computer-assisted self interviewing (ACASI) is thought to increase the validity of risk behavior reporting compared to face-to-face-interviewing (FTFI). From 470 young married women in 2 low-income urban Indian communities participating in a 2-year prospective study, we evaluated responses provided on an ACASI following an FTFI with identical questions. We compared responses between interview modes for non-sensitive questions on household decision making and sensitive questions on spousal violence. Analyses compared affirmative response ratios, response agreement, and whether participant age or education influenced agreement. Participants were less likely to respond affirmatively on the ACASI for sensitive and non-sensitive questions. They reported being less likely to be involved with health-related decision making (Risk Ratio (RR)=0.49, 95% Confidence Interval (CI): 0.44-0.55) or to have been hit, kicked or beat by their husbands (RR=0.61, 95% CI: 0.52-0.73). Response agreement between modes was poor (kappa scores ranged from 0.02 to 0.55). Participants with more education had higher agreement between modes for all questions. ACASI did not increase reports of sensitive behaviors, nor were reports consistent with FTFI. Interpretation of these findings necessitates consideration of how participants interact with interview modes, influenced by social desirability bias and perceptions of therapeutic benefit.

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THE RELATION OF THYROID FUNCTION TO WOMEN'S SYMPTOMS. *J S Lee, J Liu, E B Gold (University of California Davis, Davis, CA 95616)

Thyroid function affects metabolism, thermoregulation, vasculature, mood, and reproduction. We examined if biochemically-defined thyroid function was related to women's symptoms in the cross-sectional, community-based Sacramento Community Women's Health Study of 428 women (ages 20-67 years, mean 42.6 years) in whom serum thyroid stimulating hormone (TSH) was measured. Odds ratios (ORs) with 95% confidence intervals (CIs) were estimated for symptom clusters by TSH level. Potential confounders were included in multivariable (MV) models if they were biologically plausible or altered the OR for TSH by >10%. Four symptom clusters were identified by factor analysis: 1) night sweats and/or hot flashes (NS/HF), 2) trouble sleeping (TS), 3) vaginal dryness (VDRY), and 4) urine leakage (UL). Over 99% of women had TSH in the reference range 0.35-5.5 mIU/L. Compared to the mid-tertile of TSH (1.32-2.12 mIU/L), the highest tertile (2.13-10.90 mIU/L) had unadjusted ORs of 1.67 (CI: 0.99-2.81) for NS/HF, 1.81 (CI: 1.13-2.90) for TS, 1.79 (CI: 0.92-3.49) for VDRY, 1.66 (CI: 0.96-2.90) for UL, 2.03 (CI: 0.97-4.25) for 3+ symptoms, and 2.29 (CI: 1.32-3.97) for any such symptoms. The lowest TSH tertile (0.02-1.31 mIU/L) was not associated with each symptom but suggestively associated with any symptoms (OR=1.66, CI: 0.94-2.93). In MV models, the highest tertile had ORs of 2.08 (CI: 1.15-3.76) for NS/HF, 2.07 (CI: 1.25-3.43) for TS, 2.02 (CI: 1.00-4.08) for VDRY, 1.72 (CI: 0.96-3.08) for UL, 2.35 (CI: 1.05-5.24) for 3+ symptoms, and 2.92 (CI: 1.60-5.34) for any symptoms, adjusted for age, race/ethnicity, education, current smoking, health status, physical activity, body mass index, and menopause status. Thyroxine levels were not related to symptoms. Higher TSH, suggestive of under-active thyroid, was associated with multiple symptoms, notably hot flashes/night sweats and trouble sleeping. Re-evaluation of the 'normal' TSH range when assessing such risks may be needed.

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RACIAL DIFFERENCES IN BODY FAT DISTRIBUTION AMONG REPRODUCTIVE-AGED WOMEN. *M Rahman, J Temple, C Breitkopf, A Berenson (University of Texas Medical Branch, Galveston, TX)

We have examined the influence of race/ethnicity on body fat distribution for a given body mass index (BMI) among reproductive-aged women. Body weight, height, and body fat distribution were measured with a digital scale, wall-mounted stadiometer, and dual-energy absorptiometry (DXA), respectively, on 708 healthy black, white, and Hispanic women 16–33 years of age. Multiple linear regression was used to model the relationship between race/ethnicity and different body fat distribution variables after adjusting for BMI, age at menarche, and demographic and lifestyle variables. For a given BMI, white women had a significantly higher total fat mass (FMtotal) than their black (2.4 kg higher, $P < 0.001$) and Hispanic (1.9 kg higher, $P < 0.001$) counterparts. They also had significantly higher trunk fat mass (FMtrunk) than black (1.8 kg higher, $P < 0.001$) and Hispanic women (0.4 kg higher, $P < 0.111$), and leg fat mass (FMleg) relative to Hispanic women (1.2 kg higher, $P < 0.001$). Hispanic women had the highest percentage of FMtrunk (%FMtrunk) (4.3% higher than blacks, $P < 0.001$; 2.7% higher than whites, $P < 0.001$) and trunk-to-limb fat mass ratio (FMRtrunk-to-limb) (0.16 higher than blacks, $P < 0.001$; 0.07 higher than whites, $P < 0.001$). A similar percent body fat mass (%FM) was found for white and Hispanic women, with black women exhibiting the lowest value (3.1% lower than Hispanics, $P < 0.001$; 3.2% lower than whites, $P < 0.001$), while percentage of FMleg (%FMleg) was highest in blacks (2.3% higher than whites, $P < 0.001$; 4.1% higher than Hispanics, $P < 0.001$). The (race × BMI) interactions were significant for almost all of the body fat distribution variables. The difference between blacks and whites, and blacks and Hispanics with regard to FMtotal, %FM, %FMtrunk, %FMleg, and FMRtrunk-to-limb significantly magnified with increasing BMI. In summary, the distribution of body fat for a given BMI differs by race among reproductive-aged women. These findings raise questions regarding universally applied BMI-based guidelines for obesity and have implications for patient education regarding individual risk factors for cardiovascular disease and metabolic complications.

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PREVALENCE OF US ADULTS FOLLOWING MULTIPLE RECOMMENDATIONS TO REDUCE RISK OF CARDIOVASCULAR DISEASE. *J D Wright, C-Y Wang (CDC, Hyattsville, MD 20782)

Cardiovascular disease (CVD) has a multifactorial etiology and from a prevention standpoint it is helpful to estimate the prevalence of persons following multiple recommendations to reduce CVD risk. Using data from the National Health and Nutrition Examination Survey 1999-02 for 9,471 participants 20 years and older, we examined behaviors identified as important to reduce CVD risk: physical activity, diet, smoking, alcohol consumption, and obtaining screening tests for high blood pressure and high blood cholesterol. The outcome variable was meeting most CVD recommendations and the covariates analyzed were sex, age, race-ethnicity, education, poverty income ratio (PIR), and body mass index (BMI). We estimated the association of meeting most recommendations with these characteristics. After adjusting for other characteristics the traits associated with meeting the recommendations were female sex, age of 60+ years, more than high school education (HS), and having a PIR≥3.5. Adjusting for other characteristics women were 5% more likely than men to meet most recommendations (prevalence ratio (PR) 1.05; 95% confidence interval (95%CI): 1.02, 1.08); persons 60+ years were 26% more likely than 20-39 year-olds (PR 1.26; 95%CI: 1.22, 1.30); persons with PIR≥3.5 were 10% more likely than persons with PIR<1.3 (PR 1.10; 95%CI: 1.07, 1.13); and persons with >HS were 13% more likely than persons with < of lack explain may reasons other although persons, younger as such groups reach to targeted more be need they suggest and educated older groups, some reaching are messages that indicate results These recommendations. meeting with associated not were BMI race-ethnicity adjustments, after indicated model Our 1.16). 1.10, 95%CI: 1.13; (PR>

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INSURANCE AS A MEDIATOR OF ETHNIC MORTALITY DIFFERENCES IN A COHORT OF CVD PATIENTS, 1993–2007. *D Ng, J H Young (Johns Hopkins School of Public Health, Baltimore, MD)

Inner-city African Americans (AAs) have higher mortality than other US groups. A portion of this burden may be due to poor access to care. To investigate this notion, we examined post-discharge mortality among white and AA patients admitted to three Maryland hospitals with cardiovascular disease (CVD), a condition requiring on-going care post-discharge. All patients admitted with a principal diagnosis of CVD, heart failure, stroke or hypertensive-related conditions from 1993 to 2007 were included. Mortality was determined by the SSA Death Master File. Insurance was classified as private or Medicaid/uninsured. Cox proportional and parametric survival methods were used with risk adjustment by APR-DRG severity score. Among 48,502 CVD patients followed for 5.6 years on average, the mortality was 6.6 per 100 person-years. AAs had an 11% higher hazard of death than whites, when adjusting for age, sex, marital status, admission year, condition, disease severity, and length of stay (Hazard Ratio: 1.11 95%CI: 1.04-1.18). This effect appeared to be mediated by insurance: when insurance was included in the model, the HR was 1.00 (0.93-1.07). Furthermore, those with Medicaid had a 43% higher hazard than their privately insured counterparts (HR: 1.43, 1.33-1.54). In adjusted Cox models, we found that insurance status, but not race, was associated with an increased risk of death (Compared to privately insured whites: whites with Medicaid HR: 1.48 (1.34-1.64); privately insured AAs HR: 1.02 (0.94-1.11); AAs with Medicaid HR: 1.41 (1.29-1.54)). Among discharged CVD patients, private insurance was associated with decreased mortality and may at least partially mediate disparities in disease outcomes. Improved access to care may mitigate this disparity.

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ASSOCIATIONS BETWEEN EXPERIENCED DISCRIMINATION AND CHRONIC HEALTH AMONG ASIAN, LATINO, AND CARIBBEAN AMERICANS. *S Carlisle (University of Washington, School of Social Welfare Seattle, WA 98011)

To investigate the association between racial discrimination and chronic health conditions, secondary data analysis was conducted on the National Latino and Asian American Study and the National Survey of American Life. Using a stratified probability sampling design, the NLAAS and NSAL included a representative sample of Latino Americans (Cuban, Mexican, and Puerto Rican); Asian Americans (Chinese, Filipino, and Vietnamese); and Caribbean Americans (Spanish Caribbean, Haitian, Jamaican, and Trinidadian). Analysis used weighted data that adjusted for demographic variables in the multi-stage stratification sampling, non-response rates, and post-stratification factors. The analysis also takes into account sample design effects using SAS callable SUDAAN.A mean experienced discrimination variable was calculated resulting in 6 response categories ranging from 'never have experienced discrimination' to experienced discrimination 'almost everyday'. Principle factor analysis revealed a 1-factor loading (eigenvalue=4.94; factor loadings=.64 - .75) with a cronbach's alpha of .90. Consistent with Comrey &Lee, (1992) factor loadings over .63 are interpreted as ''very good'' and factor loadings over .71 as ''excellent''. Odds ratios were calculated using logistic regression. Compared to those who did not experience discrimination, Asian native and foreign-born respondents were 1.65 and 1.67 times more likely to have a chronic cardiovascular condition. Caribbean native-born respondents were 3.35 times more likely to have a chronic pain condition vs. .80 of their native-born counterparts. Latino native and foreign-born were 1.42 times more likely to report chronic cardiovascular and respiratory conditions.

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TIME SCALE AND ADJUSTED SURVIVAL CURVES FOR MARGINAL STRUCTURAL COX MODELS. *D Westreich, S R Cole, P C Tien, J S Chmiel, L Kingsley, M Jonsson Funk, K Anastos, L P Jacobson (UNC-Chapel Hill Department of Epidemiology, Chapel Hill, NC 27599)

Typical applications of marginal structural time-to-event (e.g., Cox) models have used time-on-study as the time scale. Here, the authors illustrate use of time-on-treatment as an alternative time scale. In addition, a method is provided for estimating confounding-and-censoring-corrected Kaplan-Meier type survival curves for marginal structural models under either time scale. For illustration, the authors estimate the total causal effect of highly active antiretroviral therapy (HAART) on time to AIDS or death in 1,498 men and women infected with HIV followed for 6,556 person-years between 1995 and 2002. Incident clinical AIDS was observed in 323 individuals, and 59 deaths occurred; 77% of the remaining 1,116 participants were still under observation at the end of follow-up. Using the time-on-study time scale, the hazard ratio (HR) for AIDS or death comparing always using HAART to never using HAART from the marginal structural model was 0.51 (95% confidence limit [CL]: 0.35, 0.75). Using the time-on-treatment time scale, the HR was 0.43 (95% CL: 0.32, 0.59), 1.19 times as far from the null and with a CL 0.86 times as wide. In marginal structural time-to-event analyses, choice of time scale may have a meaningful impact on estimates of association and precision; in this example, use of time-on-treatment yielded an HR further from the null and more precise compared to time-on-study. In addition, the use of the time-on-treatment time scale and survival curves may lead to increased clarity in the interpretation of the results from marginal structural models.

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ESTIMATING ABSOLUTE RISKS UNDER HYPOTHETICAL INTERVENTIONS USING A STRUCTURAL NESTED CUMULATIVE FAILURE TIME MODEL. *S Picciotto, J M Robins, J Young, M A Hernán (Harvard School of Public Health, Boston, MA 02115)

Under the assumptions of no unmeasured confounding and no model misspecification, the effect of a time-varying exposure on survival can be estimated via the parametric g-formula or a marginal structural Cox model. We recently described an alternative based on g-estimation of structural nested cumulative failure time models [1]. Although the parameters of these latter models do not have a straightforward interpretation, under certain conditions they can be used to calculate the absolute risk under hypothetical interventions (e.g., ''expose everybody continuously during the follow-up,'' ''never expose anybody''). These risks can be compared between themselves, or with the risk under no intervention, to obtain a risk ratio or risk difference. The method for calculating the risk under a hypothetical intervention is a two-step process: first, the model and parameter estimates are used to mathematically ''remove'' the effect of exposure at each time for each individual (if treated), working back from each outcome time to the beginning of the study. The average of these subject-specific quantities is expected to equal the risk if treatment had always been withheld in the population. This average can then be used, together with the model and parameter estimate, to calculate the risk under other interventions. We describe the method, conditions for its validity, and an application using a longitudinal cohort to study the effect of hypothetical lifestyle interventions on coronary heart disease. Reference: 1 G-estimation of structural nested cumulative failure time models. S Picciotto, J Young, MA Hernán. Am J Epidemiol 2008; 167(Suppl):S139

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ON THE DISTINCTION BETWEEN INTERACTION AND EFFECT MODIFICATION. *T J VanderWeele (University of Chicago, Chicago, IL 60637)

Formal definitions are given for the concepts of interaction and effect modification in the counterfactual framework so as to make clear the distinction between these two concepts. Interaction is defined in terms of the effect of one intervention on some outcome varying with the implementation of a second intervention. Effect modification is defined in terms of the effect of one intervention on some outcome varying across strata defined by some second variable. The concepts of interaction and effect modification are contrasted through a series of examples taking the form of causal directed acyclic graphs. Using the definitions given above, it is shown that effect modification can be present in cases in which there is no interaction between and that interaction can be present in cases in which there is no effect modification. An example using a causal directed acyclic graph is furthermore given in which it is possible to assess effect modification but not interaction when data is available for some variables on the graph but not others; and another example is given in which it is possible to assess interaction but not effect modification. The analytic procedures for obtaining estimates of effect modification and interaction parameters using marginal structural models are compared and contrasted. It is shown that the use of marginal structural models to estimate effect interaction parameters requires the estimation of two sets of weights but the use of marginal structural models to estimate effect modification parameters requires the estimation of just one set of weights. Discussion is given to characterizing cases in which effect modification and interaction will coincide.

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COMPARISONS AND CONTRASTS OF THE RECEIVER OPERATING CHARACTERISTIC CURVE WITH THE ATTRIBUTABLE FRACTION. *W D Flanders, P Mink, M Goodman (Rollins School of Public Health, Atlanta GA 30322)

Background: The population attributable fraction and the area under the receiver operating characteristic curve are important epidemiologic measures, the former indicating the reduction in incidence that would be achieved by eliminating a causal exposure, the latter the discriminatory ability of a predictive factor. In general, these two measures apply in different contexts. If, however, the predictive factor is a causal one, then the two measures might be compared and contrasted – our current goal. Methods: We assumed a (causal) continuous exposure, a distribution for that exposure (Gaussian or uniform), and a smooth dose-response (logistic or log linear model). To calculate the attributable fraction, we also hypothesized an intervention that would reduce exposure to below a particular reference level. We derived general expressions for both the population attributable fraction and the area under the curve and applied them to the specific distributions and models noted above. Results: Both measures increase monotonically with the odds or risk ratio (logistic and log linear models, respectively; Spearman R2= 1.0). In some situations, the two measures were highly and linearly correlated after a simple transformation (e.g. Pearson R2=0.82). Both depend on the reference level of exposure and the distribution in regular patterns, which are presented and discussed. Discussion: We provide Equations to calculate these two important measures for general dose-response relationships and exposure distributions, and illustrate their application using specific examples. The two measures are surprisingly close numerically in some situations.

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DEVELOPING A COHORT IN RURAL GHANA. *S Alder, D Ansong, T Agbenyega, J Amuasi, I Boakye, B Crookston, D Hale (University of Utah, Salt Lake City, UT 84105)

The Barekuma Collaborative Community Development Program is supported by a partnership of the Komfo Anokye Teaching Hospital and Kwame Nkrumah University of Sciences and Technology in Kumasi, Ghana, and the University of Utah School of Medicine. A research, development and service site exists in the Barekese subdistrict of the Ashante Region in central Ghana, which consists of 20 rural communities and approximately 25,000 residents. To facilitate the goals of the collaborative, residents have been enrolled in a cohort. We describe the process of developing a rural African cohort, including community entry, individual and household enrollment, use of appropriate technology - such as GPS - to facilitate ongoing monitoring of cohort members, and acquisition of data for epidemiologic studies. We also describe methods for linking the principles of Community-Based Participatory Research (CBPR) to the conduct of epidemiolgic research. To date, the cohort has provided further insights into the epidemiology of malaria prevalance and infection characteristics, schistosomiasis carriage, and general health health and social characteristics of community members. We provide recommendations for establishing community-based cohorts for global health research activities in the developing world.

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THE IMPACT OF SEXUAL CONCURRENCY ON RACIAL DISPARITIES IN HIV. *C Chapman, J Foster, M Andrasik (University of Washington, Seattle, WA 98195)

In the United States, HIV rates are significantly higher among non-Hispanic Blacks than among any other racial or ethnic group. In Seattle and King County, Washington, non-Hispanic Blacks comprise 6% of the population, yet they represented 18% of all newly diagnosed cases of HIV between 2002 and 2006. Due to a number of structural factors, African American and African-born populations are more likely to be engaged in relationships with two or more sexual partners that overlap in time (concurrency). Concurrent relationships have a significant impact on racial disparities in HIV. Mathematical models have shown that even a slight decrease in the number of concurrent relationships in a single community can dramatically reduce the transmission of HIV. When the mean number of sexual partners is 1.68, 2% of the population is sexual connected. When the mean number of sexual partners increases to 1.86, 64% of the population is sexually connected. This relationship, combined with an estimated 90.3% prevalence of racial assortative mixing, compounds differential rates of transmission over time. We believe these patterns may be a primary driver of racial disparities in HIV within the United States. To further investigate this hypothesis, the Center for AIDS Research at the University of Washington is currently engaged in a qualitative, interview-based study to investigate the role of sexual concurrency in the transmission of HIV in King County, Washington. The current study utilizes community-based participatory research methods to create a concurrency message for the King County Black population. Community leaders and community members are directly involved in the research design and development process as well as the dissemination of research findings.

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COMMUNITY-DRIVEN RESEARCH ON H PYLORI INFECTION IN A CANADIAN ARCTIC HAMLET. *K J Goodman, R Munday, J Huntington, J Cheung, S van Zanten, A Corriveau, (CANHelp Working Group, University of Alberta, Edmonton, AB, Canada)

In recent years, the health committee of the predominantly aboriginal hamlet of Aklavik, NWT (population ≈600) identified H pylori infection and its link to cancer as a priority concern and advocated for research to address solutions. The Aklavik H pylori Project is the start of collaborative research on H pylori infection in northern Canadian populations where gastric cancer rates are elevated and this infection is difficult to treat. This research involves community members in planning and aims to describe sociodemographic patterns of H pylori infection and the associated burden of disease, identify effective treatment regimens, generate evidence to inform local health care policy, and address community concerns regarding health risks. The present results pertain to community participation and initial H pylori screening by the 13C-urea breath test. Between November 2007 and December 2008, informed consent and clinical survey data were obtained from 314 Aklavik residents; 308 had a breath test; 205 consented to upper gastrointestinal endoscopy and 197 attempted the procedure, with biopsies for culture and histopathology obtained from 192. H pylori prevalence was 58% and the reporting of this finding to the community served as a strong catalyst for further participation. The high level of community participation in this project coupled with the interest of health authorities has generated media attention which has led to other communities asking to be included. This ongoing community-driven project will seek effective strategies for addressing emerging community concerns in populations where H pylori infection is difficult to treat.

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LOW HIV TESTING UPTAKE IN INDIA AND THE IMPLICATIONS FOR IMPLEMENTING PROVIDER-INITIATED TESTING. *S Rathod, C Rocca, S Krishnan (University of California, Berkeley, CA 94720)

Provider-initiated HIV testing and counseling (PITC) has been endorsed by the World Health Organization as a strategy to increase HIV testing, diagnosis, and treatment. Although the adoption of PITC has significantly boosted testing uptake, a heated debate has ensued about the ethics of PITC. This study draws on quantitative and qualitative data from a cohort study of 744 married women in India to illustrate and examine the ethical implications of PITC. In response to low testing uptake at study baseline (17%), we implemented PITC (with opt-in and written consent) and found that uptake remained relatively low (49%). In poststudy focus group discussions, participants highlighted husbands' negative reactions and social stigma as key barriers to testing, concerns that have not been explicitly addressed by those endorsing PITC. In our view, sensitizing health care providers to these risks is necessary but not sufficient. Additional strategies that focus on creating enabling social environments, such as through community engagement and sensitization, are needed. Further, our experiences reinforce calls for reflection on the nature of informed consent. In contexts characterized by social inequities, retaining opt-in testing may be essential to ensuring authentic consent. Finally, the success of the testing process in upholding ethical principles is heavily dependent on the implementers; capacity building of health care providers to respect individual autonomy in decision-making will be essential. The HIV epidemic has exposed gross inequities in human rights and health care. Public health professionals should devise solutions that redress rather than exacerbate these inequities.

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A PROSPECTIVE STUDY OF BODY SIZE AND TIME-TO-PREGNANCY. *L A Wise, K J Rothman, E M Mikkelsen, H T Sorensen, A Riis, E E Hatch (Boston University, Boston, MA 02215)

Background: Both underweight and obese women have been shown to have reduced fecundability. Recent studies in men have linked obesity with reduced semen quality and delayed time-to-pregnancy (TTP). Little is known about the influence of central obesity or weight gain on TTP. **Methods:** We examined the relation between anthropometric factors and TTP among 1,639 Danish couples participating in an internet-based prospective study of pregnancy planners (2006-2008). Anthropometric factors were self-reported by female participants at baseline. We categorized body mass index (BMI) as underweight (<20 kg/m2), normal weight (20-24 kg/m2), overweight (25-29 kg/m2), obese (30-34 kg/m2), and very obese (35+ kg/m2). We estimated fecundability ratios (FR) and 95% confidence intervals (CI) using discrete-time Cox regression with control for potential confounders. **Results:** We found longer TTPs for overweight (FR=0.85, CI=0.71-1.02), obese (FR=0.81, CI=0.62-1.04), and very obese (FR=0.61, CI=0.42-0.88) women, compared with normal weight women. We found little association for underweight women (FR=0.93, CI=0.76-1.13). After control for waist circumference, FRs for underweight, overweight, obese, and very obese women were 1.02 (CI=0.82-1.26), 0.75 (CI=0.59-0.94), 0.67 (CI=0.46-0.97) and 0.49 (CI=0.31-0.79), respectively. Male BMI was not materially associated with TTP after control for female BMI. Compared with women who maintained a stable weight since age 17 (-5 to 4 kg), women who gained 30+ kg had longer TTPs (FR=0.73, CI=0.61-0.90). Neither waist circumference nor waist-to-hip ratio was strongly associated with TTP in women. **Conclusions:** Our results confirm previous studies showing reduced fertility in overweight and obese women. Weight gain since age 17 was also associated with reduced fertility.

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AGE AT MENARCHE AND RISK FOR GESTATIONAL DIABETES. *L Chen, F B Hu, G B Louis, C G Solomon, C He, E Yeung, C Zhang (Louisiana State University, New Orleans, LA)

Early age at menarche was significantly associated with risk factors for diabetes (i.e. insulin resistance and excessive adiposity, etc.). However, the association of age at menarche with gestational diabetes (GDM) has not been investigated. Using data from a large prospective cohort of female nurses in U.S., we examined this association among 18,604 women who reported at least one singleton pregnancy between 1989 and 2001. During 12 years of follow-up, 1,188 incident GDM cases were identified. Cox proportional hazards models with multivariate adjustments was applied to estimate the relative risk (RR) and 95% confidence intervals (CI). Age at menarche was significantly and inversely associated with GDM risk (RR for each year of age increment: 0.93; 95% CI: 0.88 ¨C 0.97; P = 0.002) after adjusting for age, parity, race, family history of diabetes, smoking status, alcohol consumption, and physical activity. When age at menarche was analyzed as categorical variables (≤11, 12, 13, 14, or ≥15 years), the lowest risk group was women with menarche at age 14 years: the RRs and 95% CIs across the earliest to the latest age for menarche categories were 1.00 (referent), 0.85 (0.73-0.99), 0.81 (0.69-0.94), 0.70 (0.56-0.86), and 0.79 (0.63-0.99). This inverse association remained significant after additional controlling for of birth weight and childhood body fatness (RR for each year of increment in the age for menarche: 0.93; 95% CI: 0.88-0.97; P = 0.003), or BMI at age 18 (RR for each year increment: 0.93; 95% CI: 0.90-0.98; P = 0.005). The association became statistically insignificant after controlling for adulthood pre-pregnancy BMI. In conclusion, these findings suggested that earlier menarche was significantly and strongly associated with an increased risk of GDM. This association was largely mediated through excessive adulthood body adiposity.

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POST-PARTUM WEIGHT RETENTION AND CHILD OVERWEIGHT. *C E Margerison, D Rehkopf, B Abrams (University of California, Berkeley, CA 94720)

Background: Children of women who are overweight or obese before, during, or after pregnancy are more likely to become overweight themselves. 16 to 20% of US women retain ≥5 kilograms (kg) of weight after giving birth, but little is known about the relationship between post-partum weight retention (PPWR) and child overweight. **Methods:** We used generalized estimating equations to examine associations between PPWR (at 6-24 months) and child overweight (body mass index [BMI] ≥85th percentile) at ages 2-6 in 4119 children in the National Longitudinal Studies of Youth 1979. Children's sex- and age-specific BMI percentiles were calculated biannually. We examined PPWR linearly (kg) and in quintiles (mean [SD]: -4.6[3.9], -0.2[0.5], 2.3[0.6], 5.3[1.1], 13.1[5.6]) and potential effect modification by maternal pre-pregnancy BMI. **Results:** Mean (SD) PPWR was 2.5kg (6.4). 22% of children were overweight. After adjusting for potential confounders, each kg of PPWR was significantly associated with a 2% increase in odds of child overweight (95% confidence interval (CI): 1.01, 1.03). In quintile analysis, only PPWR ≥7.5 kg was significantly associated with child overweight (odds ratio (OR), 95% CI: 1.34 [1.01, 1.79]). Examination of effect modification suggested that the association between PPWR (kg) and child overweight was significant only among overweight women (1.04 [1.01, 1.06]). PPWR ≥7.5 kg (vs. <7.5kg) was significantly associated with child overweight only among overweight (1.98 [1.33, 2.94]) and obese women (1.94 [1.08, 3.47]). **Implications:** The first two years post-partum may be critical in the development of both maternal and child adiposity, especially for women who are already overweight or obese.

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THE EFFECT OF PREPREGNANCY BODY MASS INDEX MISCLASSIFICATION ON MATERNAL AND INFANT OUTCOMES: APPLICATION OF A PROBABILISTIC SENSITIVITY ANALYSIS. *L M Bodnar, A M Siega-Riz, K L Wisner, J C Diesel, B Abrams (Univ. Pittsburgh, Pittsburgh, PA 15261)

Prepregnancy body mass index (BMI) is a widely used marker of maternal nutritional status that relies on maternal recall of prepregnancy weight and height. Pregravid BMI has been associated with adverse outcomes for the mother and infant, but the impact of BMI misclassification on effect measures effect has not been quantified. The authors used a published probabilistic sensitivity analysis to account for misreporting of pregravid weight and height on effect estimates relating BMI to large- and small-for-gestational age births (LGA and SGA) using a Pittsburgh hospital delivery database (n=23,420), and maternal antenatal major depressive disorder (MDD) using a Pittsburgh cohort (n=238). The sensitivity analysis method recreates the data that would have been observed had pregravid BMI been correctly classified, assuming given classification parameters. The authors first calculated conventional odds ratios and 95% confidence intervals. These were compared with sensitivity analysis estimates and 95% simulation intervals that accounted for nondifferential exposure misclassification. In conventional models, the odds of LGA and MDD were associated with increasing BMI category and odds of SGA with decreasing BMI category. The sensitivity analysis estimates that took into account the exposure misclassification had wider simulation intervals and slightly attenuated point estimates, indicating the conventional estimates were biased away from the null. However, the relations expected a priori remained readily evident. This analysis suggests that in this population, associations between self-reported prepregnancy BMI and maternal and infant outcomes are only slightly overestimated.

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CORRELATES OF DEPRESSION DURING PREGNANCY IN LATINA WOMEN. *R Turzanski Fortner, P Pekow, G Markenson, N Dole, L Chasan-Taber (University of Massachusetts, Amherst, MA 01003)

Data on prenatal depression is sparse, particularly among Latina women. We examined associations between pre and early pregnancy factors and depressive symptoms among the first 851 participants of Proyecto Buena Salud, an ongoing cohort of pregnant Latinas in Massachusetts. Depressive symptoms were assessed by the Edinburgh Postnatal Depression Scale (EPDS) at a mean gestational age of 13 weeks by bilingual interviewers who also collected data on behavioral and acculturation factors. We used logistic regression, correcting for the non-rare outcome using the methods of Zhang and Yu (JAMA. 1998;280(19):1690). The mean EPDS score was 9.5 (SD=6.0) and a total of 33% of women had probable depression defined as an EPDS score >12. In multivariable analyses, early pregnancy smoking (relative risk [RR]: 1.41, 95% confidence interval [CI]: 1.00-1.81), prepregnancy alcohol use (RR: 1.28, 95% CI: 0.96-1.63), and ≥3 children in the household (RR: 1.66, 95% CI: 1.14-2.16) were positively associated with probable depression as compared to non smokers, non alcohol users, and those with no children, respectively. Living with a partner (RR: 0.60, 95% CI: 0.41-0.85), high income (RR: 0.62, 95% CI: 0.41-0.91), Spanish preference (RR: 0.56, 95% CI: 0.35-0.87), and ≥high school education (RR: 0.50, 95% CI: 0.33-0.73) were inversely associated with probable depression relative to women who did not live with a partner, were low income, were English speakers, and had less than a high school education, respectively. Findings can inform intervention studies aimed at targeting Latina women at risk of depression in pregnancy.

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NEIGHBORHOOD STRESSORS AND SOCIAL SUPPORT AS PREDICTORS OF DEPRESSIVE SYMPTOMS IN THE CHICAGO COMMUNITY ADULT HEALTH STUDY. *C Mair, A V Diez Roux, J D Morenoff (University of Michigan, Ann Arbor, MI 48109)

There is a growing interest in understanding the effects of specific neighborhood conditions on psychological wellbeing. This study examined cross-sectional associations of neighborhood stressors (perceived violence and disorder, physical decay and disorder, safety, population density) and social support (residential stability, family structure, social cohesion, reciprocal exchange, social ties) with depressive symptoms in 3105 adults in Chicago. Subjects came from 343 neighborhood clusters, areas of approximately 2 census tracts with meaningful physical and social borders. Depressive symptoms were assessed with an 11-item version of the Center for Epidemiologic Studies-Depression scale. Neighborhood variables were measured using (1) rater-assessed objective measurements (2) participant reports (3) census-derived scales and (4) reports of other residents. Two-level gender stratified multilevel models were used to estimate associations of neighborhood conditions with depressive symptoms after controlling for individuals' age, income, marital status, education and race/ethnicity. Most social support variables were associated with decreased depressive symptoms in women but not men (e.g. a 1 standard deviation increase in social cohesion was associated with a 0.05(95% confidence interval -0.08, -0.02) decrease in depressive symptoms in women vs. -0.03(-0.07, 0.00) in men). Neighborhood stressors were moderately associated with increased levels of depressive symptoms in all subjects. Adjusting concurrently for stressors, social support and neighborhood socioeconomic conditions did not qualitatively change results. This study suggests neighborhood characteristics relevant to depression may differ by gender.

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FACTORS ASSOCIATED WITH DEPRESSION RESILIENCY AS WOMEN MOVE TOWARD THE PERIMENOPAUSAL TRANSITION. *B L Harlow, D M Swanson, R F MacLehose (University of Minnesota School of Public Health, Minneapolis, MN 55454)

Earlier research has shown that women with a premenopausal history of depression are at an increased risk of undergoing an earlier age at menopause, which can then impact fertility and susceptibility to chronic disease during the menopausal period. These same women are more vulnerable to recurrent depression as they approach the perimenopausal transition as well. However, it is unknown to what extent declining ovarian function can impact new onset of depression in women who remained depression free during their premenopausal years. It would be of great public health importance to determine environmental factors that help women maintain resiliency from the development of depression as they move toward the perimenopausal transition. Within the Harvard Study of Moods and Cycles, we have followed a cohort of approximately 900 late reproductive-aged women (36-49 years of age) with no lifetime history of depression to determine life-events and exposures that protect them from developing depression as they enter perimenopause. Thus far, factors that appear to protect against depression during this vulnerable period include a history of oral contraceptive use for 6 years or longer relative to no use or use for <1 month (OR=0.57, 95%CI 0.30-1.12), and reporting "never or a few times or less" having lived in fear of being victimized as a child, compared to having lived in fear of being victimized as a child "more than a few times" (OR=0.44, 95%CI 0.22-0.89). These findings were adjusted for race, education, age at menarche, and parity. We are currently exploring the combination of stress-related childhood experiences and exposures during the reproductive years that impact menstrual cycle regularity and ovulatory function to determine how these factors interact to influence the likelihood of new onset of depression as women move toward the climacteric.

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ASSSUMPTIONS, ASSUMPTION, ASSUMPTIONS. *G Maldonado, S Greenland, C Poole (University of Minnesota, Minneapolis, MN)

It is well known that a statistical analysis, in essence, is a process by which data are combined with assumptions to yield a study result that is a function of both. Therefore, a fundamental analysis principle is the following: data should be combined with assumptions that are understood by the investigator and can be justified by the investigator. For many of the analysis procedures that are used today in epidemiology, the underlying assumptions are hidden or are not well appreciated. In this symposium, we will examine the fundamental assumptions for some of the analysis techniques that are (or are becoming) popular in epidemiology.

Speakers:

George Maldonado. ''Control of confounding: an iffy business'' Sander Greenland. ''Overthrowing the tyranny of null hypotheses in graphs'' Charles Poole. ''You're going to do what?''

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CONTROL OF CONFOUNDING: AN IFFY BUSINESS. *G Maldonado (University of Minnesota, Minneapolis, MN 55455)

Confounding results from imperfect substitution of an observed quantity for a counterfactual (unobservable) quantity such as a measure of disease frequency. From this perspective, it is clear what a valid confounding-adjustment method must do: it must somehow create a more perfect substitute from an imperfect one. Confounding-adjustment methods do this by making assumptions, with different methods using different assumptions. In this presentation, we will begin by briefly reviewing the concept of confounding from a counterfactual perspective. We will then examine the assumptions made by confounding-adjustment methods that are (or are becoming) popular in epidemiology. A confounding-adjustment method should be used in practice only (1) if the investigator understands the assumptions required by the method, and (2) if the investigator can justify those assumptions as approximations or argue they are harmless under the sort of violations expected. The very different assumptions used by the methods suggests that analyses using multiple methods can be helpful in guarding against overreliance on one set of assumptions. In doing so however one must discuss the full range of methods applied, to avoid risk of ''cherry-picking'' the results and to display the sensitivity of inferences to choices. None of these methods or strategies can however address the absence of sufficient confounder measurement, which requires formal sensitivity analysis over a broad range of parameters.

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OVERTHROWING THE TYRANNY OF NULL HYPOTHESES IN GRAPHS. *S Greenland (Department of Epidemiology and Department of Statistics, University of California, Los Angeles, CA)

In practice, much of modern science is based on a collection of religious precepts. One of the most destructive has been the belief that a null hypothesis should be adopted in the absence of evidence to refute it. Decades of vigorous campaigning by Rothman and others has somewhat muted this belief regarding effects of the study exposure, and have even moderated some of the practices to which it gives rise. Nonetheless, the belief is incorporated implicitly at many other levels in conventional statistical methods. For example conventional methods assume no bias arises from any source of bias that is not explicitly modeled. Over the past decade these assumptions have increasingly been challenged and relaxed. The same decade has seen the introduction of graphical models into epidemiology. While these graphs serve well to illustrate specific sources of bias, they may conceal other sources via the simplifying assumptions (arrow deletions) they use for illustration. A graph of an observational study is unrealistic if the target effect is identified by graphical rules alone. Realistic graphs lack only those arrows missing by virtue of the study design or ''laws'' of nature. I argue that we should start with realistic graphs, and then present specific-bias graphs as subgraphs. Combination of results from subgraphs requires evaluation of both primary and secondary bias (bias generated by control of primary bias sources), and synthesis of these evaluations requires quantification of effects.

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YOU'RE GOING TO DO WHAT? *C Poole (University of North Carolina, Chapel Hill, NC 27599-7435)

Methodologic and conceptual developments do not always make epidemiologic research more arcane and less practical. They can have just the opposite effect, especially when they reveal hidden assumptions. Two tools, potential outcome models and causal graphs, help show that it would take unethical, impracticable or impossible interventions to produce many estimated effects. Some high-profile examples include effects of eliminating a disease or group of diseases, eliminating a cause or group of causes, or exporting disease rates from one nation to another. Others consist of direct effects that, to be brought about, would require causal intermediates to be held constant physically, not just statistically. Estimates of effects that cannot be produced, or that no one would dare produce even if they could, are often defended as ''useful'' or ''interesting.'' These estimate are neither useful nor interesting to the epidemiologist who treasures the pragmatic value of our research, embedded as it is in the applied realism of public health. If we want our results to guide policy choices in the real world, we should estimate the impact of interventions that are ethical and achievable. Policy makers might take greater interest in those results, put them to better use than many of the fantasy results we currently offer them and, as a side benefit, hold our research in even higher regard than they do now.

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COMPLEX SYSTEMS DYNAMIC MODELING APPROACHES TO POPULATION HEALTH: PROMISE FOR A CELLS-TO-SOCIETY ANALYTIC APPROACH? *S Galea and *G Kaplan (University of Michigan, Ann Arbor, MI)

The past two decades have witnessed an explosion of knowledge concerning the complex social and economic determinants of health among populations and inequalities in health within populations, and how these determinants "get under the skin". However, the dominant analytic techniques in population health are poorly suited to utilize this data fully and to help us understand how factors at multiple levels of influence (e.g., genes, cells, organs, individuals, families, neighborhoods, states) interact dynamically to shape population health. The tools and theories of complex systems dynamic modeling provide conceptual and analytic strengths in addressing complex multilevel phenomena with extensive feedback and non-linearity and therefore may help contribute to our understanding of the multi-factorial construction of population health and identify potential avenues for intervention. Application of these methods to population health questions however presents challenges for epidemiologists. These include primarily our need (a) to develop greater facility with simulated data, (b) to develop models that accurately represent well-documented epidemiologic associations, and (c) to incorporate both realistic time parameters and life course approaches, with varying relations over time, into these models. This symposium will present examples of complex system models and their applications to population health questions. Speakers will also touch on what we can and cannot expect these models to successfully address and problems of implementation. Our hope is to demonstrate the utility of such models in epidemiologic theory and practice, thus encouraging SER members to explore further this emerging area.

Co-Chairs: George Kaplan and Sandro Galea (University of Michigan)

Speakers:

Sandro Galea – "Modeling the implications of non-health educational policies for cardiovascular disease incidence and mortality" David Méndez – "The Impact of Declining Smoking on Radon-related Lung Cancer in the US" Eirk M Volz – "Mathematical modeling of sexually transmitted infections in dynamic contact networks"
Derek AT Cummings – "The impact of changes in human demography on cycles of dengue hemorrhagic fever incidence in Thailand"

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MODELING THE IMPLICATIONS OF NON-HEALTH EDUCATIONAL POLICIES FOR CARDIOVASCULAR DISEASE INCIDENCE AND MORTALITY. *S Galea, M Riddle, G Kaplan (University of Michigan)

There is a strong association between socioeconomic factors, health related behaviors, and cardiovascular disease. In turn there is abundant evidence that educational achievement is associated with health behavior. These observations suggest that policy interventions that aim to influence educational achievement could effectively improve health outcomes. This notion is however difficult to test experimentally and there is limited observational data that can support, or refute, it. We developed an agent-based model that can be used to assess the consequences of interventions to improve educational achievement in specific areas, and in particular to consider the implications of such interventions for smoking, activity levels and diet, and for cardiovascular disease rates. The model includes households that can move between neighborhoods and agents in the household that form friend networks with each other, go to school and work to accumulate education and wealth. Agents choose health behaviors such as smoking levels, activity levels and diet, and these influence their chance of developing cardiovascular disease and their chance of dying. We calibrate the model against the results of a variety of studies based on different data sources. We then introduce a policy to increase funding for schools in neighborhoods with large minority populations, and ran simulations to compare the outcome against counterfactual simulations where the policy was not implemented. We show that sustained school funding in minority neighborhoods can reduce or eliminate racial disparities in cardiovascular disease, over the course of a few generations. We will discuss the influence of various assumptions on this observation. These simulations can play an important role in informing policy decisions by providing both an estimate of the effect of a macro-level policy and by presenting a dynamic picture of a policy's effects over time and the assumptions that critically influence the consequences of particular policies.

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THE IMPACT OF DECLINING SMOKING ON RADON-RELATED LUNG CANCER IN THE US. *D Méndez, O Alshanqueety, P Lantz, K Warner (University of Michigan, Ann Arbor, MI)

The Environmental Protection Agency estimates that radon in the home is responsible for about 21,000 deaths annually among Americans. The agency has labeled radon "probably one of the biggest public health problems we have" and has mounted, since 1986, an aggressive campaign urging the public to test their homes for radon and take remedial actions when airborne concentrations of radon daughters exceed four picoCuries per liter of air (4pCi/l). However, despite the strong interaction between radon and smoking, the EPA's assessment of risk ignores the current pattern of smoking reduction among the US population. Employing a population dynamics model, our research examines the effect of current and future smoking prevalence on radon-related lung cancer. We re-estimate the expected number of lung cancer deaths due to radon, and reassess the benefits of the EPA's radon policy under those revised assumptions. Under very conservative scenarios about the future smoking status of the population, both the radon risk to the US population and the benefits of mitigation will eventually be about half what they would have been if smoking rates were not expected to decrease. We conclude that radon is less of a cancer problem than governmental projections suggest. That this owes to decreasing smoking, undertaken independent of concern with radon, emphasizes the value of tobacco control as a public health policy strategy.

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MATHEMATICAL MODELING OF SEXUALLY TRANSMITTED INFECTIONS IN DYNAMIC CONTACT NETWORKS. *E M Volz, R R Rothenberg, L A Meyers (University of California)

An individual's risk to sexually transmitted infections (STIs) is sensitive to the structure of the network of risky partnerships as well as individual behavior. STI epidemics are characterized by rapid and concentrated spread among individuals who occupy a central position within sexual transmission networks, and therefore STI epidemics often defy the mass-action principle, which posits that incidence is proportional to the fractions of the population that are susceptible and infectious. Consideration of network structure is essential for assessing risk, targeting interventions, and predicting the efficacy of drug therapy on reducing morbidity. We estimate the structure of two contact networks using data from high-risk heterosexual population in Atlanta, GA and injection drug users (IDUs) in Tijuana, Mexico. We use these data to build a detailed transmission model for HIV in heterogeneous populations embedded in contact networks. We show that accurate estimation of epidemic incidence relies on careful measurement and inclusion of many factors such as concurrency (having multiple partners), the duration of partnerships, serosorting (preference for partners with matching serostatus), heterogeneity in the number of partners, and the presence of bridge-groups. We find that IDUs bridge the heterosexual and MSM populations and are indirectly responsible for a large number of transmissions. Targetted interventions of individuals at highest risk out-perform randomized interventions. Early initiation of therapy for individuals in the early stages of infection, those who inject drugs, or those that occupy a central network position is especially effective at reducing transmissions.

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THE IMPACT OF CHANGES IN HUMAN DEMOGRAPHY ON CYCLES OF DENGUE HEMORRHAGIC FEVER INCIDENCE IN THAILAND. *D A T Cummings, S Iamsirithaworn, J T Lessler, A McDermott, R Prasanthong, A Nisalak, R G Jarman, D S Burke, R V Gibbons (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD)

Dengue virus is a major cause of morbidity and mortality in Thailand. Incidence varies widely from year to year cycling with a 2-4 year periodicity. Simulation models have been used to investigate several aspects of dengue epidemiology including the impact of immune responses on cycles of incidence and competition between dengue viruses. Here, we present simulation modeling to investigate the impact of changes in human demography on transmission dynamics. In recent years, dengue disease has shifted from occurring predominantly among children to affect a large number of adults, suggesting a reduction in the annual hazard of infection. The age structure of the Thai population has changed dramatically in the last 25 years, due to a reduction of birth and death rates and the impact of urbanization and migration on the spatial distribution of people within the country. Simulation models incorporating changes in birth rates and age structure consistent with Thai data show lengthened multiannual cycles and reductions in the hazard of infection similar to those measured empirically. Lower birth and death rates decrease the flow of susceptible individuals into the population and increase the proportion of the population that is immune. This reduction in the flow of susceptible individuals increases the likelihood that an infectious mosquito will feed on an immune individual, thus reducing the hazard experienced by susceptible individuals. Demographic structure also appears to affect another feature of dengue transmission dynamics, the appearance of spatial-temporal traveling waves. Large, dense populations in the center of the country experience higher rates of transmission than areas to the north and south. Simulations that incorporate this spatial gradient in transmission rates can produce spatial temporal traveling waves consistent with incidence data. Our findings suggest a spatial targeting of control efforts that might minimize morbidity and mortality.

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PAST, PRESENT, AND FUTURE CONSIDERATIONS FOR THE HEALTHY WORKER EFFECT. *J M Symons, H Checkoway, E A Eisen, J Chevrier, SR Cole, D B Richardson. (*DuPont Epidemiology Program, Newark, DE 19714)

The healthy worker effect (HWE) has been recognized as a potential bias of comparative risk estimates since the first studies of disease and death in occupational cohorts. Identification and description of the HWE has been well-established since the 1980s with very little revision to the underlying concept. Techniques to remove bias due to the HWE have been much commented upon but only sporadically adopted in occupational cohort studies. The use of similar worker populations for standardized mortality and morbidity comparisons is one approach to control for the presence of the HWE. Advanced statistical modeling approaches using g-estimation and marginal structural models were published over 20 years ago; however, few occupational epidemiology studies have adopted this method. Moreover, comparisons of structural nested modeling approaches to adjust for HWE bias in estimates of standardized ratios will be presented. The session will conclude with a discussion of the theoretical and methodologic aspects of the HWE beyond its direct relation to occupational epidemiology studies.

Speakers:

Harvey Checkoway, PhD, ''Identification and development of ''healthy worker effect'' bias in occupational epidemiology.''
J. Morel Symons, PhD, ''Internal company registry rates to adjust for the HWE in standardized ratio analyses.''
Jonathan Chevrier, PhD, ''Causal models for addressing healthy worker effect in occupational cohort studies.''
Stephen Cole, PhD, ''Structural models for the effect of occupational asbestos exposure on lung-related mortality.''

Discussant: David Richardson, PhD.

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IDENTIFICATION AND DEVELOPMENT OF ''HEALTHY WORKER EFFECT'' BIAS IN OCCUPATIONAL EPIDEMIOLOGY. *H Checkoway (University of Washington, Seattle, WA 98195)

It has long been recognized that occupational cohorts typically have lower than expected all-cause mortality, compared to national and other external reference populations. This phenomenon is known as the ''Healthy Worker Effect'' (HWE). The HWE has features of selection bias (incorrect choice of comparison population), and confounding, (different distributions of predictors of mortality between the cohort and reference population). HWE bias results primarily from the selection of workers with adequate health to gain and maintain employment. Reduced mortality among workers varies by cause of death, duration of follow-up, and other time-related factors. The most common design method to minimize HWE bias is to select internal reference groups, although confounding from other factors may still be problematic. Another more recently recognized manifestation of HWE bias, termed the ''Healthy Worker Survivor Bias'' (HWSE), produces spuriously dampened dose-response gradients. HWSE is due to preferential outmigration among the most heavily exposed, and ultimately the most health-impaired, workers. Cross-sectional morbidity studies are especially vulnerable to HWSE bias. Methods to control HWSE bias include treating employment status as a covariate, and taking full account of cumulative exposure and job transfer history in cross-sectional studies. These concepts will be illustrated with published examples of occupational mortality and morbidity studies. HWE biases have predominantly been identified from studies of fatal and debilitating health outcomes among workers in ''blue collar'' occupations. Future research on characterizing and controlling HWE and HWSE in the context of other types of occupational settings and health outcomes should be fruitful.

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INTERNAL COMPANY REGISTRY RATES TO ADJUST FOR THE HWE IN STANDARDIZED RATIO ANALYSES. *J M Symons, H Q Le, K H Kreckmann, C J Sakr, W M Lednar. (DuPont Epidemiology Program, Newark, DE 19714)

The DuPont Company has maintained an occupational epidemiology program since 1955 that conducts routine surveillance among its workers. The DuPont Epidemiology Registry includes over 269,000 active and former employees with work histories in the United States. Active surveillance for the mortality registry uses company life insurance claims with all reported deaths validated against the U.S. National Death Index. Cases of incident cancer among active employees are reported by medical staff at each company facility in the U.S. In addition, quarterly cancer reports are obtained for incident diagnoses among active and retired workers covered by company-sponsored insurance plans. The registry allows for the calculation of expected mortality and cancer counts using age-adjusted rates for national and regional DuPont worker populations. Standardized ratios for observed mortality and cancer incidence at specific site-based cohorts are estimated relative to the expected counts based on DuPont reference rates. This approach reduces potential bias from the HWE since DuPont employees have comparable demographic characteristics and a similar likelihood of obtaining and retaining employment. In addition, there is an equivalent potential for follow-up of mortality outcomes and corresponding health insurance benefits between the comparison groups minimize potential differences in early diagnosis and quality of treatment, especially for cancer outcomes.

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CAUSAL MODELS FOR ADDRESSING HEALTHY WORKER EFFECT IN OCCUPATIONAL COHORT STUDIES. *J Chevrier, E A Eisen (University of California, Berkeley, CA 94720)

Individuals who are hired and remain at work longer are generally healthier than those who are unemployed or leave work, causing downward bias in studies of the health effects of occupational exposures. We present results from a study of ischemic heart disease mortality in a cohort of autoworkers exposed to metalworking fluid (MWF) using two approaches designed to reduce the bias. MWF is a mixed particulate containing metals and polyaromatic hydrocarbons and although previous studies of this cohort have found associations with selected cancers, this is the first investigation of heart disease. The cohort includes all workers hired between 1938 and 1981 who worked more than 3 years in one of three automobile manufacturing plants in Michigan (N = 39,927). The cohort was followed-up for vital status from 1941 to1995, and cause of death was ascertained from state health records and the National Death Index. Date of birth, race, gender and work history, including time off work, were obtained from company records. Annual exposure to oil-based MWF was treated as binary and health status was defined as the time off work in every year of follow up. To adjust for time off work as a time-varying confounder, we used two causal modeling approaches: Marginal Structural Models with Inverse Probability of Treatment Weights (IPTW) and Structural Nested Models using g-estimation. We compared these results based on 2,725 heart disease deaths, with those from a standard Cox model. Finally, we applied the same three approaches to examine MWF exposure in relation to all causes of death combined and all cancers combined in order to examine the hypothesis that bias due to healthy worker effect is stronger for chronic diseases, such as heart disease, than for cancer.

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STRUCTURAL MODELS FOR THE EFFECT OF OCCUPATIONAL ASBESTOS EXPOSURE ON LUNG-RELATED MORTALITY. *S R Cole, D B Richardson (Department of Epidemiology, University of North Carolina Gillings School of Global Public Health, Chapel Hill, NC 27510)

Inferences from prior research regarding occupational exposure to asbestos fibers in textile plants and lung-related mortality may be susceptible to health worker survivor bias. We re-analyze a cohort of 3072 individuals occupationally-exposed to asbestos fibers in South Carolina and followed 61 years between 1940 and 2001 for lung-related mortality. Average asbestos concentrations, in units of chrysotile fiber-years/ml, were estimated using a previously-validated job exposure matrix. At work initiation, the 3072 had an average age of 26±8.3, was 59% male and 81% Caucasian. During 119142 person-years follow up, 184 lung-related and 1681 other deaths occurred. Of the 1207 participants who were not observed to die, 857 (71%) were still under follow up in 2001. 85 and 10% of person-years had a 0 dose and cumulative dose of asbestos exposure, respectively. The median (quartiles) cumulative dose was 3.92 (0.93, 15.85) fiber-years/ml of asbestos exposure. We fit standard Cox proportional hazards models with time varying asbestos exposure with and without adjustment for time varying work status. Also, we fit, by g-estimation, Robin's rank-preserving structural nested accelerated failure time model. For the latter, inferences are made under four central assumptions: consistency, no interference, no unmeasured confounding and no unmeasured informative drop out. Three necessary (but insufficient) conditions for the healthy worker survivor effect to bias the estimation of the association of cumulative asbestos exposure with lung-related mortality were observed and will be described. Results of standard and structural models will be presented.

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USE OF ANTIDEPRESSANTS DURING PREGNANCY AND THE RISK OF PRETERM DELIVERY AND FETAL GROWTH RESTRICTION. *S Toh, A Mitchell, C Louik, M Werler, C Chambers, S Hernández-Díaz (Harvard School of Public Health, Boston, MA 02115)

The associations between prenatal exposure to antidepressants and prematurity and fetal growth restriction are controversial and poorly understood. We studied the relation between antidepressants and these outcomes. This retrospective cohort study included women with non-malformed infants interviewed in the Slone Epidemiology Center Birth Defects Study between 1998 and 2008. We estimated odds ratios (OR) and 95% confidence intervals (CI) for prematurity and small for gestational age (SGA) offspring, adjusting for sociodemographic, lifestyle, and reproductive factors. The frequency of preterm delivery was 7.3% among the 5,710 non-users (reference), 8.9% among the 192 selective serotonin reuptake inhibitor (SSRI) users (OR 1.1; 95% CI: 0.6-2.0), and 15.3% among the 59 non-SSRI antidepressant users (OR 2.2; 1.0-4.9); the respective frequencies of SGA offspring were 7.2%, 10.9% (OR 1.7; 1.0-2.7) and 13.6% (OR 2.2; 1.0-4.9). Compared to non-users, the frequency of preterm delivery (7.6%) and SGA offspring (5.7%) were not increased among the 106 women who discontinued SSRIs before the end of the first trimester. However, among women who continued SSRIs beyond the first trimester, 10.5% delivered preterm (OR 1.3; 0.6-2.8) and 17.4% had SGA offspring (OR 3.0; 1.7-5.5). Women treated with SSRIs late in pregnancy had a higher frequency of SGA infants, and women receiving non-SSRI antidepressants were more likely to deliver premature and SGA offspring. Findings suggest an effect of underlying mood disorder or an effect common to both drug classes. In any case, prenatal antidepressant use may help identify women at elevated risks of delivering preterm and SGA infants.

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DYNAMIC MARGINAL STRUCTURAL MODELS TO FIND OPTIMAL TREATMENT REGIMES. *L E Cain, M A Hernán (Harvard School of Public Health, Boston, MA 02115)

The optimal time to initiate combined antiretroviral therapy to maximize a patient's AIDS-free survival is unknown. Randomized trials that compare regimes of the form ''initiate therapy when CD4 cell count first drops below x cells/μl,'' where x takes the values 200 to 500 by 10 cells/μl, would answer this question but are unlikely to be conducted. We mimicked these trials using observational data from the HIV-CAUSAL collaboration, one of the largest follow-up studies of HIV-infected patients. We excluded those patients who we did not observe the first time their CD4 cell count dropped below 500 cells/μl and those who initiated therapy before the first time their CD4 cell count dropped below 500 cells/μl. Each patient's baseline data may be consistent with her following several regimes. Therefore, we expanded the dataset by creating as many replicates of each patient as regimes the patient followed at baseline. We then used the time-varying CD4 count and treatment initiation data to identify if and when a replicate deviated from her baseline regime. We artificially censored the replicates at those times, and estimated inverse probability weights to adjust for the potential selection bias introduced by the artificial censoring. Finally, we compared the survival of the uncensored patients by fitting an inverse probability weighted Cox proportional hazards model that smoothes over the relative effects of the dynamic regimes and includes the baseline confounders as covariates. To our knowledge, this work represents the first large scale application of marginal structural models to compare the effects of dynamic regimes on survival.

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* = Presenter; S = The work was completed while the presenter was a student

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CORRELATES FOR HPV VACCINATION IN A MANAGED CARE ORGANIZATION. *C Chao, C Velicer, J M Slezak, S J Jacobsen (Kaiser Permanente Southern California, Pasadena, CA 91101)

Studies of the effectiveness and safety of the human papillomavirus (HPV) vaccine may be limited by the characteristics of individuals opting to receive the vaccine. Thus, it is of import to study the characteristics of those who initiated the vaccine versus not. Female members of Kaiser Permanente Southern California Health Plan between ages 9 and 26 years in October 2006 were identified and assessed for their HPV vaccination between October 2006 and March 2007. We examined (1) demographics and socioeconomic status; (2) primary care provider (PCP) characteristics; (3) historical health service utilization; (4) women's health-related medical conditions and (5) selected immune-related medical conditions for their association with vaccine initiation with multivariable logistic regression. A total of 358,527 females were included in the study. Black (odds ratio (OR) =0.90, 95% CI = 0.84-0.96) and Asian race (OR = 0.79 (0.73-0.86)), lower income neighborhood, having a male PCP (OR = 0.83, 95% CI=0.81-0.86), and history of hospitalizations were associated with a lower likelihood of vaccine initiation. On the other hand, physician office visits and history of asthma/allergy were associated with higher vaccine uptake. Participation in the state subsidized Medi-Cal program (OR=1.25 (1.19-1.30)) and history of pap screening (OR=1.16 (1.09-1.23))/sexually transmitted diseases (OR=1.18 (1.01-1.39)) were also associated with more vaccine initiation in 9-17 and 18-26 years old, respectively. These findings are helpful for interpreting the results in observational safety studies, and for providing insights for developing targeted HPV vaccination programs.

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THE EFFECT OF INCREASED ALTITUDE ON RECOMBINANT ERYTHROPOIETIN (EPO) DOSING AND ACHIEVED HEMATOCRIT LEVELS IN END-STAGE RENAL DISEASE. *M Alan Brookhart, B D Bradbury, W Winkelmayer (Brigham & Women's Hospital, Boston, MA 02120)

ESRD patients who live at high altitude use less exogenous EPO yet achieve higher hematocrit levels than comparable patients living at lower altitudes. We hypothesized that a lowered partial pressure of oxygen in the atmosphere decreases the EPO dose required to achieve a desired hematocrit level. We tested this hypothesis using the natural experiment created when dialysis patients move from low to high altitude. Using data from Medicare's ESRD program between 1992-2004, we identified a cohort of patients with hematocrit levels below 32% who moved from a dialysis center located below 2,000ft to one located between 250 and 500ft higher (reference group) or to one located at >3,000ft (high altitude group). Monthly hematocrit levels and EPO doses before and after the move were compared between the groups. Patients were censored if they moved back to low elevation. After 6 months at higher altitude, the 3,734 patients in the reference group experienced an increase in hematocrit of 3.2% (95% CI 2.9-3.7) and an increase in EPO dose of 328U/week (157-499); whereas among the 129 patients in the high altitude group, hematocrit increased 4.0% (3.1-4.9) but EPO dose decreased 531U/week (70 -1132). After 12 months, the reference patients experienced an increase in hematocrit of 3.4% (3.2-3.6) and an increase in EPO dose of 436U/Wk (229-643); whereas among the patients in the high altitude group, hematocrit increased 4.5% (3.3-5.7%) but EPO dose decreased 939U/week (136 -1743). These results were unaffected by multivariable adjustment. In ESRD patients with anemia, a decreased partial pressure of oxygen is associated with an increase in hematocrit and a decrease in EPO dosing. These changes may be the result of activation of hypoxia-inducible transcription factors that induce increased expression of endogenous EPO and/or mobilization of stored iron.

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ACCOUNTING FOR DATA ERRORS IN A BIRTH-CERTIFICATE STUDY OF MATERNAL CIGARETTE SMOKING AND CLEFT LIP AND PALATE. *A Jurek, S Greenland, B Carlin (University of Minnesota, Minneapolis, MN 55455)

Birth certificates are a convenient source of population data for epidemiologic studies. It is well documented, however, that birth certificate data can be highly inaccurate. Nonetheless, studies based on birth certificates are routinely analyzed without accounting for sources of data errors. We investigated the association between maternal cigarette smoking and cleft lip and palate using validation studies to construct prior probability distributions for classification probabilities. We present comparisons of Monte-Carlo sensitivity analysis and Bayesian analysis based on these distributions, and comparisons of Bayesian analyses based on approximations and simulations. Because of the large impact of errors, we suggest that inferences from birth certificates and similarly inaccurate records would benefit from employing at least one of these methods for incorporating uncertainties due to data errors.

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DOES ADJUSTMENT FOR MEASUREMENT ERROR INDUCE POSITIVE BIAS IF THERE IS NO TRUE ASSOCIATION? *I Burstyn (University of Alberta, Edmonton, AB, Canada)

This article is a response to an off-the-record discussion that I had at an international meeting of epidemiologists. It centered on a concern, perhaps widely spread, that measurement error adjustment methods can induce positive bias in results of epidemiological studies when there is no true association. I trace the possible history of this supposition and test it in a simulation study of both continuous and binary health outcomes under a classical multiplicative measurement error model. A Bayesian measurement adjustment method is used. The main conclusion is that adjustment for the presumed measurement error does not 'induce' positive associations, especially if the focus of the interpretation of the result is taken away from the point estimate. This is in line with properties of earlier measurement error adjustment methods introduced to epidemiologists in the 1990's. An heuristic argument is provided to support the generalizability of this observation in the Bayesian framework. I find that when there is no true association, positive bias can only be induced by indefensible manipulation of the priors, such that they dominate the data. The misconception about bias induced by measurement error adjustment should be more clearly explained during the training of epidemiologists to ensure the appropriate (and wider) use of measurement error correction procedures. The simple message that can be derived from this paper is: 'Do not focus on point estimates, but mind the gap between boundaries that reflect variability in the estimate'. And of course: 'Treat measurement error as a tractable problem that deserves much more attention than just a qualitative (throw-away) discussion'.

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METHODOLOGICAL CHALLENGES IN ASSESSING THE EFFECTS OF PRENATAL CARE. *T J VanderWeele (University of Chicago, Chicago, IL 60637)

Several methodological challenges which arise in assessing the effects of prenatal care are described. First, there are difficult issues concerning the definition and measurement of prenatal care. Several indices for classifying the adequacy of prenatal care have been proposed including the Kesner, the GINDEX and the APNCU. These indices, however, have very different properties in birth outcomes models and some may be subject to certain classification biases; measurement error potentially complicates the use of these indices further. Second, it is not clear that a static adequacy index is the best way to conceptualize prenatal care; prenatal care may instead be viewed as a treatment that varies over time; care may prevent pregnancy complications but complications may themselves increase the level of care received. Conceptualizing prenatal care as a time-varying treatment can address certain biases that may otherwise be present if prenatal care is considered a static treatment and marginal structural models can be useful in the analysis of the time-varying effects of prenatal care. Finally, questions of mediation may be important in assessing the effects of prenatal care; for example, a question of interest may involve whether the effect of prenatal care on infant mortality is mediated by medically indicated preterm birth. More extensive data and stronger assumptions are needed to answer questions of mediation than are needed to address questions concerning overall effects; often the assumptions for estimating direct and indirect effects will be unreasonable. However, results on bounds for direct and indirect effects can potentially be used to at least qualitatively address these questions of mediation.

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MEASUREMENT-ERROR CORRECTION IN MARGINAL STRUCTURAL MODELS TO ESTIMATE THE EFFECT OF ANTIRETROVIRAL THERAPY ON INCIDENT AIDS/DEATH. *S R Cole, L P Jacobson, P C Tien, L Kingsley, J S Chmiel, K Anastos (Epidemiology, UNC, Chapel Hill, NC 27599)

To estimate the long-term effect of imperfectly-reported antiretroviral therapy on incident AIDS/death, we combine inverse probability-of-treatment-and-censoring weighted estimation of a marginal structural Cox model with regression-calibration. Accuracy of the method is demonstrated by Monte Carlo simulation. 950 HIV+ adults were followed for up to 24 semiannual visits in the Multicenter AIDS Cohort and Women's Interagency HIV studies between 4/1996 and 9/2007. At entry, none were using therapy, 61% were female, 41% Caucasian, the median (quartiles) CD4 count was 453 (303, 641) cells/mm3 and viral load was 4.5 (4.0, 4.9) log10 copies/ml. During 5011 person-years, 417 initiated therapy, 248 developed AIDS/died, and 124 dropped out; median follow up was 3.9 (0.7, 10) years. Compared to medical records, sensitivity and specificity of reported therapy were 84 ($\pm$ standard error 2%) and 80$\pm$4% for 331 HIV+ adults in external validation studies. Accounting for measured confounders and drop-out determinants, the weighted hazard ratio (HR) of 0.36 (95% confidence limits [CL]: 0.24, 0.55), for continuous therapy versus none, was quite constant over follow up ($P = 0.59$) and twice as strong as the crude/adjusted HRs of 0.70/0.67. Accounting for measurement-error in reported therapy provided a stronger HR of 0.17 and a widened 95% CL of 0.09, 0.31. Proposed marginal structural measurement-error models simultaneously account for major biases in epidemiologic research: exposure measurement error, selection bias and time-fixed/varying confounding.

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PERFLUORINATED SUBSTANCES AS DETERMINANTS OF MATERNAL HYPOTHYROXINEMIA IN EDMONTON, ALBERTA. *E Chan, I Burstyn, F Bamforth, N Cherry, J W Martin (Department of Public Health Sciences, University of Alberta, Edmonton, AB, Canada)

Perfluorinated acids (PFAs) are widespread global contaminants and are among the most abundant organohalogen contaminants in human blood. They produce an apparent hypothyroxinemic condition in experimental animals, and a variety of reproductive and developmental effects. In this study, we investigated whether PFAs were determinants of maternal hypothyroxinemia in a population of pregnant women from Edmonton using a case-control design. Free thyroxine (fT4) and thyroid stimulating hormone (TSH) were screened in individual samples of 974 women collected during 15-20 weeks of pregnancy. Hypothyroid cases were excluded and cases and controls were selected from the remaining samples. Hypothyroxinemic cases (n=96) had normal TSH and fT4 in the lowest 10th percentile; controls (n=175) were selected from between the 50th and 90th percentile of fT4 concentrations and were individually matched: age: ($\pm$ 3 years) and physician. Case and control serum samples were analyzed for perfluorooctanoic acid (PFOA) (median 1.35 ng/mL), perfluorohexane sulfonate (PFHxS) (median 1.07 ng/mL) and perfluorooctane sulfonate (PFOS) (median 7.40 ng/mL). Conditional logistic regression unadjusted for other co-variates indicates that PFAs were not associated with hypothyroxinemia. OR per log ng/mL of PFA were: 0.99 (95% CI 0.89-1.11) for PFOA, OR 1.05 (95% CI 0.98-1.12) for PFHxS, OR 0.88 (95% CI 0.63-1.24) for PFOS. This pattern was not altered when PFAs were categorized into tertiles. These results suggest that background exposures to PFAs in this Canadian population are not high enough to affect thyroid hormone homeostasis in pregnant women.

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MATERNAL EXPOSURE TO PERFLUORINATED ACIDS AND FETAL GROWTH RESTRICTION. *M P Hamm, J W Martin, E Chan, N M Cherry, I Burstyn (University of Alberta, Edmonton, AB, Canada)

To determine whether maternal exposure to perfluorinated acids (PFA) is associated with fetal growth restriction, we examined the concentrations of perfluorooctanoic acid (PFOA, median 1.5 ng/mL), perfluorooctane sulfonate (PFOS, median 7.8 ng/mL), and perfluorohexansulfonate (PFHxS, median 0.97 ng/mL) in a cohort of 252 pregnant women who were followed up for birth outcomes. Each of the women had undergone a second trimester prenatal screen, and these blood samples were further analyzed for PFA concentrations. Data on infant variables and maternal risk factors were collected from the delivery record completed at birth. The risk of delivering a small for gestational age (SGA) infant was not influenced by maternal PFA exposure, with adjusted relative risks (RR; 95% confidence intervals) of 1.15 (0.49 – 2.69), 1.54 (0.91 – 2.63), and 0.80 (0.50 – 1.28) per log unit of PFOA, PFHxS, and PFOS, respectively. Additionally, mean birth weight z-score showed no significant association with PFA levels (slopes per log unit: PFOA: -0.084 (-0.19 – 0.024), PFHxS: 0.018 (-0.082 – 0.12), PFOS: 0.022 (-0.14 – 0.19)). When PFA concentrations were divided into tertiles, a similar pattern was observed, with no evidence of an increased risk of fetal growth restriction with increasing exposure. Similarly, stratification by gender did not influence the pattern of findings. These results are consistent with the published body of epidemiological literature, and do not indicate that maternal PFA exposure has a substantial impact on fetal growth.

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THE ASSOCIATION BETWEEN AIR POLLUTION AND PRETERM DELIVERY IN CHICAGO. J Peters, D Treering, *D A Shoham (Loyola University Chicago, Maywood, IL 60153)

Preterm delivery is a risk factor for many developmental problems. We hypothesized that one type of air pollution, particulate matter <=2.5 microns in size ($PM_{2.5}$), could trigger an acute inflammatory response, resulting in preterm birth. Due to confounding by geography and socioeconomic position, we chose a case-crossover design, allowing each woman to serve as her own control. This approach was possible because air pollution levels are transient and labor is a discrete event. Data were drawn from Illinois Department of Public Health and the US Environmental Protection Agency (EPA), and limited to preterm births occurring among Chicago mothers during the year 2002 (n=5463; 11.4% of all live births). All $PM_{2.5}$ values were averaged daily across Chicago monitoring sites. High $PM_{2.5}$ was defined as a concentration of 25 g/m^3 or greater. Preterm delivery was defined as live birth at 36 weeks gestational age or less. We assumed no induction period, an effect period varying between 1 and 7 days, and an equal control period preceding the effect period. Following Maclure (AJE 133:144-53, 1991), we assume the effect period definition that maximizes the odds ratio is the correct one, because this definition would minimize exposure misclassification. The maximum effect period was 3 days, which yielded an odds ratio of 1.16 (95% confidence interval: 1.06,1.27). Limitations: we used daily averages across all EPA monitoring sites; due to nondifferential exposure misclassification, this estimate is likely biased to the null. Interpretation: assuming high particulate matter levels affect delivery for up to three days, elevated $PM_{2.5}$ raises the odds of preterm delivery by 16%.

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PRENATAL EXPOSURE TO THE MAJOR DDT METABOLITE 1,1-DICHLORO-2,2-BIS(P-CHLOROPHENYL)ETHYLENE (DDE) AND LONGITUDINAL GROWTH IN BOYS FROM MEXICO. *L A Cupul-Uicab, M Hernández-Ávila, M P Longnecker (Epidemiology Branch, National Institute of Environmental Health Sciences, NIH/DHHS/USA)

Recent data suggest that *in utero* exposure to DDE may reduce height and increase body mass index (BMI) in childhood, thus potentially raising the risk of adult health problems. The association between prenatal DDE exposure and growth was evaluated in 786 boys from Chiapas, a highly exposed area of Mexico. (Due to an initial study hypothesis regarding effects on other outcomes mediated by androgen-blocking, no girls were enrolled.) Median DDE levels in maternal serum at birth were 2.7 μg/g lipids. 2,629 measurements of recumbent length (cm) and weight (kg) were obtained in 2004-2005. Length and BMI (kg/m^2) were age-standardized and reported as standard deviation scores (SDS). Multivariate random-effect models for longitudinal data with an unstructured covariance matrix were fitted. Models included child's age at measurement and interaction terms between age and each variable to estimate the association with rate of change (Singer &Willett, 2003. Applied Longitudinal Data Analysis, p.664). Median age during follow-up was 18 months (range: 5-38); median number of measurements per subject was 3, taken 3.2 months apart (median). After adjusting for child, maternal and socioeconomic variables, and using DDE $\leq$3 μg/g as the reference, those with $>$ 9 μg/g had an increase of 0.009 SDS (standard error, SE=0.008) in length per month (equivalent to 0.29 mm at 18 mo); the corresponding coefficient for BMI was -0.002 (SE=0.01) (-0.003 kg/m^2 at 18 mo). Our results do not support the prior findings of an association of childhood length or BMI with DDE exposure.

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THE MEASUREMENT OF RACE. M Root (University of Minnesota, Minneapolis, MN 55455)

Epidemiologists often rely on self-reports to measure the value of a predictor or outcome variable. In most cases, the self-reports are proxies, and their accuracy rests on how well they match an objective measure of the variable. However, in the case of a few widely used predictor variables, notably race, there is no objective measure to which the self-reports can be compared. A self report of race can be compared to any of a number of other measurements of race, but there is no reason why one of them should be taken to the proper reference standard or used to validate the self-report rather than another, or why a member's self-reported race rather than his mother's race should be taken to his actual rather than apparent race if the two are different. Without a reference standard, there is no way to measure the error in a count of the number of Blacks in the population or the accuracy of a report of a Black-White difference in the rate of a disease or disease-related death. I propose a method of establishing a reference standard for self-reports of race similar to one used in economics for variables like poverty and unemployment. While there are many different measures of poverty, some absolute and others relative, which is taken to be the reference standard, to measure a family's true or actual economic position, depends on the outcome whose variation within the population the variable is used to predict or explain. Race, according to my proposal, is not an intrinsic characteristic of members of a population anymore than poverty is, and a member's race can vary from one disease or disease-related death to another. As a result, a member can be White in relation to an inherited hemoglobin disease but Black in relation to high blood pressure. Such an approach to race can lead to more effective strategies for reducing racial disparities in health.

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PERCEIVED DISCRIMINATION AND STROKE MORTALITY: THE CHICAGO HEALTH & AGING PROJECT. *S Everson-Rose, C Clark, T Lewis, L Barnes, H Guo, S Lunos, D Evans, C Mendes de Leon (University of Minnesota, Minneapolis, MN 55414)

Perceived discrimination is implicated in adverse cardiovascular health outcomes but evidence linking discrimination to stroke risk is lacking. This study examined if elderly adults who report more discrimination are at increased risk of stroke mortality. Subjects were 3,653 participants without a history of stroke (60.9% black, 39.1% white; 61.9% female; mean age 76.9+6.2 years) from the Chicago Health and Aging Project, a longitudinal study of risk for Alzheimer's Disease and other chronic conditions of aging. Stroke mortality, ascertained through 12/31/05, was verified by data from the National Death Index. Mean follow-up was 7.7 years and 59 fatal strokes occurred. Perceived discrimination was measured by a 9-item scale assessing frequency (never=0 to often=3) of subjective experiences of unfair treatment and personal rejection. A discrimination score is obtained by summing across items [mean, 3.6+3.9, range, 0-27]. In a Cox model adjusted for age, sex and race, each 1-point higher discrimination score related to a significant 7% increased risk of stroke mortality [hazard ratio (HR)=1.07, 95% confidence interval (CI)=1.01-1.13], and was little changed with further adjustment for education, systolic blood pressure, body mass index, physical activity, smoking and chronic conditions [HR=1.06, 95% CI=1.0-1.13]. Secondary analyses showed discriminatory experiences related to personal rejection had the strongest relation to stroke death. Greater experiences of perceived discrimination contributed to excess risk of fatal strokes in this cohort of black and white elders. Research is needed to determine factors that may explain how the experience of discrimination confers increased stroke risk.

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RACIAL/ETHNIC RESIDENTIAL SEGREGATION AND SELF-REPORTED HIGH BLOOD PRESSURE AMONG US- AND FOREIGN-BORN BLACKS IN NEW YORK CITY. *K White, L N Borrell, D Wong (Columbia University, New York, NY 10032)

Efforts to explain the excess burden of high blood pressure among blacks have emphasized individual- and neighborhood-level characteristics. However, few studies have examined the additional role of racial/ethnic residential segregation. Further, research exploring the role of residential segregation by nativity status has been limited. This study investigated the association between residential segregation and self-reported high blood pressure among US- and foreign-born blacks. Individual-level data obtained from the 2002 and 2005 New York City Community Health Survey (n=4,952) was linked to 2000 US Census data, which was used to define racial/ethnic residential segregation, operationalized as Wong's local index. Prevalence odds ratios (OR) and 95% confidence intervals (CI) were estimated using a multilevel logistic model controlling for individual- and area-level covariates. The prevalence of high blood pressure for US-born blacks and foreign-born blacks was 36.1% and 29.8%, respectively. In the fully adjusted model, there was no evidence in support of an association between residential segregation and self-reported high blood pressure among US-born blacks. Older foreign-born blacks residing in highly segregated neighborhoods had a lower odds of reporting high blood pressure (OR: 0.59; 95% CI: 0.48, 0.74) compared to their counterparts residing in less segregated areas. The findings underscore the need to consider the differential impact of residential segregation by nativity status. Future studies should explore psychosocial mechanisms and features of specific neighborhood characteristics that are important for understanding the pathway between residential segregation and health.

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SOCIOECONOMIC POSITION AND MORTALITY: FOR WHOM IS THERE A GRADIENT? *A Nuru-Jeter, E Backlund, N Johnson, N Adler (University of California, Berkeley, CA 94720)

Previous studies have not adequately accounted for the intersection of race with socioeconomic position and other relevant confounders, making assessments of racial differences in mortality uncertain. We use the National Longitudinal Mortality Study (NLMS) to examine statistical evidence for a continuous education-mortality gradient across 12 age-race-gender subgroups. The NLMS is a nationally representative multiple cohort prospective study of the non-institutionalized US population. We used Cox proportional hazards to examine the relationship between the education and mortality in black and white men and women: 25-44, 45-64, and 65-84 years of age. Several socioeconomic measures were used as control variables. Two measures of risk, the adjacent risk ratio and the cumulative risk ratio, and their associated 95% confidence intervals were used to quantify the effect of education on mortality risk across age-race-gender groups. Racial differences were found for men 45-64 years old (p=.03) and for both men and women 65-84 years old (p=.00). White men of both age groups show a continuous inverse education mortality relation: among 45-64 year olds, high school and college are important milestones whereas high school is an important milestone for the older age group. Blacks show an effect at high school for the younger age group and college for the older age group; elsewhere along the education continuum the slope is zero. There is no effect of education on mortality for black women whereas some college and college are important milestones for white women. These new findings highlight the importance of considering multiple and synergistic social adversities and helps identify group-specific vulnerabilities that have not been previously observed.

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MATERNAL PESTICIDE EXPOSURE AND NEURAL TUBE DEFECTS IN OFFSPRING. *J Brender, M Felkner, L Suarez, M Canfield (Texas A&M Health Science Center, College Station, TX, 77843)

Few studies have investigated the relation between maternal environmental exposures to pesticides and neural tube defects (NTDs) in offspring, and none of these included biomarkers of pesticide exposure. In a case-control study of 184 Mexican-American women with NTD-affected pregnancies and 225 comparison women, in-person interviews solicited information about environmental and occupational exposures to pesticides during the periconceptional period. Blood and urinary specimens for pesticide biomarkers were collected at the one-year anniversary date of conception to account for seasonal variations of exposures. With adjustment for maternal education, smoking, and folate intake, women who reported using pesticides around the home or on their yards, lawn, or garden were two times more likely to have NTD-affected pregnancies than women without these reported exposures. Women with NTD-affected pregnancies were also more likely to report living within one quarter mile of cultivated fields than control-women (odds ratio [OR] 3.6, 95% confidence interval [CI] 1.7, 7.6). As types of reported pesticide exposure opportunities increased, risk of NTDs in offspring also increased. The adjusted ORs and 95% CIs for one, two, and three or more types of exposures were 1.2 (0.69, 1.9), 2.3 (1.3, 4.1) and 2.8 (1.2, 6.3) respectively. No associations were noted between the presence of the pesticide metabolites measured in maternal blood and urine and NTDs in offspring. In conclusion, self-reported pesticide exposures were associated with NTD risk in this study population, but this finding was not corroborated by biomarkers measured one year post-conception.

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PARENTAL OCCUPATIONAL EXPOSURE TO ENDOCRINE DISRUPTING CHEMICALS AND RISK OF HYPOSPADIAS. *N Nassar, P Abeywardana, A Barker, C Bower (Telethon Institute for Child Health Research, University of Western Australia, WA, Australia)

Hypospadias is a uro-gential birth defect affecting infant boys. Periconceptual parental occupational exposure to endocrine disrupting chemicals (EDCs) with oestrogenic or anti-androgenic properties may adversely affect male genital development in-utero. The aim of this study was to assess the association between parental occupational exposure to EDCs and hypospadias. We analysed data from a case-control study of 1202 hypospadias cases born in Western Australia, 1980-2000 and 2583 randomly selected male controls without hypospadias. Parental occupational exposure to 7 categories of EDCs was assigned to individual job titles by applying a hypospadias job-exposure matrix. A two-level logistic random effects model taking into account confounders and family level clustering amongst siblings was used to assess association between exposure to each EDC and risk of hypospadias. There was a strong association with maternal occupational exposure to heavy metals (OR=2.6; 95% CI 1.3-5.2) and an elevated risk of hypospadias with exposure to phthalates (OR=1.2; 95% CI 0.8-1.7). Maternal occupational exposure to heavy metals, pesticides, alkylphenolic and bi-phenolic compounds magnified the risk among infants diagnosed with moderate-severe hypospadias. Paternal occupational exposure to bi-phenolic (OR=1.6; 95% CI 0.96-2.6) or polychlorinated organic compounds (OR=1.3; 95% CI 1.0-1.8) was associated with non-significant, but increased odds of hypospadias. Findings provide preliminary evidence of potential risk of hypospadias with exposure to oestrogenic properties of EDCs. As exposure classification using job titles was crude, further studies with detailed parental occupational exposure assessment are required.

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RACIAL AND ETHNIC DISPARITIES IN WORK-RELATED INJURIES AND SOCIO-ECONOMIC RESOURCES AMONG NURSING ASSISTANTS EMPLOYED IN US NURSING HOMES. SangWoo Tak*, T Alterman, S Baron, G M Calvert (NIOSH/CDC, Cincinnati, OH 45226)

Background: Nursing assistants comprise the vast majority of the direct care workforce in nursing homes. Although previous studies have documented high rates of work-related injury among nursing assistants, little is known about how these rates and other nursing assistant job characteristics vary by race and ethnicity. Methods: The 2004 National Nursing Assistant Survey (NNAS) data were analyzed to estimate the prevalence of work-related injuries by race and ethnicity. Adjusted prevalence ratios (APRs) were estimated using a generalized linear model with a Poisson distribution assumption. Results: A total of 2,880 working nursing assistants in 485 randomly sampled nursing home facilities in 2004 were included in this study. These represent approximately 677,000 US NAs. Injury with the highest prevalence among NAs was 'scratch, open wounds, or cuts' (44%) followed by 'back injuries' (17%) and 'black eyes or other types of bruising' (16%). The prevalence of 'human bites' was 12% representing 77,882 US NAs in nursing homes. The APR for back injury was 0.76 for non-Hispanic black NAs (95% confidence interval [CI]: 0.59–0.98) compared to non-Hispanic white NAs. APRs for human bites was 0.47 for non-Hispanic black (95% CI: 0.36-0.62), 0.72 for Hispanic (95% CI: 0.55-0.95), and 0.51 for other racial and ethnic groups (95% CI: 0.34-0.78), compared to non-Hispanic white NAs. Conclusions: Minority racial and ethnic groups were less likely to report having experienced injuries and more likely to report intention to leave, compared with non-Hispanic white NAs. This may be due to the difference in the nature of their jobs and the extent of their engagement in assisting patients with their activities of daily living. Future research should focus on identifying preventable risk factors so that injuries can be avoided and equity among racial and ethnic groups attained.

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POSTDEPLOYMENT HOSPITALIZATION EXPERIENCE OF SERVICE MEMBERS DEPLOYED IN SUPPORT OF THE WARS IN IRAQ AND AFGHANISTAN. *I G Jacobson, MPH, T C Smith, MS, PhD, C A LeardMann, MPH, B Smith, MPH, PhD, M A K Ryan, MD, MPH (Naval Health Research Center, San Diego, CA 92106)

Significant public and veteran concern exists over the health impact of military deployments to Iraq and Afghanistan. This study investigates morbidity among deployers by comparing postdeployment hospitalizations to both predeployment hospitalizations and hospitalizations of nondeployed service members. To compare postdeployment with predeployment morbidity, we examined active-duty military personnel who deployed for the first time in support of the wars in Iraq and Afghanistan in 2003 or 2004 and had at least 12 months of service prior to deployment. We also compared postdeployment hospitalizations to hospitalizations of personnel serving on active-duty from May 2002 through May 2004 without a deployment from September 2001 through August 2006. This historical prospective investigation utilized Cox's proportional hazards time-to-event modeling. Hospitalizations for any cause and hospitalizations based on 14 broad diagnostic categories were examined. After adjusting for demographic and occupational variables, the postdeployment risk for any-cause hospitalization was higher in comparison with predeployment (HR, 1.57; 95% CI, 1.48-1.66), but lower in comparison with nondeployers (HR, 0.95, 95% CI, 0.92-0.98). These findings highlight an increased postdeployment rate of hospitalization when compared to predeployment rates in an active-duty military population, which became consistent with rates of the general active-duty military after return from deployment. Increased risk of hospitalization over a diverse set of health outcomes does not suggest a single etiology of health problems associated with deployment but may instead be explained by a significant health care shift after the 1991 Gulf War, including postdeployment screening and pressure on military leaders to encourage medical evaluation among deployers for conditions they may have previously dismissed.

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BENZENE EXPOSURE AND NON-HODGKIN LYMPHOMA: A META-ANALYSIS. *D D Alexander, M E Wagner, M Kelsh (Exponent Health Sciences, Wood Dale, IL 60191)

Numerous epidemiologic studies have investigated the possible relationship between benzene exposure and non-Hodgkin lymphoma (NHL); however, the findings have been unclear. Thus, to clarify any potential association, we conducted a meta-analysis of cohort and case-control studies that were published through 2008. The methodology of all studies was systematically examined, and the studies were tiered based on their relative quality and likelihood of exposure. Sub-group analyses were conducted by design, exposure metric, occupational group, and study quality. Random effects models were utilized to generate summary relative risk estimates (SRRE), and sensitivity analyses were conducted to examine potential sources of heterogeneity. In our overall model, we included data for cumulative exposure, as this metric reflects both intensity and duration. If data for cumulative exposure were not available, the estimate representing the greatest likelihood of exposure was included. The SRRE for the overall model consisting of 6 cohort, 2 nested case-control, and 13 case-control studies was 1.12 (95% CI: 0.95-1.32; p-value for heterogeneity = 0.70). In the meta-analysis of cohort and nested case-control studies only, the SRRE was 1.09 (95% CI: 0.78-1.54; p-value for heterogeneity = 0.57), while the SRRE for the case-control studies only was 1.13 (95% CI: 0.94-1.37; p-value for heterogeneity = 0.58). The reporting of exposure metrics and analytical cut-points were highly variable across studies, thus, limiting analyses. Despite this heterogeneity, no consistent patterns of associations were evident across metrics such as cumulative exposure or intensity. In summary, the results from this quantitative review and meta-analysis do not support an independent association between benzene and NHL.

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NEW-ONSET HYPERTENSION ASSOCIATED WITH COMBAT DEPLOYMENT IN MILLENNIUM COHORT ACTIVE-DUTY, RESERVE AND NATIONAL GUARD MEMBERS. *N Granado, T Smith, M Swanson, R Harris, E Shahar, B Smith, E Boyko, T Wells, M Ryan (Naval Health Research Center, San Diego, CA 92106)

Introduction: Combat deployments present unique stressors to military members. Although stress is postulated to increase blood pressure, little is known regarding a potential role in the development of acute or chronic hypertension. Our objective was to determine the relationship between combat deployment-induced stress and newly-reported hypertension. Methods: A representative sample of multiservice active-duty and Reserve/National Guard members was invited to participate in a 21-year longitudinal study, The Millennium Cohort Study. A total of 77,047 participants completed the baseline questionnaire (2001-2003), while 55,021 completed the first follow-up questionnaire (2004-2006). Multivariable logistic regression was used to estimate the 3-year risk of new-onset hypertension, adjusting for general health, demographics, and occupational and behavioral characteristics. Results: Newly-reported hypertension was identified in 5.7% of deployers and 6.0% of deployers with combat exposures, within the 3-year period. After adjusting for potential confounding, deployers reporting combat exposures were 1.28 times (95% confidence interval, 1.04-1.57) more likely to report incident hypertension compared with deployers not reporting combat exposures. Conclusion: Deployment with reported stressful combat exposures appears to be a unique risk factor for new-onset self-reported hypertension even after adjusting for potential confounding. Future follow-up of this cohort to understand if this becomes chronic and studies evaluating deployment and hypertension diagnosis through blood pressure measurements are recommended.

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GENETIC-ENVIRONMENTAL INTERACTIONS FOR RIGHT- AND LEFT-SIDED COLORECTAL CANCER. B Iacopetta, J Heyworth, J Girschik, F Grieu, C Clayforth, *L Fritschi (Western Australian Institute for Medical Research, Perth, Australia)

It has proven difficult to determine risk factors for colorectal cancer. One reason for this is that risk factors for proximal (right-sided) colon cancers may be different to those of distal colon and rectal (left-sided) cancers if these tumours develop along distinct pathways. The aim of our population-based case-control study was to determine whether there were gene-environment interactions which differed in the left and right colon. We had 859 incident cases of CRC and 973 sex and age-matched controls. Information on dietary folate and alcohol intake was obtained from food frequency questionnaires and information on the anatomical site of tumours from pathology reports. DNA was collected using FTA cards and genotyping performed for MTHFR C677T and ΔDNMT3B C-149T polymorphisms (two genes involved in cellular methyl group metabolism). The MTHFR 677 T allele was associated with increased risk for proximal colon cancer (Adjusted Odds Ratio (AOR)=1.29) but decreased risk for distal cancers (AOR=0.87). The increased risk for proximal cancers was stronger in older individuals (AOR=1.49) and those with a low folate diet (AOR=1.67) or high alcohol consumption (AOR=1.90). The ΔDNMT3B -149 TT genotype was protective against proximal colon cancers (AOR=0.65), but we found no association with the risk of distal colon and rectal cancers (AOR=1.02). Epidemiological studies on dietary and genetic risk factors for CRC should take into account the anatomic site of the tumour.

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PESTICIDE EXPOSURE AND RISK OF MONOCLONAL GAMMOPATHY OF UNDETERMINED SIGNIFICANCE (MGUS) IN THE AGRICULTURAL HEALTH STUDY. O Landgren, R A Kyle, J A Hoppin, L E B Freeman, J R Cerhan, J A Katzmann, S V Rajkumar, *M Alavanja (Division of Cancer Epidemiology and Genetics, National Cancer Institute, NIH, Bethesda, MD 20892)

Background: For the first time, we assessed the risk of monoclonal gammopathy of undetermined significance (MGUS), a precursor of Multiple Myeloma (MM), among pesticide applicators. Methods: We selected 678 men (30-94 years) from a well-characterized prospective cohort of pesticide applicators from Iowa and North Carolina (Agricultural Health Study). Serum samples from all subjects were analyzed by electrophoresis. Age-adjusted prevalence estimates of MGUS were compared with MGUS prevalence in 9,469 men from Minnesota. Associations between pesticide exposures and MGUS prevalence were assessed by logistic regression models. Results: Among study participants 50 years or older (n=555), 38 were found to have MGUS, yielding a prevalence of 6.8% (95% CI, 5.0-9.3). Compared with men from Minnesota, the age-adjusted prevalence of MGUS was 1.9-fold (95% CI, 1.3-2.7) higher among male pesticide applicators. Among applicators, a 5.6-fold (95% CI 1.9-16.6), 3.9-fold (95% CI 1.5-10.0), and 2.4-fold (95% CI 1.1-5.3) significantly increased risk of MGUS was observed among users of the chlorinated insecticide dieldrin, the fumigant mixture carbon-tetrachloride/carbon disulfide, and the fungicide chlorothalonil, respectively. Conclusions: The prevalence of MGUS among pesticide applicators was twice that in a population-based sample of men from Minnesota, adding support to the hypothesis that specific pesticides are etiologically linked to myelomagenesis.

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SOCIAL FACTORS AND PROSTATE CANCER IN FRANCE: A STUDY OF 11 REGIONAL CANCER REGISTRIES. *G D Datta, C Delpierre, J Jegu, P Grosclaude (Harvard School of Public Health, Boston, MA 02115)

Background: Studies have suggested that social factors might be associated with stage at diagnosis and treatment for prostate cancer. The present study aims to assess these associations in a universal health care setting to better distinguish between the influence of primary and secondary health care access. Methods: Data was collected from a random sample of 2185 prostate cancer patients diagnosed in 2001 from 11 cancer registries throughout France. Because data on the individual-level socioeconomic status (SES) are not available from registries, we used neighborhood-level educational attainment and income as SES indicators. We used $\chi 2$ analysis to assess differences in stage of diagnosis and logistic regression models to assess the receipt of radical prostectomy. Results: No association was found between stage at diagnosis and either SES indicator. However, after adjusting for age, stage, Gleason score, PSA level, medical sector, and comorbidities we found people in neighborhoods with the fewest ($\leq$75.9%) residents with at least elementary education were less likely to receive radical prostectomy that those in neighborhoods with the most ($\geq$86.9%) (Odds ratio: 0.67, 95% confidence interval: 0.45-0.99). No association was found with income. Conclusions: Unlike what has been found in some non-universal health care settings, we observed no differences in stage at diagnosis according to social factors. However, neighborhood-level educational status was associated with the receipt of radical prostectomy. These results suggest, in the case of prostate cancer, differential secondary access to healthcare in France. Future studies are necessary to further elucidate possible causes.

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A COMPARATIVE STUDY OF CANCER RISK FACTORS BETWEEN THE MANITOBA (CANADA) INDIGENOUS AND NON-INDIGENOUS POPULATIONS. *B Elias, M Hall, E Kliewer, S Hong, A Demers, D Turner, P Martens, J Griffiths, P Czakowski, S Bruce (University of Manitoba, Winnipeg, MB, Canada R3P 3P4)

The burden of cancer is increasing in the Canadian First Nations population. While genetic factors explain some of the risk, behavior risk factors, health status, and use of cancer screening explain most of the risk. To determine the difference in risk between the First Nation and Canadian population of one province (Manitoba), estimates were compared. Two survey datasets were used to explore cancer risk factors. The Manitoba Indigenous population (MIP) was drawn from the Manitoba First Nations Regional Longitudinal Health Survey (2002). The survey included First Nations women (55%) and men (45%), aged 18 and older, residing in non-urban on-reserve communities. A comparison sample of Manitobans aged 20 and older was drawn from the 2003 Canadian Community Health Survey, which excluded residents of on-reserve communities. SUDDAN software was used to calculate weighted percentages and 95% confidence intervals. Major socio-demographic differences were found for the MIP sample, such as age (younger), marital status (a higher proportion of widowed/separated), lack of high school completion, lower employment levels, lower reporting of excellent/good health status, and a more than three times greater prevalence of diabetes. In terms of risk behaviors, the MIP consumed less fruits and vegetables, were more likely to report having no physical activity, were more likely to be obese, and were far more likely than the non-Indigenous sample to engage in cigarette smoking and binge drinking. Regardless of the discrepancy in risk behaviors, MIP women were less likely than non-Indigenous women to have had a mammogram in the previous five years, and were also less likely to have had a pap smear in the previous three years.

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* = Presenter; S = The work was completed while the presenter was a student

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DIAGNOSTIC X-RAY EXPOSURES AND RISK OF CHILDHOOD ACUTE LEUKEMIA. *K Bartley, C Metayer, S Selvin, J Ducore, P Buffler (School of Public Health, University of California, Berkeley, CA 94704)

While in-utero ionizing radiation exposure is an established risk factor for childhood leukemia, risk for postnatal exposure is not well characterized. We examined the association between history of postnatal diagnostic X-rays and acute leukemia in a Northern California population-based case-control study (1995-2008). Analyses included 711 acute lymphoblastic leukemia (ALL) and 116 acute myelogenous leukemia (AML) cases, and 1106 controls, matched on age, sex, Hispanic ethnicity, and maternal race. History of child's X-ray exposure, including number, area of the body, and age at first X-ray, was obtained from the biological parents. Conditional logistic regression was used to obtain odds ratios (ORs) and 95% confidence intervals (CI). Analyses were adjusted for household income. A statistically significant elevated risk of ALL was observed in children ever exposed to X-rays (OR = 1.45, 95% CI = 1.16, 1.81) with increased risk observed for each additional X-ray (OR = 1.17, CI = 1.10, 1.25). Children receiving chest X-rays had a borderline significant increased risk (OR = 1.39, CI = 1.0, 1.94). No associations were observed for other areas of the body X-rayed. Analyses by immunophenotype showed an increased risk for B-cell ALL (OR = 1.86, CI = 1.42, 2.46) but not for T-cell ALL. Analyses by cytogenetic subtype (chromosomal abnormalities), showed no differences in risk. Lastly, age at first X-ray exposure was not associated with ALL. No increased risk was observed for AML for any measure of X-ray exposure. Our data suggest that exposure to postnatal diagnostic X-rays increases risk of childhood ALL, but not AML, and that number of X-rays received is an important predictor.

190-S

TEMPORAL COMPARISON OF ANALYSES USING CORRELATION COEFFICIENTS FOR ESTIMATING ASSOCIATIONS IN ECOLOGIC STUDIES OF CANCER ETIOLOGY: A SYSTEMATIC REVIEW. *T Powell, M Pendurthi, R Ojha, E Evans, L Fischbach (University of North Texas Health Science Center, Fort Worth, TX 76107)

We investigated if the use of correlation coefficients for estimating ecologic associations has attenuated since the formal promotion of linear and Poisson regression for estimating ecologic rate ratios (RRs) in 1998 (Modern Epidemiology, 2nd edition). A systematic review of the literature using PubMed without language restrictions was conducted in duplicate to identify ecologic studies of cancer etiology published from January 1989-December 2008. Studies that used individual-level data were excluded. Data regarding the analytic methods used to estimate ecologic associations (correlation coefficients, linear regression to estimate variance, and linear or Poisson regression to estimate RRs) were abstracted from all eligible studies. The proportion of studies that used correlation coefficients from 1989-1998 were compared to the proportion that used correlation coefficients from 1999-2008 using a chi-square test. The systematic review yielded 219 eligible ecologic studies of cancer etiology (1989-1998: 87, 1999-2008: 132). A total of 21 studies from 1989-1998 and 27 studies from 1999-2008 used correlation coefficients for estimating ecologic associations (24.1% vs. 20.5%, respectively; p=0.52). Our analyses indicate that the use of correlation coefficients for estimating associations in ecologic studies of cancer etiology has not considerably decreased since 1998. The use of correlation coefficients in ecologic studies of cancer etiology may undermine hypothesis screening because of inability to estimate magnitude of effect and inability to control for ecologic confounders.

191-S

BODY SIZE, RECREATIONAL PHYSICAL ACTIVITY AND B-CELL NON-HODGKIN LYMPHOMA RISK AMONG WOMEN IN THE CALIFORNIA TEACHERS STUDY. *Y Lu, J Prescott, L Bernstein (University of Southern California, Los Angeles, CA 90089)

Few risk factors have been identified for non-Hodgkin lymphoma (NHL), an etiologically and clinically heterogeneous group of lymphoid malignancies. Nutritional status and physical activity are known to alter immune function, suspected as relevant to lymphomagenesis. We explored the relations of body size measures, recreational physical activity and subsequent development of NHL in the prospective California Teachers Study. Between 1995 and 2005, 478 women were diagnosed with incident B-cell NHL among 121,216 eligible cohort members aged 22 to 84 years old at baseline. Multivariate adjusted relative risks (RR) and 95% confidence intervals (CI) were estimated by fitting Cox proportional hazards models for all B-cell NHL combined as well as the 3 most common subtypes: diffuse, large B-cell lymphomas (DLBCL); follicular lymphomas (FL); and B-cell chronic lymphocytic leukemias/small lymphocytic lymphomas (CLL/SLL). Height was positively associated with all B-cell NHL combined (p for trend=0.001) and the CLL/SLL subtype (p for trend=0.02), weakly associated with DLBCL, and not associated with FL. No associations were observed for weight, body mass index (BMI, kg/m2), waist circumference, hip circumference, and waist/hip ratio, lifetime or past 3 years recreational physical activity. However, obese women (BMI > 30 kg/m2) had an increased risk of NHL that was of borderline statistical significance (RR=1.28, 95%CI=0.99-1.67) relative to women with a normal BMI (BMI of 20-24.9 kg/m2). These finding indicate that greater height which may reflect early life immune function, infectious exposures, nutrition, or growth hormone levels may play a role in NHL etiology.

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POLYMORPHISMS IN HOGG1 AND XRCC1 AND RISK OF PROSTATE CANCER: EFFECTS MODIFIED BY PLASMA ANTIOXIDANTS. *J Zhang, I Dhakal, G Greene, N Lang, F Kadlubar (University of Arkansas for Medical Sciences, Little Rock, AR 72205)

Accumulating evidence indicates that oxidative stress plays a role in prostate carcinogenesis. This study thus investigated whether polymorphisms in genes involved in the repair of oxidative DNA damage modulate and/or interact with antioxidants to influence prostate cancer risk in a population-based case-control study in Central Arkansas. Cases (n=193) were men, aged 40-80 years, diagnosed with prostate cancer in three major hospitals in 1998-2003, and controls (n=197) were matched to cases by age, race, and county of residence. After adjustment for confounders, subjects who were heterozygous or homozygous for the variant allele of the human oxoguanine glycosylase 1 (hOGG1) Ser326Cys polymorphism appeared to experience a lower risk of prostate cancer than those who were homozygous for the wild-type allele (odds ratio (OR) = 0.72, 95% confidence interval (CI): 0.46, 1.10). Conversely, a significant increased risk was observed for individuals who carried one or two copies of the variant allele of the X-ray repair cross-complementing group 1 (XRCC1) Arg399Gln polymorphism, compared with those who only harbored the wild-type allele (OR = 1.56, 95% CI: 1.01, 2.45). The above associations were generally more pronounced among subjects with low plasma carotenoids or α-tocopherol (< by modified effects these cancer prostate susceptibility influences damage DNA oxidative repairing capacity the in variability suggesting data intriguing but preliminary offers study 5.07). 1.40, CI: 95% (OR="2.64," risk elevated two-fold over an conferred allele 399Gln XRCC1 copy one least at possession l), μg

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COFFEE AND TEA CONSUMPTION AND RISK OF HEAD AND NECK CANCERS. *C Bole, V Jayaprakash, M Platek, M E Reid, M Sullivan, T Loree, N Rigual, S Popat, K B Moysich (Roswell Park Cancer Institute, Buffalo, NY 14263)

Head and neck cancers are largely attributed to smoking and alcohol. Increasing attention is being placed on identifying foods with chemopreventive properties. Coffee and tea are believed to have anticarcinogenic activity. We conducted a hospital based case-control study to investigate their effects on risk of squamous cell carcinoma of the head and neck (SCCHN). The study population included adults 18-97 years old who received medical care at Roswell Park Cancer Institute (RPCI) between 1982 and 1998. Cases were 574 individuals with primary incident SCCHN, identified from the RPCI tumor registry and the Diagnostic Index. Controls were randomly selected from a large pool of patients not diagnosed with benign or malignant neoplasms and 1-1 matched to cases on age, gender and smoking. We collected detailed information on coffee and tea consumption and potential confounders. Crude and adjusted odds ratios (OR) and 95% confidence intervals (CIs) were calculated using unconditional logistic regression. No association was observed between higher coffee use and SCCHN (OR=1.16, 95% CI 0.81-1.65). Higher consumption of decaffeinated coffee was significantly associated with lower risk (OR=0.64; 95% CI 0.47-0.87). This effect was stronger among women (OR=0.43, 95% CI 0.24-0.77) than men (OR=0.74, 95% CI 0.51-1.07). Stratifying on smoking status, significant risk reductions were observed among former smokers (OR=0.56, 95% CI 0.38-0.86). No significant associations were noted for tea consumption. Our findings suggest that decaffeinated coffee consumption is associated with lower risk of SCCHN, whereas regular coffee and tea intake was not associated with SSCHN.

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P73 G4C14-TO-A4T14 GENE POLYMORPHISM AND INTERACTION WITH P53 EXON 4 ARG72PRO ON CANCER SUSCEPTIBILITY: A META-ANALYSIS OF THE LITERATURE. *E De Feo, R Kamgaing, S Benedetto, K Matsuo, G Li, G Ricciardi, S Boccia (Institute of Hygiene, Università Cattolica del Sacro Cuore, Rome, Italy)

P73 gene (1p36-33) has been involved in cancer development through cell growth inhibition by inducing apoptosis in a p53-like manner. As p73 gene is highly polymorphic, several studies have investigated the association between the p73 G4C14-to-A4T14 dinucleotide polymorphism and cancer risk with conflicting results. Additionally, few of them considered interaction between this polymorphism and demographic factors or other polymorphisms like p53 exon4 Arg72Pro as potential effect modifiers. We have carried out a meta-analysis of 16 case-control studies looking at the relationship between p73 G4C14-to-A4T14 polymorphism and cancer risk and found that homozygous variant genotype individuals have a borderline increased risk of cancer in any site [Odds Ratio(OR)=1.28 (95%CI:0.98-1.67)]. The stratified meta-analyses according to tumour site showed a borderline statistically significant increased gastric cancer risk [OR= 1.41(95%CI: 0.88-2.25],while substantial lack of association was observed for lung and oesophageal cancer. No effect modification of p73 homozygote genotype by age, gender or ethnic group on cancer risk emerged from the subgroup meta-analyses. By stratifying p73 homozygous variant genotype according to p53 exon 4 status, a 2.15-fold increased cancer risk [OR=2.15(95%CI:1.27-3.64)] was observed for individuals both p73 variant homozygotes and p53 exon 4 heterozygotes if compared with wild type p73 allele carriers, suggesting biological synergism among the two polymorphisms. Further studies looking at p73 G4C14-to-A4T14 and p53 exon4 Arg72Pro interaction on cancer risk are required to confirm our findings.

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BODY SIZE, IGF AND GROWTH HORMONE POLYMORPHISMS, AND PREMALIGNANT COLORECTAL LESIONS IN MEN AND WOMEN. *K J Wernli, Y Wang, K W Makar, A Burnett-Hartman, M Shadman, Y Zheng, M Mandelson, P A Newcomb (Fred Hutchinson Cancer Research Center, Seattle, WA 98109-1024)

Body size and growth hormones are involved in the development of colorectal cancer, and possibly premalignant lesions. We examined the association between colorectal polyp risk with body size factors and candidate genetic polymorphisms in insulin-life growth factor (IGF1), IGF binding-protein 3 (IGFBP3), IGF1 receptor, and growth hormone (GH1). Cases with colorectal adenomas or hyperplastic polyps and controls with normal colonoscopy findings aged 20-74 years were recruited among patients of a large integrated health plan (Group Health Cooperative, Washington) who underwent colonoscopy December 2004-September 2007. Odds ratios (OR) and 95% confidence intervals (CI) were calculated using multivariate polytomous regression. Among men, increasing body mass index (BMI) was associated with an increased risk of colorectal adenomas (OR=1.8, 95% CI 1.1-2.9 for BMI>30 kg/m2), but this was not observed with hyperplastic polyps. Similarly, women had an increased risk of colorectal adenomas associated with increasing BMI (OR=1.7, 95% CI 1.1-2.5); there was no association with hyperplastic polyps. There was a reduced risk of hyperplastic polyps associated with the minor TT genotype for GH1 (OR=0.6, 95% CI 0.3-1.0) among men. There were no other statistically significant associations among men. Women with colorectal adenomas had a suggestion of a reduced risk associated with the TT genotype of GH1. There were also reductions in the risk of both colorectal adenomas (OR=0.6, 95% CI 0.3-1.3) and hyperplastic polyps (OR=0.6, 95% CI 0.4-1.0) associated with presence of G allele for IGF1 in women. There were no significant associations with IGF1 receptor or IGFBP3. These findings suggest that body size and polymorphisms within IGF-related genes might be associated with both colorectal adenomas and hyperplastic polyps for men and women.

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WITHDRAWN

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THE EFFECT OF METABOLIC CONDITIONS ON PROSTATE CANCER RISK: RESULTS FROM THE OLMSTED COUNTY STUDY. *L P Wallner, M E McGree, D J Jacobson, J L St. Sauver, S J Jacobsen, H Morgenstern, A V Sarma (University of Michigan, Ann Arbor, MI)

Research on metabolic syndrome and prostate cancer (PCa) etiology has yielded inconsistent results. Combining multiple components of the syndrome into a single variable may obscure the separate and combined effects of these metabolic components on PCa risk. The goal of this study was to determine if combinations of obesity, hypertension, and diabetes influence the development of PCa over 15 years of follow-up. In 1990, a randomly selected cohort of Caucasian men from Olmsted County, Minnesota, ages 40-79, was recruited. 2,445 men completed a questionnaire that included physician-diagnosed diabetes and hypertension. Anthropometric measures were collected during clinical examination. Biopsy-confirmed PCa in 207 men was identified from medical records. Proportional hazards regression was used to estimate the effects of these metabolic conditions, both individually and in combination, on the risk of PCa. Men with hypertension alone or in combination with diabetes were more likely to develop PCa than were men without any of the metabolic conditions. (Hazard ratio [HR] = 2.71, 95% confidence interval [CI]= 1.19, 6.17). Although obesity was not individually associated with PCa, obesity and hypertension interact to influence the risk of PCa (interaction p value: <0.01). A single indicator for the presence of all three conditions, the metabolic syndrome, was not associated with developing PCa (HR = 1.08; 95% CI = 0.27, 4.37). Our results suggest that it may not be sufficient to treat metabolic conditions as one variable when investigating the etiology of PCa in Caucasian men. Further research should focus on the separate and combined effects of these metabolic conditions in large samples.

198-S

FRUITS AND VEGETABLES, FIBER AND MICRONUTRIENTS AND HEAD AND NECK CANCER IN NORTH CAROLINA. *P T Bradshaw, A M Siega-Riz, M Campbell, M E Bell, J Smith, W K Funkhouser, M C Weissler, A F Olshan (University of North Carolina, Chapel Hill, NC 27599-7435)

Previous studies have reported a protective effect of fruit and vegetable consumption and micronutrient intake on risk of head and neck squamous cell carcinoma (HNSCC) yet few have examined differences across race or gender. We analyzed data from a population-based case-control study of 1,099 cases of HNSCC and 1,262 age, race and gender matched controls from Central and Eastern North Carolina with dietary assessment data gathered by food frequency questionnaire (FFQ). We estimated the association between intake of fruits and vegetables, fiber and micronutrients and HNSCC using unconditional logistic regression adjusting for matching factors and confounders and examined effect modification by race and gender. Overall, we found protective effects for total fruit intake [odds ratio (OR) highest vs. lowest quintile (95% confidence interval (CI)): 0.53 (0.38-0.74)], green vegetables [OR: 0.53 (0.38-0.74)], yellow vegetables [OR: 0.67 (0.49-0.93)], and citrus/melon/berries [OR: 0.46 (0.33-0.65)] as well as fiber [OR: 0.42 (0.28-0.60)], vitamin A [OR: 0.63 (0.44, 0.90)], alpha-carotene [OR: 0.53 (0.38-0.74)], beta-carotene [OR: 0.70 (0.50-0.97)], vitamin E [OR: 0.49 (0.33-0.72)], vitamin C [OR: 0.47 (0.33-0.67)] and selenium [OR: 0.42 (0.28-0.60)]. The effect of green vegetables was stronger among women compared to men and blacks compared to whites. Differences across gender were also noted for vitamin E and selenium, and across race for vitamin C and selenium, among others. Our findings underline the importance of intake of fruits and vegetables for prevention of head and neck cancer and suggest that the benefits may be greater among women and blacks.

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TRENDS IN ORAL AND PHARYNGEAL CANCER INCIDENCE – THE ROLE OF HUMAN PAPILLOMAVIRUS. *L M Brown, G Gridley, D Check, S Devesa (RTI International, Rockville, MD 20852)

Recent evidence suggests a role for human papillomavirus (HPV), the causal agent for cervical cancer, in the etiology of some cancers of the oral cavity and pharynx. We used data from the National Cancer Institute's Surveillance, Epidemiology, and End Results program to explore the temporal patterns of squamous cell carcinoma of the oral cavity and pharynx by race/ethnicity, sex, and presumed HPV status. Incidence data based on 56,334 patients (38,208 men, 18,126 women) were available for 1975-2005 for whites and blacks and for 1992-2005 for Hispanics/Latinos and Asian/Pacific Islanders. Total oral cavity and pharynx cancer age-adjusted incidence rates per 100,000 among black men peaked at 24.1 in 1986-90 and then declined markedly by 45% to 13.3 in 2001-05. Rates among white men peaked in 1981-85 at 12.8 before declining more gradually by 13% to 11.1 in 2001-05. Rates among females and among the other ethnic groups declined at paces intermediate to those of black and white males. In contrast, rates for HPV-related cancer (including base of tongue, tonsil, and oropharynx) rose 53% among white males, from 3.4 in 1975-80 to 5.2 in 2001-05, while HPV-unrelated rates declined. Among all other race/ethnic/sex groups, HPV-related cancer rates decreased less rapidly than HPV-unrelated rates. For most race/sex groups, the declines in oropharyngeal cancer incidence parallel the reductions in smoking prevalence and may also reflect decreases in alcohol consumption. The much smaller decline seen in total oropharyngeal cancer incidence rates among white men appears related to rising incidence of HPV-associated cancers.

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THE ASSOCIATION OF FOLATE CONCENTRATION IN NORMAL COLONIC EPITHELIAL TISSUE WITH PROXIMAL ADENOMATOUS POLYPS. *A Flood, Z Liu, J Mason, B Cash, A Schatzkin, A Cross, P Schoenfeld (University of Minnesota, Minneapolis, MN)

Folate has been implicated as a potential etiologic factor for colorectal cancer (CRC). Prior research has not adequately exploited concentrations of folate in normal colonic epithelial biopsies to examine the issue. We used univariate and multiple logistic regression models to estimate prevalence odds ratios (OR) for tissue concentration of folate and adenoma using subjects in a CRC screening study who were consecutive, asymptomatic, average-risk women aged 40-70 years who had been referred for CRC screening at four military medical centers. 1,593 eligible women were offered enrollment and 1,483 (93%) participated. All participants completed questionnaires prior to endoscopic procedure to assess potential confounding factors. Full colonoscopy was complete to the cecum in 98.7% (1463/1483) of the subjects. Of these, 813 (56%) had normal colonic tissue biopsies taken from the region of the splenic flexure. Colonoscopy identified 170 subjects with at least one adenoma. For adenomas generally, we observed only limited evidence of association across quintiles of tissue folate (OR=0.74, 95% CI 0.42-1.31for Q5 vs. Q1). We observed no differences in associations between advanced and non-advanced adenomas. This suggestive inverse association, however, was found only in the proximal colon (OR=0.61, 95% CI 0.30-1.23 for Q5 vs. Q1) as there was no evidence of association for the distal colon. These results provide limited support to the notion that increasing folate in tissue reduces risk of adenoma in the proximal colon, the subsite with greatest concentration of tumors showing aberrant methylation, but no evidence that tissue folate is related to risk in the distal colon.

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ASSOCIATION OF *CAVEOLIN-1* AND *-2* GENETIC VARIANTS AND POST-TREATMENT SERUM CAVEOLIN-1 WITH PROSTATE CANCER RISK AND OUTCOMES. *W J Langeberg, S A Tahir, Z Feng, E M Kwon, E A Ostrander, T C Thompson, J L Stanford (Fred Hutchinson Cancer Research Center, Seattle, WA)

Caveolin-1 (cav-1) is overexpressed and secreted by metastatic prostate cancer (PC) cells. Pre-operative serum cav-1 levels have been shown to be a prognostic marker for PC recurrence. This study evaluated the relationship between post-treatment serum cav-1 levels and single nucleotide polymorphisms in the *cav-1* and *-2* genes with risk of PC, aggressive PC, and PC recurrence or death. Two population-based case-control studies of PC among Caucasian and African-American men in Washington were combined for this analysis. Cases (n=1,458) were diagnosed in 1993-96 or 2002-05 and identified via a cancer registry. Age-matched controls (n=1,351) were identified via random digit dialing. Cav-1 was measured in post-treatment serum for 202 cases and 226 controls. Logistic regression assessed the relationship between exposures and PC risk and aggressive PC. Cox proportional hazards regression assessed the relationship between exposures and PC recurrence and death. Rs9920 in cav-1 and rs17138765 in cav-2 were associated with risk of overall PC and aggressive PC, but not with PC recurrence or death. High post-treatment serum cav-1 levels were not associated with PC risk, aggressive PC, or PC-specific death, but approached a significant inverse association with PC recurrence (hazard ratio=0.69, 95%CI=0.47,1.00). We found modest evidence for associations with variants in the cav-1 and cav-2 genes and risk of overall PC and aggressive PC, which merit further study. We found no evidence that higher post-treatment serum cav-1 is associated with risk of aggressive PC or adverse PC outcomes.

202-S

RACIAL DISPARITIES IN RECURRENCE-FREE CERVICAL CANCER SURVIVAL IN KENTUCKY. *N Das, F D Groves, R C Gupta (University of Louisville, Louisville, KY 40202)

According to the American Cancer Society, there were approximately 11,000 new cases of cervical cancer and about 4,000 deaths in the United States in 2008. Based on the estimates of the SEER Program, the 5-year relative survival rates were 75% for White versus 67% for African-American women during 1996-2002. We investigated racial disparities in recurrence-free survival following presumptively curative treatment of cervical cancer. A total of 3,236 women were diagnosed with cervical cancer and reported to the Kentucky Cancer Registry during 1995–2005; 1,799 (1,643 White, 132 African-American, and 24 others) of these women were known to have remained disease free for at least a week following initial treatment. We used the Cox proportional-hazards method (SAS 9.1.3, PROC PHREG) to model recurrence-free survival. The risk of recurrence increased with age at diagnosis (Hazard Ratio [HR] =1.03 per year, 95% confidence interval, [CI] =1.02-1.04). African-American women had slightly but non-significantly elevated age-adjusted recurrence risks after follow-up for 18 months (9.09% versus 4.81%; Hazard Ratio [HR] =1.76, 95% confidence interval, [CI] =0.96-3.25), five years (9.85% versus 7.85%; HR=1.16; 95% CI =0.65- 2.05), and ten years (9.85% versus 8.46%; HR=1.07, 95% CI= 0.60- 1.89). Previous studies of racial disparities in cervical cancer survival have implicated differences in socioeconomic status, stage at diagnosis, and treatment. Future studies will adjust for these covariates as well as smoking. (Supported, in part, from Agnes Brown Duggan Endowment).

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LEAD TIME BETWEEN DIAGNOSIS AND TREATMENT OF CANCER IN KENTUCKY. *F D Groves, R C Gupta, (University of Louisville, Louisville, KY 40202)

It is generally recommended that cancer treatment be initiated within four to eight weeks of diagnosis; however, longer lead times have been documented in the literature, at least in Canada and the United Kingdom. We obtained data on lead times between diagnosis and treatment of breast, cervical, colorectal, lung, and prostate cancers during 1995-2005 from the Kentucky Cancer Registry. Time–to-treatment was modeled by Cox proportional hazards regression as a function of race (white, black, other, and unknown) and also, among whites, stratified by region of residence. Hazard ratios and 95% confidence intervals were calculated for time-to-treatment, censoring those who died at the date of death and those who were lost to follow-up prior to treatment at the date of last contact. Whites residing in the Louisville metropolitan region were the referent group to whom persons of other races, and Whites who resided in other regions, were compared. The proportions of patients in the Louisville region who remained untreated after four weeks of follow-up were <15% for colorectal cancer and female breast cancer, but >25% for cervical cancer, >35% for lung cancer, and >60% for prostate cancer. Time-to-treatment was almost always longer among Blacks than among Louisville Whites, with hazard ratios ranging from 0.76 for male lung cancer to 0.91 for prostate cancer. Only two outlying regions achieved shorter lead times between diagnosis and treatment than metro Louisville for female breast cancer, and only one outlying region achieved shorter lead times between diagnosis and treatment than metro Louisville for female colorectal cancer and male prostate cancer. Disparities in treatment times should be reduced and nonmedical interventions offered to those awaiting treatment.

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MALE BREAST CANCER IN THE VETERAN'S ADMINISTRATION HOSPITALIZATION DATABASE. *L Brinton, J D Carreon, G Gierach, K McGlynn, G Gridley (National Cancer Institute, Rockville, MD 20852)

The etiology of male breast cancer is largely unknown, reflecting its relative rarity. Although a number of previous studies have suggested relationships with various medical conditions, the results have largely derived from case-control studies and may reflect recall biases. Within the large Veterans Administration computerized database, we had the opportunity to access 26 million hospital discharge records over the period 1969-1996 and to relate various documented medical conditions to the risk of subsequent male breast cancer. This allowed us to calculate relative risks (RR) and 95% confidence intervals (CI) for conditions occurring one or more years after the initial hospitalization, adjusted for age, race, calendar year, duration of follow-up, and number of hospital visits. Among 4,500,936 men aged 18-100 years, a total of 642 cases of primary male breast cancer were identified (523 among whites, 119 among blacks). Medical conditions that were significantly related to risk were diabetes (RR=1.30, 95% CI 1.05-1.60), obesity (1.98, 1.55-2.54), orchitis and epididymitis (1.84, 1.10-3.08), Klinefelter syndrome (29.64, 12.26-71.68), and gynecomastia (5.86, 3.74-9.17). Additionally, among black patients, cholelithiasis emerged as a significant risk predictor (3.45, 1.59-7.47). Diseases that have previously been related to male breast cancer risk that were not supported by our study results included thyroid diseases, liver cirrhosis, prostatic hyperplasia, fractures, and smoking-related conditions. After adjustment for obesity, the association with diabetes disappeared, but that with gynecomastia persisted. In multivariate models that simultaneously considered all important medical risk predictors, significant RRs were seen for obesity (1.91, 95% CI 1.49-2.44), orchitis (1.80, 1.08-3.01), Klinefelter syndrome (16.83, 6.81-41.62) and gynecomastia (5.08, 3.21-8.03). These results support previous speculations that male breast cancer is influenced not only by tissue at risk, but also by hormonal and inflammatory factors.

* = Presenter; S = The work was completed while the presenter was a student

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MEASURING PROGRESS AND RACIAL/ETHNIC AND INCOME DISPARITIES IN SELECT HEALTHY PEOPLE 2010 CANCER OBJECTIVES. *R Tuteja, K Keppel, R J Klein (National Center for Health Statistics, CDC, Hyattsville, MD 20782)

Healthy People 2010 is a comprehensive health promotion and disease prevention agenda for the United States. With 467 objectives in 28 focus areas, Healthy People 2010 is designed to improve the health of all people during the first decade of the 21st century. Healthy People 2010's second goal calls for the elimination of disparities among population subgroups in several domains, including race and ethnicity, gender, and socioeconomic status. The Healthy People 2010 cancer focus area contains 15 objectives with national targets set for the year 2010. This presentation will focus on the 10 objectives related to cancer screening (pap test, mammogram, sigmoidoscopy) and mortality (cervical, breast, colorectal, lung, oropharyngeal, and prostate cancer, and melanoma) and assess progress toward meeting the national targets for the year 2010. Additionally, progress toward the elimination of racial/ethnic and income disparities in the cancer focus area will be assessed. Preliminary analyses indicate that most objectives have either met or are making progress towards the Healthy People 2010 targets. Preliminary analyses also indicate that statistically significant differences exist between the ''best'' subgroup and non-Hispanic Blacks and non-Hispanic Whites for 6 and 7 of the mortality measures, respectively. In addition, statistically significant racial and income disparities exist for screenings for cervical, breast and colorectal cancers, and disparities have changed over time for oropharyngeal cancer and sigmoidoscopy.

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BLACK:WHITE DISPARITIES IN US ESOPHAGEAL CANCER MORTALITY: SUCCESS AND A PARADOX. R Levine, *V Agboto, M Sanderson, N Briggs, S Chakrabarty, R Zoorob, P Hull (Meharry Medical College, Nashville, TN)

Using publically available National Center for Health Statistics mortality data from the CDC Wonder internet site, we observed that the national age-adjusted (15-85+ years) black:white mortality rate ratio for male esophageal cancer fell from 3.5 (23.4 per 100,000: 6.7 per 100,000) in 1979 to 1.1 (11.2:10.2) in 2005. Since symptomatic esophageal cancer is usually rapidly fatal, this seemed paradoxical in light of a report (Alcohol and Alcoholism 2007;41:125-130) showing a net decline for black:white esophageal cancer incidence of only 4.9 in 1979-1981 to 4.7 in 2000-2002 in the 9-registry SEER area. Restricting our observations to the same 9-registry SEER area, however, also showed a decline in black:white mortality rate ratios from 4.0 to 1.1, and Wonder data from the National Center for Cancer Registries showed a black:white incidence rate ratio of 1.6 (17.1/10.9) for 2000-2002. Also, national declines in age-adjusted black:white disparities were observed for other alcohol-related diseases, including alcohol dependence syndrome (4.1 (16.1:3.9) in 1979 to 1.2 (3.9:3.3) in 2005, and chronic liver disease 1.8 (54.3:30.1) in 1979 to 0.9 (20.9:22.4) in 2005, arguing against death certificate error as a source for esophageal cancer declines. These observations are consistent with: (a) operation of successful population-based social forces leading to decreased alcohol exposure, particularly among black men; (b) the hypothesis that racial disparities in mortality and incidence from esophageal cancer have independent determinants; (c) the hypothesis that 9-registry SEER incidence estimates are an artifact; and (d) increases in esophageal cancer mortality among white men.

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GENETIC RISK UNDERLYING TYPE 2 DIABETES IS ASSOCIATED WITH PROSTATE CANCER RISK. *B L Pierce, H Ahsan (The University of Chicago, Chicago, IL 60637)

INTRODUCTION: Epidemiologic research suggests that diabetes mellitus (DM) is associated with reduced prostate cancer (PCa) risk. However, the collective effects of recently identified type 1 (T1D) and type 2 diabetes (T2D) susceptibility variants on PCa risk are unknown. METHODS: We use data on 1,171 non-Hispanic white, PSA-screened, PCa cases and 1,101 matched controls from the Cancer Genetic Markers of Susceptibility (CGEMS) genome-wide association study to test associations between T1D and T2D genetic risk scores and PCa. Using 12 and 18 single nucleotide polymorphisms (SNPs) known to influence T1D and T2D, respectively, we generated a ''risk allele count'' and a ''genetic relative risk'' for both T1D and T2D for each participant. Logistic regression, adjusted for age and genetic ancestry (derived from principal components analysis), was used to estimate odds ratios (OR) and 95% confidence intervals (95% CI). RESULTS: The highest quartile of T2D risk (>20 risk alleles) was associated with reduced PCa risk (OR=0.77; 95% CI: 0.60-0.99) when compared to the lowest category (<17 risk alleles). As continuous measures, both T2D scores, but neither T1D score, showed an inverse association with PCa risk (p=0.004 and 0.01, respectively). Associations remained significant after excluding HNF1B SNP rs4430796 (a known PCa risk factor) from the analysis. For individual T2D SNPs, 14 of 18 had odds ratios <1 for the risk allele. CONCLUSION: These results support the hypothesis that the inverse association between DM and PCa is due, at least in part, to a protective effect of the T2D phenotype on PCa risk, rather than the effects of specific pleiotropic genes. Future studies of these DM variants and PCa risk should incorporate DM phenotype data.

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SURVIVAL OF PEDIATRIC AND ADOLESCENT OSTEOSARCOMA PATIENTS IN THE UNITED STATES AFTER ADJUVANT EXTERNAL BEAM RADIATION THERAPY. *R P Ojha, E L Evans, R Thertulien, L A Fischbach (University of North Texas Health Science Center, Fort Worth, TX 76107)

We evaluated whether adjuvant external beam radiation therapy (EBRT) improves survival among pediatric and adolescent osteosarcoma patients in the United States. Population-based data from 17 Surveillance, Epidemiology, and End Results registries representative of the United States were used to establish a cohort of patients aged 5-19 years diagnosed with primary osteosarcoma from 1975-2000 with follow-up through 2005, for whom prospectively collected treatment and survival data were available (n=332). Surgery was the standard treatment for all patients and the analyses compared patients who received adjuvant EBRT to patients who did not receive adjuvant EBRT. Cox proportional hazards regression was used to estimate the hazard ratios (HRs) with corresponding 95% confidence intervals (CIs) for all-cause and cause-specific mortality after controlling for age, year of diagnosis, grade, stage, and tumor location. The mortality rates were higher for pediatric and adolescent osteosarcoma patients who received adjuvant EBRT compared to patients who did not receive adjuvant EBRT (all-cause mortality: HR=1.52, 95%CI 0.73, 3.17; cause-specific mortality: HR=1.73, 95%CI 0.82, 3.63). Our results are not consistent with the hypothesis that adjuvant EBRT improves survival among pediatric and adolescent osteosarcoma patients in the United States. Rather, the point estimates indicate that adjuvant EBRT may worsen survival, but wide confidence intervals and the inability to thoroughly address potential confounding by severity because of data limitations preclude definitive conclusions for either scenario.

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A SYSTEMATIC REVIEW AND META-ANALYSIS OF PERINATAL VARIABLES IN RELATION TO THE RISK OF TESTICULAR CANCER – EXPERIENCES OF THE SON. *M B Cook, O Akre, D Forman, M P Madigan, L Richiardi, K A McGlynn (National Cancer Institute, Rockville, MD 20852)

We undertook a systematic review and meta-analysis of perinatal variables in relation to testicular cancer risk, with a specific focus upon characteristics of the son. Literature databases Scopus, EMBASE, Pubmed and Web of Science were searched using highly sensitive search strategies. Of 5,865 references retrieved, 67 articles met the inclusion criteria, each of which was included in at least one perinatal analysis. Random effects meta-analysis produced the following results: birth weight (per kg, odds ratio (OR)=0.94, 95% confidence interval (CI):0.88-1.01, I^2=12%), low birth weight (OR=1.34, 95% CI:1.08-1.67, I^2=51%), high birth weight (OR=1.05, 95% CI:0.96-1.14, I^2=0%), gestational age (per week, OR=0.95, 95% CI:0.92-0.98, I^2=38%; low vs. not, OR=1.31, 95% CI:1.07-1.59, I^2=49%), cryptorchidism (OR=4.30, 95% CI:3.62-5.11, I^2=44%), inguinal hernia (OR=1.63, 95% CI:1.37-1.94, I^2=38%) and twinning (OR=1.22, 95% CI:1.03-1.44, I^2=22%). Meta-analyses of the variables birth-length, breastfeeding and neonatal jaundice in relation to testicular cancer risk were not statistically significant. When low birth weight was stratified by data ascertainment (record/registry vs. self-report), only the category of self-report was statistically significant. Meta-regression of data ascertainment (record/registry vs. self-report) was significant in the meta-analyses of gestational age and summary estimates for record-based/registry-based studies were less supportive of association (per week=0.97, 95% CI:0.94-1.00, I^2=29%; low vs. not =1.08, 95% CI:0.91-1.28, I^2=32%). In conclusion, this systematic review and meta-analysis finds tentative evidence that low birth weight and gestational age, and conclusive evidence that cryptorchidism, inguinal hernia and twinning, are associated with risk of testicular cancer.

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A SYSTEMATIC REVIEW AND META-ANALYSIS OF PERINATAL VARIABLES IN RELATION TO THE RISK OF TESTICULAR CANCER – EXPERIENCES OF THE MOTHER. *M B Cook, O Akre, D Forman, M P Madigan, L Richiardi, K A McGlynn (National Cancer Institute, Rockville, MD 20852)

We undertook a systematic review and meta-analysis of perinatal variables in relation to testicular cancer risk, with a specific focus upon characteristics of the mother. EMBASE, Pubmed, Scopus, and Web of Science were searched using sensitive search strategies. 5,865 references were retrieved, of which 67 met the inclusion criteria and contributed data to at least one perinatal analysis. Random effects meta-analysis found maternal bleeding during pregnancy (OR=1.33, 95% CI:1.02-1.73, I^2=33%), birth order (primiparous vs. not, 1.08, 95% CI:1.01-1.16, I^2=24%; 2nd vs. 1st, OR=0.94, 95% CI:0.88-0.99, I^2=0%; 3rd vs. 1st, OR=0.91, 95% CI:0.83-1.01, I2=15%; 4th vs. 1st, OR=0.80, 95% CI:0.69-0.94, I^2=40%) and sibship size (2 vs. 1, OR=0.93, 95% CI:0.75-1.15, I^2=54%; 3 vs. 1, OR=0.89, 95% CI:0.74-1.07, I^2=33%; 4 vs. 1, OR=0.75, 95% CI:0.62-0.90, I^2=36%) to be associated with testicular cancer risk. Meta-analyses which produced summary estimates of no association included maternal age (per year, OR=1.00, 95% CI:0.99-1.01, I^2=81%; low age, OR=0.97, 95% CI:0.85-1.10, I^2=66%; high, OR=1.02, 95% CI:0.95-1.11, I^2=15%), maternal nausea (OR=1.15, 95% CI:0.92-1.45, I^2=55%), maternal hypertension (OR=1.25, 95% CI:0.97-1.62, I^2=0%), pre-eclampsia (OR=1.11, 95% CI:0.87-1.42, I^2=0%), breech delivery (OR=1.11, 95% CI:0.70-1.77, I^2=59%) and cesarean section (OR=1.20, 95% CI:0.87-1.65, I^2=18%). Meta-regression found continent of study to be statistically significant for cesarean section (p=0.035), and an analysis restricted to the three studies from the USA produced a statistically significant summary risk estimate (OR=1.67, 95% CI:1.07-2.56, I^2=0%). In conclusion this systematic review and meta-analysis has found associations of maternal bleeding, birth order, sibship size and possibly cesarean section with risk of testicular cancer.

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BODY MASS INDEX AND LUNG CANCER RISK IN A POPULATION-BASED CASE-CONTROL STUDY FROM MONTREAL, CANADA. *M-C Rousseau, M-E Parent, B Nicolau, A Koushik, J Siemiatycki (INRS-Institut Armand Frappier, Laval, QC, Canada H7V 1B7)

The inverse association between body mass index (BMI) and lung cancer risk observed in several studies is mostly attributed to residual confounding by smoking and pre-clinical effects of lung cancer. We assessed the association between BMI at different times in the subjects' life and lung cancer in a population-based case-control study conducted in the Greater Montreal, Canada, from 1996-2002. Cases included men and women with incident lung cancer, while controls were randomly sampled from the electoral list (n=2716). Analyses were based on 1076 cases and 1439 controls that provided their height and 3 measures of weight: at age 20, 2 years before interview, and maximum lifetime. BMI, in kg/m^2, was classified into 4 categories: underweight (<18.5), normal (18.5-24.9), overweight (25.0-29.9), obese (>30). Odds ratios (OR) and 95% confidence intervals (CI) were assessed adjusting for age, education, proxy status, ethnicity, and lifetime smoking intensity. There were no associations with BMI in early adulthood. Lung cancer risk was increased among those who were underweight 2 years before the interview, in both smoking intensity strata. When comparing underweight to normal BMI, the OR was 3.1 (95% CI: 1.4, 7.2) among non/light smokers, and 2.5 (95% CI: 1.1, 5.4) among medium/heavy smokers. In medium/heavy smokers only, a decrease in BMI of at least one category between early and later adulthood was associated with an increased lung cancer risk: OR=3.4 (95% CI: 1.7, 6.9) as compared to those who remained in the same BMI category. Our results remain compatible with both possible explanations: residual confounding by smoking and weight loss from undiagnosed lung cancer.

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CHANGING INCIDENCE OF THYROID CANCER IN NORTHEAST PENNSYLVANIA. *S Lesko, G Morris, C Peters, I Prokup, H Brereton (Northeast Regional Cancer Institute, Scranton, PA 19510)

It has been suggested that incidental detection of asymptomatic tumors contributed to the recent rapid increase in thyroid cancer (TC) incidence in the US. Between 1975 and 2004, age-adjusted incidence of TC in the SEER program increased from 4.9 to 9.8 per 100,000. Clinicians in northeast Pennsylvania (NEPA) have also reported a high incidence of these cancers and recent large increases in the number of cases diagnosed annually. The aims of this study were to document the incidence of TC in NEPA and to test whether incidentally detected tumors account for the high incidence. Data from the Pennsylvania cancer registry, the SEER program and medical records were used to compute standardized incidence ratios (SIRs) and the prevalence of incidentally detected tumors. The chi-square test was used to test for differences in categorical variables. Between 1996 and 2005, the number of incident TC cases in NEPA increased from 46 to 148 per year. The SIR for cases diagnosed in 2001-2005 for both sexes combined was 1.51 (95% confidence interval (CI), 1.39-1.64). Among men, the SIR was 1.08 (95% CI, 0.86-1.29); among women, it was 1.67 (95% CI, 1.51-1.82). Among 257 cases seen at a large radiation oncology practice, the proportion of incidental tumors increased from 0% before 1995 to 13.5% in 2005-08(NS). Among men, 21.6% of all tumors were incidental, compared to 10.2% among women (p = 0.057). The incidence of TC among women in NEPA was significantly higher than SEER rates and has increased. However, the number of incidentally detected tumors does not account for a large portion of this disparity. Further research is needed to identify the reasons for the high incidence of TC in this community.

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HEALTH INSURANCE AND HEALTH SERVICES USE IN AFRICAN-AMERICAN AND LATINO MEN WHO HAVE SEX WITH MEN (MSM).

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Poor access to health insurance and medical services is a problem for ethnic minorities, particularly Hispanics/Latinos and African-Americans, and for sexual minorities such men who have sex with men (MSM). Access to health care and health insurance have not been adequately studied in individuals who are both racial/ethnic minorities and MSM. We compared health services use and health insurance coverage of Latino and African-American MSM to white MSM using data from the Los Angeles Center of the Multicenter AIDS Cohort Study (MACS). Race/ethnicity, education, clinical symptoms, health insurance, and number of medical visits were ascertained from self-administered questionnaires. CD4, CD8, and CD3 levels were measured by flow cytometry. African-American and Latino MSM were younger and more likely to report annual incomes of less than $20,000 than white MSM. Logistic regression identified age, HIV serostatus, and income, but not race/ethnicity, as predictive of health insurance. A Poisson regression analysis revealed that significant predictors of health services use were non-African American race, HIV-negative serostatus, full-time employment, income, 2+ symptoms reported, having health insurance, higher CD4 &CD8 and lower CD3 leukocyte counts. Race/ethnicity was not a significant predictor of having heath insurance in the multivariate model. We observed comparable health services use among Latino and white MSM, but lower use among African-American MSM. Health care facilities need to be more culturally sensitive and welcoming to sexual minorities, especially to African-American MSM.

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AIDS KNOWLEDGE, ATTITUDES, AND TESTING: FINDINGS FROM THE NATIONAL HEALTH INTERVIEW SURVEY, 1987-PRESENT.

*A Ward, E Blasczyk, M King (University of Minnesota, Minneapolis, MN 55455)

The U.S. National Health Interview Survey (NHIS) is a cross-sectional, multi-stage area probability household interview survey providing national estimates on health indicators, health care access and availability, and health behaviors. In 1987, the NHIS first included a supplement dealing with HIV/AIDS. In most subsequent years, the survey has questioned one adult per household about such topics as the reasons for having an HIV test, the circumstances of such testing, behavioral risk factors and self-assessed risk of HIV infection. The NHIS data are, therefore, well suited to time-series analyses of changing attitudes and practices related to HIV/AIDS in the U.S. general population. The NIH-funded Integrated Health Interview Series (IHIS) project allows researchers to work with a single multi-year file containing consistently coded NHIS variables and rich documentation addressing comparability issues, thus facilitating further research into changing attitudes, knowledge and practices related to HIV/AIDS in the U.S. We illustrate the kinds of research facilitated by the IHIS coding of NHIS HIV/AIDS data by examining interrelationships between race and ethnicity, and HIV/AIDS testing and HIV/AIDS risk factors. The data reveal that the percentage of adults ever tested for HIV/AIDS has substantially increased since 1987, and a consistent racial disparity in testing even though the rate of increase is nearly flat for all races from 1997-2007. However, during the latter 1997-2007 period, the self-reported occurrence of at least one HIV/AIDS behavioral risk factor varies widely depending on race and survey year. We conclude with some conjectures about the causes of these differences.

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SMOKING-RELATED CANCERS AMONG HIV+ AND HIV- INJECTION DRUG USERS.

*M Shiels, S Cole, S Mehta, G Kirk (Johns Hopkins University, Baltimore, MD 21205)

Objectives: To examine whether the association between cigarette smoking and smoking-related cancer risk differs by HIV-status and the association between HIV-status and lung cancer survival. Design: Prospective cohort study of 2934 HIV+ and HIV- injection drug users (IDUs). Methods: Smoking exposure was collected at semi-annual visits among IDUs in the AIDS Link to Intravenous Experience (ALIVE) study. Cancer incidence data was obtained from the Maryland Cancer Registry. We estimated hazard ratios (HRs) and 95% confidence limits (CLs) for smoking-related cancers in joint categories of pack-years smoked and HIV status. The risk of death comparing HIV+ to HIV- lung cancer cases was also estimated. Results: 49 cases of smoking-related cancer occurred in 10,516 person-years of follow-up. HIV+ participants had twice the risk (HR=2.1; 95% CL: 1.2, 3.7) of developing a smoking-related cancer, independent of smoking and other covariates. Compared to HIV- participants who smoked $\leq$8.1 pack-years, the risk of smoking-related cancer was doubled for HIV- participants who smoked >8.1 pack-years (HR=2.0; 95% CL 0.8, 4.6) and for HIV+ participants who smoked $\leq$8.1 pack-years (HR=2.0; 95% CL 0.8, 4.8). HIV+ participants who smoked >8.1 pack-years had triple the risk of smoking-related cancer (HR=3.1; 95% CL 1.4, 6.7). Among the 29 incident lung cancer cases, 26 deaths occurred in 33 person-years of follow-up. HIV was associated with 3 times the risk of death among lung cancer cases (HR=3.3; 95% CL 0.9, 12.5). Conclusions: We did not observe evidence to support the hypothesis that the increased risk of smoking-related cancers among HIV+ individuals is due to synergistic effects of HIV and smoking. However, HIV was observed to be associated with poorer lung cancer survival.

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SOCIAL AND DEMOGRAPHIC DETERMINANTS OF HIV TESTING IN THE U.S.

*P Murnane, M Brodie, J Kates, L Hamel (Kaiser Family Foundation, Menlo Park, CA)

Background: In an effort to increase early detection of HIV infection and knowledge of HIV status, CDC recommends HIV testing for all people ages 13-64. Early entry into care is critical to reducing morbidity and mortality, and knowledge of one's serostatus can influence risk behavior. Studies on barriers to testing are sparse and mostly limited to small groups. This analysis will identify characteristics of those who report being tested in the general population. Methods: Data are from a 2006 nationally representative telephone survey of 2,517 adults in the U.S. Questions measured respondents' knowledge and attitudes about HIV, and HIV testing behaviors. Variables marginally associated ($p<0.2$) with HIV testing in univariate logistic regression were considered in logical groups (stigma, knowledge, culture, demographics) for a multivariate model. Results: In the final adjusted model, those less likely to report being tested for HIV include youth aged 18-24 compared to those age 25-39 (Odds Ratio [OR] 0.3, 95% confidence interval [CI] 0.2-0.5), those concerned about stigma associated with testing (OR 0.5, 95% CI 0.3-0.6), and individuals who support abstinence for youth prevention over combined approaches including safe sex (OR 0.6, 95% CI 0.4-0.8). Those more likely to report being tested for HIV include blacks compared to whites (OR 2.1, 95% CI 1.5-3.1), college educated (OR 1.5, 95% CI 1.1-1.9), and those who expressed interest in information about testing (OR 1.5, 95% CI 1.1-2.0). Conclusions: An improved understanding of the correlates of HIV testing can contribute to more effective messaging, an important aspect to reducing stigma and increasing testing. Note: Results from a 2009 survey will be available for comparison in April.

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RETENTION & ATTENDANCE OF WOMEN ENROLLED IN A LARGE PROSPECTIVE STUDY OF HIV IN THE US. *N Hessol, K Weber, S Holman, E Robison, L Goparaju, C Alden, N Kono, D Watts, N Ameli (UCSF, San Francisco, CA 94122)

The objective was to assess study retention and attendance for 2 recruitment waves of participants in the Women's Interagency HIV Study (WIHS), since recruiting strategies were modified between the 2 waves. The WIHS, a prospective study at 6 clinical centers in the US, has experienced 2 phases of participant recruitment (N=3766). Compliance with study follow-up was evaluated by examining semi-annual study retention and visit attendance. After 10 study visits, the retention rate in the original recruits (enrolled in 1994-1995) was 83% for the HIV-infected (HIV+) women and 69% for the HIV-uninfected (HIV-) women compared to 86% and 86%, respectively, in the new recruits (enrolled in 2001-2002). In logistic regression analysis of the HIV+ women, factors associated ($p<0.05$) with early (visits 2 and 3) non-attendance were temporary housing, alcohol consumption, use of crack/cocaine/heroin, having a primary care provider, site of enrollment, lower CD4 count, and higher HIV RNA. Among HIV- women, the factors associated with early non-attendance were recruitment into the original cohort, annual household income >$12,000, temporary housing, unemployment, use of crack/cocaine/heroin, and site of enrollment. Factors associated with non-attendance at later visits (7 through 10) among HIV+ women were younger age, White race, no primary care provider, no health insurance, site of enrollment, higher HIV RNA, and non-attendance at a previous visit. In HIV- women, younger age, White race, site of enrollment, and non-attendance at a previous visit were significantly associated with non-attendance at later visits. Preventing early loss to follow-up resulted in better study retention early on, but late loss to follow-up may require different retention strategies.

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EPIDEMIOLOGY OF PERINATAL HIV TRANSMISSION, ST. PETERSBURG, RUSSIA. *S Hillis, E Kuklina, N Akatova, D Kissin, A Rakhmanova, E Stepanova, D Jamieson, J Robinson, W Miller (CDC, Atlanta, GA 30333)

In St. Petersburg, Russia, increases in HIV cases in women have led to increases in perinatal HIV transmission. We evaluated influence of type and timing of antiretroviral (ARV) prophylaxis on transmission risk. We linked surveillance data for >90% of HIV-infected women giving birth from 2004-2006 with infant PCR test data. We assessed perinatal transmission risks by ARV type (3 components: antenatal, intrapartum, infant) and timing. Of 1331 HIV-infected mothers, 824 had known infant HIV status; 6.2% (51) of these transmitted HIV to their infants. ARV distribution by type and timing follow: 11.3% received dual/triple 3-component, 52.6% zidovudine 3-component, 15.5% single dose nevirapine 2-component (mother and infant), and 20.6% 1-component (mother or infant); 50.5% received ARVs <28 wks; 15.8% 29-42 weeks; and 33.7% labor and delivery. Perinatal transmission occurred in: 2.2%, 3.9%, 8.6%, and 12.4% of women receiving dual/triple 3-component, zidovudine 3-component, single dose 2-component, or 1-component (p for trend <.05), and in 2.9%, 7.7%, and 10.4% of those initiating ARVs at <28 weeks, 29-42 weeks, or labor and delivery (p for trend <.05). After adjustment for preterm, injection drug use, and C-section, initiating prophylaxis >28 wks vs. <28 wks was associated with increased transmission odds (28-42 wks Odds Ratio (OR) =3.1, 95% Confidence Interval (CI) 1.3-7.5; labor and delivery OR=3.2, 95% CI 1.5-7.1). Increased transmission odds were observed for women receiving 2- (OR=1.9, 95% CI 0.8-4.5) or 1- (OR=2.7, 95% CI 1.3-5.6), compared to 3-component prophylaxis. The potential to protect infant health through expanded use of perinatal ARVs is evident.

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EGOCENTRIC NETWORKS OF MEN WHO HAVE SEX WITH MEN: NETWORK COMPONENTS, CONDOM USE NORMS AND SAFER SEX. *H Liu, T Feng, H Liu, F Hong, Y Cai, A Rhodes, O Grusky (Virginia Commonwealth University, Richmond, VA 23298)

Research on risk behaviors among men who have sex with men (MSM) is often based on individualistic models of health behavior, but sexual behavior is inherently social in nature and often determined by constituents of social networks. A respondent driven sampling study recruited 350 MSM in the Shenzhen region of China and collected information on network components (relations, structures, and functions) and HIV risk behavior among network egos and their alters. Logistic regression was performed to examine relationships between condom use norms and safer sex and between norms and network components. A total of 2,385 alters were nominated by the 350 egos. Egos reported an average of 4 non-sexual relation alters and 2 sexual partner alters. Egos perceived to receive more tangible and emotional support from non-sexual relation alters than from sexual-partner alters. One third (69%) of egos consistently used condoms. Sixty-seven percent of egos reported having 1 or more alters who always encouraged egos to use condoms, 84% had 1 or more alters who consistently used condoms, and 55% had 1 or more alters who insisted on condom use. Both subjective and descriptive norms were positively associated with consistent condom use. Network components were associated with the levels of the two norms. These findings suggest that social network components may activate or strengthen condom use norms within network, which, in turn, may determine consistent condom use among MSM. HIV behavioral interventions need to target the promotion of safer sex practices through enhancing peer norms of condom use within networks.

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OVERLOAD: THE IMPACT OF INCIDENT STRESSFUL EVENTS ON ANTIRETROVIRAL MEDICATION ADHERENCE AND VIROLOGIC FAILURE IN A LONGITUDINAL, MULTISITE HIV COHORT STUDY. M J Mugavero, J L Raper, S Reif, K Whetten, J Leserman, PhD, N M Thielman, *B Wells Pence (Duke University, Durham, NC 27705)

Background: HIV-infected individuals frequently experience traumatic and stressful events such as sexual and physical assault and major financial and employment difficulties. Past trauma history has been associated with poorer medication adherence and HIV health outcomes, yet little research has examined the influence of incident stressful experiences on adherence and treatment outcomes. Methods: We prospectively measured incident stressful and traumatic events, antiretroviral (ARV) medication adherence, and plasma HIV viral load (VL) over 27 months in an 8-site, 5-state study conducted in the Southeast US. Using multivariable logistic and generalized estimating equation modeling, we assessed the impact of 3 measures of incident stressful events (all stressful events; severely stressful events; traumatic events) on 27-month changes in self-reported ARV adherence and virologic failure (VL≥400 c/mL). Results: Of 474 participants on ARVs at baseline, 289 were interviewed and still on ARVs at 27 months. Participants experiencing the median number of incident stressful events (n=9) had over twice the predicted odds of ARV non-adherence at follow-up compared to those with no events (OR=2.35). Severely stressful and traumatic events were also associated with non-adherence. Stressful (OR=1.09 per event, 95%CI=1.02-1.17) and severely stressful events (OR=1.19 per event, 95%CI=1.02-1.39) predicted increased odds of virologic failure. Conclusions: Incident stressful events are common in the lives of HIV-infected individuals and are negatively associated with ARV adherence and VL outcomes.

* = Presenter; S = The work was completed while the presenter was a student

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HIV AND ABNORMAL CLINICAL PROTEINURIA IN AN INJECTION DRUG USER POPULATION. *E Yanik, G Lucas, G Kirk, S H Mehta. (Johns Hopkins School of Public Health and Medicine, Baltimore, MD 21205)

Markers of clinical proteinuria in urine samples in a cohort of 902 HIV-infected and uninfected injection drug users were examined in order to identify possible associations with kidney damage. The primary outcome was albuminaria which was defined as a urine protein-creatinine concentration ratio higher than 200. A cross-sectional analysis was done using log-binomial regressions to determine prevalence ratios as estimates of relative risk. The median age of the 902 participants was 49.5; 65.41% were male, 91.57% African-American and 30.27% HIV positive. Overall, 24.8% of participants were found to have albuminaria. HIV serostatus was strongly associated with prevalence of albuminaria (PR=2.86; 95% CI 2.29-3.57). In addition, Hepatitis B infection (PR=1.53), a history of diabetes (PR=1.59), Hepatitis C antibody status (PR=2.70), having health insurance (PR=1.35), having visited the emergency room within the past 6 months (PR=1.44), African-American race (PR=1.97), and age (PR=1.02) were all positively associated with albuminaria. Being employed was negatively associated with albuminaria (PR=0.54). Drug use (neither cocaine nor heroin) was not associated with albuminaria. In the multivariate analysis, HIV, employment status, age, diabetes diagnosis, and Hepatitis C antibody status remained significantly associated with albuminaria. We observed a high prevalence of albuminaria in this population that was linked to infection with HIV and other infections. It is likely that the burden associated with chronic renal disease will continue to grow given the high prevalence of many associated factors. Early diagnosis and intervention is particularly important in this population with limited access to care.

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UNDERSTANDING BARRIERS TO CARE: WHAT PREVENTS HIV POSITIVE PEOPLE FROM ENTERING INTO CARE? *M Lowe, R Lindsay, CA Porucznik (University of Utah, Salt Lake City, UT 84108)

With the introduction of effective HIV dug therapies in the mid-1990s, there has been great effort by medical and public health professionals to get HIV positive people into care. These efforts have been partially successful. The Health Resources and Services Administration estimates that one third of the individuals who know that they are HIV positive are in not in care, and recent reports by the Utah Department of Health estimate 20–28% of people aware of their HIV positive status are not seeing a care provider. In 2008, a needs assessment was conducted among people living with HIV/AIDS (PLWHA) in Utah in part to identify what factors present the most common and serious barriers for accessing services. There were 365 respondents (17% of the approximately 2200 PLWHA in Utah). The five most serious barriers reported by respondents to accessing services are: 1) ''insufficient insurance coverage'', 2) ''navigating the system'', 3) ''the cost of the service to me'', 4) ''lack of sensitivity from service providers'' and, 5) ''the amount of red tape and paperwork''. Preliminary analysis showed that lack of comfort with English among Hispanics, lack of case management, being on the Ryan White Program (a federally funded program for low income PLWHA), and not being on Medicaid/Medicare are positively associated with significant barriers to accessing services. These findings suggest case management and services provided in Spanish will reduce barriers while PLWHA in Utah view the Ryan White Program differently from Medicaid and Medicare.

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SOCIO-DEMOGRAPHIC AND RISK BEHAVIORAL CORRELATES OF SEROPREVALENCE AND CO-INFECTION WITH HERPES SIMPLEX VIRUS TYPE 1 AND 2 AMONG ADULTS IN THE UNITED STATES. *H Beydoun, J Dail, B Ugwu, A Boueiz, M Beydoun (Eastern Virginia Medical School, Norfolk, VA 23501)

Although HSV-1 and HSV-2 may co-exist and interact, some epidemiologic features including geographical distribution, time trends, route of transmission, and established risk factors may distinguish these HSV sub-types. With recent data indicating a link between genital herpes and either strain, a re-evaluation of risk factors for HSV-1/HSV-2 infection and co-infection is needed. We used the 1999-2004 National Health and Nutrition Examination Study data to identify socio-demographic and risk behavioral factors that can independently predict HSV-1/HSV-2 infection and co-infection. History of genital herpes was found in individuals infected with either or both HSV sub-types. Nearly 60% were positive for HSV-1, 19% were positive for HSV-2 and 12% were co-infected with HSV-1 and HSV-2. Whereas age, gender, race/ethnicity, education, marital status and household income independently predicted all three outcomes, sexual activity as well as use of tobacco products and recreational drugs mainly correlated with HSV-2 infection and HSV-1/HSV-2 co-infection. Alcohol use indicators were not significantly associated with HSV-1/HSV-2 infection and co-infection. Although HSV-1 and HSV-2 appear to have distinct risk factors, sexual activity played an important role in both sub-types, with implications for healthcare practice and vaccine development.

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SEX AND AGE DIFFERENCES IN LIPID PROFILES ASSOCIATED WITH CHRONIC INFECTION WITH THE HEPATITIS C VIRUS IN THE UNITED STATES NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEYS. *Xiang Qian Lao, A Thompson, J G McHutchison, J J McCarthy (Duke University Medical Center, NC 27710)

Hepatitis C virus (HCV) infection has been reported to be associated with low serum lipids, but whether the presence of HCV dyslipidemia is constant across age, race and sex has not yet been explored. We performed cross-sectional analysis using data from two independent National Health and Nutrition Examination Survey (NHANES) cohorts (14369 adults from NHANES 1999-2006 and 12261 from NHANES III). Total and LDL cholesterol were significantly lower among HCV infected versus non-infected in both cohorts (all $p<0.01$), after adjusting for potential confounders. The adjusted odds ratios (95% confident interval) for HCV-associated hypo-LDL cholesterol (lowest 25th percentile) among women >50 years of age were 10.51 (2.86, 38.62) in NHANES 1999-2006 and 24.21 (6.17, 94.92) in NHANES III, respectively, while among women <50 years, they were 0.52 (0.14, 1.88) and 3.01 (1.00, 9.04). HCV by age interaction among women was significant in both cohorts ($p<0.001$ and $p=0.004$). Among men, the adjusted odds ratios (95% confident interval) were 3.84 (1.66, 8.88) in NHANES 1999-2006 and 2.74 (1.55, 4.85) in NHANES III, respectively, with no significant age effects. Similar patterns were observed for total cholesterol. No significantly discernable patterns were seen for HDL-cholesterol or triglycerides. Our results provide further evidence that HCV infection is associated with lower total and LDL cholesterol, extending these findings to a multi-ethnic, population-based U.S. cohort. We also uncovered significant age and sex differences in the association, suggesting a possible influence of sex hormones on host lipid response to HCV infection.

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COMPARISON OF NOTIFIABLE-DISEASE SURVEILLANCE AND SURVEY SELF-REPORTED COCCIDIOIDOMYCOSIS IN ARIZONA. *J A Tabor, M K O'Rourke (University of Arizona, College of Public Health, Tucson, AZ 85724)

The dramatic increase in state-reported coccidioidomycosis (valley fever) cases in Arizona since 1997 indicate an epidemic of unknown causes. Changes in disease reporting-compliance, misdiagnosis, and demographics of susceptible populations can mask the true disease frequency. This presentation uses disease frequencies from address-level notifiable-disease surveillance and from a cross-sectional survey to estimate the true disease frequency using a geographic information system. Survey data were collected in 2002 and 2003 through a stratified, clustered, address-based telephone survey of greater Tucson, Arizona. Disease frequencies from 1992 to 2003 were analyzed at census block group resolution and by six strata that were based on three landscape types and two demographic units. There was no dramatic increase in surveillance cases between 1992 and 2003 after adjusting for reporting compliance. Disease frequency is highly variable at the census block-group and coarser geographies. Strata-specific differences in disease frequencies indicate exposure and susceptibility are important predictiors of disease occurrence. Self-reported, symptomatic valley fever in 2001 was five times health department surveillance estimates. The reported 1998 to 2001 epidemic in Arizona was likely due to surveillance improvements since 1995. The difference between predicted frequency and surveillance frequency disappears when reporting compliance and misdiagnosis of community-acquired pneumonia are considered.

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A MULTI-LEVEL ANALYSIS OF RRISK FACTORS FOR SCHISTOSOMA JAPONICUM INFECTION IN CHINA. *J Yang, Zhengyuan Zhao, Yuesheng Li, Daniel Krewski, Shi Wu Wen (McLaughlin Centre for Population Health Risk Assessment, University of Ottawa, 1 Stewart Street, Ottawa, ON, Canada K1N6N5)

The aim of this study was to explore risk factors of schistosomiasis japonica in China, using a hierarchical multi-level model with individuals nested within villages. A cross-sectional survey of schistosomiasis japonica was conducted in 16 villages in the Chinese province of Hunan. A multi-level modeling technique (HLM 6.04) was used to assess risk factors of schistosomiasis. The results from this multi-level model were compared with those from a conventional single-level logistic regression model. A total of 10,245 individuals were enrolled this study, about 4.1% of whom infected with schistosoma japonicum. In the multi-level model analysis, individual level variables such as gender, age, and occupation, and village level variables such as type of schistosoma japonicum endemic area, drinking water source, sewage treatment, June temperature, and April rainfall were associated with schistosomiasis japonica infection. Conventional single-level logistic regression analysis selected more independent variables, and had narrower confidence intervals around the corresponding regression coefficients. In particular, per capital income, precipitation in October, and density of infected snails were statistically significant in conventional single-level logistic regression analysis but not in the multi-level model. Multi-level modeling is a useful tool in the analysis of risk factors of schistosomiasis japonica. Because the multi-level model captures the hierarchical structure of the data, it may be considered a more appropriate analytical tool for data of this type.

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REDUCED RISK OF HOSPITALIZATION ASSOCIATED WITH INFLUENZA VACCINATION AT THE CANADIAN HEALTH REGION LEVEL. *Y Chen, J Wu, Q Ye (University of Ottawa, Ottawa, ON, Canada K1H 8M5)

To evaluate the effectiveness of influenza vacation, we examine the association between influenza vaccination and hospital admission among 128,677 subjects 12 years of age or more who participated in the Canadian Community Health Survey in 2005. We conducted analyses at both individual and health region levels. In 2005, 51.2% ever had a flu shot and 32.7% had the last flu shot in the last 12 months. During the past 12 months, 7.6% were admitted to hospital. Both influenza and hospital admission proportions varied across health regions. Health regions with a higher proportion of influenza vaccination had a significantly lower proportion of hospitalization. A 10% increase in the vaccination proportion during the past 12 months was associated with a reduction of 7% in the risk of hospitalization. The proportion of having the last flu shot 1-2 years ago or 2+ years ago was not significantly associated the proportion of hospitalization. However, individual data showed that people who had a flu shot had an increased risk of hospitalization during the past 12 month. People with poor health are more likely to have a flu shot. Ecological analysis in this case has some important advantages, which allows assessing both direct and indirect effectiveness of the vaccine and is less likely to be affected by individual characteristics. Our study demonstrated an effectiveness of influenza vaccination at the population level.

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DEPRESSION DURING INTERFERON THERAPY FOR CHRONIC HEPATITIS C: PREVALENCE AND RISK FACTORS. *Y Furuya, C Kidoguchi, T Okamoto, K Suzuki, T Tanaka, M Sakamoto, N Enomoto, Y Hirose, Z Yamagata (University of Yamanashi, Chuo, Japan)

Interferons (IFNs) are widely used for the treatment of chronic hepatitis C (CHC), and IFN treatment is associated with a high rate of depression. However, little is known about the underlying mechanisms and reliable predictive factors of IFN-therapy-induced depression. In this study, we aimed to determine the prevalence and risk factors for depression in CHC patients receiving IFN therapy. We used the Zung Self-rating Depression Scale (SDS) to assess depression in 79 CHC patients at the baseline and at 3 and 6 months of treatment. We also obtained 6-month follow-up data for 67 of the 79 patients. The mean SDS scores after 3 months were higher than those at the baseline. Depression (SDS scores $\geq$50) was diagnosed in 74% of the patients during the study period. We performed multiple logistic regression analysis; depression during the IFN therapy and the factors associated with patients and their diseases were considered as the dependent and independent variables, respectively. Age, sex, and baseline SDS score were used to adjust for the confounding factors. At pretreatment, the perceived disease severity, social disposition, and sleeping hours were independent risk factors for depression in CHC patients (adjusted odds ratio [OR] = 0.21, 95% confidence interval [CI] = 0.06¨C0.75; adjusted OR = 5.34, 95% CI = 1.08 ¨C26.42, and adjusted OR = 4.24, 95% CI = 1.11 ¨C16.22, respectively). Our results showed that depression might be a common complication during IFN therapy. Moreover, our results suggested that the perceived disease severity, social disposition, and sleeping hours could be used to predict depression during IFN therapy.

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IMPORTANCE OF EMPLOYEE VACCINATION AGAINST INFLUENZA IN PREVENTING CASES IN LONG-TERM CARE FACILITIES. *A M Wendelboe, C Avery, B Andrade, J Baumbach, M Landen (Centers for Disease Control and Prevention (CDC), Atlanta, GA 30329)

Residents of long-term care facilities (LTCF) are at increased risk for complications and death from influenza. CDC recommends that LTCF employees with resident contact be vaccinated against influenza annually to reduce influenza incidence among residents. This investigation estimated the magnitude of the benefit of this recommendation. Active surveillance in all 76 LTCFs in New Mexico was implemented during influenza seasons 2006–07 and 2007–08. Among residents and direct-care employees, proportion vaccinated and number of influenza cases in each facility was collected monthly from the nursing director. LTCFs with at least one case of influenza (defined alternately by laboratory confirmation or symptoms of influenza-like illness [ILI]) among residents were compared with LTCFs reporting no influenza. Regression modeling by generalized estimating equations was used to obtain adjusted odds ratios (aORs) and 95% confidence intervals (CIs) for the association between employee vaccination coverage and occurrence of influenza in a resident. Covariates included vaccination coverage among residents, staff-to-resident ratio, and proportion of filled beds. Ten laboratory-confirmed influenza outbreaks (n=19 residents) and seven outbreaks defined by ILI (n=40 residents) were detected during this 2-year period. Median vaccination coverage among employees in all LTCFs was 60% (range:0%−98%). Increasing employee vaccination coverage was protective against detecting laboratory-confirmed influenza (aOR: 0.07; 95% CI, 0.01–0.46) or ILI (aOR: 0.15; 95% CI, 0.02–0.96) in a LTCF. High vaccination coverage among direct-care employees is essential in preventing influenza in LTCFs.

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GUILLAIN-BARRÉ SYNDROME IN US ACTIVE-DUTY MILITARY PERSONNEL. *A Bukowinski, P Rockswold, B Smith, T Smith (Naval Health Research Center, San Diego, CA 92106)

Guillain-Barré syndrome (GBS) is a rare acute inflammatory autoimmune neuritis, often preceded by a viral or bacterial infection. Vaccines have also been considered as potential putative agents, although not typically having a direct association. Concern exists regarding the number of cases in several military settings, including recruit training centers and various vaccination campaign sites within the military. Incident cases of GBS were identified among all active-duty US military personnel during the years 2000-2006. For each case, five controls were selected and matched on age and sex. Histories of recent viral or bacterial infections, vaccinations, and deployments were compared between the two groups, as were various demographic and service-related factors. Analyses are ongoing. Results of this study will provide further information on the relationship between GBS and recent viral and bacterial infections and vaccinations. Results may also help target intervention efforts by identifying particular groups within the military who may be at increased risk for developing GBS.

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RATES OF HPV VACCINE INITIATION AMONG FEMALES AGED 9 – 20 ENROLLED IN FLORIDA MEDICAID. *R L Cook, J Zhang, H G Steingraber, T L Kauf, B A Brumback, T A Arcomone, C Mallison (University of Florida, Gainesville, FL 32610)

In March, 2007, the ACIP recommended the Gardasil HPV vaccine for girls aged 11-12, with catch-up vaccination up to age 26. Our objectives were to determine age- and race-specific rates of HPV vaccine initiation in the year after vaccine approval. Using administrative Medicaid data for the period 7/1/06 −8/31/07, we identified all enrolled females aged 9 – 20 (n=416,829). Overall and group-specific rates of first HPV vaccine administration were calculated by dividing the number who received their first HPV vaccine by the number of enrolled women within each time interval. Rates were determined for 2-month intervals and adjusted per 1000 woman-years. The work was supported in part by a research grant from Merck. During the follow-up period, 9612 women received their first HPV vaccination through Florida Medicaid. Vaccination rates increased over time. During the final 2-month interval (July-August, 2007), vaccination rates were highest in girls aged 11-12 (175 vaccinations per 1000 woman-years), followed by rates in women ages 13-15, 16-18, and 9-10; and were lowest in women aged 19-20 (3.1 vaccinations per 1000 woman years). At each time point, vaccination rates were lower in black women than in white and Hispanic women. Vaccination rates increased initially after the ACIP recommendation, however few women aged 19 – 20 had received the vaccine. Strategies to improve HPV vaccination dissemination to young women may be needed. These data also suggest possible racial disparities in HPV vaccine uptake. Future analyses will examine trends over the subsequent year and examine individual, provider, and system level variables associated with HPV vaccine uptake.

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INCIDENCE OF HERPES ZOSTER AMONG CHILDREN VACCINATED WITH VARICELLA VACCINE IN A PRE-PAID HEALTH CARE PLAN, 2002-2008. *H F Tseng, N Smith, S M Marcy, L S Sy, S J Jacobsen (Southern California Permanente Medical Group, Pasadena, CA 91101)

Herpes zoster (HZ), or shingles, is caused by reactivation of latent varicella-zoster virus (VZV) following a primary infection with either wild-type or vaccine-type VZV, the latter having been introduced in 1995 for children. Since then, few population-based data about the incidence of childhood HZ are available. We identified children ≤12 years of age who were vaccinated with one dose of varicella vaccine between 2002 and 2008 and followed them through their electronic health records for a diagnosis of HZ. The medical records of these children were reviewed according to prespecified criteria. Persistent and chronic conditions for these children prior to HZ were identified. Of the 240 diagnoses, 96 were rejected by chart review. There were 172,163 children vaccinated, with overall follow-up of 446,027 person-year (Incidence Rate = 32.3/100,000/year, 95% Confidence Interval: 27.2-38.0). Children vaccinated after age 5 years had a higher but not statistically significant different rate than children vaccinated between 12-18 months. (45.7 vs. 32.9 per 100,000 per year). Among children vaccinated between 12-18 months, incidence rates gradually increase each year in the first 4 years after vaccination (p for trend= 0.00). Among the HZ cases, there were 1 (0.7%) case of lymphoid leukemia, 1 (0.7%) case of drug abuse, 16 (11.1%) cases of asthma with >=3 acute exacerbation, 12 (8.3%) cases of developmental disorders, and 3 (2.1%) cases of psychological or mental disorders. These data demonstrate that diagnosed HZ is a rare occurrence among children following varicella vaccine. Despite the small numbers, the roles of delayed vaccination, severe asthma, and development disorders warrant further investigation.

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LOW HPV VACCINATION RATES AMONG FLORIDA AND TEXAS MEDICAID *S Staras, E Shenkman (University of Florida, Gainesville, FL 32608)

Each year in the United States, 11,000 women are diagnosed and 4,000 women die from invasive cervical cancer with a disproportionately high amount among low-income, minority women. Most cases of cervical cancer are preventable with the human papillomavirus (HPV) vaccine approved by the Food and Drug Administration in 2006, but a reduction in cervical cancer cases will depend on achieving high vaccination coverage. We assessed HPV vaccination using claims and encounter data for the Texas Medicaid HMO and Florida Medicaid populations from April 2007 to March 2008. Among 9-17 year old girls with at least one medical claim during this time period, we identified girls with at least one claim for the HPV vaccine using current procedural terminology codes 90649 or 90649-SL. Approximately 13% of the 300,000 9-17 year old girls in Florida and Texas Medicaid received at least one dose of the HPV vaccine. When considering race/ethnicity, vaccination rates were highest among Hispanic girls (16%); a smaller but similar percent of non-Hispanic Black (10%) and non-Hispanic White (11%) girls received the vaccine. Vaccination rates differed by age with the highest rates among 12-15 year olds of whom approximately 20% received the HPV vaccine. We found HPV vaccination claims for 4% of 9 to 10 year olds and between 10-15% of girls aged 11, 16, or 17 years. Despite the low or no cost of the vaccine for Medicaid eligible girls thought the federal Vaccines for Children program, low percentages of girls in Medicaid have received the HPV vaccine. Research into why nearly 90% of girls receiving medical services are not receiving the HPV vaccine needs to be conducted so interventions to improve vaccination rates can be developed.

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ASSOCIATION BETWEEN HEAVY ALCOHOL CONSUMPTION AND HEPATITIS IN VIETNAM VETERANS. *A Shoaibi, W H Chen, E Braver (Department of Epidemiology and Preventive Medicine, School of Medicine, University of Maryland, Baltimore, MD 21201)

Background: Vietnam veterans have a higher risk of excessive alcohol consumption, hepatitis, and alcoholic liver disease than non-Vietnam veterans. This study investigated whether heavy alcohol consumption explained the increased hepatitis risk among Vietnam veterans. Methods: The study population consisted of the U.S. Army Chemical Corps deployed in Vietnam or serving during the same era but not in Vietnam. Health data were collected by telephone interview during 1999-2000. Adjusted risk ratios (aRR) and 95 percent confidence intervals (CI) along with population attributable fraction were estimated by using Log-binomial and Poisson regression. Results: The aRR for hepatitis was 1.72 (95% CI: 1.22-2.41) in Vietnam veterans compared with non-Vietnam veterans. The aRR of a history of frequent binge drinking among Vietnam veterans was 1.41 (95% CI: 1.19-1.67) after controlling for age, education level, marital status, and body mass index. The aRR of hepatitis among veterans who were frequent binge drinkers was 1.61 (95% CI: 1.16-2.24) relative to veterans who drank less. The population attributable fraction of hepatitis due to frequent binge drinking was 12% in Vietnam veterans and 11% in non-Vietnam veterans. Conclusion: Although Vietnam veterans had a history of significantly higher alcohol consumption and heavy alcohol consumption was a risk factor for hepatitis, the population attributable fraction for hepatitis was not higher among Vietnam veterans compared to non-Vietnam veterans.

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ACUTE GASTROENTERITIS IN HONG KONG AND THE ASSOCIATED RISK FACTORS: A POPULATION-BASED TELEPHONE SURVEY. *S C Ho, P H Chau, P K Fung, A Sham, A Nelson, J Sung (School of Public Health, Chinese University of Hong Kong, Hong Kong)

This population-based telephone survey on acute gastroenteritis (AG) was conducted in Hong Kong from August 2006 to July 2007. Study subjects were recruited through random-digit-dialing with recruitments evenly distributed over the year. About 70 subjects were telephone interviewed per week and 3743 completed questionnaires were obtained. The respondents were asked whether they had experienced any episode of AG during the 4 weeks prior to the interview. A symptom-based definition of AG was adopted. An AG was defined as diarrhoea three or more times or any vomiting in a 24-hour period, in the absence of any known non-infectious causes. 7% reported having experienced an AG during the prior 4 weeks. The age-standardized rate (2005 world population) was 7.7%. Women had a slightly higher incidence than men with an overall incidence of 0.84 episodes per person-year (95% CI 0.73-0.99). Children under 5 had the highest incidence. The mean duration of illness was 3.6 days. Among the AG cases, 39% consulted a physician, and 2.6% were admitted to hospital. For subjects aged $\leq$15y, consumptions of certain meal types or foods were found to be significant risk factors for AG. These included raw oyster, buffet meals, hot pot, salad, half cooked or raw eggs/fish, sushi, sashimi, snacks bought at road side, with odds ratios ranging from 1.3 to 2.4. Surveillance of food hygiene practices and consumer education should be among the strategies for lowering the disease burden of AG in the Hong Kong population. 1. Majowicz SE et al. A common, symptom-based case definition for gastroenteritis. Epidemiol Infect 2008;136:886-894. Funded by the RFCID, Food and Health Bureau, HKSAR

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THE USE OF SATELLITE IMAGERY IN CONTACT/TRAVEL QUESTIONNAIRES. *J Lessler, J M Read, S R Riley, D A T Cummings (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD)

For many infectious diseases close personal contact is important in transmission. The geographic distribution of contacts dictates the disease's spatial rate of spread and which communities are infected. Contact questionnaires are used to determine how and where contacts occur, but often depend on the ability of interviewees to recall the distance from their home at which contacts are made. Satellite imagery has proven useful to epidemiologists, providing a way to identify households when accurate census information is not available, helping to characterize environmental risk factors, and enhancing the display of epidemiologic data. However, satellite imagery is rarely used in interviews. We present a computer application built on Google Earth that allows the interviewee to identify the location of close personal contacts on a high resolution satellite image of the surrounding area. Using Google Earth allows users to zoom out from the local area to identify more distant contacts. Many interviewees are unable to identify their location or that of their contacts; but once key landmarks are identified, most interviewees are quickly able to identify the location of contacts. This application is most useful for distant contacts and in rural settings. In urban areas the density and homogeneity of buildings causes problems; however, street map overlays may be useful in orienting users. Regardless of their ability to identify the location of contacts, the ''cool'' factor of the satellite imagery increased the enthusiasm of participants. Our experience suggests that satellite imagery is a powerful tool, not only for communication between scientists, but for communication between researchers and study participants.

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PHARMACY AND NEIGHBORHOOD LEVEL CHARACTERISTICS ASSOCIATED WITH IN-PHARMACY VACCINATION. *Natalie Crawford, Shannon Blaney, Silvia Amesty, Crystal Fuller (New York Academy of Medicine, New York, NY 10029)

New York State (NYS) passed legislation authorizing pharmacists to administer immunizations in 2008. Racial/socioeconomic disparities persist in vaccination rates and vaccine-preventable diseases including influenza and hepatitis. Many NYS pharmacies participate in the Expanded Syringe Access Program (ESAP) to help prevent transmission of HIV among injection drug users and are uniquely positioned to offer vaccination services to low-income communities. To understand individual and neighborhood characteristics of pharmacists support for in-pharmacy vaccination we combined census tract data with baseline pharmacy data from the Pharmacies as Resources Making Links to Community Services study among ESAP pharmacies. Eligible pharmacies must sell syringes via ESAP without additional requirements, and have regular and new ESAP customers. 390 pharmacists, non-pharmacists owners and technicians enrolled from 118 eligible pharmacies located in 129 New York City census tracts. Multilevel adjusted analyses showed pharmacists versus technicians ($p<0.01$), perception of being located in high drug activity neighborhood ($p=0.04$) and pharmacies in neighborhoods with a high percent of foreign-born residents were significantly more likely to support in-pharmacy vaccination ($p=0.03$). Interestingly, pharmacies in disadvantaged neighborhoods, measured by the Townsend index of disadvantage and deprivation, were less supportive ($p=0.01$). Education on importance of increasing vaccination among low-income populations should be targeted to ESAP pharmacies in disadvantaged neighborhoods to help reduce and prevent widening of racial/socioeconomic disparities in vaccination rates.

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A MULTILEVEL-BASED STUDY OF SCHOOL POLICY FOR TOBACCO CONTROL IN RELATION TO CIGARETTE SMOKING AMONG CHILDREN. *C M Huang, Y L Lin, T Y Wang, T M Sun, Y Y Yen, HL Huang (Kaohsiung Medical University, Kaohsiung, Taiwan 807)

The aim of this study was to comprehensively assess the impact of school tobacco policy intention, implementation and student perceptions of smoking rates at school-level. The Multilevel models were used to estimate the individual and school level effects for cigarette smoking among a representative school-based sample of 3rd to 6th graders (n=2,350) in 26 elementary schools, in southern Taiwan. A significant random variation between schools was identified [$\delta^2_{\mu 0}=1.25(0.41)$, $P<0.05$]. School effects were large in comparison to individual-level effects, accounting for 75% of variance in the odds of being a smoker, which indicated the school cluster was very important. The risk of smoking was significantly associated with those schools without tobacco use prevention education implementation [odds ratio (OR) = 3.84], with increasing rate of student perceptions on school smoking prevalence (OR= 2.52) and schools located in a mountainous region (OR=3.23) while controlling for individual-level characteristics. However, school tobacco policy intention or a health promoting school was not a significant predictor. Other observed individual-level characteristics having a significant relationship to student smoking behavior were immediate social environmental factors in which best friends always smoked in front of me (OR=6.08), and family always smoked in front of me (OR=2.08) as well as drinking alcohol (OR=2.41) and chewing betel nuts (OR=3.76). The findings suggest that effective tobacco control policies and preventive programs should be strongly considered for implementation in elementary schools that are putting children at the greatest risk for cigarette smoking.

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UNCOVER THE EFFECT OF ADOLESCENT TOBACCO CONTROL IN THE UNITED STATES DURING 1990-2005-AN AGE-PERIOD COHORT ANALYSIS. *X Chen (Wayne State University, Detroit, MI 48201)

The period from 1990 to 2005 represents a time in the United States when substantial efforts were devoted to tobacco control. It remained a myth why the prevalence of adolescent smoking did not decline accordingly. In this study, we used the age-period-cohort method to uncover the myth using annual data from the 1990-2005 National Survey on Drug Use and Health. Findings of the analysis indicated that birth year was positively associated with lifetime smoking for youth born in 1969-84 and with current smoking for youth born in 1969-1976 respectively. These adolescents had limited exposure to the tobacco control programs that gained momentum since the 1990s and the smoking rate among them increased in 1990-98. Birth year was negatively associated with lifetime smoking for youth born after 1984 and with current smoking for youth born after 1976 respectively. These adolescents had cumulative exposed to the national tobacco control programs since the 1990s and smoking prevalence among them did not decline until the later 1990s. The protective cohort effect appeared to level off for participants born after 1987-91, corresponding to the period after 2002 with dramatic reductions in funding for tobacco control in the United States. CONCLUSIONS: Tobacco control in the United States showed its effect in reducing adolescent smoking primarily through cumulative exposures of youth to various anti-tobacco programs in the past. Adolescent smoking is anticipated to rebonce after the cumulative cohort effect has been exhausted. Findings of this analysis underscore the need for immediate changes in national strategies to re-assure the previous tobacco control momentum.

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JOINT EFFECTS OF CHILD TEMPERAMENT AND MATERNAL SENSITIVITY ON THE DEVELOPMENT OF CHILDHOOD OBESITY. *T Wu, W E Dixon, Jr., W T Dalton, III, F Tudiver, J Liu, X Liu (East Tennessee State University, Johnson City, TN 37614)

The interplay between child characteristics and parenting is increasingly implicated as crucial to child health outcomes. Based on data from a national birth cohort, this study assessed the joint effects of child temperamental characteristics and maternal sensitivity on the development of childhood obesity. Infant temperament, assessed by maternal report, was categorized into three types: easy, average, and difficult. Maternal sensitivity, assessed by observing maternal behaviors during mother-child semi-structured interaction, was categorized into two groups: sensitive and insensitive. Child's weight and height were measured from age two years to Grade 6 and body mass index (BMI) was calculated. Obese (>= the 95th percentile) and overweight-or-obese (>= the 85th percentile) were defined based on sex and age specific BMI percentiles. Generalized estimating equations were used to analyze data. The proportions of children who were obese and overweight-or-obese increased as they got older, 5.47% and 15.58% at 2 years of age, to 18.78% and 34.34% at Grade 6. Children with easy temperament and under the care of a sensitive mother were at the lowest risks of obesity and overweight-or-obesity over childhood. The joint effects of children's temperament and maternal sensitivity on overweight-or-obesity largely depended on childhood phases. For instance, children with difficult temperament and under the care of an insensitive mother had much higher risks during school age but not during early childhood. In conclusion, parents may need to tailor their parenting strategies to particular child temperamental characteristics in order to prevent and control the development of childhood obesity.

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CHARACTERISTICS OF DOMESTIC AND NON-DOMESTIC HOMICIDE VICTIMS IN THE U.S. *H-C Kung, R Wei, K Faulkner (National Center for Health Statistics/CDC, Atlanta, GA)

Background: Homicide is the 15th leading cause of death in the U.S., and also have the highest rate when compared to other industrialized Nations. While most studies examine the characteristics of homicide victims and offenders, only few studies have examined whether victim's attitude toward violent behavior contribute to the mortality. In addition, few studies have used comparison groups to assess the similarities and differences in various characteristics of domestic and non-domestic violence related deaths. **Methods:** A case-control study was constructed from the 1993 National Mortality Follow-back Survey. The natural cause-of-death was used as control group. The case were domestic homicide victims and is defined as victims involved in family arguments prior to their death (N=2941, weighted). The selected variables for the study were: age, race, gender, education, if assailant know the victim, alcohol and illicit drug use, attitude toward violent behavior, violent behavior and if firearm involved. We use separate logistic regression models by male and female to examine the main and interaction effect among selected variables. **Results:** The preliminary study results suggest that the selected variables differ among domestic, non-domestic homicide victims when compared with natural cause-of-death decedents. **Conclusions:** Identifying the difference and similarities of domestic and non-domestic homicide victims' characteristics will have important implication in violence prevention effort.

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IS COMPLEMENTARY AND ALTERNATIVE MEDICINE USE ASSOCIATED WITH CHANGE IN BODY MASS INDEX IN A LARGE MILITARY COHORT? *I G Jacobson, MPH, C A Wong, MPH, B Smith, MPH, PhD, E J Boyko, MD, MPH, G D Gackstetter, DVM, MPH, PhD, T C Smith, MS, PhD; for the Millennium Cohort Study Team (Naval Health Research Center, San Diego, CA 92106)

Although studies have examined complementary and alternative medicine (CAM) use for treatment of chronic disease, few have investigated its use for preventive purposes such as weight management. Specifically, the prevalence of CAM use and its association with body mass index (BMI) among military personnel has not yet been examined. This analysis included participants from the Millennium Cohort Study, a 21-year longitudinal study designed to evaluate the short and long-term effects of military service on health. Participants eligible for this study completed a questionnaire from both the 2004-2006 and 2007-2008 survey cycles. CAM use was measured using 12 survey questions and BMI was calculated using self-reported height and weight, which were collected at both time points. Analysis of covariance was used to examine the relationship between CAM use and change in BMI from the first assessment to the second assessment. Over 70,000 participants were included in analyses, and approximately 40% self-reported using at least one CAM therapy at the first assessment. The mean BMI at the first assessment was 24.8 for women and 26.9 for men. Analyses are ongoing. These results assess how CAM use may be associated with changes in BMI over time among a population of US service members that are either actively serving or no longer in service. Future research should focus on specific CAM therapies that may be beneficial for weight management in aging veteran populations.

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SOCIAL-COGNITIVE PROCESSES IN THE PATIENT-PHYSICIAN RELATIONSHIP: STEREOTYPE THREAT AND EXECUTIVE CONTROL. *M D Agars, J F Reimer, D Young, D M Bleakney, M Vale (California State University, San Bernadino, CA 94207)

Patient cognition and social cognitive mechanisms within the patient-provider dyad remain underexplored in the health disparities literature. These factors, however, are critical to the patient-physician interaction, and resultant health outcomes. It has been demonstrated that minority group members are more likely to perceive that their medical care was adversely impacted because of their race/ethnicity. Further, patient stereotypes about physicians can interfere with communication and lead to a decrease in the utilization of health services. Also critical are patient cognitions about the self. Stereotype threat is a situational condition in which an individual underperforms on a task for which they are at risk of confirming a negative stereotype associated with a social group salient in his or her social identity. We argue that the experience of stereotype threat creates deficits in executive control/attention, which is one's ability to focus cognitive resources on a goal and inhibit irrelevant information while performing a complex cognitive task. In the context of a health care setting, the experience of stereotype threat may result in the impairment of communication between patient-physician and impair a patient's ability to process critical health information. Through a set of studies, our research tests the model that the patient-physician interaction may create stereotype threat in minority patients, which impacts patient cognitive capacity in a health care context, leading to heath disparities. The results are discussed in the context of current social-cognitive models and are valuable for exploring causes of health disparities and developing interventions.

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KNOWLEDGE OF METABOLIC SYNDROME AND HEALTH-RELATED BEHAVIOURS AMONG ADULTS IN TRINIDAD AND TOBAGO. *S Nichols (University of the West Indies, St. Augustine, Trinidad and Tobago)

Coronary heart disease (CHD) is the major cause of adult morbidity in Trinidad and Tobago. Metabolic syndrome -a clustering of diseases such as diabetes mellitus, high blood pressure, high triglyceride levels, and obesity- remain a major contributor to the development of CHD. In this study, the nature of the associations between knowledge of metabolic syndrome and health-related behaviours were assessed. A cross-section of 2,497 volunteers ages 18-55 years completed a self-administered questionnaire consisting of socio-demographic, anthropometric, dietary, physical activity, nutrition label use and other health behaviour. Approximately 17% of participants reported being knowledgeable about metabolic syndrome. Persons who were knowledgeable about metabolic knowledge of metabolic were more likely to report giving greater importance nutrition content when buying food ($p<0.001$), greater nutrition label use ($p<0.001$), ability to read and understand nutrition labels ($p<0.001$), lower levels of fat intake ($p<0.05$), higher intakes of vegetables, fruit intake, multivitamin ($p<0.01$), greater participation in moderate-to-high intensity activities outside of their occupations ($p<0.01$), better quality of life and greater satisfaction with their current health ($p<0.01$) than persons who reported having no knowledge of metabolic syndrome. The findings were independent of gender, body mass index, level of education and current health status. The results suggest that knowledge of metabolic syndrome and its adverse outcomes might be associated with might be associated with motivational factors that facilitate positive health-related behaviours.

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TRANSITIONS IN SMOKING AMONG ADOLESCENTS. *C Mathur, D J Erickson, C L Perry, J L Forster (University of Minnesota, Twin Cities, MN 55454)

Smoking uptake among adolescents can be conceptualized as progressing through a series of stages, and risk factors associated with this process may play different functions at different points in the progression. The goals of the current analysis were to model movement between smoking stages and identify potential predictors of these transitions. Data came from the Minnesota Adolescent Community Cohort study, a population-based, observational cohort study designed to assess the effects of tobacco control policies and programs on adolescent smoking. The sub-sample used for the current analyses includes 1325 adolescents who were 14-16 years of age at time 1. Using 10 dichotomous indicators of smoking behavior from 5 conceptual domains, latent class analyses suggest 4 distinct smoking classes, labeled nonsmokers (80% at time 1), experimenters (12%), non-regular smokers (3%), and established smokers (2%). Latent transition analysis was used to model movement between latent stages of smoking. Transition probabilities varied by stage, with 14% of nonsmokers and 31% of experimenters progressing to a higher stage at time 2. Non-regular smokers displayed the highest mobility, with 56% progressing to an established smoker and 21% moving back to an experimenter. Established smokers were the most stable, with 96% still established smokers 2 years later. Unadjusted analyses suggest females were more likely than males to progress from nonsmokers to experimenters (Odds Ratio [OR] = 2.1, 95% CI = 1.3, 3.3) and those with a parent who smokes were more likely to progress from a nonsmoker to non-regular smoker (OR=2.5, 95% CI=1.4, 4.5) and from a nonsmoker to an established smoker (OR=3.2, 95% CI= 1.3, 7.9). Adjusted analyses will also be presented.

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PREVALENCE OF REGULAR LEISURE TIME PHYSICAL ACTIVITY AMONG U.S. ADULTS, 2000 AND 2007. *A Ryskulova, R J Klein (National Center for Health Statistics, CDC, Hyattsville, MD 20782)

Regular physical activity (PA) is associated with decreased risk for chronic diseases and premature mortality. Healthy People 2010 objectives include increasing the proportion of adults who engage regularly in moderate or vigorous activity to at least 50% and reducing the proportion of adults who do not participate in any leisure-time physical activity by 20%. To examine changes in the prevalence of regular, leisure-time, physical activity from 2000 to 2007, data from the National Health Interview (NHIS) were analyzed using SUDAAN to account for complex survey design. The results of the analysis show that about 40% of adults did not engage in leisure-time PA in 2000 and 2007. The prevalence of regular PA in 2000 was 32% and it did not change significantly in 2007. Men, adults ages 18-24, white non-Hispanic, and persons without disabilities were more likely to be physically active than their counterparts. The prevalence of PA among adults with bachelor degrees or above was two times as high as those who did not graduate high school. The limitations of the self-reported data should be noted as although 31% of adults reported being involved in regular PA, the self-reported data may not reflect the actual physical activity status. The 2003-04 National Health and Nutrition Examination Survey accelerometer-measured physical activity data indicated that less than 5% of adults were complaint with PA recommendations to have at least 30 minutes per day 5 or more days per week. Collaborative efforts from public health agencies, health educators, and public are needed to further to promote the benefits of PA and increase physical activity levels with a focus on eliminating disparities.

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ASSOCIATION BETWEEN DRINKING AND SMOKING BEHAVIORS IN TEENAGERS AND YOUNG ADULTS: VARIATION BY LEGAL AGE OF USE. *K Choi, T Toomey, L Fabian, K Lenk, D Erickson, J Forster (University of Minnesota, Minneapolis, MN 55454)

Variation in the associations between drinking and smoking behaviors in the context of the legal ages for drinking and smoking has not been previously examined. Therefore, we assessed the correlations and prospective predictions between drinking and smoking behaviors among a cohort in the United States that included those under the legal smoking age (<18), under the legal drinking age (<21), and above the legal drinking age (21 or above), and evaluated the gender differences among these associations. We analyzed data from 4091 participants who were aged 16-22 in 2005 and were surveyed every 6 months until 2008 as part of the Minnesota Adolescent Community Cohort Study. Drinking measures included days of drinking in the past 30 days and frequency of bingeing (≥5 drinks in one sitting) in the past 14 days. Participants were also classified into six smoking stages (from ''never-smoker'' to ''established smoker'') according to their cigarette consumption. Cross-sectional correlations between drinking variables and smoking were assessed at each year of age; prospective predictions were evaluated after stratifying by age (<18, 18-20, and 21 or above). We found that drinking was significantly correlated with smoking, but the strength of the correlations decreased as the participants aged. Correlations were also higher among 16 and 17-year-old boys than among same-age girls. Prospectively, smoking consistently predicted alcohol use among those under the legal drinking age; however, we observed some differences by gender. Our results suggested that interventions that lower or prevent tobacco use before the legal drinking age may also lower rates of monthly and high-risk alcohol use.

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THE ROLE OF FAMILY DISEASE HISTORY AND PERCEIVED RISK OF DISEASE IN CHANGE OF FRUIT AND VEGETABLE CONSUMPTION OVER 12 MTHS. *D Johnson, G Divine, G Alexander, S Rolnick, J Calvi, M Stopponi, J McClure, J Richards, V Strecher, C C Johnson, (Biostatistics & Research Epi, Henry Ford Health System, Detroit, MI)

A sufficient daily consumption of fruits and vegetables (F&V) could help prevent chronic diseases. Since implementing the 5 A Day program, research has shown that awareness has increased, but average F&V intake among American adults remains under the minimum recommendation. This analysis examines factors related to increasing F&V intake among participants in the MENU study, a randomized trial with two intervention arms and one control arm. In 2005, 2513 confirmed HMO members, aged 21–65, from 5 geographically-diverse health plans completed an online enrollment survey, reporting F&V intake and personal &family health history. Mean change in combined F&V servings per day was assessed at 12 mths post-baseline, using a validated self-report F&V food frequency questionnaire. Analysis of covariance adjusting for the baseline F&V intake, regardless of study arm, was performed for each factor considered. Of the 2513, 80% were followed up at 12 mths. Those with a family history of hypertension or diabetes increased their F&V consumption, p=.03 and p=.04 compared to those with no family history of these conditions, regardless of race. There were no observed differences in consumption increase by reported family history of cancer, heart disease or obesity. Participants with a high perceived risk of developing diabetes increased their intake by more than 0.6 servings than those with no perceived diabetes risk, p=.05, regardless of race. There were no statistical differences for consumption increase by risk of hypertension, heart disease or obesity. We tested for interactions between race and family history (FH) & perceived risk (PR) individually for each condition. Only FH of obesity was significant, p=.09 showing that whites with FH were more likely to increase F&V intake while blacks were not. The only significant interaction for PR was PR of cancer, p=.07. Interestingly, while the overall change was not significant for either race, whites w/high PR increased F&V & blacks w/a low PR increased F&V. FH of hypertension and diabetes, as well as perceived higher risk for developing diabetes, were characteristics that contributed to increasing F&V consumption, regardless of race. FH of obesity and PR of cancer contributed to differences in F&V intake change between blacks and whites. Interventions addressing perceived risk of disease or family history of disease may be valuable in encouraging dietary lifestyle.

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PROSPECTIVE INVESTIGATION OF MENTAL HEALTH CHALLENGES AND COPING BEHAVIORS IN DEPLOYERS SUPPORTING THE WARS IN IRAQ AND AFGHANISTAN. T Smith*, T Wells, I Jacobson, B Smith, C LeardMann, C Hoge, D Blazer, M Ryan, for the Millennium Cohort Study Team (Naval Health Research Center, San Diego, CA 92106)

While combat exposure increases the risk for mental health outcomes, little is known about the relationship of new-onset mental health morbidity and subsequent use of alcohol or uptake of cigarette smoking as coping mechanisms. Data were from the Millennium Cohort Study, a 21-year longitudinal study designed to determine the long-term health effects of military service. Using baseline data collected in 2001 and follow-up data collected in 2004, this analysis prospectively investigated new-onset mental health challenges in association with newly reported alcohol problems and uptake of cigarette smoking after deployment. Posttraumatic stress disorder (PTSD) symptoms were assessed using the PTSD Checklist and major depressive syndrome, panic syndrome and other anxiety syndrome were assessed using the Primary Care Evaluation of Mental Disorders Patient Health Questionnaire. These disorders were evaluated individually and also aggregated to investigate relationships with new-onset smoking and drinking. Self-reported history of smoking cigarettes and alcohol consumption and misuse were measured at baseline and follow-up. Of the 55,021 individuals that completed a baseline and follow-up survey, approximately 25% were deployed to the current conflicts. Analyses are ongoing. This study quantifies the burden of mental health morbidity potentially attributed to combat deployment, and the uptake of coping mechanisms associated with mental health challenges.

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THE RELATIONSHIP BETWEEN CHILDHOOD SEXUAL ABUSE AND SEXUAL RISK-TAKING BEHAVIOR IN MEN. *H Romaniuk, E Moore, C Olsson, Y Jayasinghe, J Carlin, G Patton (Clinical Epidemiology and Biostatistics Unit, Victoria 3051, Australia)

Findings from studies of females consistently show an association between childhood sexual abuse (CSA) and sexual risk-taking behavior. There is little longitudinal data to indicate whether the same trend occurs in males. We used data from a nine-wave, population-based cohort study of 943 adolescent males in Australia (1992-2008). Number of sex partners and risky condom use was assessed at three waves (waves 7, 8 and 9: mean age 21, 24 and 29 years respectively). At waves 8 and 9, age of sexual debut and self-reported CSA (6-item questionnaire) were assessed retrospectively. Potential confounding factors included age, smoking and alcohol status, nationality, education, and regional indicators of socioeconomic level. Repeated measures of sexual behavior were analyzed using multinomial random effects models, and sexual debut was analyzed using a Cox proportional hazards model. Compared to reporting one partner in the previous year, reporting no sexual partners (odds ratio (OR)=2.3, 95% confidence interval (CI):1.0, 5.3) or $\geq$5 sexual partners (OR=2.1, 95% CI: 0.9, 4.5) were moderately associated with CSA. Compared to always using condoms, men with a history of CSA were less likely to report occasional condom use (OR=0.5, 95% CI: 0.3, 0.9) or other types of contraception (OR=0.4, 95% CI: 0.2, 0.7). Men with CSA were likely to debut earlier than men without CSA (hazard ratio=1.6, 95% CI: 1.1, 2.4). Our findings suggest that there may be two risk profiles for men with a history of CSA: abstaining from sexual intercourse or engaging in intercourse with multiple partners. Condom use practices were found to differ by history of CSA; however no evidence of riskier behavior was found.

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COMMUNITY PERCEPTIONS OF DOCTOR AND HEALTH FACILITY QUALITY AND DELIVERY DECISIONS IN RURAL TANZANIA: A MULTILEVEL ANALYSIS. *P C Rockers, M E Kruk, G Mbaruku, M Paczkowski, C Nzabuhakwa, S Galea (University of Michigan, Ann Arbor, MI 48109)

More than half of child deliveries in Tanzania occur in the home. We investigated the relation between community perceptions about the quality of doctors and health facilities and place of delivery among rural women in western Tanzania. We interviewed a population-representative sample of 1,067 women from 50 villages throughout Kasulu District. Key variables collected included location of most recent delivery, belief about the importance of delivering in a health facility, perception of quality of care at nearest health facility, and assessment of skills and effort of doctors and traditional birth attendants. We aggregated responses about perceptions of the health system to the village level. A multilevel random-intercept logistic regression model was fit to assess associations between individual- and village-level variables and place of delivery. In the full model, individual-level, but not village-level, agreement with the importance of delivering in a facility was associated with increased odds of facility delivery (Odds Ratio (OR) 1.88, 95% Confidence Interval (CI): 1.30 – 2.72). In contrast, village-level, not individual-level, perceptions of high quality at the nearest facility (OR 7.95, 95% CI: 1.54 – 41.12) and assessments of doctors' skills and effort as better than traditional birth attendants' (OR 17.06, 95% CI: 1.63 – 178.25) were significantly associated with increased odds of facility delivery. These results suggest that village-level perceptions of the health system are important in promoting facility delivery and may suggest interventions to reduce maternal morbidity and mortality.

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EXPERIENCES OF TRAUMA AND POST-TRAUMATIC STRESS DISORDER IN POST-CONFLICT LIBERIA. *P C Rockers, M E Kruk, S Galea (University of Michigan, Ann Arbor, MI 48109)

Conflict began in Liberia's Nimba County in 1989, sparking two country-wide civil wars that ended in 2003. We assessed traumatic event experiences and attendant post-traumatic stress disorder (PTSD) in post-conflict Liberia. We administered a household survey to a population-representative sample of 1,426 individuals throughout Nimba County. The Harvard Trauma Questionnaire was used to assess PTSD as well as potentially traumatic experiences (PTEs). Ninety-nine percent of participants reported at least one PTE. The prevalence of PTSD was 48.2%. In multivariable modeling, experiences of combat situations (Odds Ratio (OR) 3.20, 95% Confidence Interval (CI): 1.16 – 8.85), physical violence (OR 1.87, 95% CI: 1.40 – 2.50), restricted freedom (OR 2.77, 95% CI: 1.87 – 4.09), harm to family or friends (OR 2.66, 95% CI: 1.90 – 3.74), and witnessing torture (OR 2.27, 95% CI: 1.16 – 4.42) were associated with greater odds of PTSD when taking into account baseline demographics. However, the relation between particular PTEs and risk of PTSD was modified by different demographic factors. The risk of PTSD among those who experienced harm to family or friends was greater among women than among men (p=0.03); the relation between material deprivation and risk of PTSD was greater among those over the age of 35 vs. younger (p=0.04), while the relation between witnessing torture and risk of PTSD was greater among those with low vs. high education (p=0.04). These data suggest that the experience of PTE was near ubiquitous in Liberia, that PTSD is highly prevalent, but that individual characteristics modify the relation between PTEs and risk of PTSD.

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POVERTY, FOOD INSECURITY AND CHILDHOOD INTERNALIZING AND EXTERNALIZING PROBLEMS. *N Slopen, G Fitzmaurice, D R Williams, S E Gilman (HSPH, Boston, MA 02115)

Poverty and food insecurity have been shown to have negative effects on children's physical growth and development, though less is known about their effects on psychological development. We investigated the effects of poverty and food insecurity on internalizing and externalizing problems among 2810 children of the Project on Human Development in Chicago Neighborhoods (ages 4-14 at baseline). Problem status was defined using cut-points on the Child Behavior Checklist that converge with diagnostic outcomes. Adjusting for child age, sex, race/ethnicity, and caregiver age, education, and depression, children from food insecure households were 1.53 (95% CI: 1.24-1.88) times more likely to have internalizing problems, and 1.54 (95% CI=1.16-2.05) times more likely to have externalizing problems, compared to children in food secure households. In prospective analyses over a 2 year period, children from homes that were persistently food insecure were 1.49 (95% CI: 1.11-1.99) times more likely have internalizing problems and 2.09 (95% CI: 1.27-3.45) times more likely to have externalizing problems, compared to children who were never food insecure, adjusting for prior problem status and other characteristics. Children in households that became food insecure over the duration of the study were 1.74 (95% CI: 1.03-2.92) times more likely to have externalizing problems at follow-up, relative to children from households that were never food insecure. To our knowledge, this is the first prospective study to demonstrate an association between trajectory of food insecurity and internalizing and externalizing problems. This study provides new evidence that poverty, and specifically food insecurity, adversely effect children's mental development.

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CHILDHOOD GENDER NON-CONFORMITY AND RISK OF ADULT PSYCHOPATHOLOGY IN MEN. *W C Holmes, A Cohen, T Sandfort (University of Pennsylvania School of Medicine, Philadelphia, PA 19104)

To estimate the association between gender non-conformity and psychopathology – and to assess if such an association, if it exists, is mediated by sexual orientation and/or abuse histories – we random-digit-dial-recruited 1,157 African American, Caucasian, and Latino men. A proxy measure of gender non-conformity was assessed by asking men if their childhood peer playmates were only/mostly boys (B), equally boys/girls (BG), or only/mostly girls (G). We also assessed sociodemographics, and childhood physical abuse (CPA), childhood sexual abuse (CSA), depression, posttraumatic stress disorder (PTSD), borderline personality disorder (BPD), dissociation, and alcohol/drug abuse histories. Overall, 50% were in B, 40% BG, and 10% G subgroups (ordered by increasing gender non-conformity). Gender non-conformity was associated with sexual orientation, CPA, and CSA; and with chronic depression and chronic PTSD ($p<0.001$; $p=0.025$; $p=0.001$; $p=0.015$; and $p<0.001$, respectively). After adjusting for sexual orientation/abuse, gender non-conformity was not associated with depression but was associated with PTSD. For PTSD, adjusted odds ratios (AORs) for BG and G (compared to B) subgroups were 0.80 and 2.17 ($p=0.35$ and $p=0.013$, respectively); and AORs for gay/bisexual, CPA, and CSA subgroups were 1.60, 3.42, and 3.15 ($p=0.12$, $p<0.001$, and $p<0.001$), respectively. Of the psychopathology studied, gender non-conformity was associated with two types, one of which – depression – appeared to be mediated by sexual orientation and abuse. The association between gender non-conformity and PTSD was not mediated by sexual orientation and abuse, suggesting that gender non-conformity in males may be traumatic directly or in other unmeasured indirect ways.

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INCOME, TRAUMATIC EVENT EXPOSURE, AND RISK OF PTSD IN DETROIT. *E Goldmann, Delva J, Aiello A, Uddin M, Momper S, S Galea (University of Michigan, Ann Arbor, MI 48104)

Low socioeconomic status is associated with greater risk of posttraumatic stress disorder (PTSD) in studies of the general population. It remains unclear, however, whether the higher prevalence of PTSD found among those with low incomes compared to those with higher incomes can be fully explained by greater exposure to traumatic events. We recruited a random sample of 1382 adult residents of Detroit and conducted structured interviews to assess traumatic event exposure and PTSD, consistent with DSM-IV criteria. Lifetime prevalence of traumatic events was 87.0% overall, 85.0% among low income persons vs. 91.5% among high income persons. However, individuals with low incomes had greater lifetime prevalence of exposure to assaultive violence than did individuals with high incomes (54.9% vs. 49.5%) and experienced a greater mean number of distinct assaultive violence events (1.1 vs. 0.8, $p<0.01$). Lifetime conditional risk of PTSD given exposure to assaultive violence was 9.9% among low income persons, compared to 2.7% among high income persons ($p=0.01$). Among those who experienced assaultive violence, using logistic regression models, we found that those with low incomes were almost three times more likely to develop PTSD than those with high incomes (OR=2.8, 95% CI: 1.0-7.8), even after controlling for number of distinct lifetime traumatic events experienced. Results suggest exposure to traumatic events may not entirely account for the difference in PTSD risk between income groups, and that low income individuals may be more vulnerable to the consequences of traumatic event exposure. Future studies that further evaluate this economic vulnerability to developing PTSD are warranted.

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QUALITY OF NEIGHBORHOOD OF RESIDENCE AND RISK OF PTSD: EVIDENCE FROM THE DETROIT NEIGHBORHOOD HEALTH STUDY. *E Goldmann, A Aiello, M Uddin, J Delva, S Momper, S Galea (University of Michigan, Ann Arbor, MI 48104)

Posttraumatic stress disorder (PTSD) is a common mental disorder associated with substantial morbidity. Individual characteristics associated with PTSD are well established; however, there is little evidence about how features of the social context, such as quality of the built environment, are associated with the risk of PTSD. We conducted systematic observations of all 54 neighborhoods in Detroit in June-July 2008 to evaluate the quality of neighborhoods, including building conditions as measured by the presence of broken or boarded up windows or doors, buildings with outside damage, and entirely vacant buildings. We recruited a random sample of 1382 adult residents of Detroit and conducted structured interviews to assess traumatic event exposure and PTSD, consistent with DSM-IV criteria. Among sample participants, 87% were exposed to at least one traumatic event in their lifetime. Lifetime and current PTSD prevalence was 10% and 7%, respectively. Among persons who had been exposed to traumatic events, in adjusted generalized estimating equations (GEE) models, living in a neighborhood with poorer building conditions was significantly associated with a greater risk of current PTSD (odds ratio (OR)=1.20, 95% confidence interval (CI): 1.03, 1.40) compared to those living in neighborhoods with better building conditions, controlling for individual-level characteristics. These results suggest that exposure to contextual adversity may be associated with greater vulnerability to the consequences of traumatic events. Future study of the biologic mechanisms through which the local environment shapes vulnerability to mental illness is warranted.

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DYNAMICS OF PERSONAL-SOCIAL DEVELOPMENT IN A COHORT OF ETHIOPIAN CHILDREN. *M Paczkowski, F Tessema, A Tegegn, C Hadley, M Asefa, S Galea (University of Michigan, Ann Arbor, MI 48109)

Early life cognitive and social emotional development is strongly associated with later life productivity and learning. Extant evidence from poor countries suggests that socioeconomic status (SES), nutrition, and maternal mental health are associated with early life development. It is unclear, however, whether the role of SES is mediated by the two other factors. Using a cohort study of 368 Ethiopian children aged 3 to 24 months at baseline, we investigated the relation among baseline SES, maternal post traumatic stress (PTS), and stunting and personal-social development scores over time. We also assessed whether the relation between baseline SES and follow up personal-social scores was mediated by baseline maternal PTS and stunting. We found that children from wealthier households had personal-social scores that were 0.09 (95% CI 0.02, 0.16) and 0.37 (95% CI: 0.11, 0.64) higher, at baseline and follow-up respectively, compared to children from poorer households. Children of mothers with PTS had baseline personal-social scores that were 0.11 (95% CI: -0.20, -0.01) lower and follow up scores that were 0.37 (95% CI: 0.05, 0.70) higher compared to children of mothers without PTS, suggesting these children were catching-up developmentally. Baseline maternal PTS and baseline stunting did not mediate the relation between baseline SES and follow-up personal-social scores. The effects of SES on personal-social development may be due to higher SES families providing an environment that is more conducive to personal-social development. Future work should assess the mechanisms through which high SES environments in poor countries improve child personal-social skills.

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THE COGNITIVE FUNCTIONS AND DEPRESSION RELATED FACTORS IN THE KOREAN ELDERLY. *S J PARK, Y Ahn, H M Kim, S S Kim (Center for Genome Science, KNIH, KCDC, Seoul 122-701, Korea)

The objective of this study was to investigate the factors which affecting the cognitive function and depression of a Korean elderly group. A total number of 1,562(Male: 591, Female: 971) elderly over 60 years participated in this study. The subjects were tested for cognitive function with Korea-Mini Mental State Examination and depression with Geriatric Depression Scale Short Form. The prevalence rate of mildly impaired cognitive function of the elderly was 14.0% and severe impairment was 8.7%. The 24.4% of the elderly were categorized as mild depression and 14.9% had severe depression. The variables such as sex, smoking, exercise, education, marital status, income, job, solitude, self-rated health status (CRH), dental problem, weight change, dizziness, nutrient intake and central obesity were significantly related with impaired cognitive function and depression. Aspartate aminotransferase, total cholesterol (Tchl), red blood cell, hemoglobin, hematocrit, and anemia were only related with cognitive function while sleep time and eating behaviors only associated with depression. After multiple stepwise regressions, age, sex, exercise, education, CRH, and tchl were still significantly related to cognitive function. Depression related factors were smoking, exercise, education, income, job, CHS, weight change, dizziness, meal enjoyment, energy intake, and protein intake. These findings suggest that the lifestyle management and good nutrition status may be helpful in preventing decline of cognitive function and depression.

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SERIOUS PSYCHOLOGICAL DISTRESS AND ITS ASSOCIATIONS WITH BODY MASS INDEX: FINDINGS FROM THE 2007 BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM (BRFSS) *G Zhao, E Ford, C Li, T Strine, S Dhingra, J Berry, A Mokdad (Centers for Disease Control &Prevention, Atlanta, GA 30341)

To examine the associations of body mass index (BMI) with serious psychological distress (SPD) after taking into consideration the obesity-related comorbidities (ORCs-diabetes, myocardial infarction, angina pectoris, stroke, hypertension, hypercholesterolemia, asthma, and arthritis), lifestyle factors, or emotional support, we used self-reported data (n=153,865) from the 2007 BRFSS. Psychological distress was assessed by the Kessler-6 Questionnaire; respondents with a Kessler-6 score of $\geq$13 were defined as having SPD. The multivariate adjusted prevalence ratios (APRs) with 95% confidence intervals (CIs) were estimated using log-binomial regression analyses. Overall, 3.2% (95% CI: 3.0-3.4%) of US adults had SPD. Compared to participants with a normal BMI (18.5-$<$25 kg/m^2), the prevalence of SPD was significantly higher among men who were underweight (BMI$<$18.5 kg/m^2) or obese (BMI$\geq$30 kg/m^2) or among women who were underweight, overweight (BMI 25-$<$30 kg/m^2) or obese. The APRs for SPD were 1.58 (95% CI: 1.06-2.35) in adults who were underweight, 1.04 (95% CI: 0.90-1.19) in adults who were overweight, and 1.21 (95% CI: 1.04-1.41), 1.31 (95% CI: 1.07-1.61), and 1.36 (95% CI: 1.13-1.63), respectively, in adults who were obese with BMIs of 30-$<$35 kg/m^2, 35-$<$40 kg/m^2, and $\geq$40 kg/m^2 (adults with a normal BMI as the referent). Our results demonstrate that an abnormal BMI is significantly associated with an increased likelihood of having SPD independent of multiple ORCs, lifestyle factors, or emotional support.

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TRAUMA HISTORIES AND SUICIDALITY OF MANITOBA (CANADA) INDIGENOUS RESIDENTIAL SCHOOL SURVIVORS. *B Elias, M Hall, S Hong, A Woods, J Mignone, J Sareen (University of Manitoba, Winnipeg, MB, Canada R3E 3P4)

Potential predictors of lifetime suicide thoughts and suicide attempts for residential school survivors (RSS) were explored using data from the Manitoba First Nations Regional Longitudinal Adult Health Survey, 2002 (subsample n=611). Trauma histories included abuse history (emotional, physical, and/or sexual) regardless of an abuse experience in a residential school, and whether or not they had parents and/or grandparents who attended a residential school. Covariates included age, gender, and marital status (partner/no partner). Bivariate and logistic regression analyses were performed ($p <= 0.05$) to identify potential predictors of a history of suicide thoughts and attempts. Abuse history was the only significant independent predictor of lifetime suicide thoughts: adjusted odds ratio (AOR) = 5.17 (95%CI 2.55-10.49). Similarly, abuse history was the only significant independent predictor of lifetime suicide attempts: AOR = 2.83 (CI 1.31-6.13). When adjusting for age, gender, marital status, and other traumatic experiences, RSS who had ever experienced abuse were more than 5 times more likely to have contemplated suicide at least once over their lifetime when compared to RSS who had not experienced abuse. Similarly, RSS who had ever experienced abuse were nearly 3 times more likely to have attempted suicide at least once over their lifetime when compared to RSS who had not experienced abuse. In summary, the data suggests that any experience of abuse has had a profound effect on the mental health of residential school survivors, as expressed through suicide thoughts or attempts.

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TRAUMA HISTORIES AND THE MENTAL HEALTH OF MANITOBA (CANADA) INDIGENOUS PEOPLES: WHAT ABOUT THE OFF-SPRING OF RESIDENTIAL SCHOOL ATTENDEES? *B Elias, M Hall, S Hong, A Woods, J Mignone, J Sareen (University of Manitoba, Winnipeg, MB, Canada R3E 3P4)

Potential predictors of lifetime suicide thoughts and attempts for Indigenous individuals who had not attended residential school were investigated using data from the Manitoba First Nations Regional Longitudinal Adult Health Survey (RHS) 2002 (subsample n=2343). Trauma histories included whether or not the individual was an offspring of a residential school survivor (ORSS; i.e., had parents and/or grandparents who had attended residential school), and whether or not they had an emotional, physical, and/or sexual abuse history. Covariates included age, gender, and marital status (partner/no partner). Bivariate and logistic regression analyses ($p <= 0.05$) were used to assess potential predictors of suicide thoughts and of suicide attempts. Being an ORSS was a marginally significant predictor of suicide thoughts: adjusted odds ratio (AOR)=1.48, (95%CI 1.08-2.02). More significant was age compared to those over fifty years (18-27 years, AOR=3.16 [CI 1.58-6.35]; 28-39 years, AOR=4.17 [CI 2.09-8.30]; 40-49 years, AOR=2.64 [CI 1.31-5.29]), and especially abuse history: AOR=6.18 (CI 4.19-9.11). Abuse history was the only significant predictor of suicide attempts: AOR=6.64 (CI 3.98-11.05. Abuse history has had a profound effect on the mental health of Manitoba Indigenous people, increasing the odds of suicide thoughts by more than 6 times; any age group under 50 years is at risk of suicide thoughts, but more so for those aged 28-39; and being an ORSS increases the risk of suicide thoughts by nearly 50%. Any experience of abuse increased the odds of suicide attempts by more than 6-1/2 times over those who had not experienced abuse.

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PHYSICAL ACTIVITY IS ASSOCIATED WITH POSTTRAUMATIC STRESS DISORDER SYMPTOMS IN A LARGE, MILITARY COHORT. *M L Kelton, MS, C A LeardMann, MPH, B Smith, MPH, PhD, E J Boyko, MD, MPH, T S Wells, DVM, MPH, PhD, A Littman, PhD, T C Smith, MS, PhD; for the Millennium Cohort Study Team (Naval Health Research Center, San Diego, CA 92106)

Posttraumatic stress disorder (PTSD) is associated with many physical and psychological comorbidites and adverse behaviors. The relationship between PTSD symptoms and positive health behaviors, however, is not well understood. The objective of this study was to examine the association of physical activity with prospectively assessed PTSD symptoms in a large military cohort. Baseline and follow-up questionnaire data from the Millennium Cohort Study, a large prospective study of US military service members, were used. Three types of physical activity – light/moderate, vigorous, and strength training - were assessed in relation to PTSD symptoms. Multivariable logistic regression was used to estimate adjusted odds of new-onset and persistent PTSD symptoms by physical activity levels at follow-up. Of the 38,883 study participants, 89.4% reported at least 30 minutes per week of any type of physical activity. New-onset PTSD symptoms were associated with lower levels of all activity types. Vigorous physical activity had the strongest, most consistent inverse association with PTSD symptoms. Individuals reporting at least 20 minutes of vigorous physical activity twice per week had approximately 40% reduced odds for new-onset and persistent symptoms. While more longitudinal research is needed, these findings contribute to emerging research in PTSD and associated physical activity, and may influence prevention and treatment guidelines for service members.

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DEPRESSION IS PROSPECTIVELY ASSOCIATED WITH COMBAT DEPLOYMENT IN SUPPORT OF THE WARS IN IRAQ AND AFGHANISTAN. *T Wells, DVM, MPH, PhD, C LeardMann, MPH, S Fortuna, MD, B Smith, MPH, PhD, T Smith, MS, PhD, M Ryan, MD, MPH, E Boyko, MD MPH, D Blazer, MD, PhD, for the Millennium Cohort Study Team (Naval Health Research Center, San Diego, CA 92106)

Background: Studies have reported an association of deployment with depression, but these studies have been limited by small size or lack of longitudinal design with predeployment data. Objective: To prospectively explore the relations of deployment with new-onset depression. Methods: Designed to investigate the long-term effects associated with military service, the Millennium Cohort is the largest prospective, military study. This study included 40,226 Millennium Cohort members who completed baseline and follow-up questionnaires and met study criteria. Using nine items from the Primary Care Evaluation of Mental Disorders Patient Health Questionnaire (PHQ-9), participants were identified with new-onset depression if they met the PHQ-9 criteria at follow-up but were symptom-free at baseline. Results: Deployed men and women with reported combat exposures had the highest new-onset of depression (5.6% and 15.7%, respectively), followed by those not deployed (3.9% and 7.7%, respectively), and those deployed without combat exposures (2.3% and 5.1%, respectively). After adjusting for demographic, behavioral, and military characteristics, combat-deployed men and women were at significantly increased odds for new-onset depression compared with nondeployed men and women. Conclusions: To our knowledge, this is the first longitudinal study with predeployment data to examine the relationship of deployment with depression. Deployment with combat exposures is a significant risk for new-onset depression among service members.

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A PROSPECTIVE INVESTIGATION OF POSTTRAUMATIC STRESS DISORDER AND BODY WEIGHT IN A LARGE MILITARY COHORT. *C A LeardMann, MPH, I G Jacobson, MPH, B Smith, MPH, PhD, T S Wells, DVM, MPH, PhD, E J Boyko, MD, MPH, M A K Ryan, MD, MPH, T C Smith, MS, PhD; for the Millennium Cohort Study Team (Naval Health Research Center, San Diego, CA, 92106)

Background: Posttraumatic stress disorder (PTSD) has been associated with a variety of adverse health effects. The temporal relationship, however, between PTSD and body weight has not been established. Objectives: To longitudinally examine the relationship between PTSD and body weight. Methods: Using data from the largest population-based prospective, military study, this study included over 41,000 Millennium Cohort members. Using the PTSD Checklist, PTSD was defined as meeting the Diagnostic and Statistical Manual of Mental Disorders criteria. Change in weight was calculated using self-reported weight. Multivariable modeling was performed to evaluate the relationship of PTSD symptoms with weight change. Results: In the 3 years from baseline to follow-up, all groups had a mean increase in weight (4 to 10 pounds). Among nondeployed men, after adjusting for demographic, mental health, and behavioral characteristics, those with new-onset or persistent PTSD symptoms gained significantly more weight (about 3 pounds more) than those with resolved symptoms or no symptoms. Among both deployed and nondeployed women, those with new-onset PTSD symptoms gained significantly more weight (about 4 pounds more) compared to women without PTSD symptoms. There were no significant differences among deployed men. Conclusions: New-onset PTSD symptoms are associated with a significant increase in weight compared to those without symptoms among nondeployed men and women and deployed women. Implementing programs for weight control among those with newly diagnosed PTSD may help mitigate symptoms.

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THE ASSOCIATION BETWEEN CHILDHOOD SEXUAL ABUSE AND SELF-HARM BEHAVIOR FROM ADOLESCENCE TO ADULTHOOD. *E Moore, H Romaniuk, C Olsson, Y Jayasinghe, J Carlin, G Patton (Murdoch Childrens Research Institute, Victoria 3051, Australia)

There is conflicting evidence about the role of childhood sexual abuse (CSA) in the development of self-harm behavior. We used data from a nine-wave, population-based cohort study of adolescents in Australia (1992 to 2008). Self-harm was prospectively measured at seven waves during adolescence and adulthood using the Beck Suicide Intent Scale (mean age at waves 3 to 9: 15.9, 16.3, 16.8, 17.4, 20.7, 24.1 and 29.1 years). CSA was retrospectively assessed using a 6-item questionnaire at ages 24 and 29 years. Repeated measures of self harm were analyzed using logistic random effects models. We adjusted for sex, age, country of birth, and parent's education, marital and smoking status, and area measures of deprivation and urban/rural status. The risk of self-harm behavior was increased in people who reported CSA, with this risk varying over time. From waves 4 to 7 the increased risk of reporting self-harm for people with a history of CSA remained comparable to the risk at wave 3, while at waves 8 and 9 there was evidence that the risk of self-harm increased (wave 3: odds ratio (OR)=2.6, 95% confidence interval (CI):1.5, 4.5; wave 4 OR=3.5, 95% CI: 1.9, 6.5; wave 5 OR=2.2, 95% CI: 1.1, 4.5; wave 6 OR=4.7, 95% CI: 2.1, 10.3; wave 7 OR=3.6, 95% CI: 1.7, 7.7; wave 8 OR=8.2, 95% CI: 3.5, 19.1; wave 9 OR=12.9, 95% CI: 3.6, 45.8). There was no evidence for effect modification by sex. Our results suggest that history of CSA is an independent risk factor for self harm. Those with a history of CSA had a consistently elevated risk that increased further after adolescence. These results have implications on interventions to prevent self-harm behavior across the life course.

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DEPRESSION AND DISABILITY AMONG INDIVIDUALS WITH DIABETES. *N Schmitz, L Messier, D Nitka, A Ivanova, G Gariepy, J Wang, A Malla, R Boyer, A Lesage, I Strychar (Douglas Hospital Research Centre, McGill University, Montreal, QC, Canada)

OBJECTIVE— The purpose of this study was to assess the association between depression and disability in a population-based study of individuals with diabetes in Quebec, Canada. RESEARCH DESIGN AND METHODS— Telephone survey methods were employed (January to April 2008). Random digit dialing was used to select a sample of 2003 adults with self reported diabetes aged 18 to 80 years in Quebec, Canada. Health status was assessed by the World Health Organization Disability Assessment Schedule II and the CDC healthy day's measure. The Patient Health Questionnaire (PHQ-9) was used to assess depressive illness. Structural equation models were used to identify the direct and indirect processes through which risk factors contributed to both, depressive symptoms and poor physical functioning. RESULTS— Diabetes severity was directly associated with both, depression and poor physical functioning, while lifestyle-related factors were directly associated with poor physical functioning and indirectly associated with depression. CONCLUSIONS—Our results suggest a complex interaction between lifestyle-related factors, diabetes severity, social support and depression and physical functioning. Diabetes specific complications might have a direct effect on both, depression and physical functioning.

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OCCURRENCE OF DEPRESSION AND ANXIETY PRIOR TO PARKINSON'S DISEASE. *E Jacob, N Gatto, A Thompson, Y Bordelon, B Ritz (UCLA, Los Angeles, CA 90095)

Many people with Parkinson disease (PD) suffer from depression and anxiety prior to the onset of motor symptoms. Studies suggest these psychiatric conditions may be risk factors for PD or prodromal non-motor symptoms. Using a population-based approach in three rural California counties, we recruited 371 incident PD cases, 402 population and 115 unaffected sibling controls. We recorded self-reports of lifetime depression/anxiety diagnoses and use of psychotropic medications. Diagnoses and medication use first occurring at or after PD diagnosis (cases) or time of interview (controls) were excluded. Analyses were adjusted for age, race, sex, pack-years of smoking, and education, and we conducted analyses after excluding (lagging) both diagnoses and medication use first occurring within 2, 5, 10, and 20 years of the index/diagnosis date. Cases compared to population controls were more likely to have received a diagnosis of depression and/or anxiety at any time prior to index date (odds ratio (OR) 1.42, 95% confidence interval (CI) 1.01, 2.00), but were not more likely to have been both diagnosed and treated (OR 1.11, 95% CI 0.77, 1.60). Male PD patients received diagnoses combined with treatment more often than population controls within 5 years of PD diagnosis (OR 2.21, 95% CI 1.21, 4.04; 2 year lag: OR 2.44, 95% CI 1.29, 4.61; 5 year lag: OR 1.67, 95% CI 0.80, 3.49). We did not see any differences for females. Results for cases compared to sibling controls were similar to those obtained for population controls. These results suggest that non-motor symptoms of depression and/or anxiety may be early symptoms during the prodromal phase of PD rather than etiologic risk factors.

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POST-TRAUMATIC STRESS DISORDER CHECKLIST SCORES AND ROLE IMPAIRMENT IN AN ARMY SAMPLE. *R Herrell, P D Bliese, C W Hoge (Walter Reed Army Institute of Research, Silver Spring, MD 20910)

The Post-Traumatic Stress Disorder Checklist (PCL) is widely used to identify cases of PTSD in clinical and population samples. In a sample of U.S. solders and national guardsmen (n=5665) who completed surveys 3 months after returning from Iraq, we assessed role impairment in those with low (17-29), intermediate (30-49), and high (50-85) PCL scores. Participants were asked whether in the past 4 weeks stress or emotional problems ''limited your ability to do your primary military job,'' ''caused you to do work less carefully than usual,'' and ''caused your supervisor to be concerned about your performance.'' Depression and anxiety were measured using the Patient Health Questionnaire (PHQ). Controlling for demographics, rank, morale, other service characteristics, depression, and anxiety, intermediate PCL scores (PCL-I) and high PCL scores (PCL-H) strongly predicted limited ability to perform the primary job (for PCL-I, odds ratio [OR]=2.2, 95% confidence interval [CI]=1.8,2.8; for PCL-H, OR=3.8, CI=2.9-4.8). Comparable effects were found for the other 2 role impairment questions. We used ordinal logistic regression to assess the association of the PCL scores and the count of endorsements of the impairment items. Model fitting statistics suggested that the impact of PCL scores differed across the number of items endorsed. In those who endorsed all 3 items, PCL scores increased the odds of impairment (for PCL-I OR=1.7, CI=1.2-2.3; for PCL-H OR=2.8, CI=1.9-4.0). Co-occurring depression and anxiety substantially increased the risk of impairment. High PTSD symptomatology, especially associated with depression and anxiety, strongly increased endorsement of functional impairment.

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POST-TRAUMATIC STRESS DISORDER, DEPRESSION, AND RESILIENCE AFTER HURRICANE GUSTAV. *E W Harville, X Xiong, P Buekens, K Elkind-Hirsch, G Pridjian (Tulane University, New Orleans, LA 70112)

Post-disaster psychopathology is likely to be exacerbated when victims are reminded of previous events. Hurricane Gustav hit the Gulf Coast three years after Hurricane Katrina. 102 southern Louisiana women who had participated in a study of postpartum mental health after Katrina were re-interviewed about mental health (the Posttraumatic Stress Checklist and Edinburgh Depression Scale) and experience of Gustav. Frequency tabulation and logistic regression were used to analyze the effect of the hurricanes. 13% had symptoms of post-traumatic stress disorder (PTSD) and 16% of depression, similar to the proportion with PTSD two years earlier (15%), but lower than for depression (23%). Even when adjusted for prior mental health, fearing for one's life during Gustav was associated with PTSD (adjusted odds ratio (aOR) 7.9, 95% confidence interval (CI) 1.4-44.0) and depression (aOR 7.4, CI, 1.6-34.1). Injury was also associated with poor mental health; experiences related to evacuating were not. Experience of Katrina continued to exert an independent effect on mental health, but did not interact with experience of Gustav. Similar proportions as earlier indicated that they saw positive things arising from Katrina (78% vs. 74%). Two years earlier, the most common benefits named were the baby, closeness with family, and material benefits; after Gustav, women were more likely to say Katrina had produced community benefits (including better preparation for Gustav) and less likely to cite material benefits. At the next major hurricane threat after Katrina, PTSD stayed fairly constant but depression was lower, possibly because the women were no longer postpartum. Experience of both hurricanes contributed to mental health.

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BEREAVEMENT AND THE DIAGNOSIS OF MAJOR DEPRESSIVE EPISODE. *S E Gilman, J Breslau, N H Trinh, M Fava, J M Murphy, J W Smoller (Harvard School of Public Health, Boston, MA 02115)

Depressive episodes following the loss of a loved one are currently excluded from a diagnosis of depression unless there is evidence that the bereavement was prolonged and complicated. Assessing the validity of this exclusion is needed to determine whether bereavement-related depression should continue to be exempt from a diagnosis. We analyzed the associations between loss and the 12-month risk for depression, and evaluated differences in indicators of psychopathology between individuals with bereavement-excluded depression and diagnosis-qualifying depression, in the National Epidemiologic Survey on Alcohol and Related Conditions (n=43,093). Among individuals reporting a loss in the year prior to interview, the 12-month risk of depression was 11.0%, compared to 7.4% among individuals not reporting a loss (adjusted odds ratio=1.63; 95% CI=1.48, 1.79). Compared to individuals whose depression qualified for a diagnosis, individuals with bereavement-excluded depression had fewer lifetime depressive episodes; lower lifetime risks of other disorders; a lower level of impairment; a reduced likelihood of treatment seeking; and lower risks of disorders at a 3-year follow-up interview. However, individuals with bereavement-related depression had a higher risk of disorders at the follow-up interview than individuals without any prior depression history. We conclude that most individuals do not experience a depressive episode following a loss. Furthermore, although bereavement-related depression is in many ways less indicative of psychopathology than major depression, the elevated risk of future disorders associated with bereavement-related depression challenges the validity of the current diagnostic criteria for depression.

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PHYSICAL FUNCTION AND DEPRESSIVE SYMPTOMS AMONG OLDER EUROPEANS – LONGITUDINAL RESULTS FROM THE SURVEY OF HEALTH, AGEING AND RETIREMENT IN EUROPE (SHARE). *M Busch, J Welke, B Neuner, J Fuchs, C Scheidt-Nave (Robert Koch Institute, Berlin, Germany)

Associations between physical and mental health in older age have been described in many cross-sectional studies. Little is known, however, about the temporal relationship between poor physical function and depression in older adults. We investigated the longitudinal effect of physical function on late-life depression, using data from n=17.692 participants in the Survey of Health, Ageing and Retirement in Europe, a longitudinal study of non-institutionalized people aged $\geq$50 years in 11 countries, who were followed for 2 years (2004/5-2006/7). Depressive symptoms were measured using the EURO-D scale. Measures of physical function included maximum hand grip strength, and self-reported limitations with mobility, basic (ADL) and instrumental (IADL) activities of daily living. The effects of physical function variables on depression (EURO-D $\geq$4) at 2 years were examined using logistic regression analysis controlling for sociodemographic variables, country, depressive symptoms at baseline, and comorbidities. Prevalence of depression (EURO-D $\geq$4/12) at 2 years was 23.1%, with higher prevalences in the Latin ethno-lingual group of countries. After adjustment for all covariates, higher grip strength was protective for depression (Odds Ratio (OR) per kg increase, 0.98; 95% Confidence interval (CI), 0.97-0.98), while one or more limitations with mobility (1.38; 1.26-1.52), ADL (1.43; 1.23-1.65) or IADL (1.27; 1.12-1.43) were strongly associated with depression. In conclusion, better physical function was associated with a reduction in depressive symptoms in older adults, independent of sociodemographic variables and chronic physical conditions.

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PSYCHOLOGICAL FACTORS AND INTIMA-MEDIA THICKNESS (IMT) IN POLYCYSTIC OVARY SYNDROME (PCOS). * J A Cipkala-Gaffin, MN, RN, E O Talbott, Dr PH, E Barinas-Mitchell, PhD, M-K Song, PhD, C Brown, PhD, J Wilson, PhD (University of Pittsburgh, Pittsburgh, PA 15213)

Objective: Earlier work has shown that women with PCOS have increased subclinical atherosclerosis as measured by IMT and increased depression. The aim of this study was to examine whether psychological factors are risk factors for IMT in women with PCOS independent of baseline cardiovascular risk factors. Methods: The sample originated from 161 cases and controls matched on age, race and neighborhood who participated in the Cardiovascular Health and Risk Measurement Study (CHARM) conducted in (1993-4) investigating coronary heart disease risk factors in women with PCOS. Psychological characteristics of the women were collected using the Beck Depression Inventory (BDI) I, the Spielberger Trait Anger and Anxiety Scales, the Cook-Medley Scale (Hostility/Cynicism) and the Diener Satisfaction with Life Scale along with selected cardiovascular risk factors. Four years later subjects underwent B-mode ultrasonography of the carotid arteries for evaluation of carotid IMT. There were 196 subjects that had psychological and IMT data. Results: PCOS cases were younger (36.4$\leq$6.4) years compared to controls (38.5 $\leq$ 6.9). There was no association between the psychological factors and IMT. In all regression analyses with BDI in the model and selected cardiovascular risk factors age was a significant predictor of IMT. For the total sample, age, BMI (borderline) and systolic blood pressure were predictors of IMT. Age and systolic blood pressure p<.034 were significant predictors of IMT in women <45. Age and BMI (borderline) were predictors of increased IMT for those $\geq$ 45. Conclusions: There was no independent relationship between the psychological variables and IMT measurements for the sample. Further research to explore psychological variables independent of cardiovascular risk factors and IMT is warranted.

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COUNTY-LEVEL DEPRIVATION IS ASSOCIATED WITH ADOLESCENT DEPRESSION: INSIGHTS FROM A NATIONALLY REPRESENTATIVE SAMPLE. *M Uddin, E Bakshis, A Aiello, K Koenen, S Galea (University of Michigan, Ann Arbor, MI 48104)

Depression is one of the most common psychiatric disorders in childhood and adolescence. Established risk factors include individual- and family-level characteristics, such as household structure and gender. Little is known, however, about how macrosocial influences modify the relation between these characteristics and depression. Using data from a nationally representative sample of U.S. adolescents (AddHealth), we investigated the association between county public assistance (PA) levels and depressive symptoms in adolescents (N=4889) interviewed during wave 2 of the study. First, we used multilevel mixed models adjusting for demographics, social support, access to health care, family structure and whether a parent was receiving PA. We found that adolescents living in counties with high PA levels, compared to adolescents living in counties with low PA levels, were more likely to have more depressive symptoms (β=0.37, $p<0.001$). Second, we used linear regression analyses stratified by sibling type (monozygotic, dizygotic, full sibs, half sibs and non-related pairs) and residence in counties with high vs. low PA. We found that 4 of the 5 sibling types (i.e. all but MZ) who resided in counties with high PA had a greater concordance of depressive phenotypes than their counterparts residing in counties with low PA, adjusting for age, sex and whether a parent was receiving PA: intraclass correlations (ICCs) in the high PA stratum ranged from 0.14 (NR) to 0.40 (MZ); ICCs in the low PA stratum ranged from 0.06 (HS) to 0.40 (MZ). Future work should aim to identify additional features of the macrosocial environment that may be associated with adolescent depression.

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PHYSICAL SYMPTOMS AND PSYCHIATRIC DISORDERS AMONG ADOLESCENTS IN PRIMARY CARE SETTINGS. *N C Low, S S Lee, J G Johnson, G Galbaud du Fort, E S Harris (McGill University, Montréal, QC, Canada)

The expression of psychiatric syndromes through physical/somatic symptoms has been of longstanding clinical and theoretical interest. This study examined physical symptoms in association with psychiatric disorders in 632 adolescents from primary clinics. Subjects self-reported their physical symptoms leading to the clinic visit following which they were administered the PRIME-MD instrument to detect mood, anxiety, substance use and eating disorders. Logistic regression models were conducted with physical symptoms as outcomes and psychiatric disorders as the main effects. Models were adjusted for sex, age, ethnicity and source of sampling. Results show 24.8% of the adolescents had a current psychiatric disorder, with the most common being mood and/or anxiety disorders (17.6%). However, only 3.5% of the sample stated an emotional/stress problem was the reason for the clinic visit. Pain, trouble sleeping, and dizziness symptoms were related to mood [odds ratio range (ORs): 2.0-5.7], anxiety (ORs: 2.2-4.5) and eating (ORs: 2.9-6.5) disorders. Heart and breathing problems were additionally associated with mood (ORs: 2.2-4.1) and anxiety (ORs: 2.9-19.7) disorders, whereas eating disorders were associated with gastrointestinal complaints (OR: 5.0). No physical symptoms were related to substance use disorders. Since psychiatric disorders frequently begin in adolescence, these results underscore the potential utility of systematic inquiry for psychiatric symptoms in primary care services, a setting that may provide an opportunity for secondary prevention of these debilitating disorders.

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GENE-ENVIRONMENT INTERACTION IN PROBLEMATIC SUBSTANCE USE BEHAVIOURS: RISK FOR TOBACCO, CANNABIS AND ALCOHOL USE DUE TO THE JOINT ACTION OF THE DRD4 EXON III 7-REPEAT-DERIVATIVES AND INSECURE ATTACHMENT STYLE. *C A Olsson, E E Moore, J A Ellis, G Byrnes, G C Patton (Murdoch Childrens Research Institute, Victoria 3051, Australia)

The purpose of this study was to examine gene-environment interaction in risk for problematic patterns of cannabis, tobacco and alcohol use by young adulthood. We hypothesised that: (1) novelty seeking personality traits previously associated with carriers of 5, 6, 7 or 8 repeats (labelled 7R+) would increase risk of problematic substance use, and (2) risk for substance use would be further increased among carriers of 7R+ with a history of insecure parent-child attachment relations. Methods: Analyses were based on genetic and social data collected as part of a 10-year longitudinal study of the health and wellbeing of 2000 young Australians followed across 8 waves from 14- to 24-years. The DRD4 exon III VNTR was genotyped for 962 participants. Substance use (cannabis, tobacco and alcohol) and young attachment style were assessed at 24-years. Interaction was evaluated using a 2x4 table with a common reference group (Botto, 2001). Results: The 7R+ disposition and insecure attachments were associated with slight increases in cannabis, tobacco and alcohol use by 24-years of age. However, the combination of 7R+ carriage and insecure attachment styles conferred greater risk than either factor in isolation. Compared with wild-type carriers who reported secure attachments, the odds of reporting problematic cannabis and tobacco use (but not alcohol use) among carriers of the 7R+ disposition who reported insecure attachments were elevated ~5- (odds ratio(OR) = 4.8, 95% Confidence Interval (CI) = 2.6-8.9) and 3-fold (OR = 2.9, CI = 1.7-4.9), respectively. The percentage of risk attributable to the joint effect of the 7R+ disposition and insecure attachments was 67% for cannabis use and 38% for tobacco use. No joint effect was observed for alcohol use. Conclusions. 7R+ repeats may increase risk of substance use behaviour, particularly among those reporting insecure parent-child attachments. Strengthening secure attachments (a potentially modifiable risk processes) might remove risk associated with the synergistic effects of both exposures.

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CONCURRENT AND SEQUENTIAL COMORBIDITY BETWEEN DEPRESSION/ANXIETY, SUBSTANCE USE AND ANTISOCIAL BEHAVIOR FROM ADOLESCENCE TO YOUNG ADULTHOOD. *M Cerdá, M Tracy, B Sánchez, S Galea (New York Academy of Medicine, New York, NY 10029)

The nature of the relationships between mental health problems over the lifecourse remains largely unknown. The authors used data from the Project on Human Development in Chicago Neighborhoods (1995–2002) to assess trajectories in substance use (SU), antisocial behavior (AB) and depressive/anxious symptoms (ANX/DEP) among children aged 12-15 at baseline and followed for six years (n=1517). We applied clustered multivariate transition models and used pairwise odds ratios to quantify concurrent comorbidity. We found concurrent and reciprocal sequential associations between AB and both ANX/DEP and SU. No comorbidity was detected between ANX/DEP and SU. AB and SU were 3.56 (95% CI: 2.54, 4.99) times more likely to co-occur at wave 1 than any other two problems, while AB and ANX/DEP were 3.41 (95% CI: 2.07, 5.59) times more likely to co-occur at wave 1. Respondents with high baseline AB had a 0.3 probability of high ANX/DEP at the next wave (compared to a 0.08 probability among those with low baseline antisocial behavior). Those with high baseline SU had a 0.62 probability of reporting high AB at the next wave (compared to a 0.36 probability among those with low baseline SU). A different set of sequential patterns emerged between waves 2 and 3: high AB at wave 2 predicted high SU at wave 3, and high ANX/DEP at wave 2 predicted high AB at wave 3. Of a series of individual and neighborhood-level characteristics, only engagement with deviant peers explained the sequential associations between AB and ANX/DEP and SU. Further research on the etiology of comorbidity can be critical to the design of mental health policies that can effectively reduce the mental health burden.

* = Presenter; S = The work was completed while the presenter was a student

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INCOME AND DRINKING LEVELS: EXPLORING THE LINKS BETWEEN LIFECOURSE INCOME TRAJECTORIES AND ADULT DRINKING TRAJECTORIES. *M Cerdá, V Johnson-Lawrence, S Galea (New York Academy of Medicine, New York, NY 10029)

Little research exists on the ways that lifecourse income trajectories, rather than static measures of income, influence alcohol consumption. We evaluated the relationship between family income trajectories followed between 1968 and 1999 and alcohol use between 1999 and 2005 in a sample of 8363 adults from the ongoing Panel Study of Income Dynamics. Income was assessed as the yearly total family income adjusted for inflation. Latent class growth mixture models with a censored normal distribution were used to estimate lifetime income trajectory groups. Income trajectory group membership was then entered as a covariate in a repeated measures marginal Poisson model estimating the average number of drinks consumed per day. The model was adjusted for age, gender, education, and race/ethnicity. We found three lifetime income trajectory groups, described as stable-high (44.5% of the sample; mean 1999 income $67,806), stable-moderate (42.1% of sample; mean 1999 income $30,946) and decreasing-low (13.1%; mean 1999 income $8866). The relative decrease in the number of drinks per day associated with having followed a decreasing low-income trajectory over the lifecourse rather than a stable high income trajectory was 0.84 (95% CI: 0.77, 0.91), while the relative decrease in the number of drinks per day associated with having followed a moderate stable rather than a high income trajectory was 0.85 (0.80, 0.88). No difference in level of use existed between those in the decreasing-low and moderate-stable income trajectories. Future epidemiologic research should identify pathways to high alcohol use among individuals exposed to lifetime high income levels.

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INCOME SHOCKS AND VERY LOW WEIGHT BIRTHS AMONG BLACK MOTHERS IN CALIFORNIA. *T Bruckner, D Rehkopf, R Catalano (UC Berkeley School of Public Health, Berkeley, CA 94704)

Infants born to black mothers of lower socioeconomic status exhibit an elevated incidence of very low weight (i.e., less than 1,500 gram) births. It remains unclear whether scarce financial resources *per se* account for this finding. Consistent with the notion that adequate financial resources may improve birth outcomes, we test whether a large income shock, in the form of the Earned Income Tax Credit (EITC), reduces the odds of a very low weight birth. We capitalize on differences in credit eligibility and the timing of disbursement among pregnant women in their second or third trimester to estimate the causal role of the EITC on very low weight births. We apply autoregressive, integrated, moving average time-series methods to the monthly odds of very low weight births in California in 1989 -1997 among 70,895 low-income black mothers likely to receive the EITC. We then examine the robustness of our findings with individual-level logistic regression methods, which also control for temporal patterns identified by time-series methods. Contrary to our hypothesis but anticipated by the literature, the odds of a very low weight birth among black women that qualify for the EITC increased above their expected value two and three months after the credit. Individual-level results converge with the ecological test in that the odds ratio of very low weight birth appears elevated two and three months after the EITC (odds ratio [OR] at lag two = 1.32, 95% confidence interval [CI]: 1.09-1.58; OR at lag three =1.22, 95% CI:1.01, 1.47). The EITC income shock may adversely affect the gestations of black women. If others replicate our results, the Treasury might mitigate any adverse effects of the EITC by disbursing the income at regular, short intervals throughout the calendar year.

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THE IMPACT OF NEIGHBORHOOD CHARACTERISTICS ON INFLAMMATORY MARKERS: FINDINGS FROM THE MULTI-ETHNIC STUDY OF ATHEROSCLEROSIS. *A Nazmi, A V Diez-Roux, N Ranjit, T Seeman, N S Jenny (University of Michigan, Ann Arbor, MI 48109)

Area-level factors are linked to cardiovascular disease, but the factors mediating these associations remain unknown. Inflammation, which is affected by behavioral and psychosocial factors that may vary across neighborhoods, is one proximal mediator. Using data from the Multi-Ethnic Study of Atherosclerosis we investigated cross-sectional associations of neighborhood deprivation, problems, safety and cohesion with circulating levels of fibrinogen, interleukin-6 and C-reactive protein (n=6841) and longitudinal associations with changes in interleukin-6 over a 3-4 year period (n=946). Mixed models with random intercept at the census tract level were used. After adjustment for age and sex, higher levels of neighborhood deprivation and problems were associated with higher levels of all three inflammatory markers, whereas higher levels of safety were associated with lower levels. Results with neighborhood cohesion were less consistent. Associations with fibrinogen remained robust to adjustment for race/ethnicity and socioeconomic status (≈1% difference in fibrinogen per SD increase in neighborhood deprivation, problems and safety scores). Associations with C-reactive protein and interleukin-6 were confounded by race/ethnicity and were not robust to adjustment. Greater neighborhood deprivation, more problems and less safety were also associated with greater increases in interleukin-6 over follow-up (≈9-16% increase per SD increase in neighborhood characteristic score), with associations persisting after race/ethnicity, socioeconomic status, and covariate adjustment. These findings suggest that inflammation may contribute to neighborhood differences in cardiovascular disease.

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EDUCATIONAL ATTAINMENT AND C-REACTIVE PROTEIN: A MEDIATION ANALYSIS. *K N Kershaw, B Mezuk, C Abdou, J A Rafferty, S J Colbert, D Hudson, J S Jackson (University of Michigan, Ann Arbor, MI 48109)

Background: Low socioeconomic position (SEP) has been associated with elevated C-reactive protein (CRP), a marker of systemic inflammation. Health behaviors may mediate the relationship between low SEP and CRP. Objectives: This study aims to (a) estimate the contributions of behavioral mediators (cigarette smoking, a high fat and sugar diet, heavy alcohol use, and vigorous exercise) to the association between low SEP and CRP and (b) evaluate whether these mediated relationships are moderated by gender and race/ethnicity. Sample: 6313 participants of the 2001-2006 National Health and Nutrition Examination Survey aged 40+. Methods: Path analysis of a series of Probit regression models was used to evaluate mediation and moderation. High serum CRP was defined as ≥0.3 mg/dl. SEP was measured using categorical educational attainment (less than high school (HS), high school, some college, and college or more [referent group]). Results: Significant total indirect effects were found between socioeconomic position and CRP. For example, less than HS was associated with a 0.25 standard deviation increase in the predicted probit index (95% confidence interval: 0.18, 0.32). Smoking and vigorous exercise were the strongest mediators of the SEP-CRP relationship, accounting for 45.2% and 45.6% of the total indirect effect, respectively. There was evidence of significant moderation by gender and race/ethnicity of the mediation effect of smoking and by gender of the mediation effect of exercise. Conclusion: These findings suggest that smoking and lack of vigorous exercise may be major pathways through which low socioeconomic position affects CRP levels.

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ARE IMMIGRANT ENCLAVES HEALTHY PLACES TO LIVE? *T L Osypuk, A V Diez Roux, C Hadley, N Kandula. (Northeastern University, Boston, MA 02115)

Immigrant enclaves may facilitate successful immigrant adaptation. Moreover, the growing size and changing composition of the foreign born population highlights the importance of examining the health consequences neighborhood context. Using 2000-02 data from the Multi-ethnic Study of Atherosclerosis in four US cities, we examined whether neighborhood ethnic-specific immigrant composition was associated with diet &physical activity among Hispanic (n=1191) &Chinese Americans (n=711). Secondarily we tested whether neighborhoods with high proportions of immigrants exhibited better or worse neighborhood quality, and whether these dimensions of neighborhood quality were associated with healthy behaviors. After adjustment for age, gender, income, education, neighborhood poverty, and acculturation, living in a tract with a higher proportion of immigrants was associated with lower consumption of high-fat foods among Hispanics and Chinese (p-trend <0.001 Hispanics &.09 Chinese), but with being less physically active among Hispanics (P-trend 0.03). Residents living in neighborhoods with higher proportions of immigrants reported better healthy food availability, but worse walkability, fewer recreational exercise resources, worse safety, lower social cohesion, &lower neighborhood-based civic engagement. Associations of neighborhood immigrant composition with behaviors persisted after adjustment for reported neighborhood characteristics. Neighborhood healthy food availability, walkability, availability of exercise facilities &civic participation remained associated with behaviors after adjusting for immigrant composition &other covariates. Living in an immigrant enclave is not monolithically beneficial and may have different associations with different health behaviors.

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NEIGHBORHOOD RACIAL/ETHNIC COMPOSITION AND DEPRESSIVE SYMPTOMS. *C Mair, A V Diez Roux, T L Osypuk, S R Rapp, T Seeman, K E Watson (University of Michigan, Ann Arbor, MI 48109)

The racial/ethnic composition of a neighborhood may be related to residents' depressive symptoms through differential levels of neighborhood social support and/or stressors. We used the Multi-Ethnic Study of Atherosclerosis to investigate cross-sectional associations of neighborhood racial/ethnic composition with the Center for Epidemiologic Studies-Depression (CES-D) scale in adults aged 45-84. The key exposure was a census-derived measure of the % people of the same racial/ethnic background in each participant's census tract. Two-level multilevel models were used to estimate associations of neighborhood racial/ethnic composition with CES-D scores after controlling for age, income, marital status, education and nativity (Chinese and Hispanics only). Models were further adjusted for neighborhood social cohesion, safety, problems, aesthetic quality and socioeconomic factors derived from survey responses and census data. Living in a neighborhood with a higher % of residents of the same race/ethnicity was associated with increased CES-D scores in African American men (mean difference per 10% increase in African Americans 0.26(95% confidence interval 0.12, 0.41)) and decreased CES-D scores in Hispanic men and women and Chinese women (p>0.05). Adjusting for other neighborhood characteristics strengthened protective associations amongst Hispanics (mean difference after adjustment for neighborhood SES -0.39(95% CI -0.75, -0.04) (women) and -0.31(95% CI -0.61, 0.00) (men)), but did not change the associations in African American men. These results demonstrate the heterogeneity of contextual effects and the need for further exploration of which aspects of neighborhood environments increase residents' vulnerability to depressive symptoms.

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RACIAL INEQUALITIES IN THE PREVALENCE OF SELF-REPORTED HISTORY OF MEDICAL DIAGNOSIS OF UTERINE LEIOMYOMAS. K Boclin, *E Faerstein, M Szklo (Rio de Janeiro State University, Rio de Janeiro 20550-900, Brazil)

Uterine leiomyomas (UL) are the most frequent benign neoplasms of the female reproductive system and may cause significant morbidity. In the US, higher occurrence and severity were observed among black women. However, the nature of this association remains unexplained; differences in the prevalence of known risk factors for this condition do not satisfactorily explain the observed racial inequalities, which were never studied outside the USA. We investigated racial inequalities in UL prevalence among Brazilian women and potential mediating exposures. We analyzed data from self administered interviews of 1733 female civil servants at a Rio de Janeiro University during the baseline data collection (1999-2001) of the longitudinal PróSaúde Study. The study outcome was the self-reported lifetime history of medical diagnosis of UL. The exposure of interest was self-identified color/race. Indicators of early and later-life socioeconomic position, reproductive life characteristics, atherogenic risk factors and health care access variables were explored in sequential models as potential mediators of the main association. Crude and adjusted prevalence ratios (PR) and 95% confidence interval (CI) were estimated from Poisson regression models with robust variance. Medical history of UL was reported by 19.4% (95% CI: 16.8 – 22.1) of white women, 22.9% (95% CI: 18.8 – 27.4) of browns (mixed race) and 32.8% (95% CI: 28.2 – 37.6) of blacks. Compared to whites, adjusted PR were 1.0 (95% CI: 0.7 – 1.4) for brown and 1.7 (95 CI %: 1.2 – 2.3) for black women. In this Brazilian population, being black was associated with increased UL prevalence, and other known risk factors did not apparently mediate this association.

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THE EFFECT OF AREA DEPRIVATION ON HEALTH RISK BEHAVIORS ACROSS U.S. COUNTIES. *M O Hearst, P J Johnson, K F Carlson, R Widome (University of Minnesota, Minneapolis, MN 55454)

Purpose: To analyze the contextual effect of area deprivation on adult health risk behaviors and determine if effects differ by race/ethnicity. Methods: Area deprivation index was calculated for all US counties from the 2000 US Census and divided into quartiles. Adult health risk behavior data were collected from the 2006 Behavioral Risk Factor Surveillance Survey. Sample was limited to adults aged 18-65 who reported non-Hispanic White, non-Hispanic Black or Hispanic race/ethnicity (n=198,255). Data were merged by county FIPS codes. Mixed effects logistic regression models were used in SAS. Results: Univariate hierarchical analysis revealed a significant positive stepped association between county-level deprivation and smoking and a significant negative stepped association with binge drinking. Those in most deprived counties had 1.07 times higher odds of current smoking compared to those in least deprived counties (95% CI 1.06 – 1.09). However, those in most deprived counties had lower odds of binge drinking (OR=0.96, 95% CI 0.95-0.97) and always wearing a seatbelt (OR=0.99, 95% CI 0.98-1.00) than those in least deprived counties. Patterns differed by race/ethnicity. Models stratified by race/ethnicity and adjusted for individual demographic factors attenuated associations to null between degree of county-level deprivation and smoking and binge drinking for non-Hispanic Blacks and Hispanics. Conclusions: Area level deprivation is an important contextual exposure when exploring adult risk behaviors, particularly by race/ethnicity. However, the effect of individual level characteristics among minorities outweighs the impact of county-level deprivation on health risk behaviors.

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IS INFLAMMATION MEDIATING THE ASSOCIATION BETWEEN ADVERSE HOUSING/NEIGHBORHOOD CONDITIONS AND DISEASE AMONG MIDDLE-AGED AFRICAN AMERICANS? *M Schootman, J E Morley, D K Miller (Washington University, St Louis, MO 63108)

Adverse housing and neighborhood conditions are independently associated with increased risk of heart disease, diabetes, disability, and cancer. One possible mediating pathway relates to systemic inflammation, which has been associated with these adverse health outcomes. We investigated the association between housing/neighborhood conditions with inflammatory markers using data from 352 African American aged 49-65 years. Participants were identified by a multi-stage random selection process and received in-home evaluations (response rate: 76%). Blood was analyzed for soluble cytokine receptors (IL-6, TNF α), c-reactive protein, and adiponectin. Neighborhood and housing characteristics consisted of 5 observed block face conditions (external appearance of the block on which the subject lived), 4 perceived neighborhood conditions, 4 observed housing conditions (home assessment by the interviewers rating the interior and exterior of the participant's building), and census-tract level poverty rate from the 2000 census. Covariates included sampling stratum (inner city, suburb), age, gender, self-reported physician-diagnosed chronic conditions, body mass index, smoking status, and risk of alcohol abuse. Differences in inflammatory markers were found by age, sex, chronic conditions, and body mass index (all Bonferroni-adjusted $p<0.0034$). There was no association between any of the housing/neighborhood conditions and the inflammatory markers in unadjusted and covariate-adjusted models (all $p>0.0034$). Thus, inflammation does not appear to be a mediator of the association between poor housing and neighborhood conditions with adverse health outcomes in middle-aged African Americans.

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DEPRESSION AND ANXIETY AMONG ASIAN AMERICANS: THE EFFECTS OF SOCIAL SUPPORT AND STRAIN. *C Sangalang, G Gee (University of California, Los Angeles, CA 90095)

It is almost taken for granted that social relationships benefit mental health, yet these relationships may not always be protective. We examine how the support and strains individuals derive from their social networks may be related to depression and anxiety among Asian American men and women. Data come from the 2003-2003 National Latino and Asian American Study (NLAAS), the first nationally representative study of mental health outcomes among Asian Americans (n=2,066). Results indicate that social support was not associated with DSM-IV criteria for major depressive disorder or generalized anxiety disorder among men or women. Social strain was associated with increased odds of depressive disorder equally among both men and women. However, strain was associated with generalized anxiety disorders among women, but not men. The findings affirm the need to consider social strain along with social support, with attention to the potentially stronger effects of strain for women.

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ACCESS TO HEALTHCARE AFFECTS THE DETECTION OF DIABETES AMONG ADULT RESIDENTS OF THE US-MEXICO BORDER REGION. *X-P Zhang, G Imperatore, K Bullard, G Beckles, X-Z Zhang, R Ruiz, M Frontini, M Cerqueira, E Gregg (Centers for Disease Control and Prevention, Atlanta, GA 30341)

We examined the association of healthcare access with the detection of diabetes among a high-risk population along the US-Mexico border. We identified 205 adults (age 18-64 years) with undetected diabetes, 481 with diagnosed diabetes, and 3334 without diabetes along the US Mexico border. Healthcare access was measured by current healthcare insurance coverage, frequency of receiving healthcare over the past year, and having a routine source of healthcare. We used logistic regression models, weighted to represent the region's adult population, controlling for age, sex, marital status, education, occupation, body mass index, and health status. Among persons with diabetes who received healthcare 0, 1, 2 to 3, or 4+ times over the past year, the prevalence of undetected diabetes was, respectively, 41.8%(SE6.9%), 32.6%(7.4%), 23.8%(6.8%), and 19.3%(4.5%) ($p<0.01$ between 0 and 4+). For those reporting no routine source of healthcare, the prevalence of undetected diabetes was twice that for those using private care (38.6%[9.0%] vs. 18.2%[4.4%], $p<0.05$). In analyses stratified by nation, lacking insurance was associated with more than twice the prevalence of undetected diabetes (33.2%[9.9%] vs. 12.5%[3.3%] among insured persons) among people with diabetes in the US. No association between insurance status and detection ratio was observed in Mexico. Limited healthcare access-especially lack of healthcare insurance coverage and lower frequency of use of healthcare service-was significantly associated with undetected diabetes. Improved detection of diabetes requires that healthcare access issues be addressed.

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SOCIAL GRADIENTS IN CHRONIC DISEASE RISK FACTORS IN DEVELOPING COUNTRIES: EVIDENCE FOR EFFECT MODIFICATION BY URBANICITY AND ECONOMIC DEVELOPMENT IN ARGENTINA. *N L Fleischer, A V Diez Roux, M Alazraqui, F De Maio, H Spinelli (University of Michigan, Ann Arbor, MI 48103)

While chronic diseases are traditionally thought to be more important in developed countries, most of the burden occurs in developing countries. Few studies examine the social patterning of chronic disease risk in these countries. We investigated the social patterning of chronic disease risk factors (body mass index [BMI], hypertension, and diabetes) in Argentina and the heterogeneity in this patterning by provincial-level urbanicity and economic development using cross-sectional survey data from 2005. Our estimates were age-adjusted and sex-stratified. Higher socioeconomic position was associated with lower prevalence of diabetes in both men and women and with lower BMI and hypertension in women only. Provincial-level urbanicity and economic development (as assessed by percent urban and median income) modified these results such that the social gradient was more pronounced in more urban and more developed areas, although the strength of these differences varied somewhat by socioeconomic indicator, risk factor, and gender. These cross-sectional results provide evidence for the increased burden of chronic disease risk among those of lower socioeconomic status and illustrate how two provincial-level markers of globalization modify these relationships in one middle-income country.

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ENVIRONMENTAL CONDITIONS, POLITICAL ECONOMY, AND RATES OF INJECTION DRUG USE IN LARGE US METROPOLITAN AREAS 1992 – 2002. *E T Roberts, S R Friedman, J E Brady, E R Pouget, B Tempalski, S Galea (University of Michigan, Ann Arbor, MI 48104)

City-specific studies suggest local environments and economic circumstances are associated with risk of injection drug use (IDU). However, no studies have assessed the relation among the quality of the local environment, economic circumstances, and IDU over time across US metropolitan statistical areas (MSAs). We estimated (a) annual numbers of IDUs in 88 large MSAs by extrapolating, adjusting, and allocating existing estimates, (b) the quality of the local environment as a composite measure of perceptions of crime, abandoned buildings, bars on windows, and litter in the street, and (c) the political economy as the unemployment rate, percent of individuals below the poverty line, and percent of households receiving public assistance. We accounted for counts of police officers, spending on police, and population size as confounders. We used generalized estimating equations to assess the relation among our variables, and IDU prevalence using one year lagged models. MSAs with a worse local environment (measured as a one standard deviation difference) had a greater risk of IDU 1.03 ($p<0.01$);similarly, a one percentage point worsening of the political economy for an MSA was associated with greater risk of IDU [RR=1.04 to 1.10 (all $p<0.01$)]. Final models indicated heterogeneity of effect by region whereby the quality of the local environment was associated with IDU in the South (RR=1.12, $p<0.01$), West (RR=1.04, $p<0.01$) and Midwest (RR=1.03, $p=0.04$), and the metropolitan political economy was associated with IDU in the West (RR=1.05, $p<0.01$) and Northeast (RR=1.12, $p<0.01$). Further work needs to elucidate the mechanisms linking political and economic factors and MSA IDU rates.

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SOCIAL CAPITAL: VALIDATION OF A CULTURALLY-APPROPRIATE ANALYTIC FRAMEWORK TO EXPLORE COMPLEX SOCIOECONOMIC CONDITIONS IN INDIGENOUS COMMUNITIES. *J Mignone, B Elias, M Hall (University of Manitoba, Winnipeg, MB, Canada R3E 3P4)

An earlier study of our research group formulated a conceptual framework of social capital for First Nation communities and developed a culturally appropriate instrument for its measurement. We tested this instrument further in the Manitoba First Nations Regional Health Survey (RHS 2002). Using data from this survey, we investigated the bonding dimension of the social capital conceptual framework. The total sample of the RHS was 3109 First Nations living in 27 Manitoba First Nations communities. Twenty-seven Likert-scale survey questions measured aspects of bonding, including socially-invested resources (physical, natural, financial, human resources), ethos (trust, reciprocity, collective action, participation), and networks (inclusiveness, flexibility, diversity). Validation analyses included an evaluation of internal consistency to determine whether the items used in the survey measured the same concept, factor analysis to explore how well the items clustered together into the components of the social capital framework, and the ability of the items to discriminate across the communities represented in the sample. Cronbach's Alpha was computed on the twenty-seven scale items, producing an Alpha of 0.839 indicating high internal consistency. Factor analysis produced five distinct factors with a total explained variance of 54.3%. Lastly, a one-way analysis of variance run by community produced highly significant F-ratios between the groups on all twenty-seven bonding items. The culturally-sensitive items included in the social capital framework were found to be an appropriate tool to measure bonding aspects among Manitoba Indigenous communities.

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CROSS-NATIONAL VARIATION OF INCOME BASED DISPARITIES IN OBESITY: UNITED STATES VS. CANADA. *A Siddiqi, Q Cam T Nguyen (University of North Carolina, Chapel Hill, NC 27599)

We used a cross-national comparative lens to study whether income related disparities in obesity are dependent on societal context. With data from the Joint Canada/United States Survey of Health (2002/2003) we used multinomial logistic regression analysis to examine differences in obesity across income quintiles in both nations. In the United States (US), after adjusting for sociodemographics, education, health insurance status and income 'misingness', compared to people in the highest income quintile, people in the lowest quintile had higher odds of obese class I versus normal/underweight (Odds Ratio (OR)= 1.91, 95% Confidence Interval (CI) =1.28-2.86), and obese class II/III (OR= 2.15, 95% CI =1.31-3.51). Americans in the second income quintile had higher odds of overweight (OR=1.41, 95% CI=1.06-1.86), obese class I (OR= 1.73, 95% CI =1.17-2.55) and obese class II/III (OR= 1.64, 95% CI =1.01-2.66). By contrast, In Canada, people in the lowest quintile only had higher adjusted odds of obese class I (OR= 1.70, 95% CI =1.06-2.72). All other results were non-significant in Canada. For both nations we also calculated the Relative Index of Inequality (RII), a summary measure of income based disparities at the national level. The RII of obesity for the US was 1.99 and for Canada 1.42, indicating greater overall income based disparities in obesity in the US compared to Canada. Income is more strongly associated with obesity in the US than in Canada and this appears not to be due to differences in health insurance. Findings are more likely attributable to differences in social policies, such as greater governmental support for public neighborhood recreational services and less residential segregation (thus fewer income-related differences in access to grocery stores and fast food outlets) in Canada compared to the United States.

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PSYCHOSOCIAL RISK FACTOR MODELING. C J Clark, *S Everson-Rose, H Guo, S Lunos, D Evans, C Mendes de Leon (Univ of Minnesota, Minneapolis, MN 55414)

Psychosocial factors, potential risk factors for heart disease, are often modeled independently in statistical analyses. However, these measures typically are correlated, suggesting the presence of a latent structure(s). This study examines the latent structure of psychosocial variables collected as part of cycle 2 of the Chicago Health and Aging Project, an ongoing longitudinal study of risk of Alzheimer's Disease and other diseases affecting the elderly. Subjects included 3492 (62% women, 62% black, 38% white) participants with complete data on all variables of interest. Measures included the 6-item Perceived Stress Scale, the 10-item Center for Epidemiologic Studies-Depression Scale, 8 items from the Cook-Medley Hostility Scale, the 9-item Perceived Discrimination Scale, a 5-item measure based off the Life Satisfaction Index, and measures of childhood and adult socioeconomic status (SES). All measures were standardized into z-scores and modeled using Principal Components Analysis (PCA) with Varimax rotation. Sampling adequacy was examined with the Kaiser-Meyer-Olkin Test (0.79). The PCA was repeated by race. A three-component solution was indicated by both Eigenvalues (E) above 1.0 and the Scree Plot. Meaningful loadings were determined by a value of >0.30 with the highest meaningful loading determining the variable's component placement. Component 1 (variance=21%) was comprised of measures of stress, depression and life satisfaction. Component 2 (variance=19%) reflected SES. Component 3 (variance=15%, E=1.94) reflected hostility and discrimination. The factor structure did not differ by race. These findings suggest the presence of underlying latent constructs, potentially informing future statistical analyses of some psychosocial variables.

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MULTILEVEL EFFECTS OF INDIVIDUAL- AND SCHOOL-LEVEL FACTORS ON BLOOD-LIPIDS OF JUNIOR HIGH SCHOOL STUDENTS. *W J Yang, Y C Hung, Y H Chang, C H Lee (Department of Public Health, Kaohsiung Medical University, Kaohsiung 807, Taiwan)

Blood lipids including triglyceride, high- (HDL), low-density and total cholesterols (TC) are important components of metabolic syndrome. Fast-food restaurants are concentrated within a short walking distant from schools, exposing children to poor-quality food environments. Factors that influence the level of blood lipids for adolescents might be not only associated with individual variables, but also with school-level aspects. To investigate such issues, we designed a multilevel sampling strategy and subject recruitment plan for students of junior-high school in Taiwan. A total of 1889 adolescents from 22 urban and rural schools participated in this study and provided blood samples (response rate, 62%). Individual factors including dietary habits and anthropometry examinations were collected. Food-related providers/shops and sport facilities in schools and around the schools within 300 and 600 m were video-taped and counted. Blood lipids, uric acid, fasting glucose levels are the primary outcomes. We used multilevel regression models to assess multilevel effects on these outcomes. Blood lipids, uric acid and fasting glucose were all associated with gender, body mass index and body fat. About 5.2-22.4% of blood lipids and 3.5-10.0% of uric acid and fasting glucose differences between adolescents were attributed to the school-level variations. This level of contextual effect was particularly strong (proportional change of variance, 22.4% for HDL and 10.7% for TC) for high-density of fast-food restaurant within 300 m of the school. Our results emphasize the importance of developing individual- and school-level strategies to reduce high-level of blood lipids for adolescents.

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DEPLOYMENT CHARACTERISTICS, COMBAT, AND POSTTRAUMATIC STRESS DISORDER AMONG NATIONAL GUARD MEMBERS. *M R Prescott, M Tamburrino, I Liberzon, R Slembarski, J Calabrese, S Galea (University of Michigan, Ann Arbor, MI 48109)

The psychological consequences of combat may be modified by deployment characteristics such as proper training and unit support in reserve forces. We assessed the relation between combat, deployment characteristics, and posttraumatic stress disorder (PTSD) among Guard members. We interviewed a representative sample of Ohio National Guard members (N=821, 69% participation rate, 79% male, 32% between the ages of 24-32). Overall 45.5% of Guard members had an overseas deployment and 94.7% of Guard members reported at least one traumatic event. During their most recent deployment, 41.3% experienced high levels of combat, 52.1% felt well prepared, 47.6% felt high unit support, and 42.5% reported being concerned about their home life during deployment. Among those deployed overseas the prevalence of Diagnostic and Statistical Manual of Mental Disorders (IV)-consistent lifetime PTSD was 9.8%. In separate multivariate models, adjusting for demographics, overseas deployment and trauma exposure, high unit support (p-value=0.04) and being concerned about home life (p-value=0.03) both modified the effect of combat on developing PTSD. Specifically, persons experiencing higher unit support or fewer concerns regarding their home life, were less likely to develop PTSD than persons with lower support, or more home life concerns, given similar combat experiences. These data suggest that deployment characteristics of Guard members may jointly affect the psychological impact of deployment. Further work will evaluate the mechanisms, both behavioral and biologic, that may explain how we can modify the effect of combat by improving deployment conditions.

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SCHOOL SOCIOECONOMIC INDICES AS PREDICTORS OF ORAL HEALTH STATUS. *P Da Rosa, B Nicolau, J M Brodeur, M Benigeri, C Bedos, M C Rousseau (INRS-Institut Armand-Frappier, Laval, QC, Canada H7V 1B7)

Over the past 20 years, the prevalence of chronic oral diseases (COD) has decreased substantially. However, COD still occur mostly among children in the lower social strata. **Objective:** To investigate whether school socioeconomic indices could be used as predictors of schoolchildren oral health status. **Methods:** We conducted an ecological study using a sample of 316 elementary public schools in the province of Quebec, Canada. Data from two sources were linked using school identifiers: (i) Two school socioeconomic indices (in deciles) were obtained from the Ministry of Education: a poverty index based on low-income cut-offs, and a socioeconomic environment index based on parental employment and maternal education; (ii) Oral health outcomes from the Quebec Schoolchildren Oral Health Survey 1998-99 were aggregated at the school level. These included dental caries experience in permanent dentition measured by mean decayed, missing and filled surfaces (DMF-S index) and proportion of children with caries. Linear regression was used to assess the relation between school socioeconomic indices and oral health outcomes. **Results:** The mean DMF-S by school was 0.73 (SD=0.55); the average proportion of children with caries was 25%. The poverty index did not predict oral health outcomes, but the socioeconomic environment index did. A one unit increase in this index (higher deciles meaning unfavorable) was associated with a 1.3% (95% confidence interval: 0.6-1.9%) increase in the proportion of children with caries. **Conclusion:** The school socioeconomic environment index – defined by parental employment and maternal education – was a predictor of oral health outcomes, whereas the poverty index was not.

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A MULTILEVEL STUDY FOR THE ASSOCIATIONS OF INDIVIDUAL FACTORS AND SCHOOL CONTEXTS WITH ADOLESCENT OBESITY AND BLOOD PRESSURE. *Y C Hung, W J Yang, Y H Chang, S Y Ciou, C H Lee (Department of Public Health, Kaohsiung Medical University, Kaohsiung 807, Taiwan)

Obesity and hypertension are important components of metabolic syndrome and significant risk factors for cardiovascular disease. The prevalence of obesity among adolescents in Taiwan has increased by 26.8% during recent decades. About 80% of adults eat out for lunch and 60% for dinner. The distribution of restaurants around the neighborhood or the school may affect the diet style of a family, and thereby influence the weight and blood pressure of a child. To understand multilevel impact of factors from individual and community on adolescents' weight and BP, we conducted a multilevel study in southern Taiwan. A total of 2507 adolescents from 22 urban and rural junior-high schools participated in this study (response rate, 95%). Individual factors including diet, free time activity, smoking, drinking and anthropometry examinations were collected. Food-related providers/shops and sport facilities in schools and around the schools within 300 and 600 m were video-taped and counted. Body mass index (BMI), systolic BP (SBP) and body fat (BF) are the major outcomes. We used multilevel regression models (MLwiN 2.02) to assess multilevel effects on these outcomes. Gender, age and high calorie foods intake were all the significant explanatory factors for these outcomes. About 1.1-6.4% of BMI, SBP and BF disparities between adolescents were associated with the school-level variability. Random slope effect between age and school-level SBP variation was identified. High density of restaurant within 600 m of the school was found to relate to about 34.9% of school-level SBP variations.

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ADOLESCENCE TO YOUNG ADULTHOOD: EMERGENCE OF SOCIO-ECONOMIC DISPARITIES IN SUBSTANCE USE & MENTAL HEALTH. *R Widome, M Wall, M Eisenberg, M Nelson, D Neumark-Sztainer (Department of Veterans Affairs, Minneapolis, MN 55417)

Introduction: Cross-sectionally, mental health status and substance use prevalences vary dramatically by socio-economic position. Objective: To compare substance use and mental health trends from adolescence to adulthood in two socio-economic groups: individuals who, by young adulthood, are enrolled in or graduates of college and those who are not. Methods: In Project EAT, 1,710 adolescents were surveyed in 1999 and followed up five years later. Mixed-model logistic regression was used to assess longitudinal changes in past year cigarette, alcohol, and marijuana use; depressive symptoms; and suicidal thoughts (with adjustment for age, gender, and race). We tested college status x time interactions to determine if trends differed between college status groups. Results: Cigarette, alcohol, and marijuana use displayed significantly different trends ($p<.05$) by eventual college status. Cigarette use increased for the college group but remained nearly flat for the non-college adults. Marijuana use increased from adolescence to young adulthood more dramatically in the college group, however the non-college group had a higher probability of marijuana use at both waves. The probability of drinking was lower for adolescents who would attend college compared to those who would not (.16 vs .28) but by young adulthood, the college group reported far more alcohol use (.45 vs .34). Suicidality appeared to rise more for the college group, however the interaction was borderline significant ($p=.07$). Depressive symptoms had decreased similarly by young adulthood in both groups (interaction $p=.4$). Conclusions: These socio-economic groups have distinct developmental patterns for substance use behaviors.

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SOCIAL NETWORKS AND BODY COMPOSITION IN HIGH SCHOOL SENIORS. *D A Shoham, A Ceja, G Garcia, L Dugas (Loyola University Chicago, Maywood, IL 60153)

We hypothesized that students' body mass indexes (BMIs) would be associated between subjects (egos) and the friends they nominated (alters), and that this association would be greater among friends who eat meals together. The setting was a small magnet high school located in an inner suburb of a major US city. High school seniors were invited to participate. Informed consent was obtained from 50 students or parents. Mean age was 17.6 years, and 20.5% were male. Complete data was obtained from 44 students. Students were asked to choose their best 5 male and female friends from a fixed list, and to identify with whom they ate meals. This yielded 280 best-friend directed pairs, and 214 pairs who ate together. BMI (weight/height^2), race-ethnicity, and gender were by self-report; the latter two were used as adjustment factors in regressions. We defined overweight as BMI$>=$25kg/m^2. Pajek and Stata were used for analyses. Results: 27% of males and 43% of females were overweight. Neither out- network nominations (best-friend or eating partner's average BMI) was associated with ego's BMI. However, each unit increase in mean BMI of students naming an ego as a friend (in-network nomination) was associated with 0.7kg/m^2 greater BMI in the ego (95% confidence interval: 0.1, 1.2). There was no difference in popularity (prestige) by ego's overweight status. The study was limited by small size and lack of longitudinal data, which we will address in future studies. In conclusion, students tend to receive nominations from others whose BMI is like their own, but not vice-versa. If this represents a causal influence of peers' BMI, then lowering BMI in even a subset of students may have a knock-on effect.

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LIFE COURSE SOCIAL ADVERSITY AND AGE AT MENOPAUSE IN WOMEN FROM LATIN AMERICA AND THE CARIBBEAN. *M P Vélez, B E Alvarado, M V Zunzunegui (Département de médecine sociale et préventive, Université de Montréal)

Earlier age at menopause has been related to poor life course social conditions in women from high income countries. This association has not been examined in middle and low income countries. Data from a representative sample of 3924 women aged 60-79 years from seven cities in Latin America and the Caribbean (SABE survey in 2000) were analyzed to assess the association between life course social adversity and age at menopause. Multiple linear regressions were used to estimate the change in age at menopause associated with social adversity. The mean age at menopause was 48.5 years (SD 5.8). In age adjusted analyses, women who were poor in childhood began menopause 0.41 years earlier (95% confidence interval [CI] 0.06, 0.76) than those who were not poor. Analogously, compared to women without social adversities, the following adversities were associated with beginning menopause earlier: poor health during childhood (0.28 years earlier; 95% CI -0.05, 0.61); low education (1.37 years earlier; 95% CI 1.00, 1.74); housewives and manual lifelong work (1.02 years earlier; 95% CI 0.68, 1.36); and no access to pension (0.55 years earlier; 95% CI 0.22, 0.88). All associations remained significant in the fully adjusted model which included number of children, hormone therapy, smoking, body mass index, knee height, total height and all other social adversity indicators. **In conclusion**, age at menopause in women from Latin America and the Caribbean occurs several years earlier compared to women from high income countries (~53-54 years). Results support the association of life course social adversity and age at menopause.

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DOES PARENTS' EMPLOYMENT STATUS INFLUENCE EXCESS WEIGHT GAIN IN MIDDLE SCHOOL GIRLS? *S Lee, D R Young, C A Pratt, J B Jobe, S E Chae, R G McMurray, C C Johnson, S B Going, J P Elder, J Stevens (University of Maryland School of Public Health, College Park, MD 20742)

We investigated the effects of parents' employment status on excess weight gain over two years in a cohort of 1,201 girls from the Trial of Activity in Adolescent Girls. Height and weight were measured at 6th and 8th grades. Parents' employment status (measured at 6th grade) was categorized into working full time (reference), part time, unemployed, staying at home, and don't know. Mixed model regression was used to reflect the hierarchical design of our study and we adjusted for age, race, parents' education level, and free school lunch status. Weight gain in girls in this age range is not necessarily unhealthy and fluctuations in body weight of $\pm$ 3% are normal. Therefore, we created specific criteria to identify girls with weight gain that was likely to be deleterious: gained $>$10% baseline BMI and were overweight (BMI $>$ CDC 85th percentile) in 8th grade or were overweight at baseline and gained $>$3% body weight. Girls whose mothers worked part time or stayed at home had decreased risk of excess weight gain (RR=0.94, 95% CI: 0.88, 1.00; RR=0.89, 95% CI: 0.79, 1.00, respectively) compared to girls whose mothers worked full time. Girls whose fathers were unemployed had an increased risk of excess weight gain (RR=1.13, 95% CI: 1.00, 1.26) compared to girls whose fathers worked full time. Having an unemployed mother, part-time or staying at home father was not associated with excess weight gain. Our findings indicate a need for better understanding of how parents' employment status influences excess weight gain in adolescent girls.

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INCOME INEQUALITY, MORTALITY AND SELF-RATED HEALTH: A META-ANALYSIS OF MULTILEVEL STUDIES WITH 60 MILLION SUBJECTS *N Kondo, G Sembajwe, I Kawachi, R van Dam, S V Subramanian, Z Yamagata (Harvard School of Public Health, Boston, MA 02115)

The association between income inequality and health has been studied extensively during the past decade, but consensus remains elusive. We conducted random-effects meta-analyses of studies worldwide to estimate the overall relative risk for subsequent mortality among prospective cohort studies (cohort RR) and the overall odds ratio for poor self-rated health among cross-sectional studies (cross-sectional OR) according to income inequality. Eligible studies were obtained through online search using PubMed, the ISI Web of Science and the National Bureau for Economic Research database. Our meta-analyses included nine cohort studies (n=59,509,857) and 18 cross-sectional studies (n=1,267,436). The overall cohort RR and cross-sectional OR (and their 95% confidence intervals) per 0.05 unit increase in Gini coefficient (a measure of income inequality) was 1.078 (1.059-1.098) and 1.034 (1.018-1.051), respectively. Studies were heterogeneous. Meta-regressions demonstrated stronger associations between income inequality and the health outcomes among studies with higher Gini (>0.3), data after 1990 (vs. pre-1990), longer follow-up period (>7 years) and incorporating time lags between income inequality measure and outcomes. Fixed-effects models (i.e., models adjusted for regions) showed smaller and statistically non-significant RR. These results suggest an adverse effect of income inequality on health. The association between income inequality and mortality is modest but the population attributable risk may be more substantial. The factors potentially explaining the between-study heterogeneity deserve further study.

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COUNTY-LEVEL SOCIAL ENVIRONMENT MODIFIES THE ASSOCIATION BETWEEN SEROTONIN TRANSPORTER GENOTYPE AND RISK OF POST-TRAUMATIC STRESS DISORDER IN ADULTS. *E Bakshis, K Koenen, A E Aiello, A B Amstadter, K J Ruggiero, R Acierno, D G Kilpatrick, J Gelernter, S Galea (University of Michigan School of Public Health, Ann Arbor, MI 48109)

Although both genetic factors and features of the social environment are important predictors of posttraumatic stress disorder (PTSD), there exists data examining gene-social environment interactions in studies of PTSD. This project examined whether features of the social environment (county-level crime rate and unemployment) modified the association between the serotonin protein gene (*SLC6A4*) promoter variant (5-HTTLPR) and prevalence of current PTSD in a population-representative sample of 590 participants of the 2004 Florida Hurricane Study. Interviews were used to obtain individual-level risk factor measures and DSM-IV diagnoses of PTSD. DNA was extracted from salivary samples. County-level crime and unemployment rates were assessed from 2000 census data. There was an interaction between 5-HTTLPR genotype and both county-level crime rate (interaction prevalence odds ratio (POR) = 2.68 95% confidence interval (CI) = (1.09, 6.57)) and unemployment rate (POR = 3.67, 95% CI = (1.42, 9.50)) in logistic regression models predicting PTSD and including individual-level determinants of PTSD. Stratified analyses indicated the 's' allele of the 5-HTTLPR polymorphism was associated with decreased prevalence of PTSD in the low-risk environments (low crime/unemployment rates) but increased prevalence of PTSD in the high-risk environments. These results suggest that the social environment modifies the relation between the 5-HTTLPR genotype on PTSD.

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CHANGES IN THE GENDER DIFFERENTIAL IN LIFE EXPECTANCY IN KOREA: SIMILAR TRENDS BUT DIFFERENT EXPLANATIONS. *S Yang, Y-H Khang, H Chun, S Harper, J Lynch (McGill University, Montreal, QC, Canada)

Women live much longer than men in Korea (men 76.1, women 82.7 in 2007), with remarkable gains in life expectancy at birth for the past several decades. The gender differential has steadily increased over time, reaching a peak of 8.4 years in 1985, and decreased thereafter to 6.7 years in 2005. We analyzed age- and cause-specific mortality data to examine which age groups and causes of death contributed to the narrowing of gender differentials in life expectancy from 1985 to 2005 using a decomposition method. While mortality changes in the elderly over 70 (+0.9 years) contributed to the widening of gender differentials, it was offset by the contributions from younger ages with the ages 30-64 contributing the most (-2 years), resulting in the overall reduction of the gender gap between 1985 and 2005. Among causes of death, hypertensive diseases (-0.7 years), stroke (-0.3 years), liver diseases (-0.6 years), and tuberculosis (-0.2 years) contributed the most to the overall 1.6 years reduction in gender gap. However, changes in mortality from lung cancer (+0.6 years), ischemic heart diseases (+0.3 years), suicide (+0.2 years), and chronic lower respiratory diseases (+0.2 years) contributed to widening the gap during the same period. In summary, though the narrowing trend of gender differentials in life expectancy was observed in Korea as in other industrialized countries, contributing causes were different. While smoking-related causes of death have contributed most to the narrowing gap in most other countries, they contributed toward increasing the gender gap in Korea. Hypertension-related diseases were major contributing cause of death to the narrowing of gender differentials in life expectancy in Korea.

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UNEQUAL HEALTH AND INCOME TRAJECTORIES: THE ROLE OF PRIVATE HEALTH INSURANCE IN A NATIONAL HEALTH SYSTEM. *E Renahy, A Quesnel-Vallée (McGill University, Montreal, QC, Canada H3A1X9)

The association between health and income has been extensively described in the literature. However, accounts of the time dynamics of this relationship are scant, as are studies examining the modifying effect of public policies on this relationship, measured here through private health insurance (PHI). We used the National Population Health Survey, a cohort study of the general Canadian population spanning 12 years, from 1994 to 2006. We considered middle-aged participants only (18-56, n=7362). To assess the impact of PHI on the relationship between self-rated health (SRH) and income over time, we estimated a latent class growth model. We first synthetised PHI trajectories in 3 latent classes: 1/never privately insured, 2/always privately insured and 3/unstable PHI coverage. Unconditional models fit very well the SRH and income trajectories: on average, SRH decreased while income increased over time. The SRH intercept was higher in the second class (3.45) and the decline was less important (-0.05) than in the first or third class (respectively 3.32, -0.06 and3.34, -0.07). Gender and education also modified the intercept differently among latent classes. Each year of education increased the SRH intercept by 0.34 ($p<0.05$) in the second class, while men had better initial SRH than women (0.20, $p<0.05$) in the first class. The same modelization performed by province showed differences in estimated effects by PHI classes. Our results indicate that PHI coverage tends to increase health inequalities in Canada. In the international context of the growing proportion of PHI coverage to the expense of public insurance, the surveillance of theses trajectories could give evidence for future public health orientations and policies.

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LIFE COURSE SOCIOECONOMIC POSITION AND INCIDENCE OF TYPE 2 DIABETES: FRAMINGHAM OFFSPRING STUDY. *B T Smith, E B Loucks, S Harper, M Abrahamowicz, C S Fox, J W Lynch (McGill University, Montreal, QC, Canada H3A 1A2)

Little is known about whether cumulative life course socioeconomic disadvantage influences type 2 diabetes incidence. We prospectively investigated the association of cumulative socioeconomic position (SEP) with incidence of type 2 diabetes in the Framingham Offspring Study (United States). Participants (N=1895, 52% women, mean baseline age 34 years) were followed from 1971-2003 and were diabetes free at baseline. Cumulative SEP was calculated by summing scores for father's education (high school=2), own education (≤12 years=0, 13-16 years=1, ≥years=2) and occupation (laborer=0, clerical/sales/homemaker=1, executive/professional/supervisor/technical=2). Cox proportional hazards analyses showed age-adjusted cumulative SEP was associated with type 2 diabetes risk in women (hazard ratio (HR)=1.96, 95% confidence interval (CI):1.10-3.48 for low *vs.* high cumulative SEP), but not men (HR=1.06, 95% CI:0.70-1.61). Further adjustment for potential mediators, body mass index (BMI) (HR=1.68, 95% CI:0.94-3.00) and BMI, smoking, alcohol and height (HR=1.47, 95% CI:0.79-2.74), attenuated the association in women. Further, own education and occupation (but not father's education) were independently associated with type 2 diabetes risk in women but not men. This study provides evidence that cumulative SEP is inversely associated with type 2 diabetes risk in women, but not men; the association appears to be mediated substantially through BMI. In addition, adulthood may be a sensitive period for women, where low SEP increases type 2 diabetes risk. Understanding the contributions of SEP across the life course can inform policy on the timing and types of intervention for type 2 diabetes.

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THE SOCIAL DETERMINANTS OF CHILD HEALTH: VARIATIONS ACROSS HEALTH OUTCOMES. *C C Victorino, A H Gauthier (University of Calgary, Calgary, AB, Canada T2N 1N4)

Disparities in child health outcomes persist despite advances in medical technology and increased global wealth. The social determinants of health model is useful in explaining health disparities. This study aims to test whether the effect of income is the same across different child health outcomes and whether this effect persists after controlling for other traditional socioeconomic characteristics (education and employment); and to test the role of potentially mediating variables (parental stress, number of children, and family structure). This population-based cross-sectional study used data from the 2003 US National Survey of Children's Health involving 102,353 children aged 0 to 17 years. Using multivariate logistic regression models, the association between household income, education and employment, and other social determinants and the following child health outcomes were examined: presence or absence of asthma, headaches/migraine, ear infections, and various allergies. Controlling for other factors including household education and employment, a gradient association persisted between household income and a child having asthma, migraine/headaches, or ear infections with children more likely to have the illness if their family is closer to the federal poverty level. Potentially mediating variables, namely parental stress, number of children, and family structure had consistent effects across health outcomes. The social determinants of health model can provide important information regarding inequalities in physical health outcomes among children. This is especially important given the high prevalence of physical outcomes.

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SOCIAL CLASS INEQUALITIES IN HEALTH: FINDINGS FROM THE BARCELONA SOCIAL CLASS AND ALL CAUSE MORTALITY LONGITUDINAL STUDY. *C Muntaner, C Borrell, J Solà, M Marí-Dell'Olmo, H Chung, M Rodríguez-Sanz, J Benach (University of Toronto, Toronto, ON, Canada M5T 1P8)

We examined the effects on mortality of Neo-Marxian social class (i.e., measured as relations of control over productive assets) and potential mediators such as labor market position, work organization, and material deprivation upon mortality in Barcelona, Spain. We used longitudinal data from the Barcelona 2000 Health Interview Survey (n=7526) with follow-up interviews through the municipal census in 2005 (96.8% response rate). Using data on relations of property, organizational power, and education, social classes were grouped according Wright's scheme: capitalists, ''petit bourgeoisie'', managers, supervisors, and skilled, semi-skilled and unskilled workers. Social class, measured as relations of control over productive assets, is an important predictor of mortality among working class positions in men but not in women. Workers (hazard ratio: 1.88, 95% confidence interval: 1.08-3.27), but also small employers and managers, had a higher risk of death as compared to capitalists. The extensive use of conventional gradient measures of social stratification has neglected sociological measurements of social class conceptualized as relations of control over productive assets. This concept is capable of explaining how social inequalities are generated. To confirm the protective effect of the capitalist class position and the ''contradictory class location hypothesis'', additional efforts are needed to properly measure class among low level supervisors, capitalists, managers and small employers.

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A SOCIAL COGNITIVE EXAMINATION OF LATINO HEALTH DISPARITIES: THE ROLES OF SELF-STEREOTYPING AND SELF-ESTEEM IN BODY MASS INDEX AND BLOOD PRESSURE. *L M Rivera, S Paredez (California State University, San Bernardino, CA 92407)

Although the presence of ethnic-racial diversity is one of the United States' greatest assets, the benefits of multiculturalism is often overshadowed by the reality that the disproportionate burden of negative health outcomes is carried by ethnic-racial groups. For example, adult Latinos, relative to non-Latino Whites, are at greater risk of developing a cardio vascular disease, which is a risk factor of obesity. To explain this health gap, psychological research demonstrates that ethnic-racial identification and perceived discrimination have been hypothesized to increase the risk of negative health in ethnic-racial groups, but the social cognitive processes linking such factors to health outcomes are not well understood. Here we demonstrate that self-stereotyping, which is the process by which negative cultural stereotypes influence the self-evaluations of stigmatized individuals, is a social cognitive mechanism that negatively impacts the health of Latino adults because of the harm self-stereotyping has on their self-image. Data from 100 Latino and White participants revealed that Latinos who highly self-stereotyped were 2.48 more likely to be obese or overweight, as well as 8.96 more likely to have prehypertension or hypertension, than Latinos who did not self-stereotype. However, among White participants, these relations did not emerge. Finally, mediation analyses indicated that (a) the more Latinos self-stereotyped, the lower their self-esteem ($B = -.39$, $p = .001$); (b) the lower their self-esteem, the more likely they were overweight or obese ($B = -1.47$, $p = .01$); and (c) self-esteem completely accounted for the relation between self-stereotyping and obesity.

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BLACK-WHITE BIRTH OUTCOME DISPARITIES: AN EXAMINATION OF COUNTY-LEVEL VARIATION. *A Schempf, P Mendola, J Parker, K Schoendorf (National Center for Health Statistics, Hyattsville, MD 20782)

Individual level risk factors have generally failed to explain persistent Black-White disparities in birth outcomes. We chose to examine both low birth weight (LBW, <2500 grams) and preterm birth (PTB, <37 weeks' gestation) because LBW is more accurately measured and a major predictor of newborn morbidity and mortality, whereas PTB is more etiologically distinct and is the major cause of the Black-White infant mortality gap. We analyzed county level variation in LBW and PTB by race, as well as the Black-White rate ratios (RRs), and characterized areas with low and high levels of disparity. Contextual variables included the poverty rate, the % Black, rural/urban continuum, part of a Health Professional Shortage Area, and region of the country. Birth data came from 1999-2001 Natality Files while county level data came from the Area Resource File. Counties with 20 or more events of LBW or PTB for each race were included, resulting in 742 counties for LBW and 891 counties for PTB analyses. For LBW, White rates ranged from 2.6% to 12.0% and Black rates ranged from 5.9% to 20.2%. For PTB, White rates ranged from 4.0% to 19.1% and Black rates ranged from 6.9% to 30.0%. County level Black-White RRs were higher for LBW than PTB (mean= 2.28 v 1.78). LBW RRs ranged from 0.92 to 4.5 whereas PTB RRs ranged from 0.73 to 3.3. Compared to counties with high levels of LBW or PTB disparities, those with low disparity tended to be more poor, rural, and medically underserved areas. Areas with low disparity generally had lower than average Black rates and higher than average White rates. Greater focus on reducing Black rates rather than relative disparities may be warranted to reduce adverse outcomes on a population level.

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PREVALENCE VARIATIONS IN SELECTED GASTRIC AND LIVER DISEASES AMONG ETHNIC POPULATIONS. *M F Liu, S Dean, R P Myers, A A Shaheen, P Faris, N Jetté, H Quan (Calgary Health Region, Calgary, AB, Canada T3B 0M6)

Although US and UK studies have shown ethnic variations in certain cancer prevalence rates, such ethnic variations have not been studied in Canada where universal health care exists. Our objective was to investigate prevalence variations of gastric and liver diseases among Asians (East, South), First Nations, and other Canadians to assess possible service utilization disparity. Alberta Health Care Insurance Plan Registry (>99% population) and regional physician claims databases were linked for 2000-01 to 2002-03 (n=1216307). ICD-9-CM codes were used to identify physician visits. Cases were defined as 2 visits in 3 years. Surname analysis was used to define East and South Asian ethnicities. Sex and age standardized ethnic prevalence rates were compared. Gastric ulcer was most prevalent in First Nations (16.5 per 10,000, 95% Confidence interval (CI) 9.8–27.6). Gastritis and duodenitis prevalence in South Asians (342.9 per 10,000, 95% CI 313.5–375.5) was 3.3 times that of other Canadians (105.2 per 10,000, 95% CI 102.9–107.6). Duodenal ulcer was most prevalent in South Asians (89.7 per 10,000, 95% CI 74.6–107.8). Peptic ulcer was more prevalent in South Asians (58.2 per 10,000, 95% CI 46.3–73.0) and First Nations (51.6 per 10,000, 95% CI 39.1–67.9) than in East Asians (25.3 per 10,000, 95% CI 21.4–29.8) or other Canadians (18.9 per 10,000, 95% CI 17.9–19.9). Gastrojejunal ulcer was rare and of no differences (p=0.57). Chronic liver diseases and cirrhosis were 4 times prevalent in First Nations (36.6 per 10,000, 95% CI 25.1–53.5) than in other groups. Our study shows different rates of diseases in the four ethnic populations, which needs to be considered in community based health planning.

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USING STRENGTHS-BASED MULTIDISCIPLINARY THEORY AND METHODS TO EXAMINE HEALTH INEQUITIES: LINKING SCHOOL- AND NEIGHBORHOOD-LEVEL DATA. S. Jain, DrPH, S Witt, PhD T Iton, MD, PhD, JD (WestEd Health and Human Development Program, Oakland, CA)

Public health researchers and practitioners have traditionally focused on using a deficit-based model of risk factor identification and prevention to eliminating inequities in health. Whereas resilience research shows that 50-70% of youth exposed to adversity are successful (Benard 2004). This presentation will highlight how a strengths-based multidisciplinary perspective can be used to assess and address place-level inequities in youth health linking community and school-level data. We analyzed data from the California Healthy Kids Survey 2005-06, Census 2000, the Mortality files, and State Department of Education within Alameda County, to examine the association between protective factors, poverty and health and educational outcomes at the school and neighborhood-levels. We found preliminary evidence that 1) neighborhood poverty and educational levels were strong predictors of life expectancy, and other health indicators in a community, 2) disadvantaged schools and communities still had high developmental assets and academic performance, and 3) a 'healthy' community was one with high levels of assets in the schools and communities. We will discuss the benefits of merging multidisciplinary theory and datasets to examining place-based inequities in youth health, and explore use of school-level data as a proxy for neighborhoods. Results shall help inform local policies and programs focused on reducing health and educational inequities, and foster collaborations across sectors.

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EVIDENCE, CHALLENGES, AND FUTURE DIRECTIONS ON THE EPIDEMIOLOGICAL INVESTIGATION OF RACIAL/ETHNIC RESIDENTIAL SEGREGATION, HEALTH RISK, AND HEALTH DISPARITIES. *K White, L N Borrell (Columbia University, New York, NY 10032)

Racial/ethnic residential segregation is considered a fundamental cause of health disparities because of its role in determining access to educational and employment opportunities, shaping the distribution of social and physical attributes of neighborhoods, and influencing health behaviors. Given the recent increase in interest of the social determinants of health disparities, a comprehensive search of the MEDLINE, Web of Science, and PsychInfo databases was conducted, providing an updated systematic appraisal of empirical studies published between 1950 and 2008. There is limited evidence suggesting that residential segregation may have a beneficial effect on health. The majority of studies, however, demonstrate a fairly consistent association between residence in highly segregated neighborhoods and poor health across multiple health outcomes, despite the heterogeneity in measures of residential segregation and level of geographic aggregation. A critical analysis of conceptual and methodological issues highlights several gaps in the current investigation of residential segregation and health studies. Much research needs to be done specifically related to: 1) conceptualization and measurement of residential segregation important for health; 2) understanding the implications of level of geography; 3) testing specific intermediary pathways; 4) choosing study designs and analytic strategies; and 5) identifying policy-relevant solutions. Strengthening these issues is imperative for understanding and addressing the specific processes by which residential segregation contributes to health risk and health disparities.

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LIFECOURSE SOCIOECONOMIC POSITION AND ANKLE-BRACHIAL INDEX. *G Agha, J M Murabito, J W Lynch, M Abrahamowicz, S B Harper, E B Loucks (McGill University, Montreal, QC, Canada H3A2T5)

Socioeconomic position (SEP) across the lifecourse is inversely associated with cardiovascular disease (CVD), however the biological mechanisms are poorly understood. Objectives were to investigate whether cumulative lifecourse SEP is associated with a measure of subclinical CVD: the ankle-brachial index (ABI). The study sample included 1500 participants of the Framingham Heart Study Offspring Cohort (mean age 57 years, 47% men). Cumulative SEP score was calculated by summing scores for father's education, own education, and own occupation. ABI was dichotomized as low (¡Ü1.1) and normal (>1.1 to 1.4), due to increased risk for CVD events with values ¡Ü1.1. Logistic regression analyses found that cumulative lifecourse SEP was associated with low ABI in men after adjustment for age, smoking, systolic blood pressure, antihypertensive medication, fasting glucose, total:HDL cholesterol ratio, cholesterol-lowering medication, CVD events, diabetes, and depression (OR=1.95, 95% confidence interval [CI]: 1.17,3.27 for low vs. high cumulative SEP score), and not in women (OR=0.87, 95% CI: 0.57,1.34). Further analyses found an association between own education and low ABI in men (OR=3.58, 95% CI:1.64,7.81 for high school) and not women (OR= 1.08, 95% CI:0.59,1.95). Father's education and own occupation were not associated with ABI in men or women. In conclusion, cumulative SEP is inversely associated with low ABI in men and not women; own education appears to contribute most strongly to the association. Understanding the contributions of SEP at different lifecourse stages may inform the timing and method of intervention for subclinical CVD, and thus lead to prevention of progression to clinically manifest disease.

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THE ROLE OF NATURAL HAZARDS AND SOCIAL STRESSORS IN POPULATION HEALTH. *J Ahern, E Grace, A Hubbard, S Galea (University of California, Berkeley, CA 94720)

We previously proposed a model in which the health of human populations reflects underlying population vulnerabilities and capacities, and response to intermittent stressors. Previous research found that variability in mortality rates was explained to some degree by vulnerabilities and capacities of populations, suggesting they exacerbate or temper vulnerability to negative health outcomes. In the present analysis, we examined whether variability in mortality rates was explained by intermittent natural hazards or social stressors. Health outcomes were rates of mortality from twelve causes for 3138 United States counties between 1995 and 2004. Negative binomial regression models were initially fit with a measure of socioeconomic vulnerability, median income, predicting each mortality rate. We examined changes in the variability of mortality rates (as indicated by changes in overdispersion of the models) after additionally accounting for (1) natural hazards (natural disasters and their severity), and (2) social stressors (crime rates). Little variability in all mortality rates was explained by accounting for natural hazards (mean overdispersion reduction of 3.3%). However, more substantial variability in mortality rates was explained by accounting for social stressors (mean overdispersion reduction of 14.8%). The results suggest that intermittent stressors explain some of the variability in population health, but social stressors rather than natural hazards are relevant. Understanding the convergence of conditions that produce population health conditions may inform intervention efforts and improve population health.

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NEIGHBORHOOD SOCIOECONOMIC CHARACTERISTICS AND DIABETES RISK IN CHICAGO YOUTH. * D S Grigsby-Toussaint, R B Lipton, N Chavez, T P Johnson, A H Handler, J Kubo (University of Illinois, Urbana, Champaign, IL 61820)

Although social and environmental factors are implicated in both type 1 and type 2 diabetes risk, few studies have examined specific determinants at the neighborhood level, particularly in youth. Using data derived from a population-based diabetes registry of youth ages 0-17 (N=1252) in the city of Chicago, this study examined associations between neighborhood socioeconomic characteristics and diabetes risk. Incident cases identified between 1994 and 2003 were geocoded to one of 77 Chicago community areas based on street address. Census counts of children ages 0-17 in each community area provided denominators for the calculation of incidence rates. An index of income diversity accounting for economic context between 1970 and 2000 was determined for neighborhoods (community areas) using census data. Neighborhoods were characterized as emerging high-income (N=21), stable diversity (N=19), emerging bipolarity (N=15), emerging low-income (N=11) and desertification (N=11). Incidence rates for type 1 diabetes ranged from 11 [(95% Confidence Interval (CI 9, 14)]/105 in emerging low-income neighborhoods to 18 (95% CI 16,21)/105 in emerging high-income neighborhoods. Rates for type 2 diabetes ranged from 11 (95% CI 8,14)/105 in emerging low-income neighborhoods to 16 (95% CI 13,20)/105 in desertification neighborhoods. Poisson regression was conducted to generate age, sex, and ethnic specific incidence rates. Compared to stable diversity neighborhoods, significant associations for type 1 diabetes were found for emerging low- income (protective for males, relative risk = 0.55, 95% CI 0.38, 0.78, p-value <.05) and emerging high- income (44% increased risk for females, RR = 1.44 (95% CI 1.06, 1.91, p<.05) neighborhoods. For type 2 diabetes males residing in desertification neighborhoods had the highest risk (RR = 1.95, 95% CI 1.20, 3.16, p<.05).

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HOSPITALIZATIONS FOR GYNECOLOGIC DISORDERS IN THE UNITED STATES. *M Whiteman, E Kuklina, D Jamieson, S Hillis, P Marchbanks (CDC, Atlanta, GA 30341)

To assess the impact of gynecologic conditions among U.S. women aged 15–54, we estimated hospitalization rates using cross-sectional data for 1998–2005 from the Nationwide Inpatient Sample, a nationally representative survey of hospitalizations. Records with a gynecologic disorder principal diagnosis were used to estimate rates per 10,000 women. Weighted least squares regression was used to perform tend tests. During 1998–2005, gynecologic disorders accounted for 7% and 14% of all inpatient hospitalizations among reproductive-aged (15-44) and midlife (45-54) women, respectively. The most common diagnoses overall were uterine leiomyomas (rate=27.5), menstrual disorders (rate=12.3), endometriosis (rate=9.5), genital prolapse (rate=7.0), ovarian cysts (rate=6.5) and pelvic inflammatory disease(PID) (rate=6.1). The hospitalization rate for menstrual disorders increased 36% during 1998–2005, from 9.8 to 13.3; this was largely due to a 46% increase in the rate among those aged 25–44 from 16.4 to 24.0 (P-trend<0.001). Most menstrual disorder hospitalizations were for excessive menstruation (62.6%). Hospitalization rates declined for PID, genital prolapse, ovarian cysts, and endometriosis (P-trend<0.05) and were unchanged for uterine leiomyomas. Whereas only 38% of PID hospitalizations included surgery, the majority of hospitalizations for the other most common gynecologic disorders included a surgical procedure (range 73%−97%). While hospitalization rates for some common gynecologic diagnoses have declined, they remain an important contributor to inpatient hospitalizations among both reproductive-aged and midlife women. Further study is needed to elucidate possible reasons for the observed increase in the hospitalization rate for menstrual disorders.

* = Presenter; S = The work was completed while the presenter was a student

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POLYCHLORINATED BIPHENYLS AND RISK OF ENDOMETRIOSIS. *B L Trabert, V L Holt, S M Schwartz, D Scholes, U Peters, A J De Roos (Fred Hutchinson Cancer Research Center, University of Washington, Seattle, WA 98105)

Endometriosis, a gynecologic disorder affecting 5-10% of US reproductive age women, is defined as the presence of endometrial tissue outside the uterus and is linked to pelvic pain and infertility. Environmental contaminants, including polychlorinated biphenyls (PCBs) are hypothesized to contribute to endometriosis risk through effects on immune function and steroid hormones. Human exposure to PCBs occurs through skin contact, breathing and the consumption of animal and dairy products. We investigated serum PCB concentrations and risk of endometriosis in a population-based case-control study of Group Health enrollees in Western Washington. Congeners of twenty PCBs and lipid levels were measured in the serum of newly diagnosed, surgically confirmed endometriosis cases between 1996 and 2001 (n=251), and age and reference year matched female controls without a history of endometriosis (n=538). Odds ratios of endometriosis risk associated with each PCB congener (quartiles) were estimated using unconditional logistic regression adjusted for matching factors, serum lipid levels, and serum DDE. The third and fourth quartiles of PCB 118 were associated with increased risk of endometriosis compared to the lowest quartile [second quartile: odds ratio (OR) 1.2 95% confidence interval (CI) (0.7, 1.9); third quartile: OR 1.7 95% CI (1.0, 2.7); highest quartile: OR 1.6 95% CI (0.9, 2.8)]. No other PCB congeners were associated with endometriosis. PCB exposure was not correlated with consumption of red meat, fish or dairy. Our study suggests that certain PCB congeners may influence the development of endometriosis, a finding that requires further investigation.

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THE ASSOCIATION OF FIBROIDS WITH REPRODUCTIVE TRACT INFECTIONS. *S K Laughlin, D D Baird (NIEHS, Durham, NC 27707)

Uterine fibroids occur in 70-80% of women by age 50, yet etiology of these tumors is unknown. New hypotheses suggest that fibroids may be a response to local inflammatory processes, raising a question discussed since the 1930's. Might reproductive tract infections stimulate fibroid development? The only epidemiologic data come from a 2001 case-control study in which self-reported pelvic inflammatory disease (PID) and Chlamydia had a positive association with clinically relevant uterine fibroids, and abnormal pap smears had a negative association. We examined this question with data from the NIEHS Uterine Fibroid Study which screened randomly selected George Washington University health plan members aged 35-49 for fibroids with ultrasound. We limited this analysis to pre-menopausal black and white women with fibroid status and infection data (n=938). We used logistic regression to investigate associations between prior infection (diagnoses before age 30) and fibroids, adjusting for other fibroid risk factors. Fibroids were identified in 604 women (64%); 50% had no prior diagnosis. Chlamydia was reported by 6%, PID by 6%, and abnormal pap smear by 16%. The adjusted odds ratio (aOR) for fibroids associated with Chlamydia was 1.1 (0.5, 2.3) in blacks and 1.7 (0.6, 4.8) in whites. For PID, the aORs for blacks and whites were both close to 1.0. Our findings may not duplicate the prior study due to screening for fibroids. However, consistent with the prior report, the aOR for abnormal pap smear was 0.6 (0.4, 1.0) for blacks and 0.8 (0.4, 1.4) for whites. Human papilloma virus (HPV), the most common cause of abnormal pap smear, has been found to induce immunologic changes, and these might reduce fibroid development. Serology testing for HPV may support these findings.

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A PROSPECTIVE STUDY OF DAIRY AND SOY INTAKE AND RISK OF UTERINE LEIOMYOMATA. *L A Wise, R G Radin, S K Kumanyika, J R Palmer, L Rosenberg (Slone Epidemiology Center, Boston, MA 02215)

Background: Black women are more likely to develop uterine leiomyomata (UL) than White women. Dietary factors that differ in prevalence between Black and White women and that might explain this disparity include dairy and soy food intake. We assessed the relation of dairy and soy intake to UL risk in a prospective study of U.S. Black women. **Methods:** We followed 21,431 premenopausal women in the Black Women's Health Study from 1997 to 2007. We identified 5,642 incident cases of UL diagnosed by ultrasound (N=3,816) or surgery (N=1,846). Diet was estimated using food frequency questionnaires in 1995 and 2001. We used Cox regression to derive incidence rate ratios (IRR) and 95% confidence intervals (CI), adjusting for covariates. **Results:** Cumulative-averaged dairy food intake was inversely associated with UL risk. Multivariable IRRs comparing highest (2+ servings/day) vs. lowest (<1 serving/week) intake categories were 0.85 (CI=0.75-0.97) for total dairy foods, 0.74 (CI=0.60-0.91) for high-fat dairy foods, 0.81 (CI=0.70-0.92) for low-fat dairy foods, and 0.78 (CI=0.68-0.89) for milk (all p-trends<0.01). In non-users of multivitamins, we found inverse associations comparing highest vs. lowest quintiles of dietary calcium (IRR=0.86, CI=0.76-0.96), phosphorus (IRR=0.86, CI=0.77-0.97), and calcium-to-phosphorus ratio (IRR=0.86, CI=0.77-0.96). Control for each nutrient and total dairy foods did not appreciably change the IRRs. Intake of soy foods was unrelated to UL risk. **Conclusions:** This is the first study to report a reduced risk of UL associated with high dairy intake. Dairy components (calcium and phosphorus) also showed inverse associations with UL, but it was difficult to discern their independent effects.

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A PROSPECTIVE STUDY OF PRENATAL EXPOSURE TO CIGARETTE SMOKE AND RISK OF BENIGN BREAST DISEASE. *T Liu, A Baylin, S L Buka (Department of Community Health, Brown University, Providence, RI 02912)

This is the first prospective study to examine the relationship between maternal smoking during pregnancy and risk of benign breast disease among adult offspring. The analytic sample includes 509 premenopausal women whose mothers enrolled in the Collaborative Perinatal Project (CPP) from 1959 to 1966 at Boston and Providence. These female offspring were followed prospectively from gestation through age 45 years. The results showed that maternal smoking during pregnancy was associated with a more than two fold increased risk of benign breast disease. (Odds Ratio (OR) 2.4, 95% Confidence Interval (CI) 1.5, 4.0) The association was independent of age, race, education, age at menarche, parity, obesity, current smoking status, birth weight and maternal age. Furthermore, the study results indicated maternal smoking of one pack or more at any pregnancy day was also associated with severe subcategories of BBD. The calculated adjusted ORs for the two proxies of severe forms of BBD were 2.4 (95% CI: 1.1, 5.0) and 6.1 (95% CI: 1.7, 21.7). Since some severe forms of BBD were potential precursors of breast cancer, this study not only contributes to the current knowledge of the etiology of BBD, but also may provide information on potential risk factors of breast cancer. This research offers evidence supporting smoking suspension during pregnancy.

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RISK FACTORS FOR OVARIAN CANCER IN HIGH RISK FAMILIES. *J Ferris, Y Liao, M B Terry (Columbia University Mailman School of Public Health, New York, NY 10032)

Risk factors for ovarian cancer have primarily been studied in unrelated individuals. The Breast Cancer Family Registry (BCFR) is comprised of six sites across North America and Australia that have recruited families with a history of breast and/or ovarian cancer. Using data from the New York site of the BCFR, we examined known risk factors for ovarian cancer in high risk families. Specifically, we examined exogenous hormone use, reproductive history, alcohol use and cigarette smoking with respect to ovarian cancer risk within families. There were 174 reported cases of ovarian cancer and 65 unaffected sister controls available for this analysis. We estimated multivariable-adjusted models using general estimating equations to examine the association between these risk factors and ovarian cancer. Parity, hormone replacement therapy, and alcohol intake were not associated with ovarian cancer risk within this cohort of high risk families. Oral contraceptive use was associated with a decreased risk of ovarian cancer (odds ratio (OR) = 0.4, 95% Confidence Interval (CI) = 0.2, 0.7) and ever smoking status was associated with an increased risk of ovarian cancer (OR = 3.0, 95% CI = 1.6, 5.7). These results suggest that selected risk factors for ovarian cancer established among unrelated individuals may also have similar associations in high risk families.

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SUNLIGHT, HORMONE REPLACMENT STATUS AND COLORECTAL CANCER RISK IN POST-MENOPAUSAL WOMEN. *D M Freedman, P Rajaraman, B Fuhrman, R Hoffbeck, B Alexander (National Cancer Institute, Division of Cancer Epidemiology and Genetics, Bethesda, MD 20892-7238)

A reanalysis of the Women's Health Initiative (WHI) randomized clinical trial found a statistically significant interaction between supplementation with vitamin D/calcium and estrogen therapy and the risk of colorectal cancer risk. To explore whether the effects of vitamin D are modified by estrogen therapy, we report a largely cross-sectional, analysis of the association between sun exposure, which is an important source of vitamin D, and colorectal cancer risk among postmenopausal women in the U.S. Radiologic Technologists (USRT) study. Among 21,695 participants, there were a total of 108 cases. Sun exposure was based on time outdoors and on ambient ultraviolet radiation (UV) exposure based on residence linked to erythemal exposures derived from the Total Ozone Mapping Spectrometer (TOMS) database. Although there was no relationship between outdoor time or ambient UV measure and colorectal cancer risk in current hormone replacement therapy (HRT) users, there was a statistically significant inverse trend (p=0.04) with higher ambient UV exposure in never/past HRT users. Non-statistically significant lower risks were also associated with higher levels of outdoor time ($\geq$3.5 hours/week) in never/past HRT users. The interaction between both indicators of sun exposure and HRT and CRC risk was not significant. These data, although exploratory, are consistent with evidence from the WHI suggesting a decrease in colorectal cancer risk may be associated with vitamin D exposure among postmenopausal women who are not taking HRT, but not among current HRT users.

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ESTROGEN EXPOSURE AND BLADDER CANCER RISK IN EGYPTIAN WOMEN. *B Wolpert, S Amr, Y-L Zheng, M Zhan, K Squibb, C A Loffredo (DEPM, University of Maryland, School of Medicine, Baltimore, MD 21201)

To examine associations between estrogen exposure, determined by reproductive history, and urinary bladder cancer in Egyptian women while taking into account this malignancy's established risk factors, we used questionnaire data from an ongoing multicenter case-control study in Egypt [Gender Differences in Bladder Cancer Risk Factors (Loffredo et al., NIH 5R01-CA115618-03, 2006-2011)]. Controls were matched on age and residency site. Cases with confirmed urothelial (transitional) and squamous cell carcinoma of the bladder were included in this analysis. We recruited 619 women (429 controls, 190 cases; >98.0% nonsmokers). Unadjusted odds ratios (UORs) indicated that menopause at early age (<45 y), age at first pregnancy (>18 y), environmental tobacco smoke (ETS) exposure, and schistosomiasis history were significantly associated with increased risk. Among postmenopausal women (317 controls, 171 cases), the association between menopause at early age and bladder cancer risk [(UOR 2.0; 95% confidence interval (CI) 1.3, 3.0)] remained statistically significant in the final logistic regression model [adjusted odds ratio (AOR) 1.8; 95% CI 1.1, 2.8], which included all of the above variables, age, place of residence, and number of pregnancies. In the final model, age at first pregnancy (AOR 1.0; 95% CI 1.0, 1.1), ETS exposure (AOR 1.6; 95% CI 1.0, 2.4), and schistosomiasis history [AOR 1.1; 95% CI 1.0, 1.2) exhibited borderline significance. Our data indicate that early menopause increases the odds of bladder cancer in Egyptian women and thus suggest that estrogen exposure may play a role in urinary bladder carcinoma development.

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HORMONE EXPOSURE AND ESTROGEN RECEPTOR STATUS AT BREAST CANCER DIAGNOSIS: IMPLICATION FOR TREATMENT AND EFFECT ON SURVIVAL. *L Bessonova, J Largent, A Ziogas, H Anton-Culver (University of California, Irvine, Irvine, CA 92697)

To examine if hormone exposures including oral contraceptive use, pregnancy, breast feeding, and estrogen replacement therapy (ERT) were associated with estrogen receptor (ER) status at breast cancer diagnosis and all-cause and breast cancer-specific mortality, we studied population-based incident breast cancer cases, excluding women with previous cancer diagnosis, in situ cases and cases without recorded ER status. The sample of 582 women provided information on hormonal exposures prior to diagnosis in 1994-1995, including pregnancy, breast feeding, oral contraceptive and ERT use. Survival analyses using Cox proportional hazards regression were used to examine the role of hormonal exposures on all-cause and breast cancer-specific mortality, using cancer registry data through 2004. History of pregnancy was associated with ER+ status at diagnosis in pre-menopausal women (OR=2.32; 95%CI: 1.05, 5.11). Among post-menopausal women, history of ERT use was associated with ER+ status (OR=2.01; 95% CI: 1.13, 3.56). Multivariate survival analyses indicated that ERT use in ER+ post-menopausal women improved all-cause and breast cancer-specific mortality (HR=0.45; 95% CI: 0.28, 0.68). We conclude that different hormonal exposures are associated with ER status at diagnosis between pre- and post-menopausal women, but the specific mechanisms remain unknown. ERT use before breast cancer diagnosis in ER+ post-menopausal women was observed to promote survival, perhaps due to removal upon diagnosis of hormonal ''fuel'' for tumor growth in women with hormone-sensitive breast cancer.

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* = Presenter; S = The work was completed while the presenter was a student

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ROLE OF PRESCRIBING CULTURE: OFF-LABEL QUETIAPINE FOR ALCOHOL PATIENTS IN THE VETERAN'S HEALTH ADMINISTRATION (VHA). *S Wang, V Mor, D Dore, R Swift (Brown University, Providence, RI 02906)

Quetiapine is indicated for management of schizophrenia and bipolar disorder, however there has been increasing interest in its use for treatment of alcoholics. Although there is little research on efficacy or safety in this population, off label use among alcohol dependent veterans is prevalent. As no practice guidelines are available, physician preference or facility level factors in the face of uncertain benefits of treatment are likely to be key determinants of its use. We hypothesized that there is spatial clustering of similar off label prescribing rates resulting from transmission of prescribing culture across medical facilities. Using national extracts from the VHA in FY 2006, we identified veterans with ¡Ý1 encounter associated with a diagnosis code for an alcohol use disorder. Those with labeled indications for quetiapine use, defined by diagnosis of schizophrenia, bipolar, or dispensation of lithium were excluded. Rates of quetiapine prescription were aggregated to medical station. Spatial dependency was evaluated using Moran's I and spatial lag models. There was strong evidence that variation in quetiapine prescribing rates was not completely spatially random, p=.013. Likelihood ratio tests indicated that a spatial lag model was a better fit then ordinary least squares (OLS), p=.003. Results were consistent with two neighborhood structures. Supportive of our hypothesis of proximity based transmission of prescribing culture we found spatial clustering of quetiapine prescribing rates for alcohol patients in the VHA. Although a spatial lag model is a better fit then OLS, only 22% of the variation in prescribing rates is explained. Further exploration of predictors of off label prescribing in the VHA is warranted.

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IMPROVING IMMUNIZATION RATES AMONG ESRD CLINICS: A GROUP-RANDOMIZED EVALUATION OF A QUALITY IMPROVEMENT INTERVENTION. *T Christopher Bond, P R Patel, MD, J Krisher, L Sauls, J Deane, K Strott, W McClellan (Department of Epidemiology, Rollins School of Public Health, Emory University, Atlanta, GA 30322)

Influenza vaccination is important for end-stage renal disease (ESRD) patients, but many centers report under 50% coverage. Multicomponent quality improvement (QI) interventions at the clinic level may be used to address such issues, but their effects are difficult to quantify. We present a group randomized evaluation of a multicomponent intervention to increase influenza vaccination rates in poorly performing dialysis centers in three ESRD Networks (6, 11, and 15). The inclusion of a ''standard'' group and an ''intensive'' intervention group allowed us to formally evaluate the benefits of the QI program above and beyond standard practice, while accounting for unknown factors. All treatment centers received a feedback report that summarized their rank in comparison to other centers in their state and Network and were provided with educational materials for staff and patients. Centers allocated to the intensive intervention group also received: 1) three educational seminars: 2) assistance with and review of center-specific action plans for improving immunization coverage; and 3) monthly monitoring of plan and rates. Of the 77 centers selected for inclusion, 39 received standard intervention and 38 received intensive intervention. There was an 8.4% (95% CI: -3.0, 17.1; p=0.057) mean absolute difference in improvement between centers which had the intensive intervention (+30.4%) versus the standard intervention (+22.0%). Breakdown by Network showed a pre- to post-intervention difference between 1.1% and 14.2% in the three Networks. This evaluation provides evidence-based data regarding the extent to which a multicomponent intervention can impact vaccination rates at poorly performing dialysis centers.

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EVALUATION OF A COMMUNITY-BASED INTERVENTION TO INCREASE BREAST CANCER SCREENING AND EARLY DETECTION AMONG LOW-INCOME, AFRICAN AMERICAN WOMEN. *I J Hall, C Johnson-Turbes, N Kamalu, Y Zavahir, E Hanniffy (Centers for Disease Control and Prevention, Atlanta, GA 30341)

The recent decrease in breast cancer deaths in white females is attributed to greater use of breast cancer screening; however, deaths among African American women continue to increase, in part, because disease is diagnosed at later stages. We evaluate a new multimedia, pilot-campaign to increase awareness of breast cancer screening and intention to utilize no-cost mammography services among African American women in Savannah and Macon, Georgia. Using breast cancer survivor testimonials on radio stations with wide African American listenership, the African American Women and Mass Media (AAMM) pilot campaign, launched in July 2008 in Savannah and Macon, Georgia. Columbus, Georgia was used as a control site. We monitored calls received from Savannah, Macon, and Columbus, Georgia to the Cancer Information Service's (CIS) hotline, 1-800-4CANCER, as a measure of increased awareness of no-cost services as well as calls to local health departments as a measure of intention to get a mammogram. Across the three sites, calls increased by 160% over baseline in the first 5 months of the campaign with 3X and 2X as many calls coming from Savannah and Macon, respectively, as compared to Columbus. In addition, the number of callers who report radio as their source of information increased to a high of 11 of 47 (23%) and 13 of 30 (43%) callers in Savannah and Macon, respectively, over the 5 month period compared to 0 of 15 calls in Columbus. The preliminary findings suggest the beginning of community uptake of promotional messages in the two test sites. Our findings reveal the potential value of using black radio to reach African American women with public health messages, affect changes in knowledge, awareness, and behavioral intent, and potentially help reduce racial/ethnic health disparities.

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A MULTI-LEVEL ANALYSIS OF NATIONAL-LEVEL FACTORS AND INDIVIDUAL USE OF HEALTH CARE IN 31 LOW-INCOME COUNTRIES. *M R Prescott, M E Kruk, S Galea (University of Michigan, Ann Arbor, MI 48109)

Country-level factors such as modes of health financing may affect an individual's use of health care, yet few studies have examined this relation in the presence of community and individual-level factors. Using Demographic Health Surveys and World Bank data for 31 low-income countries and random-intercept logistic multi-level models with three levels (country, community and individual) we assessed the determinants of whether a woman had a skilled birth attendance for her last birth. Our key determinants of interest were the government share of health spending, gross national income per capita (GNIpc), national equality and land area. Covariates at the community level were the fraction living in an urban setting; covariates at the individual level were maternal age, relative income and level of education. In intercept only models, a woman's probability of skilled birth attendance at delivery significantly differed between countries (explaining 40.8% of variance; p-value <0.05). In multivariate models the government share of the health spending [Odds Ratio=4.10, 95% CI(1.28, 13.1)], GNIpc [OR=7.61, CI(3.65, 15.9)] and land area [OR=0.62, CI(0.41, 0.92)] all were associated with women using skilled birth attendants; 60% of the total country-level variation in skilled birth attendance was due to the national factors of interest. Our findings suggest that, in addition to individual and community influences, country characteristics independently influence a woman's likelihood of having skilled birth attendance. Future research will examine the mechanisms by which higher government health spending is associated with individual health care decisions and behaviors.

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HEALTHCARE DISPARITIES RESEARCH: DATA SOURCES FOR RACE, ETHNIC, AND IMMIGRANT (REI) GROUPS. *P J Johnson (University of Minnesota, Minneapolis, MN 55414)

Disparities in healthcare coverage and access have gained a prominent place on the national health policy agenda as evidenced by the monitoring and documentation efforts of Healthy People 2010 and the National Healthcare Disparities Report. Yet, data for disparities populations defined by race, ethnicity, or immigrant (REI) group, are limited. Policy, funding decisions, and programs to address disparities often occur at state and local levels. However, local level data are not always readily available for monitoring and evaluation. In the absence of local data, national survey data are used to quantify a problem or serve as a national benchmark. We assessed the extent to which national survey data could be used for state and local level healthcare disparities research. Data sources examined include: Census Bureau products (CPS, SIPP), NCHS products (NHIS, NHANES, NSCH, NSFG), CDC products (BRFSS), and AHRQ products (MEPS-HC). We highlight strengths and limitations of national surveys for examining healthcare coverage and access for REI groups at state and local levels. Cross-survey comparisons are made for REI groups with respect to publicly available data, sample size, and subgroup detail (Hispanic or Asian subgroups). We also summarize available measures of healthcare coverage (uninsurance, insurance types), access to care (usual source of care, barriers, utilization), and levels of geography for each survey. Emphasis is on tradeoffs between availability and quality of REI measures, coverage and access to care measures, and geographic identifiers. These findings are part of a new resource to assist researchers with survey development and/or analysis of existing survey data to examine healthcare coverage and access for disparities populations.

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DIFFERENTIAL AND CUMULATIVE IMPACT OF BMI AND CENTRAL OBESITY ON C-REACTIVE PROTEIN LEVELS: FINDINGS FROM A BRAZILIAN BIRTH COHORT. *A Nazmi, I O Oliveira, D A González, D P Gigante, B L Horta, C G Victora (University of Michigan, Ann Arbor, MI 48109)

Adipose tissue drives production of inflammatory agents, including C-reactive protein (CRP). Excess body fat perpetuates a chronic subclinical inflammatory state, which is strongly associated with atherosclerosis. Individuals with central obesity have increased risk for cardiovascular disease overall and within categories of body mass index (BMI). Evidence from biological and epidemiologic studies indicate that visceral adipose is more cardiopathogenic than subcutaneous fat, but the differential influence of BMI and waist circumference on inflammatory outcomes has not been widely investigated. Using data from the 1982 Pelotas (Brazil) Birth Cohort study, we examined CRP levels relative to BMI and central obesity, individually and in conjunction, in 3827 men and women aged 23 years. Geometric mean (SE) CRP levels were 0.99 mg/L (1.03) in individuals with normal waist circumference and 2.56 mg/L (1.05) in those with central obesity ($\geq$94 cm in men, $\geq$80 cm in women). Corresponding levels for BMI classified as underweight, normal, overweight and obese were 0.69 (1.12), 0.99 (1.03), 1.49 (1.05) and 3.13 mg/L (1.07), respectively. Centrally obese individuals had 40-49% higher CRP levels in each category of BMI ($p<0.01$ for all). Associations remained significant when adjusted for age, sex, skin color, education, and income. Patterns were similar in men and women. Adiposity had a powerful impact on inflammation, and the effects of central obesity were greater than those of BMI. This suggests that the pro-inflammatory consequences of visceral fat compose one pathway by which central obesity contributes to greater risk for cardiovascular disease.

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GREEN TEA CONSUMPTION AND MORTALITY AMONG JAPANESE ELDERLY: A POPULATION-BASED COHORT STUDY. *E Suzuki, T Yorifuji, S Takao, H Komatsu, M Sugiyama, H Doi (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama, Japan)

In vitro and animal studies have provided evidence that tea extracts may prevent the pathogenesis of chronic diseases. However, the effects of green tea in humans remain unclear. To investigate the association between green tea consumption and risk of mortality, a population-based, prospective cohort study was conducted in Shizuoka, Japan. A total of 14,001 elderly residents (aged 65-84 years), who were randomly chosen from all 74 municipalities in the prefecture, completed the questionnaires including the frequency of green tea consumption. They were followed for six years, from 1999 to 2006. Consequently, 9,339 subjects without a baseline history of chronic diseases were analyzed to estimate the hazard ratios (HRs) for mortality from all-causes, cancer, and cardiovascular disease (CVD). Among 49,436 person-years, 786 deaths were identified (follow-up rate, 79.5%). The multivariate HRs and 95% confidence intervals (CIs) for CVD mortality, compared those who consumed 7 or more cups per day with those who consumed less than 1 cup per day, were 0.25 (0.11-0.53), 0.28 (0.10-0.78), and 0.24 (0.07-0.78) for total participants, men, and women, respectively. Although green tea consumption was not inversely associated with cancer mortality, green tea consumption and colorectal cancer mortality were inversely associated with a clear dose-response relationship. In conclusion, green tea consumption is associated with reduced mortality from all-causes and cardiovascular disease. This study also suggests a possibility that green tea has protective effects on colorectal cancer mortality.

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DERIVATION AND VALIDATION OF A RISK SCORE TO ESTIMATE THE IMPACT OF ENVIRONMENTAL FACTORS ON THE RISK OF MYOCARDIAL INFARCTION IN THE COSTA RICA STUDY. *S Aslibekyan, H Campos, A Baylin (Department of Community Health, Brown University, Providence RI 02912)

Summary measures of cardiovascular risk such as the Framingham score have long been used in research and practice, but few of them focus exclusively on modifiable factors. We developed and validated a novel risk score in a matched case-control study of myocardial infarction (MI) conducted in Costa Rica. After restricting the data set to healthy participants (n=800), we used conditional logistic regression to model the risk of MI based on modifiable factors: unhealthy diet, decreased physical activity, smoking, decreased alcohol intake, and low socioeconomic status. Using the estimated coefficients as weights for each component, we fit a regression model to assess the discriminatory ability of the score. Higher environmental score values were associated with a significant increase in the risk of MI (odds ratio (OR) = 2.47, 95% confidence interval (CI): 2.02- 3.02, p-value <0.0001). We applied the risk score to the entire data set (n=2884) to assess its performance in the general population. Results confirmed a significantly increased risk of MI associated with higher values of the score (OR= 2.49, 95% CI: 2.20- 2.83, p-value <0.0001). The findings were replicated in sensitivity analyses. Our score presents a robust quantitative summary of modifiable cardiovascular risk factors in the study population.

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INTERACTION BETWEEN ARSENIC EXPOSURE AND B VITAMINS AND FOLATE ON URINARY TOTAL ARSENIC EXCRETION IN A BANGLADESHI POPULATION. *M Argos, P Rathouz, B Pierce, T Kalra, Y Chen, F Parvez, J Graziano, H Ahsan (University of Chicago, Chicago, IL 60637)

Background: Arsenic exposure through drinking water is a risk factor for many diseases including cancer. Dietary nutrients, including folate and B vitamins, have been hypothesized as factors involved in the inter-individual variability of arsenic retention in the body because of their known role in arsenic metabolism. Objectives: This study evaluated the modifying effects of dietary B vitamins and folate intakes on the association between water arsenic intake and urinary total arsenic excretion among individuals in the Health Effects of Arsenic Longitudinal Study (HEALS) in Bangladesh. Enrolled in the HEALS cohort are married adults with known exposure to a wide range of arsenic levels through drinking water. Design: Arsenic concentration in drinking water, dietary B vitamins and folate intakes (based on food frequency questionnaire), and urinary total arsenic concentration were assessed at the baseline evaluation of cohort participants. We used generalized estimating equations, accounting for familial correlation, to evaluate interaction between arsenic exposure from drinking water and dietary B vitamins and folate intakes in relation to urinary total arsenic excretion. Results: There was evidence of effect modification on the additive scale in this linear model for the association between water arsenic intake and urinary total arsenic excretion by B vitamins (p for interaction; thiamin: p=0.01, niacin: p=0.01, panthenol: p=0.01, and pyridoxine: p=0.01). Conclusion: The potential beneficial effect of these nutrients on the development of arsenic-related diseases and their utility in public health interventions in arsenic-exposed populations should be further investigated.

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BEYOND TRADITIONAL DESIGNS AND STANDARD ANALYSES. *M B Terry, PhD (Columbia University Mailman School of Public Health, New York, NY)

Methodological advances in study design and analyses sometimes fail to be readily adopted in practice. This panel will discuss several methods that are often underutilized, drawing upon a common framework of testing an exposure disease association when auxiliary data are available. The first presentation will discuss the two-phase design, a technique developed several decades ago but not widely adopted. Two-phase studies are an extension to the traditional case-control design where the population is stratified on information in addition to outcome status. Analytic approaches have been developed to deal with the biases created by this sample but have not been widely adopted. The second presentation will discuss extended traditional case-control studies into prospective studies and methods to deal with the resulting selection bias that may occur. The third presentation will present missing data methods that exploit auxiliary data to reduce selection bias in molecular epidemiologic studies. Using real and simulated data they will show methods that can be easily applied in a variety of situations where a proportion of subjects are missing data on biospecimens and auxiliary data are available. Each presentation will be given jointly by an epidemiologist and biostatistician to emphasize both the substantive question and the methodological enhancement.

Speakers:
Diana Buist and Sebastien Haneuse: ''Two Phase Designs'' Group Health Center for Health Studies, Seattle, WA.
Amy Trentham-Dietz and Ronald Gangnon ''From Case Control to Cohort'' University of Wisconsin School of Medicine & Public Health, Wisconsin
Mary Beth Terry and Manisha Desai, ''Use of Auxiliary Data in Molecular Epidemiologic Studies'' Columbia University Mailman School of Public Health, New York

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TWO-PHASE DESIGNS. *S Haneuse, *D Buist (Group Health Center for Health Studies, Seattle, WA)

In research settings where the outcome of interest is rare, case-control study designs have been a mainstay of epidemiology. Two-phase studies are extensions of the traditional case-control design, originally proposed to increase statistical efficiency when the exposure of interest is also rare. Despite having a broad statistical literature, outlining methods as well as illustrating potentially substantial gains in efficiency/power, two-phase study designs have not been widely adopted. In a recent survey of 4,792 studies in five top-line epidemiological/medical journals, published since 2002, we found just one study that employed the two-phase design. This may be due, in part, to a lack of published guidance on how to design and plan two-phase studies. Towards overcoming these barriers, in this talk we review the two-phase design and present preliminary results from a simulation study exploring the impact of various choices associated with the design of two-phase studies. This work is motivated by ongoing and future research conducted by the Breast Cancer Surveillance Consortium (BCSC). Two-phase designs provide a framework to achieve scientific and statistical efficiency, and improved guidance on the planning and design of such studies will be crucial for future cost-effective and yet statistically powerful studies.

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FROM CASE-CONTROL TO COHORT. *R E Gangnon, *A Trentham-Dietz (University of Wisconsin, Madison, WI)

The past few decades have brought advances in early detection and cancer treatment, so that survival after a cancer diagnosis has improved dramatically for many types of cancer. Gaps in our understanding of the challenges facing cancer survivors and a dearth of evidence-based recommendations for lifestyle choices are driving new research directions. For these reasons, investigators with completed case-control studies are increasingly re-visiting the cancer cases enrolled in these studies as a population for survivorship studies. In Wisconsin, five case-control studies conducted during 1987-2006 enrolled over 15,000 cases of breast cancer. All cases completed extensive telephone interviews regarding established and suspected risk factors for breast cancer. Linkage with the National Death Index allows near-complete passive follow-up for date and cause of death. Statistical analysis of the association between breast cancer-specific mortality and potential risk factors such as body mass index at diagnosis raises several important methodologic challenges. Issues to be discussed include (1) left truncation (only subjects alive at the time of interview are included in the analysis), (2) competing risks, e.g. non-breast cancer mortality, and related modeling choices, e.g. cause-specific hazards or cumulative incidence, and (3) time-varying (or non-proportional) effects of covariates during extended follow-up many years after initial diagnosis.

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USING AUXILIARY DATA IN MOLECULAR EPIDEMIOLOGIC STUDIES. *M Desai, *M B Terry (Columbia University, New York, NY)

Molecular epidemiologic studies often collect biospecimen data on a proportion of subjects from a cohort on whom epidemiologic data are available, posing a missing data problem. Analyses based on those with complete data only (complete-case (CC) analyses) are typically chosen for computational and model simplicity. Such analyses, however, can lead to biased and inefficient estimates. While a variety of missing data techniques for dealing with missing data have been developed, they may not be utilized due to low accessibility. In this talk, we will discuss missing data methods that exploit auxiliary data in molecular epidemiology studies. Specifically, using simulated and real data, we will compare readily accessible methods including multiple imputation (MI). MI is a missing data technique that is easy to implement and valid when the data are missing at random (MAR), an assumption that is difficult to verify. We will characterize the bias that can result from CC analyses. In addition, we will discuss practical issues involved with using these methods and compare the performance between MI and CC in the presence of auxiliary variables and even when the MAR assumption does not hold.

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IS EVERYTHING REALLY RELATIVE? AN ARGUMENT FOR ABSOLUTE RISKS. *J Kaufman (Editor: *Epidemiology.*)

Epidemiologists have come to rely almost entirely on relative measures of effect (odds ratios, risk ratios and hazard ratios). Why is this? There is no reason in principle why we should prefer the ratio. One explanation is simply the matter of convenience: ratio measures are the natural output of our most common tools (multiplicative regression models for categorical outcomes) and our most common study design (case-control studies). In neglecting absolute risks and the additive scale contrast, the field of epidemiology has fallen into some confusion about interaction, effect modification, and the potential public health benefits associated with some reported effects. Confusion over scales has dogged our tracking of health disparities, and our preference for the hazard ratio over the survival curve in longitudinal data can introduce selection bias. Many of these problems might be avoided by a greater attention to the baseline risks in our research and the reporting of our results. Parallel advances in epidemiologic theory and readily available statistical software now make it more practical to report absolute risks and rates, and their contrasts. Standard software programs now include bootstrap, jack-knife and delta-method variance estimates for non-linear combinations of estimated parameters, making it simple to generate estimated effect measures on the additive scale for common model forms. We think it is time for epidemiologists to reexamine this fundamental way of operating. In this panel, we will explore 1) the theoretical advantages and disadvantages of difference scale contrasts in various settings, 2) the peculiar historical journey that led our field down the path of radical relativism, 3) the practical tools for estimating difference contrasts and additive-scale interactions in a wide variety of model forms, and 4) the special problem of selection bias for hazard ratios in time-to-event models along with practical alternatives.

Part of the ''Changing Face of Epidemiology'' Series, Presented by the Editors of EPIDEMIOLOGY

Speakers:
Charlie Poole – ''Review of Issues in Choosing Between Ratio and Difference Effect Measures''
Brian Langholz – ''Absolute risk estimation from case-control studies''
Miguel Hernan – ''The hazards of employing hazard ratios''

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REVIEW OF ISSUES IN CHOOSING BETWEEN RATIO AND DIFFERENCE EFFECT MEASURES. *C Poole (University of North Carolina, Chapel Hill, NC 27599-7435)

On natural disease frequency scales such as risk, rate and prevalence, we can estimate effects by division or subtraction. The year 2009 marks the golden jubilee of the conclusion by Cornfield and colleagues that ratio measures are better for assessing causality and difference measures for determining the population impact of associations that have been accepted as causal. This talk reviews the rationale for that criterion for choosing between relative and absolute effect measures as well as several others, including: estimability in different study designs, statistical efficiency of estimation, suitability for measuring association ''strength,'' symmetry upon reversal of exposure or outcome coding, facility for communicating results, interpretation as averages of individual effects, and utility for studying synergism and antagonism. The upshot is that discussion and methodologic research on each of these issues has yet to reach closure.

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ABSOLUTE RISK ESTIMATION FROM CASE-CONTROL STUDIES. *B Langholz (University of Southern California, Los Angeles, CA 90033)

The vast majority of epidemiologic studies are of the case-control design. And it is a commonly held belief that only measures based on odds ratios can be estimated from these studies. I will argue that this is a consequence of the pervasive reliance on the retrospective model for case-control data. However, an alternative view is the nested case-control model, i.e., that case-control studies are sampled from a prospective cohort. While relative measures are still the natural scale for modeling variation in rates and risk, estimation of absolute risk measures is quite natural. I will focus on individually matched nested case-control data for which the estimators are just generalizations of non- and semi-parametric survival analysis methods for full cohort data. Risk estimation from unmatched case-control studies under the nested case-control model is not as well developed but the same principles apply. I contend that all case-control studies are nested case-control studies and recommend that more attention be given to the case-control sampling process so that risk and rate measures can be reliably estimated.

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THE HAZARDS OF EMPLOYING HAZARD RATIOS. M A Hernán (Harvard University, Boston, MA 02115)

Epidemiologic analyses of cohort studies often use the hazard ratio, averaged over the follow-up period and adjusted for confounders, as a summary effect measure. However, even in the absence of unmeasured confounding and model misspecification, endowing average hazard ratios with a causal interpretation may be problematic because (i) the true hazard ratio may vary over time and thus cannot be adequately summarized in a single number, and (ii) hazards have a built-in selection bias. These problems can be overcome by summarizing the study findings via appropriately adjusted survival curves or other measures of absolute risk. This talk describes a step-by-step methodology to generate adjusted survival curves in cohort studies. It also describes how these methodology was used in real epidemiologic studies in which a summary hazard ratio would have been misleading.

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QUALITATIVE METHODS FOR EPIDEMIOLOGIC RESEARCH? *E Torrone, *I Yen (University of North Carolina, Chapel Hill, NC)

Epidemiologic research is dominated by quantitative methods. However, the growing complexity of research questions, including incorporation of social determinants, had led to researchers to look to mixed methodology to most more generate hypotheses, design and validate measurement tools, and interpret data. The purpose of this symposium is to highlight ways that qualitative methods can complement and enhance quantitative methods. This session includes presentations on: 1) Use of qualitative methods to inform quantitative instruments and interventions; 2) Use of qualitative methods to explain quantitative findings; 3) Use of qualitative and quantitative methods in parallel and 4) Strategies to ensure rigor in qualitative research. Presenters will cover topics including: characteristics of the food environment, client perceptions and preferences for HIV test counseling and methods for tracking social networks in the developing world.

Co-Chairs: Elizabeth Torrone and Irene Yen

Speakers:
Lynne Messer – ''Social network analysis: modifying a quantitative instrument for a resource-poor environment''
Barbara Laraia – ''Perception of the local supermarkets on diet''
Elixabeth Torrone – ''Risk behavior disclosure during HIV test counseling''

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SOCIAL NETWORK ANALYSIS: MODIFYING A QUANTITATIVE INSTRUMENT FOR A RESOURCE-POOR ENVIRONMENT. *L C Messer, K O'Donnel, S Parkash, E Umar, K Whetten (Duke University, Durham, NC)

Many developing countries have experienced increases in the numbers of orphans resulting from adult mortality due to HIV and malaria. As underdeveloped countries attempt to cope, resources are limited and stretched beyond capacity. One approach to meeting the multiple needs of these orphans is to create a system of referrals among agencies devoted to orphan and other vulnerable children (OVC) care. Assessing this system's development is an important component for program evaluation and future funding decisions. Social network analysis (SNA) is the ideal tool for measuring relationships among agencies. Unfortunately, SNA assumes some pre-existing level of relationship between agencies, common understandings about the roles of referral and interaction, and the willingness to openly state degrees of positive interactions between organizations. Pilot-testing of a traditional (quantitative) SNA instrument indicated none of these assumptions were met. Here, we report on the modifications made to a SNA instrument, turning it from a quantitative to qualitative instrument, for use in a resource-poor environment. Benefits of the qualitative version, including its acceptance by local OVC care providers and its perceived utility by the local community-based organizations and funders, will be discussed. Baseline and follow-up results will be presented.

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PERCEPTION OF THE LOCAL SUPERMARKETS ON DIET. *B Laraia, L M Messer, P Kannan, D Dee (Department of Medicine, UCSF, San Francisco, CA)

The neighborhood food environment has been associated with dietary intake, and the prevalence of diabetes and obesity in cross sectional studies. A deeper understanding of where families shop for food and their perceptions of the local food environment will help ground research findings. The perceptions of postpartum women are of particular interest because their food environment could directly influence weight retention and because they are often the gatekeepers of household purchases. We conducted a qualitative study of perception of the local food environment and the role that it plays in shopping behaviors and food selection. Thirty-four postpartum women were recruited mainly through WIC clinics and participated in focus group discussion or individual interviews. Findings suggest that among low-income women in this study, all shopped at least weekly at a major supermarket chain, although several had difficulty getting to the supermarket. There was a high preference for two of 11 large chain supermarkets mentioned by participants. Participants reported that the food environment influenced their self-esteem, and that certain food stores were not as welcoming as others were. Perceptions of the food environment varied by weight status; overweight women identified more fast food establishments near their homes while normal and underweight women did not, and did not think that fast food was associated with weight gain. Access to healthy and unhealthy food was viewed to vary by community socioeconomic status. Perceptions of the food environment may be an additional influencing factor in the relationship between one's actual food environment and dietary intake.

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RISK BEHAVIOR DISCLOSURE DURING HIV TEST COUNSELING. *E A Torrone, J C Thomas, S Maman, A E Pettifor, J S Kaufman, A Seña, L B Hightow-Weidman (University of North Carolina at Chapel Hill, NC)

Individualized risk assessments during HIV testing are an integral component of prevention counseling and are the source of aggregate behavioral statistics which inform prevention programs and allocation of resources. To quantify client-reported accuracy during the risk assessment and identify barriers to accurate risk behavior disclosure, we interviewed young men accessing HIV testing services in a southeastern United States city using mixed methodology. Based on data collected via an Audio and Computer Self-Administered Interview (n=203), over 30% of young men self-reported that they were not accurate during the risk assessment. Participants reported numerous interpersonal barriers to complete disclosure, including perceptions of the HIV test counselor. During qualitative interviews (n=25), participants revealed that many did not understand the purpose of the risk assessment. By combing quantitative and qualitative data simultaneously we examined the primary research questions from different perspectives. A mixed methods approach allowed us to expand on barriers to risk behavior disclosure not captured quantitatively. Findings from this study suggest that the risk assessment completed during HIV test counseling may be incomplete. Modifications to the risk assessment process, including better explaining the role of the risk assessment in prevention counseling, may increase the validity of the data.

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VITAMIN D: IS IT AS GOOD AS IT SEEMS? *J E Manson, C F Garland, M L Melamed, H D Sesso (Harvard University, Boston, MA 02215)

The potential health benefits of vitamin D are receiving increasing attention in the medical literature and the popular press. In addition to the well-documented benefits for bone health, Vitamin D has been implicated in the prevention of cancer, coronary heart disease, heart failure, diabetes, hypertension, frailty, depression and mood disorders, infections, autoimmune diseases, and other disorders. The available research derives primarily from laboratory studies, animal research, and epidemiologic studies, but large-scale randomized clinical trials are lacking. Many experts are now recommending vitamin D intakes far above the government's dietary reference intake levels. Growing enthusiasm for vitamin D supplementation underscores the urgent need for timely initiation of clinical trials, before high intake becomes so prevalent (through supplements and/or fortification of the food supply) as to render participant recruitment and hypothesis testing impossible. We know from prior experience that randomized trials have not confirmed the expected benefits of several other micronutrients, including beta-carotene, vitamin E, and folic acid/B vitamins. Will the same be true of vitamin D or are there reasons to believe that vitamin D will live up to the exceptionally high expectations? The symposium speakers will critically review the epidemiologic evidence for diverse health benefits of vitamin D, dose-response relationships, and the need for additional research including large-scale randomized trials.

Speakers:
Cedric Garland, MPH, DrPH, ''Does Vitamin D Prevent Cancer?''
Michal Melamed, MD, MHS, ''Does Vitamin D Prevent Cardiovascular Disease and All-Cause Mortality?''
Howard Sesso, ScD, ''Why We Need Randomized Trials of Vitamin D''

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VITAMIN D: DOES IT REDUCE RISK OF CARDIOVASCULAR DISEASE AND ALL-CAUSE MORTALITY? *M L Melamed, MD, MHS (Albert Einstein, Bronx, NY)

A lot of recent attention in observational studies has focused on low vitamin D as a risk factor for multiple chronic health conditions. These conditions include but are not limited to insulin resistance, high blood pressure, cardiovascular disease, specific cancers, and early mortality. However, results from randomized clinical trials in this area have been inconsistent. Is this another case of a vitamin that shows promise in observational studies but will not stand the test of randomized clinical trials? Potential problems with the observational analyses are residual confounding and the multiple outcomes studied without adjustment for multiple comparisons. Vitamin D is obtained from exposure to sunlight. Physical activity, especially outdoor physical activity, is highly correlated with vitamin D levels but many studies do not have good measures of physical activity. This and other potential unmeasured confounders may contribute to the reported associations. There has been little focus on potential harmful effects of high vitamin D levels including a risk of kidney stones, kidney disease and potentially atherosclerosis and vascular calcification. This symposium will review the findings from observational studies and randomized clinical trials about potential risks of low vitamin D levels and potential harms of vitamin D supplementation.

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LESSONS LEARNED: THE EPIDEMIOLOGY OF VITAMINS AND CHRONIC DISEASE, AND A CASE FOR CLINICAL TRIALS TESTING VITAMIN D. *H D Sesso (Brigham and Women's Hospital, Boston, MA 02215)

Studies in nutritional epidemiology have consistently demonstrated that those who consume greater amounts of fruits and vegetables tend to have lower rates of cardiovascular disease (CVD), cancer, and other chronic diseases. In turn, researchers have actively sought to identify particular constituents of foods that underlie a potential effect. Several vitamins and minerals – including beta-carotene, vitamin E, vitamin C, folate, and selenium, among others – have had strong mechanistic and epidemiological justifications for potential benefit. However, the inherent heterogeneity in study design, participant characteristics, potential confounding, interactions with other vitamin and food components, and other elements of epidemiologic studies makes any assertion of causality problematic and increasingly dependent upon randomized clinical trials. In turn, the majority of randomized clinical trials testing vitamins have contradicted the epidemiologic evidence and found a lack of benefit. This has led many to question the role of vitamin supplements in chronic disease prevention, along with the necessity and potential limitations of clinical trials. We are in a familiar crossroad regarding the role of vitamin D in the prevention of chronic disease, which has been shown to be both biologically plausible and supported by consistent findings from epidemiologic studies. Small-scale clinical trials of high doses of vitamin D supplementation have also appeared promising, whereas the lack of effect noted for vitamin D in the Women's Health Initiative may reflect too low a dose of vitamin D. Clarifying the role of vitamin D in the prevention of chronic disease has major public health implications, given the high prevalence of vitamin D insufficiency and the potential cost-effectiveness of vitamin D supplementation in the broad US population.

* = Presenter; S = The work was completed while the presenter was a student

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CYTOMEGALOVIRUS INFECTION, INFLAMMATION AND MORTALITY AMONG ELDERLY LATINOS OVER 9 YEARS OF FOLLOW-UP. *E T Roberts, M N Haan, J B Dowd, A E Aiello (University of Michigan, Ann Arbor, MI 48104)

Research has implicated Cytomegalovirus (CMV) as a contributing factor to age related changes known as immunosenescence and as an etiologic agent in cardiovascular disease, cancers, cognitive and functional impairment, possibly through inflammatory pathways. However, no studies report on the relation between CMV immunoglobulin G (IgG) antibody levels and inflammation on mortality in a population based cohort. We used data from the Sacramento Area Latino Study on Aging, a population based study of older Latinos followed from 1998 to 2008. We used Cox models to assess the relation between CMV IgG antibody titers and all-cause and cardiovascular (CVD) mortality and Sobel tests to examine mediation by Interlukein-6 and Tumor Necrosis Factor-alpha. Individuals with CMV IgG antibody titers in the highest quartile had 1.28 times (95% Confidence Interval 1.02, 1.61) higher all-cause mortality compared to those in lower quartiles over a 9 year period in fully adjusted models. The hazard of CVD mortality in fully adjusted models was elevated but not statistically significant after adjustment (HR=1.17, 95%CI 0.87, 1.58). A composite measure of IL-6 and TNF-α mediated a substantial proportion of the association between CMV and all-cause (18.87%, $p<0.01$) and CVD mortality (28.97%, $p=0.02$). This is the first study to show high CMV IgG antibody levels are significantly related to mortality over a 9 year period in a community based aging population and that this relationship is partly mediated by TNF-α and IL-6. Further studies elucidating the mechanisms between CMV and its putative diseases are warranted. Increased primary prevention efforts are necessary.

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CHILDHOOD SOCIOECONOMIC FACTORS AND TELOMERE LENGTH. *L A DeRoo, C G Parks, S Kim, R M Cawthon, C Weinberg, D P Sandler (Epidemiology Branch, National Institute of Environmental Health Sciences/NIH, Durham, NC 27709)

Telomeres are repetitive DNA sequences that cap the ends of chromosomes and undergo shortening with each replication. Average leukocyte telomere length is thought to be a marker of aging. The rate of telomere shortening is greatest in early life and may be influenced by factors that impact health. Lower socioeconomic status (SES) is associated with poorer health and survival, and may be related to faster aging. We examined childhood SES factors and relative telomere length in a sample of participants (n=647) in the Sister Study, a cohort of women aged 35-74 who have a sister with breast cancer. Average telomere length was measured in whole blood using quantitative polymerase chain reaction. Linear regression was used to estimate differences in telomere length base pairs (bp) by self-reported childhood factors, adjusted for race and current age. Shorter average telomere length was observed in women who reported childhood food deprivation (times when their family did not have enough to eat) vs. not (-397 bp; 95% confidence interval -669, -124); highest education level in household $\leq$ high school vs. $\geq$ bachelor's degree (-294 bp; -505, -82); low income or poor vs. average or well-off (-47 bp; -225, 132); and single- vs. two-parent household (-207 bp; -491, 78). Furthermore, women reporting one (-150 bp; -344, 43), two (-251 bp; -477, -24), or three or more (-362 bp; -667, -57) of these factors had shorter telomeres compared to those with none. These results suggest that adverse socioeconomic conditions in childhood are associated with shorter telomere length in adulthood.

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DASH DIET ADHERENCE SCORES AND COGNITIVE DECLINE AMONG AGING MEN AND WOMEN: CACHE COUNTY STUDY OF MEMORY HEALTH AND AGING. *H Wengreen, C Nelson, R Munger; for the Cache County Study Investigators (Utah State University, Logan, UT 84322)

The Dietary Approaches to Stop Hypertension (DASH) dietary pattern is recommended in the current dietary guidelines for Americans to decrease hypertension and risk for chronic disease. We prospectively examined associations between DASH diet adherence scores and cognitive function and decline among aging men and women of the Cache County Study on Memory and Aging in Utah. In 1995, 3831 residents 65 years of age or older completed a baseline survey that included a food frequency questionnaire and cognitive assessment. Cognitive function was assessed using the Modified Mini-Mental State examination (3MS) at baseline and at three follow-up interviews spanning 11 years. A DASH diet adherence score (DASH score) based on nine food-group/nutrient components (fruit, vegetables, nut/legumes, whole grains, low-fat dairy, sodium, sweets, non-fish meat, and fish) was calculated. Multivariable mixed effects models were used to examine change in average 3MS score over time across increasing quintile of the DASH score. Higher DASH scores were associated with higher 3MS scores at baseline that were maintained over 11 years of follow-up (p-trend = <0.001). Those in the highest quintile scored 1.42 (0.32) points higher at baseline and 1.81 (0.28) points higher after 11 years of follow-up than did those in the lowest quintile of DASH score (p-value for the difference at baseline = <0.001; p-value for time interaction = 0.02). Adhering to the DASH dietary eating pattern may help to attenuate age-related cognitive decline among the elderly.

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BONE LEAD LEVELS ARE ASSOCIATED WITH MEASURES OF MEMORY IMPAIRMENT IN OLDER ADULTS. *E van Wijngaarden, J R Campbell, D A Cory-Slechta (University of Rochester, Rochester, NY 14642)

Accumulating evidence suggests a link between lead exposure and memory impairment. We conducted a pilot study of 47 healthy subjects 55-67 years of age to examine associations between bone lead levels and 4 tests sensitive to the natural history of Mild Cognitive Impairment (MCI) and Alzheimer's disease (AD). These include 3 subtests of the Cambridge Neuropsychological Test Automated Battery: delayed match-to-sample, paired associates learning and spatial recognition memory; and the Montreal Cognitive Assessment Test. Bone lead concentrations were measured at the mid-shaft of the tibia and at the calcaneus with K X-ray fluorescence. Higher tibial and calcaneal bone lead values were statistically significantly ($p<0.05$) associated with lower performance levels on delayed match-to-sample and paired associates learning in unadjusted analyses with Spearman rank correlation coefficients of about 0.4. Multiple linear regression analyses (i.e., least-squares means of cognitive test scores across tertiles of lead exposure) adjusted for age, education and smoking status continued to show an association of higher calcaneal lead levels with increasing memory impairments on delayed match-to-sample ($p=0.07$). Additional adjustment for history of hypertension reduced the strength of this association ($p=0.19$). Given the demonstrated impact of lead exposure on hypertension and the vascular nature of certain types of dementia, we speculate that hypertension plays a mediating role in the association between lead exposure and memory impairment.

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THE ROLE OF SEX IN THE ASSOCIATION OF THE APOLIPOPROTEIN E EPSILON 4 ALLELE WITH INCIDENCE OF DEMENTIA, COGNITIVE IMPAIRMENT AND DECLINE AMONG OLDER US ADULTS. *M A Beydoun, A Boueiz, M Abougergi, M H Kitner-Triolo, H A Beydoun, S M Resnick, R O'Brien, A B Zonderman (National Institute on Aging, Baltimore, MD 21224)

Apolipoprotein E epsilon4 allele (ApoE4+) may increase dementia risk and cognitive impairment or decline differentially by sex. Data on 638 participants from the Baltimore Longitudinal Study of Aging were used. Onset age of dementia was determined, and global and domain-specific cognition was assessed longitudinally. Using mixed models, cognitive impairment and decline were predicted at mean age of follow-up. 107 subjects developed dementia after 25 years median follow-up. ApoE4+ was an important predictor of dementia (HR=2.72; 95% CI: 1.81-4.11), without significant sex differences. For both men and women, ApoE4+ was associated with increased risk of cognitive decline on the MMSE (ORs ranged between 2.07 and 6.55, $p<0.05$). For all time points, women had significantly stronger positive associations than men between ApoE4+ status and impairment or decline on the California Verbal Learning Test (CVLT) for delayed recall (after bonferroni correction) and List A total recall, Verbal Fluency Test-Categories (VFT-C) (prior to bonferroni correction). Taking time points prior to dementia, ApoE4+ status had a stronger positive association with impairment in CVLT (delayed recall) among women compared to men (prior to bonferroni correction). For both sexes, decline and impairment in many cognitive tests mediated the ApoE4+ status-dementia association, including MMSE, CVLT (delayed recall, List A), VFT-C, and Trails B. Sex-specific mediation included decline in VFT-L among men, and impairment in CVLT (List A) among women. While ApoE4+ status is a sex neutral risk factor for dementia, its effect on decline and impairment in specific domains including verbal memory and learning was stronger among women.

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STRATEGIES FOR COMMUNICATING HEALTH RESEARCH FINDINGS IN AN ARCTIC ABORIGINAL COMMUNITY. *J Huntington, K J Goodman, C Fletcher, R Munday, G Gordon (University of Alberta, Edmonton; Susie Husky Health Center & Aklavik Health Committe, Aklavik, NWT, Canada)

Residents of the primarily Aboriginal hamlet of Aklavik, NWT have expressed concern about health risks from H pylori infection. The Aklavik H pylori Project aims to describe the burden of disease, assess control measures, and effectively communicate research findings to address community concerns. Community members participate in the research process by means of a local planning committee. In addition, broader community consultation was used to assess potential effectiveness of methods for disseminating project information. This qualitative research approach included group discussions and informant interviews to assess local understanding of the research, expectations, and preferred methods of knowledge transfer. Community members' expectations were centered on learning about behaviors that could protect against ill health. Most informants were satisfied with communication methods employed by the project (radio shows, announcements, flyers) but were skeptical about the potential value of the research, many commenting that researchers typically leave after data collection never to be heard from again. Most informants supported a proposal to create a video aimed at revealing the process of conducting research and understanding the results. This investigation suggested that effective community-driven research should provide individuals with recognizable benefits from participation, particularly knowledge about how to safeguard their own health. We also identified a promising knowledge transfer strategy, the creation of a video to document the research process, which will be carried out as a collaboration between community and research team members.

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TOWARD A CLEARER DEFINITION OF CONFOUNDING REVISITED WITH CAUSAL GRAPHS. *P P Howards, E F Schisterman, C Poole, C R Weinberg, J S Kaufman (Emory University, Atlanta, GA 30322)

In 1993, Weinberg considered the definition of confounding in etiologic studies. She focused on whether it was appropriate to adjust for variables that were affected in part by exposure and associated with the outcome among the unexposed but that were not on a causal pathway between the exposure and the outcome. As an illustrative example, she considered the common practice of adjusting for prior spontaneous abortion when assessing the etiologic contribution of an exposure to (subsequent) spontaneous abortion. She showed mathematically that controlling for prior spontaneous abortion could substantially bias the risk ratio even though prior spontaneous abortion would meet some definitions of a confounder. Since then, the use of directed acyclic graphs (DAGs) to evaluate confounding and other biases has been refined. We revisit Weinberg's work using DAGs to represent scenarios that meet or further develop her original assumptions. Our DAG analyses reiterate Weinberg's finding that adjusting for prior spontaneous abortion introduces bias given her assumptions. For the examples we consider, adjustment causes bias if prior spontaneous abortion is a descendant of the exposure and is associated with the outcome among the unexposed or is a collider or a child of a collider on a backdoor path. Both situations seem plausible. DAGs allow simplifying assumptions of mathematical examples to be relaxed; but DAGs do not provide information on the magnitude of bias that can be introduced, so quantitative analyses complement conclusions based on DAGs.

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ESTIMATING THE EFFECTS OF POTENTIAL PUBLIC HEALTH INTERVENTIONS ON POPULATION DISEASE BURDEN: A STEP-BY-STEP ILLUSTRATION OF CAUSAL INFERENCE METHODS. *J Ahern, A Hubbard, S Galea (University of California, Berkeley, CA 94270)

Causal inference methods allow estimation of the effects of potential public health interventions on the population burden of disease. Motivated by calls for epidemiologic research to be presented in ways that are more informative for intervention, the authors present a discussion of the steps required to estimate the population effect of a potential intervention using an imputation based causal inference method and discuss the assumptions of and limitations to its use. An analysis of neighborhood smoking norms and individual smoking behavior is used as an illustration. The implementation steps include: 1) modeling the adjusted exposure and outcome association, 2) imputing the outcome probability for each individual while manipulating the exposure by ''setting'' it to different values, 3) averaging these probabilities across the population, and 4) bootstrapping confidence intervals. Imputed probabilities represent counterfactual estimates of the population smoking prevalence if neighborhood smoking norms could be manipulated through intervention. If norms were at their most permissive level in all neighborhoods, the imputed prevalence of smoking in the whole population would be 29%. If norms were at their most prohibitive level, the imputed prevalence of smoking would be 17%. The degree to which temporal ordering, randomization, stability, and experimental treatment assignment assumptions are met in the illustrative example is discussed, along with ways future studies could be designed to better meet the assumptions. Using this approach, the potential effects of an intervention targeting neighborhoods, individuals, or other units can be estimated.

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DEBUNKING THREE EPISTEMIC MYTHS FROM INTRODUCTORY EPIDEMIOLOGY; WE SHOULD TEACH THAT NON-RCT DATA, ECOLOGIC DATA, AND THE ABSENCE OF EVIDENCE ARE OFTEN THE MOST USEFUL INFORMATION. C V Phillips, *K J Goodman (Uiversity of Alberta, Edmonton, AB, Canada T6G2L9)

Debunking myths about epidemiology is a challenge, and it is made worse when we create them ourselves. Those who study only introductory epidemiology (including most health reporters, clinical researchers, and health policy makers) are usually taught oversimplifications that become pervasive myths. This little learning is dangerous; it is often ''known'' better than basic principles and persists even when someone learns enough to know better. Our field relies on observational data, yet we perpetuate the myth that randomized trials always provide the most useful evidence. *Ceteris paribus*, randomization replaces systematic confounding with easily modeled random confounding, but the costs of controlling an experiment (limits on study population, timing and type of exposure, etc.) often result in deconfounded measures of something that is not really useful to know. All that most students learn about ecologic data is the myth that it always leads to a fallacy, but for many social behaviors or network exposures it provides more useful information than other available data. The mantra, ''the absence of evidence is not evidence of absence'' is often forgotten when it is true (regarding significance testing), but it is overgeneralized to a myth; the dog that did not bark is often the most useful scientific clue. We address the origins of these myths, debunk them, and provide examples of how believing them has interfered with scientific knowledge and discourse. We urge our colleagues who teach at the introductory level to avoid the didactic convenience of oversimplification, and to discard textbooks and teaching notes that perpetuate myths that weaken our science.

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PITFALLS OF METHODS FOR ESTIMATING SURVIVAL IN THE PRESENCE OF STRONG SELECTION BIAS INDUCED BY ARTIFICIAL CENSORING. *C J Howe, S R Cole, J Chmiel, A Muñoz (Johns Hopkins University, Baltimore, MD 21205)

In the setting of time-to-event analyses artificial censoring with correction for induced selection bias can be used to examine the natural history of a disease after effective interventions are widely available. This approach has also been used to address intent-to-treat bias due to non-compliance as well as estimate survival in the presence of competing risks. Artificial censoring would entail censoring subjects when they are exposed to the intervention, fail to comply with their initial treatment regimen, or develop the competing outcome. The correction method, which can be any approach for handling informatively censored data (e.g., inverse-probability-of-censoring weights (IPCW)), then attempts to recapture the survival experience of the artificially censored subjects had they never been exposed to the intervention, complied, or not developed the competing outcome. The ability of the correction method to recapture unobserved survival and yield an unbiased estimate is dependent on whether the assumptions of positivity, exchangeability and no misspecification are met. An example from the Multicenter AIDS Cohort Study concerning long-term AIDS-free survival in the absence of Highly Active Antiretroviral Therapy (HAART) is used to demonstrate that in the context of very strong selection bias induced by censoring participants at HAART initiation, methods such as IPCW fail to correct the induced bias. Instead, the corrected survival estimate remains nearly as biased as the estimator that ignores the selection bias. The correction method fails due to violations of the positivity and exchangeability assumptions. These violations occur partly as a result of very strong induced selection bias.

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USING WEIGHT TRIMMING TO IMPROVE PROPENSITY SCORE WEIGHTING. *B K Lee, J T Lessler, E A Stuart (Johns Hopkins School of Public Health, Baltimore, MD 21205)

Propensity score weighting is sensitive to model misspecification and outlying weights that may disproportionately impact results. For logistic regression propensity score models, weight trimming can reduce the bias and mean square error of the effect estimate. However, it is unknown whether weight trimming is advantageous in the context of nonparametric ensemble classification methods such as generalized boosted models. We examined the performance of logistic regression and various ensemble methods in conjunction with weight trimming to estimate propensity score weights in a simulation study. We show across a range of scenarios that although misspecified logistic regression propensity score models yield significant bias, weight trimming can greatly improve the accuracy of final effect estimates. In contrast, weight trimming did not improve the ensemble method-derived effect estimates. The performance of ensemble methods without weight trimming was similar to the best performance obtained by logistic regression with trimming. These results indicate that weight trimming should be used to optimize the performance of logistic regression propensity score models, although the optimal level of trimming is difficult to determine. In contrast, weight trimming is of little utility for ensemble method propensity score estimation. These ensemble methods outperform logistic regression models and do not benefit from trimming, possibly because they allow for a more flexible model specification and hence are less prone to misspecification. The results add to a growing body of evidence suggesting the superiority of ensemble methods over logistic regression for propensity score estimation in the context of inverse probability of treatment weighting.

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A DIAGNOSTIC FOR UNCERTAINTY INTERVALS FROM NONIDENTIFIED MODELS. *P Gustafson, S Greenland (University of British Columbia, Vancouver, BC, Canada)

We review some aspects of Bayesian and frequentist interval estimation, focusing attention to observational-data situations in which explicitly accounting for the limitations of study design and data collection leads to nonidentifiability. We argue, via a series of examples, that Bayesian interval estimation is an attractive way to proceed in this context even for frequentists, because it can be supplied with a diagnostic in the form of a calibration-sensitivity simulation analysis. We illustrate the basis for this approach in a series of theoretical considerations, simulations, and an application to a study of silica exposure and lung cancer.

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A PROSPECTIVE COHORT STUDY OF ARSENIC EXPOSURE FROM DRINKING WATER AND INCIDENT SKIN LESIONS IN BANGLADESH *T Kalra, M Argos, P Rathouz, F Parvez, J Graziano, H Ahsan (The University of Chicago, Chicago, IL 60637)

As many as 70 million people in Bangladesh are chronically exposed to arsenic, a Class I human carcinogen, through contaminated drinking water. Skin lesions are indicative of arsenical toxicity and an increased risk for arsenic-related cancer. Research has shown the adverse health effects of arsenic exposure for a high dose range (>300 μg/L), but health effects for low- to moderate-dose exposure (<300 μg/L) are largely unknown. The national standard for arsenic in drinking water in Bangladesh is 50 Ìg/L. We utilize data from 11,746 married adults recruited into the Health Effects of Arsenic Longitudinal Study (HEALS) in Bangladesh. All 5,966 tubewells in the study area were tested for arsenic. We prospectively evaluated the relationship between water arsenic in relation to the risk of incident skin lesions using Discrete Time Hazards Regression Models. We observe a strong dose-response relationship between arsenic exposure and incident skin lesions identified during 4 years of follow-up. Compared with water arsenic concentration levels of <10 μg/L, concentrations of 10.1-50, 50.1-100, 100.1-300, and >300 μg/L of arsenic were associated with the adjusted risk ratios (RR) of 1.15 (95% CI: .88, 1.49), 1.68 (95% CI: 1.30, 2.19), 2.10 (95% CI: 1.30, 2.19), and 3.39 (95% CI: 2.56, 4.50), respectively. Additionally, there is evidence that extended periods of exposure to levels of arsenic below the national standard (<50 ug/L) in drinking water increases risk of skin lesions (RR: 1.59, 95% CI: 1.08, 2.32). These findings clearly highlight the increased risk of skin lesions with increasing exposure to arsenic, even at levels below the national standard for arsenic in drinking water.

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COULD MINING BE PROTECTIVE AGAINST PROSTATE CANCER? AN INVESTIGATION AND LITERATURE REVIEW. *J Girschik, D Glass, G Ambrosini, L Fritschi (Western Australian Institute for Medical Research, Perth, WA 6009, Australia)

Background: Prostate cancer is one of the most commonly diagnosed cancers in Western men. Currently, only increasing age and family history have been reasonably well established as risk factors. A growing number of studies have investigated occupation in relation to prostate cancer but, like other risk factors, no associations have been conclusively established. Mining is the main contributor to the Western Australian economy and employs a significant proportion of the work force. This study had two aims: first to investigate mining as a risk factor in the Western Australian Prostate Health Study and; second, to examine whether previous studies have found mining occupations to be related to the risk of prostate cancer. Methods:Data was obtained from a population-based case control study conducted from January 1 2001 to August 20 2002 at The University of Western Australia. A systematic search of the online databases MEDLINE, EMBASE, CINAHL, Global Health, AUSThealth and Web of science was conducted until September 2008. Results: In our study, after controlling for age, family history and military service in Vietnam, miners had a statistically significantly reduced risk of prostate cancer (AOR 0.35 95% CI 0.16-0.75). A literature search found a reasonably consistent trend of a decreased risk of prostate cancer amongst miners. Conclusions: The consistency of the finding that miners have a decreased risk of prostate cancer has not been discussed previously, and a biological mechanism has not previously been proposed. It is possible the consistent protective trend may be due to chance or confounding, however, this study discusses increased melatonin in underground miners as a potential biological mechanism.

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OCCUPATIONAL EXPOSURE TO DIESEL ENGINE EMISSIONS AND RISK OF LUNG CANCER: EVIDENCE FROM A CASE-CONTROL STUDY IN MONTREAL, CANADA. *J Pintos, M-E Parent, J Siemiatycki (Centre de Recherche du CHUM, and INRS-Institut Armand-Frappier, Montreal, QC, Canada H2W 1V1)

Objective: to examine the association between exposure to diesel engine emissions in a wide range of occupations, and risk of lung cancer. Methodology: a population-based case-control study was conducted in Montreal (1996-2001). Interviews elicited a detailed job history from 1159 cases and 1460 controls. For each job held, a team of chemists/hygienists assigned the confidence, frequency (hours/week), relative concentration and duration of exposure (in years) to 294 substances, including diesel engine emissions. Odds ratios (ORs) and 95% confidence intervals (CIs) were estimated adjusting for age, sex, SES, respondent status, and smoking history. Results: any occupational exposure to diesel emissions was associated with an increased risk of lung cancer (OR=1.46; 95%CI:1.1-1.9). Relative concentration was a stronger predictor of risk than frequency or duration of exposure. Substantial exposure – defined as medium or high concentration of exposure for at least five years and at least 5% of the working time-conferred a two-fold increase in risk (OR=1.96; 95%CI:1.3-3.6). Exposure lag period analyses suggested that the exposure contributing the most to the excess risk was the one occurring 25 to 30 before diagnosis. Discussion: these results provide support for the hypothesis of an excess lung cancer risk due to prolonged diesel exhaust exposure in the workplace.

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PENTACHLOROPHENOL PRODUCTION WORKERS MORTALITY STUDY. *A M Ruder, M H Sweeney (The National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, Cincinnati, OH 45226)

Since 1936, when U.S. production began, 2,3,4,5,6-pentachlorophenol (PCP) has been widely used as an industrial wood preservative, fungicide, insecticide, and general herbicide. All U.S. PCP production workers (n=2166) in the National Institute for Occupational Safety and Health Dioxin Registry, exposed to PCP and to dioxin and furan contaminants of PCP production, were followed from first employment through 2005. A subcohort of 764 was also exposed to 2,4,5-trichlorophenol and 2,3,7,8-tetra¬chlorodibenzodioxin (classified by the International Agency for Research on Cancer as ''carcinogenic to humans'') during production of 2,4,5-trichlorophenoxyacetic acid. A priori hypotheses based on animal and human studies were that the cohort would have elevated standardized mortality ratios (SMRs) for liver, adrenal, thyroid, and parathyroid cancer, soft-tissue sarcoma, lymphatic and hematopoietic cancers, and aplastic anemia in life-table analyses, compared to the U.S. population. Statistically significant excess mortality occurred for all causes (1139 deaths, SMR 1.06, 95% confidence interval [CI] 1.00-1.13), all cancer (324 deaths, SMR 1.21, CI 1.08-1.35), respiratory cancer (130 deaths, SMR 1.36, CI 1.14-1.61), and non-Hodgkin's lymphoma (17 deaths, SMR 1.77, CI 1.03-2.83) but not from other a priori causes of death. In race- and sex-specific analyses, nonwhite males had increased leukemia mortality (four deaths, SMR 7.03, CI 1.92-18). A cancer incidence study might clarify interpretation of results, especially for cancers of a priori interest such as soft-tissue sarcoma, lymphomas, and leukemia.

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* = Presenter; S = The work was completed while the presenter was a student

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DEMENTIA AND DIABETES AMONG OLDER MEXICAN AMERICANS: THE ROLE OF INSULIN-DEGRADING ENZYME. *A Zeki Al Hazzouri, M N Haan (University of Michigan, Ann Arbor, MI 48109)

Insulin Degrading Enzyme (IDE) regulates insulin and low levels reflect higher peripheral insulin which crosses the blood brain barrier and influence Alzheimer's risk. This analysis evaluates whether IDE was associated with dementia and diabetes among Mexican Americans. The Sacramento Area Latino Study on Aging (SALSA) is a longitudinal cohort study with 1789 participants aged 60-100 years in 1998-1999. A stratified random subsample for whom IDE was tested (n=819) was included in the present analysis and was categorized into 4 groups: participants with both diabetes and dementia, participants with either condition, and participants with neither. Using a series of linear regression models, we examined the associations between IDE and diabetes and dementia while adjusting for various covariates including cytokines and body fat composition variables. Regression coefficients (â) and standard errors (SE) were computed for each diabetes/dementia group compared to the group with neither condition (reference category). Participants who were both demented and diabetic had significantly lower mean value of IDE compared to those with neither condition (â=-0.186; SE=0.094; p-value <0.05). Similar results were observed after adjusting for age, gender, and selective cytokines. IDE was negatively correlated with body fat. The association between diagnosis group and IDE was not significant after adjusting for selective body fat composition variables. These findings suggest that low IDE concentrations are associated with dementia and diabetes even after we adjusted for selective covariates. Body composition may play a role in insulin regulation. They may provide an opportunity for early intervention in this high-risk and fast growing subgroup.

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SLEEP DURATION, SLEEP QUALITY AND CARDIOVASCULAR DISEASE MORTALITY AMONG THE ELDERLY: A POPULATION-BASED COHORT STUDY. *E Suzuki, T Yorifuji, K Ueshima, S Takao, M Sugiyama, H Doi (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama, Japan)

A U-shaped association between sleep duration and mortality has been reported among middle-aged adults. However, evidence remains sparse for the elderly. We investigated associations between sleep duration and mortality in the elderly controlling for sleep quality. Data were collected from participants in a prospective cohort study in Shizuoka, Japan. A total of 14,001 elderly residents (aged 65-85 years), randomly chosen from all 74 municipalities in the prefecture, completed questionnaires that evaluated sleep duration, sleep complaints, and the use of hypnotics. Participants were followed for up to 6 years, from December 1999 to March 2006. After excluding those who reported extremely poor activities of daily living, 11,395 subjects were analyzed to estimate the hazard ratios (HR) for mortality from all causes and cardiovascular disease (CVD). With 60,252 person-years, 1,004 deaths were identified. While short sleep duration and mortality were not associated, longer sleep duration was associated with higher risk of mortality in both sexes. Compared with those who slept 7 hours, the multivariate HR and 95% confidence interval of CVD mortality for those who slept $\geq$10 hours was 2.04 (1.24-3.37) and, for those who slept $\leq$5 hours, it was 1.10 (0.62-1.94). Although no clear association was found between sleep quality and mortality, long sleep duration was associated with a higher risk of CVD mortality among those with poor sleep quality. This study suggests an interaction effect between long sleep duration and poor sleep quality on CVD mortality, but not on all-cause mortality.

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ARE DISABILITY TRENDS WORSENING AMONG RECENT COHORTS OF OLDER AMERICANS?: NHANES 1999–2004 VERSUS 1988–1994. T. Seeman, *S S Merkin, E Crimmins, A Karlamangla (University of California, Los Angeles, CA 90095)

Objectives: Trends in disability among the rapidly growing population of older Americans were investigated because of the significant costs to society as a whole if burdens of disability increase. Methods: Data from two National Health and Nutrition Surveys (1988-1994 and 1999-2004) were used to assess time trends in four types of disability (basic activities of daily living, instrumental activities, mobility and functional limitations) for adults aged 60 and over. Results: With the exception of functional limitations, significant increases in each type of disability were seen over time among the 60-69 year olds, independent of socio-demographic characteristics, health status and health behaviors, with significantly greater increases evident for non-white and obese/overweight subgroups (two of the faster growing subgroups within this population). No significant trends were seen among the 70-79 year olds, while for those 80 and older time trends suggested lower prevalence among more recent cohorts. Conclusions: Increasing disability in cohorts now entering their 60's has significant and sobering implications – foreshadowing increased disability among older Americans and increased costs to society as a whole to meet the health care needs of these disabled Americans.

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NEIGHBORHOOD CHARACTERISTICS, HOUSING DEVELOPMENT TYPE, AND MORTALITY AMONG PUBLIC HOUSING RESIDENTS - NEW YORK CITY, 1999–2001. *H P Nair, K Althoff, L Thorpe, T Matte (New York City Department of Health, New York, NY 10013)

Recently the New York City (NYC) Department of Health found higher mortality rates among older, low-income public housing residents, compared with nonpublic housing residents. Within public housing residents, we evaluated associations between neighborhood and development characteristics and mortality. We analyzed a data set that linked death records for 1999-2001 NYC vital statistics with 2000 U.S. Census population statistics, neighborhood variables from NYC city planning and police departments, and building characteristics from the NYC housing authority. We used generalized estimating equations to evaluate associations between census-block-level natural-cause mortality among public housing residents aged $\geq$50 years and neighborhood factors (poverty, crime, pedestrian safety, and land-use mix), and development type (older high- and low-apartment density and newer low-apartment density) after controlling for age, sex, and race/ethnicity. We evaluated age- and sex-specific death counts for 247 census-blocks entirely comprising public housing (5,467deaths, 1,466 observations). Pedestrian safety, development type, and crime significantly improved the fit of a model containing only demographic factors (chi2=32.2; df=6; P<0.0001). We identified higher mortality rates in neighborhoods with high pedestrian-auto injuries (adjusted rate ratio [aRR], 1.2; 95% confidence limits [CL], 1.1, 1.7), high felony rates (aRR, 1.1; 95% CL, 1.1, 1.2), and in older high-apartment density (aRR, 1.4; 95% CL, 1.2, 1.6) and older low-apartment density (aRR, 1.2; 95% CL, 1.1, 1.4) developments relative to newer low-apartment density developments. Relative to demographics, neighborhood and development characteristics have modest, but important associations with health among older public housing residents. Public health initiatives for reducing mortality rates should consider neighborhood safety and development design.

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METABOLIC SYNDROME AND PHYSICAL PERFORMANCE IN ELDERLY MEN: THE OSTEOPOROTIC FRACTURES IN MEN (MROS) STUDY. *S Everson-Rose, M Paudel, B Taylor, T Dam, P Cawthon, E LeBlanc, E Strotmeyer, J Cauley, M Stefanick, E Barrett-Connor, K Ensrud (University of Minnesota, Minneapolis, MN 55414)

Metabolic syndrome is a marker of metabolic dysregulation consisting of altered glucose/insulin metabolism, hypertension, dyslipidemia, and central adiposity. It is highly prevalent in older adults, and has been related to self-reported mobility declines; however, metabolic syndrome has not been examined in relation to objective measures of physical performance in an elderly cohort. We examined the cross-sectional relation of metabolic syndrome to physical performance, assessed by grip strength, narrow walk speed, walking speed, and time to complete repeated chair stands, in 5,457 men (92% white; mean age, 73.6 + 5.9 years) from MrOS, an ongoing, multisite cohort study of healthy aging and fracture risk. Scores on each performance measure were converted to quintiles from worst (''1'') to best (''5'') with unable to complete coded as ''0'' and summed for an overall performance score (mean, 11.6 + 4.3, range, 0-20). Most men (86%) reported good to excellent health at study entry. Prevalence of metabolic syndrome, defined by World Health Organization criteria, was 26%. In a linear regression model adjusted for age, race, education, and site, metabolic syndrome was related to more than a 1-point lower performance score (â=-1.11, p<.001), and remained significant after adjusting for behavioral risk factors, skeletal mass, history of falls/fractures, health status, and chronic medical conditions (â=-.974, p<.001). Among relatively healthy elderly men, metabolic dysregulation is related to poorer physical function. Future research will examine whether metabolic syndrome contributes to greater functional declines over time.

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EPIDEMIOLOGY OF ANEMIA IN A COHORT OF ELDERLY LIVING IN A DEPRIVED AREA: SAO PAULO AGEING AND HEALTH STUDY. *I S Santos, M Scazufca, P R Menezes, P A Lotufo, I M Benseñor (University of São Paulo, Brazil)

OBJECTIVE: Nutritional causes are frequently related to anemia in developing countries. To determine in a population-based cohort study of elderly living in deprived areas: (1) prevalence of anemia; (2) presence of persistent anemia after 2 years; (3) incident anemia after 2 years in high-risk participants (hemoglobin≤13.5g/dl at baseline) and its causes. METHODS: Determination of total blood cell counts, iron profile, folic acid, vitamin B12, C-reactive protein, creatinine, reticulocytes and medical follow-up. NHANES III diagnostic criteria were adopted. Mortality data was obtained from interview/official health statistics. RESULTS: Prevalence of anemia (baseline) was 203/1948=10.4%. 777 high risk participants were followed. Excluding deaths, refuse to participate and losses to follow-up, 438 (56%) were reassessed, 91 had anemia (prevalence=20.8%). From 203 patients with anemia (baseline), 145 completed follow-up. Only 28% were alive without anemia; 39% had persistent anemia and 33% died before reassessment, mostly from cardiovascular disease/cancer. Causes of persistent anemia were renal disease (67%), chronic inflammation (32%), megaloblastic (16%), iron-deficiency (16%), other (4%), unexplained (9%). Of 574 high-risk subjects but without anemia (baseline), 341(59%) completed follow-up. 2-year incidence of anemia=10.0%: renal disease (35%), chronic inflammation (32%), iron-deficiency (15%), megaloblastic (12%), other (9%), unexplained (26%). CONCLUSION: In this sample of older people, most frequent causes of persistent and incident anemia were renal disease and chronic inflammation. Although living in a poor area, nutritional causes of anemia were secondary. Anemia was prevalent and associated to high mortality.

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DASH-STYLE DIET PATTERN AND RISK OF OSTEOPOROTIC HIP FRACTURE IN ELDERLY RESIDENTS OF UTAH. *H J Wengreen, C Nelson, R Munger (Utah State University, Logan, UT 84322)

The Dietary Approaches to Stop Hypertension (DASH) diet is mineral-rich and emphasizes fruits, vegetables, and low-fat dairy foods. Associations between a DASH-diet adherence score and risk of osteoporotic hip fracture among elderly men and women with and without hip fracture were examined. Utah residents with hip fracture (n=1167) were ascertained through surveillance of 18 Utah hospitals during 1997-2001. Age, and gender-matched controls (n=1334) were randomly selected. Participants were interviewed in their place of residence, and diet was assessed using a picture-sort food frequency questionnaire. A DASH score based on nine food-group and nutrient components (fruit, vegetables, nut/legumes, whole grains, low-fat diary, sodium, sweets, non-fish meat, and fish) was calculated. Risk of hip fracture was examined across increasing quintile (Q1-Q5) of the DASH diet adherence score. In multivariable logistic regression analyses the odds of hip fracture decreased across increasing quintile of DASH diet score. Those in highest quintile of DASH diet score had 45% lower risk of hip fracture compared to those in the lowest quintile of DASH diet score (odds ratio Q1: 1 (reference); Q2: 0.92 (95% confidence interval 0.71, 1.19); Q3: 0.76 (0.57, 0.99); Q4: 0.74 (0.56, 0.97); Q5: 0.55 (0.39, 0.71); p-trend = <0.001). Adherence to a DASH diet was associated with lower risk of hip fracture among men and women who were 50-89 years of age.

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MEASURING DEXTERITY AND STRENGTH IN THE GENERAL POPULATION AGED 3-85: PRELIMINARY FINDINGS OF THE NIH TOOLBOX MOTOR DOMAIN. *C Marchand, Y-C Wang, S Magasi, H McCreath, D Reuben, R Gershon, W Z Rymer (Rehabilitation Institute of Chicago, Chicago, IL 60611)

Aims: The NIH Toolbox's goal to develop a comprehensive battery to measure motor, cognitive, sensory, and emotional health across the lifespan is challenging due to the anthropomorphic and developmental differences of age groups. This study reports on the preliminary findings of two motor sub-domains, dexterity and strength. Methods: In a standardized setting, 36 people (aged 3-85) completed dexterity and strength measures identified by expert panels and literature review. Dexterity measures included 9-hole pegboards (wood, plastic, and electric), 25-hole pegboards (smooth and grooved) and the Purdue Pegboard. Strength measures included grip dynamometry, hand held dynamometry (HHD) of the upper and lower extremity, and the timed chair rise. Measures were evaluated for usability, discriminative ability, and reliability. Results: The 25-grooved pegboard emerged as the leading candidate for its ease of administration, superior discriminative ability, high within session reliability (WSR=0.92), between session reliability (BSR=0.80) and inter-rater reliability (0.99). The Jamar Plus grip dynamometer was optimal for upper extremity strength with high WSR (0.97) and BSR (0.94). HHD of knee extension was the leading candidate for lower extremity strength, but reliability was compromised when participants overwhelmed administrators' ability to apply counter-pressure. An innovative, externally stabilized isometric testing device removed the administrator as a test variable and increased reliability. Adapted protocols for children and novel designs are leading to a robust battery that will have applications in clinical settings and longitudinal studies.

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PHYSICAL ACTIVITY EFFECTS ON HIP FRACTURE IN OLDER MEN. *D C Mackey, A Hubbard, I Tager, K Stone, P Cawthon, J Cauley, E Orwoll, K Ensrud, M L Stefanick, S Cummings (University of California, Berkeley, CA 94720)

Hip fractures substantially reduce physical function and increase mortality in the elderly. Physical activity (PA) may reduce hip fracture incidence by improving bone strength and reducing falls, but few studies have examined the relation in older men or applied causal models. We measured PA with the Physical Activity Scale for the Elderly (PASE) in 5851 men aged 65 years and older in the prospective Osteoporotic Fractures in Men (MrOS) Study. PA levels were classified as low (bottom quartile of PASE score), moderate (middle quartiles), or high (top quartile). Incident hip fractures were confirmed by central review of radiology reports. We estimated the marginal effect of baseline PA on subsequent hip fracture with inverse probability weighted (IPW) estimation of a point-treatment logistic marginal structural model (MSM) and calculated 95% confidence intervals (CI) with 10000 bootstrap iterations. During 6.5 years of follow-up, 110 (1.9%) men had a hip fracture. In unadjusted analyses, hip fracture odds were lower in men with moderate PA (Odds ratio [OR]:0.50, CI:0.33-0.76) or high PA (OR:0.35, CI:0.20-0.60) than men with low PA. In contrast, in IPW MSM analyses, which controlled for confounding and censoring, hip fracture odds were not significantly lower for men with moderate PA (OR:0.66, CI:0.39-1.13) or high PA (OR:0.70, CI:0.28-1.44) than men with low PA. Further, when we examined vigorous PA (metabolic equivalents $\geq$6), neither unadjusted (OR:0.88, CI:0.60-1.29) nor IPW MSM (OR:0.85; CI:0.54-1.38) estimates showed an association with hip fracture. The results do not provide strong support for a protective effect of physical activity on hip fracture incidence in older men.

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CHANGES IN BODY MASS INDEX BY BIRTH COHORT: REPEATED CROSS SECTIONAL ANNUAL NATIONWIDE SURVEY OF JAPAN 1948–2005. *I Funatogawa, T Funatogawa, E Yano (Teikyo University School of Medicine, Tokyo, Japan)

The Body Mass Index (BMI) is an important health parameter, but its change with age is still not clear because of lack of long duration of data. National Nutrition Survey, Japan (NNS-J), which has been conducted annually over nearly six decades, provides an opportunity to estimate changes in BMI by birth cohort. In previous studies, we examined the changes in BMI of Japanese girls and young women (Funatogawa et al. BMJ 337:a802, 2008), and adults (Funatogawa et al. Int J Epidemiol, doi: 10.1093/ije/dyn182, 2008). In this study, we examined the changes in BMI by birth cohort from childhood to adults, and compared these between men and women based on data from NNS-J (1948-2005, 1-69 yr born in 1891-1999). Generally changes in BMI differed between men and women. Especially, in young adults, BMI increased in men, but decreased in women in any birth cohorts. Furthermore, changes in BMI differed among birth cohorts. In 1930s birth cohort, the BMI of men was lower than that of women in adolescent, but caught up during young adults, and similar in later ages. Contrarily, in more recent cohorts, the BMI of men was similar to that of women in adolescents, but the higher BMI of men compared to women established during young adults. Monitoring changes in BMI from childhood to later life by birth cohort provides better understanding of human growth and ageing. A repeated cross sectional annual survey is suitable for this purpose.

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RACIAL/ETHNIC DIFFERENCES IN HIP STRUCTURAL GEOMETRY WITH AGING. *Z Chen, J Cauley, C E Lewis, G Wu, J S Nicholas, T Beck (University of Arizona, Tucson, AZ 85719)

Bone fracture risk increases with age and it threatens the health and quality of life in many seniors, mostly older women. Racial/ethnic variations in fracture rates are well known. To understand the mechanisms underlying the variations in fracture risk we examined proximal femur structure geometry in a subcohort of postmenopausal women aged 50 to 79 in the U.S. Women's Health Initiative (WHI) study. All participants included in this analysis had dual-energy x-ray absorptiometry (DXA) scans at the hip conducted at three WHI bone centers, Arizona, Birmingham, and Pittsburgh. Among the 5,877 women, 13.1% were non-Hispanic Black, 7.4% were Hispanic, and less than 1% were Native Americans. The participants were followed for an average of 6.7 $\pm$ 2.1 years and had bone scans at baseline, year 3, year 6 and year 9. The DXA scans of the hip were processed with hip structure analysis (HSA) to extract femur geometry at three regions: narrow neck, intertrochanter, and femoral shaft. Mixed effects models were employed, with years past age 50 as the time variable. Compared to Caucasian women, Black participants had better bone strength, as measured by higher section moduli, thicker cortices and lower buckling ratios ($p<0.05$) at all three femur regions, whereas, other ethnic groups did not differ significantly. Hip geometric structure also changed more rapidly with aging in Black women ($p<0.05$), suggesting faster declines in bone strength. In summary Black women were found to have stronger femur geometry, but their structural advantage over Whites diminished with aging.

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THE ASSOCIATION BETWEEN CYTOMEGALOVIRUS AND HERPES SIMPLEX VIRUS-1 SEROPOSITIVITY, C-REACTIVE PROTEIN LEVEL AND MORTALITY IN THE U.S. *A M Simanek, MPH, PhD Candidate, J B Dowd, PhD, A E Aiello PhD (University of Michigan-School of Public Health, Ann Arbor, MI 48109)

Studies have documented an association between persistent infections, inflammatory markers and increased morbidity to cardiovascular disease, physical impairment and dementia. Few studies have examined the relationship between seropositivity to infections, inflammatory markers and mortality. The purpose of this study was to investigate whether seropositivity to cytomegalovirus (CMV) and Herpes Simplex Virus-1 (HSV-1) as well as high levels of C-reactive protein (CRP) are associated with all-cause mortality. We used data from the National Health and Nutrition Examination Survey III, 1988-1994, including subjects >=45 years of age who were tested for seropositivity to CMV, HSV-1 and/or tested for CRP levels and had data available on their mortality status up through December 31, 2000. Survival analysis was conducted to generate hazard ratios (HR) and 95 percent confidence intervals (CI). Of those >=45 years of age whom also had mortality data (N=8190), 28.5% died during the follow period. Seropositivity to CMV and high levels of CRP (>=3 mg/L) were significantly associated with risk of death (HR=1.33, 95% CI (1.07,1.66), HR=1.86, 95% CI (1.57, 2.20), respectively) even after controlling for age, gender and race. Neither seropositivity to HSV-1 or combined seropositivity to CMV and HSV-1 were significantly associated with risk of death after controlling for confounders. However, subjects seropositive to both pathogens and with high levels of CRP were at higher risk for death than those seropositive to one or no pathogens and with low levels of CRP (HR=1.92, 95% CI (1.23, 2.99)), even after covariate adjustment. Seropositivity to CMV and combined seropositivity to both CMV and HSV-1 along with high levels of CRP predict mortality in a large U.S. representative sample. Reducing the number of persons infected with CMV and HSV-1 in conjunction with lowering CRP levels may prevent early mortality in the U.S.

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THE DIFFERENTIAL EFFECT OF ULTRAVIOLET LIGHT EXPOSURE ON CATARACT RATE ACROSS REGIONS OF THE LENS. *A G Abraham, C Cox, S West (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD)

In studies of cortical cataract, a severity score representing the area covered by cataract is often used as the primary outcome. However, additional disease information may exist in the spatial distribution of opacities. Further, it has been hypothesized that the lower nasal region of the lens is the most susceptible to damage by environmental ultraviolet light exposure (UVB). Using a sample of 46 right eye and 61 left eye images from the Salisbury Eye Evaluation Study, we used a digital cortical cataract grading algorithm to capture the location of opacities in binary images. These images were used to estimate the rate of cataract in 16 regions around the lens. We examined the effect of UVB across the lens on the arcsin squareroot transformed cataract rates and the change in the effect by region in each eye separately using linear mixed models, controlling for the established risk factors of sex, age, and race. In our data, the lower nasal areas of the lens had the highest rates of cortical cataract in both the right and left eyes and the rates were statistically different ($p<0.05$) from those seen in the upper temporal region. Looking at tertiles of UVB exposure, higher exposures had a larger effect in the lower nasal regions compared to the upper temporal regions, and the differences were significant in the left eye where there was a larger range of UVB exposure. These results support a hypothesized concentration of UVB exposure in the lower nasal region of the lens that leads to more rapid development of opacity.

378-S

CHANGES IN THE PREVALENCE OF COGNITIVE IMPAIRMENT AND ACTIVITY LIMITATIONS AMONG OLDER MEXICAN AMERICANS IN THE UNITED STATES, 1993–2004. *K Sheffield, M Alghatrif, K Markides (University of Texas Medical Branch, Galveston, TX 77550)

Changes in cognitive impairment and activity limitations were examined using data from the Hispanic Established Population for the Epidemiological Study of the Elderly, a panel study of older Mexican Americans in the southwestern U.S. The baseline cohort of 3,050 adults aged 65+ was selected in 1993/94, with follow-up interviews in 95/96, 98/99, 00/01, 04/05, and 06/07. In 2004, a new cohort aged 75+ was added to the remaining original cohort. We compared respondents aged 75+ in 1993 (n=1132) to the new cohort added in 2004 (n=902). Respondents scoring less than 21 out of 30 on the Mini Mental State Examination were classified as cognitively impaired. Those reporting one or more limitations in Activities of Daily Living (ADL) or Instrumental Activities of Daily Living (IADL) were classified as having ADL or IADL disability. Logistic regression was used to investigate potential explanations for changes between waves. The prevalence of cognitive impairment increased from 28.3% in 1993 to 40.1% in 2004 ($p<0.001$). ADL limitations increased from 25.1% to 33.8% ($p<0.05$). Mean years of education increased, and more respondents in 2004 were U.S. born. The prevalence of diabetes, obesity (body mass index >30), and hypertension increased, while depression (CESD score ≥ 16) and stroke (self-reported, ever had stroke) decreased. Changes in cognitive impairment were not accounted for by shifts in demographic factors, education, chronic conditions or depression. Respondents in 1993 performed better on the orientation and working memory dimensions of the MMSE. Changes in ADL limitations from 1993 to 2004 were accounted for by the increase in diabetes among respondents.

379-S

WILL GRANDMA LEAVE TOO?: THE HEALTH BURDEN OF OBESITY AMONG CUSTODIAL GRANDPARENTS. *M S Syidah Abdullah, H E R Hunte (Purdue University, West Lafayette, IN 47907)

The rising obesity epidemic among older Americans, the fastest growing age group in the United States, will not only challenge our healthcare system, but will also strain other health-related social policies. Of particular interest is the indirect effect of obesity among custodial grandparents on their young dependents. The cumulative effects of obesity poses a unique set of health challenges among the elderly and may be particularly salient among elderly populations burdened with the responsibility of being primary caregiver. Using the 2007 National Health Interview Survey, we explore the health of older Americans who are the primary caregivers to their grandchildren. Consistent with other studies, our analyses suggest that custodial grandparents were on average 12 years older than non-custodial grandparents ($p < .05$) and were more likely to report limitations in activities of daily living ($p < .05$) than non-custodial grandparents. Preliminary results, using logistic regression analysis controlling for age, suggest that custodial grandparents are twice as likely to be overweight/obese than non-custodial grandparents (odds ratio = 2.13, $p < 0.05$). This observation is troubling because custodial grandparents may provide a stable, loving environment for their grandchildren who might otherwise be exposed to deleterious living conditions. Research supports the benefits of this relationship for grandchildren. However, the impact of this arrangement on the health of the caregiving grandparent has been less positive.

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THE EFFECTS OF DENTAL LOSS ON NUTRIENT INTAKES IN KOREAN ELDERLY. *Y Ahn, S J Park, H M Kim, S S Kim (Center for Genome Science, KNIH, KCDC, Seoul 122-701, Korea)

This study was to assess whether tooth loss was related to nutrient intake in Korean elderly. From the elderly cohort subjects established in 2005-2006, 1,414 subjects over 60 years old with dental information and dietary questionnaire were included in this analysis. The dietary intake data were obtained by food frequency questionnaire. Their mean age was 73.8 years old and the mean number of present teeth was 13.4. Energy, protein, fat, carbohydrate, calcium, phosphate, iron, vitamin A, thiamin, riboflavin, niacin and vitamin C intakes were compared by dental status. The all dentate group (n=243) consumed more than the dental loss group (n=1,171) in most nutrients except carbohydrate. In the physical and biochemical examination, only BMI showed significant difference. There was no effect of denture status on nutrition. We classified the subject based on the number of present teeth (0~10, 11~20, 21~27, all dentate). According to the increase of the number of present teeth, intakes of all nutrients except carbohydrate were increased. In conclusion, dental loss itself and the number of present teeth affected on the nutrient intakes. No effect on the carbohydrate intake reflected the characteristic of Korean style diet which has cooked rice as a main carbohydrate source.

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CHOLESTEROL INTAKE AND DEPRESSION IN ELDERLY PEOPLE: RESULTS FROM THE LOUISIANA HEALTHY AGING STUDY. *Z Zhang, L J Su, K E Cherry, C M Champagne, C Lefante, E Ravussin, S M Jazwinski, for the Louisiana Healthy Aging Study (LHAS) (Louisiana State University Health Sciences Center, New Orleans, LA 70112)

The National Cholesterol Education Program (NCEP)'s guideline for cholesterol intake recommends < 200 mg/d for individuals with high risk of cardiovascular disease and abnormal blood cholesterol level. However, there was no specific recommendation of cholesterol intake for late life depression which is a major mental health problem among the elderly. The purpose of this analysis was to use LHAS data to examine the relationship between dietary cholesterol intake and depression among elderly measured by 15-point Geriatric Depression Scale (GDS). Subjects aged 65-103 were randomly sampled and recruited for the LHAS with 428 subjects subjected to GDS testing. Excluding those with extreme daily caloric intake and abnormal cognitive status, 376 subjects aged over 65 (Mean: 85.7 $\pm$ 9.0) were included into this analysis. GDS $\leq$5 was categorized as normal (N=340) and GDS >5 was categorized as depressed (N=36). Daily cholesterol intake was estimated from the Block's food frequency questionnaires. Odds ratios (OR) and confidence intervals (CI) were calculated via multivariate logistic regression model adjusting for age, sex, daily total caloric intake, education level and marital status. Study results showed that OR of the 3rd tertile (>285.25mg/d) versus 1st tertile cholesterol intake (<175.83mg/d) was 6.72 (95% CI:1.98-22.87). OR for those with cholesterol intake >200mg/d versus $\leq$200mg/d was 3.20 (95% CI: 1.24-8.28). In conclusion, higher cholesterol intake was associated with late life depression, NCEP's guideline for cholesterol intake is also applicable for depression among elder population.

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ETHNIC DISPARITIES IN ADVANCED END-STAGE OSTEOARTHRITIS. *M G Walsh, J Slover, P E DiCesare (New York University School of Medicine, New York, NY 10003)

The purpose of this study was to examine the relationship between race and pre-operative function in a large, diverse, clinic-based osteoarthritis (OA) registry of end stage OA. We conducted a cross-sectional study using the 3542 end stage OA patients who were candidates for total hip or knee arthroplasty. Harris Hip and Knee Society scores, which are based on exam and questionnaire, were used to quantify pre-operative function. Analysis of covariance was used to determine whether there were differences in function across ethnicity, while simultaneously controlling for age, BMI, physical activity level, and gender. Multiple comparisons were adjusted using Tukey's method. African Americans (AA) and Latinos (LT) both presented with more advanced OA and greater disability for both hip and knee OA. The results demonstrate lower function, with average Harris Hip Scores that were 4.9 ($p<0.0001$), and 8.77 ($P<0.001$) points lower in AA and LT than whites, and average Knee Society Scores that were 6.03 ($P<0.06$), and 12.8 ($P<0.001$) points lower in AA and LT than whites for the population, respectively. This study demonstrates that AA and LT have substantially worse pre-operative hip and knee function and more advanced OA than whites in our registry at the time end stage OA is identified for need of surgical intervention. This disparity in such a debilitating disease has represents a severe public health burden. Further study must determine if specific blocks to health care access impede timely intervention for communities of color.

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RACIAL DISPARITIES IN DISABILITY IN THE UNITED STATES: SUGGESTIVE EVIDENCE OF ACCELERATED AGING. *R J Thorpe, Jr, C N Bell, T A LaVeist, E M Simonsick. (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205)

In the U.S., racial disparities in disability are well documented; however, present explanations do not fully account for observed differences. A possible explanation for the race differences in disability is accelerated aging among blacks. Testing the weathering hypothesis, we examined the relationship between race and disability by ten year age groups in 183,383 persons aged 35 and older in the National Health Interview Surveys from 2000 to 2007. Disability was defined as needing help with personal care (ADL disability), needing help with routine needs (IADL disability), or any combination of the two. Prevalence of disability increased with age for blacks and whites but at different rates. For example, among blacks ages 35-44 the prevalence of ADL disability was 1.2% vs 0.7% for whites ($p<0.01$). This prevalence of ADL disability in whites was not reached until ages 45-54 (2.2% vs 1.1%; $p<0.01$). Similar findings exist for IADL and any disability. After adjusting for gender, educational attainment, marital status, and income, blacks had greater odds of ADL (odds ratio [OR] =1.45, 95% confidence interval [CI] 1.28, 1.64), IADL (OR=1.20, 95% CI=1.09-1.32), and any disability (OR=1.19, 95% CI=1.08-1.31) than whites. These findings are consistent with accelerated aging, suggesting that disability occurs at younger ages in blacks relative to whites. Efforts to develop interventions and health promoting strategies to delay or postpone disability should be targeted to blacks at younger ages.

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THE IMPACT OF PHYSICAL ACTIVITY ON BROADBAND ULTRASOUND ATTENUATION OF THE HEEL BONE IN CAUCASIAN AND AFRICAN AMERICAN MEN: THE ADVENTIST HEALTH STUDY-2. V Lousuebsakul, S F Knutsen, *L Beeson (Dept. Of Epidemiology and Biostatistics, School of Public Health, Loma Linda University, Loma Linda, CA)

The association between physical activity and Broadband Ultrasound Attenuation (BUA) of the calcaneus was examined among 434 Caucasian and African American men who were already part of the Adventist Health Study-2 (AHS-2) and who had completed an extensive lifestyle and dietary questionnaire at enrollment. These men were part of two clinic studies of the AHS-2 where calcaneal BUA was performed. The association between osteoporosis (t-score <-1.8) and physical activity level and selected lifestyle factors (age, body mass index (BMI), education, race, smoking, previous minor accident fractures, self-reported health status, protein intake, calcium intake) was assessed using logistic regression. As expected, osteoporosis was positively associated with age (odds ratio (OR) = 1.06, 95% confidence interval (CI): 1.03-1.09) and inversely associated with BMI (OR=0.95, 95% CI: 0.86-1.05) and educational level. Among men, those who reported walking, running or jogging for 3 hours per week or more had 65% lower odds of osteoporosis (OR=0.35, 95% CI: 0.13-0.93) (ptrend=0.02) compared to men who exercised between 0-120 minutes per week. The benefit of exercise on bone remained significant (OR= 0.30, 95% CI: 0.09-0.97) (ptrend=0.05) even after adjusting for important nutrient intake such animal protein, vegetable protein and calcium. We conclude that osteoporosis is positively associated with age and inversely associated with BMI and physical activity. Our findings confirm previous reports of the benefit of physical activity on bone health.

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THE ASSOCIATION BETWEEN BROADBAND ULTRASOUND ATTENUATION (BUA) MEASUREMENT OF THE CALCANEUS AND LEAN MUSCLE MASS. RESULTS FROM THE ADVENTIST HEALTH STUDY 2. *C Robinson, V Lousuebsakul, L Beeson, S F Knutsen (Dept. Of Epidemiology and Biostatistics, School of Public Health, Loma Linda University, Loma Linda, CA)

Most studies have found a strong correlation between bone mineral density (BMD) and lean muscle mass. Data on lean muscle mass and BUA are few. The association between lean muscle mass and calcaneal BUA was examined among 495 men and 537 postmenopausal women who are enrolled in the Adventist Health Study-2 (AHS-2). Analysis of covariance was used to determine the trends in age-adjusted least square means of BUA among white men (n=315), black men (n=180), postmenopausal white women (n=326) and postmenopausal black women (n=211) by the quartile of lean muscle mass. Among postmenopausal women, the age-adjusted quartile of lean muscle mass explained the variability of BUA by 24%. A significant trend ($p < .0001$) was observed showing an elevation in BUA (MHz) as lean muscle mass increased. When the analysis was stratified by race, the significant trends remained in both black and white women. The age-adjusted quartile of lean muscle mass explained the variability of BUA among postmenopausal white women and postmenopausal black women by 23% and 15%, respectively. Among men, the age-adjusted quartile of lean muscle mass explained the variability of BUA by only 11% as compared to postmenopausal women. Similar significant trends were observed among men in both whites and blacks ($p < 0.05$); however, the age-adjusted model only explained 9% and 15% of the variability of BUA, respectively. Our findings revealed the similar association between BUA and lean muscle mass as observed in BMD.

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ASSOCIATIONS BETWEEN EXERCISE AND DEVELOPMENT OF RHEUMATOID ARTHRITIS. 25 YEAR FOLLOW-UP OF THE ADVENTIST HEALTH STUDY. *S Newsom, K Oda, S F Knutsen (Loma Linda University School of Public Health, Loma Linda, CA 92350)

Several studies find that exercise reduces the risk of chronic disease. Lifestyle has also been found to be associated with risk of rheumatoid arthritis (RA). We assessed the association between exercise and development of rheumatoid arthritis over a 25-year period among 3,524 women and 2,107 men who participated in two large cohort studies, the Adventist Health Study 1 (1976) and the Adventist Health Study 2 (2002-6). METHODS: Subjects completed a comprehensive lifestyle questionnaire including demographics, diet, exercise and medical history in both studies. Among the several chronic diseases, they were also asked about doctor-told RA. Subjects reporting prevalent RA in 1976 were excluded from the study, leaving 3,425 women and 2,078 men for this analysis. Multiple logistic regression analyses was used to assess risk of RA adjusted for age, body mass index, and various dietary factors. RESULTS: The 25-year incidence on RA was 4.72% or 260 cases with higher incidence among women than men, 3.47% (N=191) and 1.25% (N=69), respectively. As expected, there was a positive association with age. A negative association was found with exercise with odds ratios (OR's) of 0.824 (95% Confidence Interval (CI): 0.576, 1.177), 0.684 (95% CI: 0.482, 0.970), and 0.525 (95% CI: 0.340, 0.810) for light, moderate and hard exercise, respectively [P(trend)<0.0001]. CONCLUSION: Exercise may be protective for development of rheumatoid arthritis. Further studies from other populations are needed to confirm these findings.

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THE ASSOCIATION BETWEEN INTAKE OF ANIMAL AND PLANT SOURCE PROTEIN AND RISK OF HIP FRACTURE AMONG PERI AND POST MENOPAUSAL CAUCASIAN WOMEN. *W L Liao, S F Knutsen, K Jaceldo-Siegl (Dept. of Epidemiology and Biostatistics, School of Public Health, Loma Linda University, Loma Linda, CA 92350)

We assessed the association between animal and plant source protein on risk of hip fractures in a large cohort study, the Adventist Health Study 2 (AHS2). A total of 13,416 peri- and postmenopausal Caucasian women aged 45 years and older completed a lifestyle questionnaire, including demographics, medical history, diet, physical activity and female history. Two years later, a follow up questionnaire was completed which included question about hip fractures due to minor trauma/fall. All women with prevalent osteoporosis or previous fracture at baseline were excluded from the analyses. Nutrients were energy adjusted. In total, 49 new cases of hip fracture occurred during the 2 year follow-up period giving an incidence rate of 1.83 per 1,000 person-years. Multivariate analyses were adjusted for age, body mass index, hormone use, self reported health, intake of Phosphate and Calcium as well as alcohol, smoking, physical activity and age *protein intake interaction. The risk of hip fracture was positively associated with age (odds ratio(OR)=1.12 with 95% confidence interval(CI):1.087,1.157) and inversely associated with animal source protein (OR=0.942 (95%CI: 0.394,2.253), 0.602 (95% CI: 0.230,1.439) and 0.381 (95% CI: 0.101,1.439), respectively, for intakes of 7-13 mg/day, 14-25 mg/day and 26+ mg/day vs.<7 mg/day] (p (trend)= 0.1139) and plant source protein (OR=0.501 (95% CI: 0.228,1.101) and 0.436 (0.155,1.227), respectively for intakes of 36-53 mg/day and 54+ mg/day vs.<36 mg/day. Our findings support other studies that have emphasized the importance of adequate protein intake for bone health. Further studies are needed to assess whether there is a threshold effect above which protein is no longer beneficial.

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THE ASSOCIATION BETWEEN REGULAR EXERCISE AND RISK OF HIP FRACTURE AMONG PERI AND POST MENOPAUSAL CAUCASIAN WOMEN. S F Knutsen, *W L Liao, D L Thorpe (Dept. of Epidemiology an Biostatistics, School of Public Health, Loma Linda University, Loma Linda, CA 92350)

We studied the association between regular physical activity and hip fractures in a large cohort study, the Adventist Health Study 2 (AHS2). A total of 17,253 Caucasian peri- and post-menopausal women completed a lifestyle questionnaire, including demographic, medical history, dietary, female history at baseline. Physical activity information included usual frequency, distance and time spent doing vigorous exercise or ''walk, run, jog'' workout per week. A follow-up questionnaire was completed 2 years later which included questions on hip fractures due to minor trauma/fall since enrollment. Analyses were limited to those without past fractures or prevalent osteoporosis and who reported a regular physical exercise program such as ''walk, run or jog'' or other vigorous activity. After adjusting for age, body mass index, hormone use and self-reported health, a protective effect was found for hip fracture: odds ratio (OR)=0.38 (95% confidence interval (CI):0.127,1.138) and 0.33 (95%CI:0.12,0.92) for subjects who ''walk, run, job'' 2.5-5 miles/week and > 5 miles/week, respectively, compared to <2.5/week. Duration of regular vigorous exercise was also protective: OR = 0.924 (95% CI:0.324,2.645) and 0.608 (95% CI:0.226,1.630) for 60-119 min/week and 120+ min/week, respectively, versus. <60 min/week. For duration of ''walk, run, or jog'' exercise: OR=0.990 (95%CI: 0.423, 2.321 and OR=0.534 (95%CI 0.193, 1.472) for 60-119 min/week and 120+ min/week, respectively, versus <60 min/week. Adjusting for prevalent chronic diseases did not change the results. Our findings suggest that a regular walking program of at least 5 miles per week lowers the risk of hip fracture.

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* = Presenter; S = The work was completed while the presenter was a student

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POLYCYCLIC AROMATIC HYDROCARBONS EXPOSURE ASSESSMENT AND BIOLOGICAL MONITORING OF ASPHALT ROAD-BUILDING WORKERS.

*I F Mao, M S Li, Y Y Lu, C J Tsai, M L Chen (Chung-Shan Medical University, Taichung 402, Taiwan)

Asphalt road-building workers directly expose to asphalt that contains high levels of polycyclic aromatic hydrocarbons (PAHs). Ninety asphalt road-building workers were recruited as exposure group and 40 adults with no PAHs exposure served as control group. According to the working types, exposure group was divided into 3 subgroups: manual working group, machine operating group and management group. Personal PAHs levels of exposure workers were sampled and determined by US/NIOSH No.5506 method. Urine sample of each participant was collected to measure urinary 1-hydroxypyrene (1-OHP) by HPLC with fluorescence detector. The average personal exposure levels of total PAHs were 2456.31 ng/m3, 1779.34 ng/m3 and 901.67 ng/m3, and particle-bound PAHs were 101.24 μg/g, 80.56 μg/g and 88.09 μg/g for manual working group, machine operating group and management group, respectively. Mean values of Benzo(a)pyrene (BaP) in total suspended particulates were 2.70 μg/g, 1.58 μg/g and 2.25 μg/g, and the gaseous and particle-bound ratios were 0.57, 1.25 and 0.2 for the three groups, respectively. The average concentration of urinary 1-OHP of exposure workers was 0.17 μmol/mol creatinine and it was 3.4 fold higher than that of control group. Urinary 1-OHP in smokers was 1.26 fold higher than that of non-smokers among management group ($p<0.05$). This study indicated that asphalt road-building workers exposed to high levels of PAHs and BaP, and it influenced the urinary 1-OHP levels.

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BIOLOGICAL MONITORING AND DAILY DIETARY INTAKE OF ALKYLPHENOLS AMONG ADULTS.

*I F Mao, Y Y Lu, S Y Hu, C J Tsai, M L Chen (Chung-Shan Medical University, Taichung 402, Taiwan)

Alkylphenol ethoxylates (APnEO) are widely used in industrial processes, especially plastic and household cleaning products. They could be biodegraded to toxic alkyphenols (APs) including nonylphenol (NP), octylphenol (OP), and butylphenol (BP) which could disrupt endocrine function in humans. The urine samples were collected from the non-occupational exposure adults residing in four areas with different urbanized levels, and used as the biological monitoring samples to evaluate the exposure of NP, OP, and BP. A questionnaire survey for personal food intake was also adopted to calculate the daily APs intake by each subject with the APs concentration of each food. A total of 289 valid questionnaires and 510 urine samples were collected in the morning and the end of the shift. The results showed the concentrations of NP, OP and BP in morning urine samples were 2.63±4.18, 11.67±41.46 and 11.86±79.00 Ìg/g cr., and in end of shift urines were 3.77±12.03, 8.53±24.75 and 12.12±56.69 Ìg/g cr., respectively. The average concentrations and urinary detection rates of NP, OP, and BP were significantly higher ($p<0.01$) in the highest urbanized area than those in three other areas for both morning and end of the shift samples. The estimated food daily intake of NP in adults was 22.48±17.74 Ìg/day, and this level was three and five times more than that in German and New Zealanders, respectively; it suggested that Taiwanese had high level exposure of NP. This study also indicated the urbanized level was related to the exposure of NP from food or other related polluted sources.

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IS LEPTIN ASSOCIATED WITH ALLERGIC DISEASES IN OBESE CHILDREN?

*Y W Jeong, K A Kong, E H Ha, Y S Hong, H S Park (Department of Preventive Medicine, Ewha Womans University, School of Medicine, Seoul, Korea)

There is increasing epidemiological evidence that child obesity increases the risk of allergic diseases in children. The link between obesity and allergic diseases is partly explained by increase in cytokines produced by adipose tissues. We hypothesize that leptin may play a role in developing allergic diseases in obese children. We carried out a cross-sectional study with 100 children aged 7 to 9 years. Body mass index and serum leptin levels were measured. Information on the child's allergic illness was collected through parent-reported questionnaires. Mean serum leptin level was 8.28±6.08 (ng/ml). Obese children had twice as high serum leptin levels as non-obese children ($p<0.0001$). In regression analysis, body mass index and body weight were both significantly associated with serum leptin levels, when adjusted for sex ($p<0.0001$). Children in the highest serum leptin level quartile were 5.8 times more likely to experience allergic rhinitis ($p=0.04$). This association was particularly strong for boys compared to girls (Odds Ratio=11.3, $p=0.04$). Among obese children, those with allergic rhinitis, atopic dermatitis, and chronic respiratory disease showed higher serum leptin levels than those who did not have the disease, although this was not statistically significant. The result of this study suggests that leptin may be involved in the pathogenesis of allergic diseases in obese children. This implies that dietary modification including supplementation with antioxidant vitamins may be beneficial to obese children with allergic diseases.

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ASSOCIATION OF SERUM MALONDIALDEHYDE(MDA) WITH ALLERGIC DISEASES IN PRESCHOOL CHILDREN.

*Y W Jeong, B H Park, E A Park, S Y Oh, Y S Hwang, H S Lim, E H Ha, H S Park (Department of Preventive Medicine, Ewha Womans University, School of Medicine, Seoul, Korea)

Prevalence of allergic diseases has increased during the past several decades. Recently, epidemiological and clinical evidence suggest that such trend in allergic disease prevalence may be attributable to increased oxidative stress levels. We aim to evaluate serum MDA levels in association with allergic diseases in preschool children. 211 children were followed up at 3 years of age in a hospital based birth cohort. Body mass index and serum MDA levels were measured. Information on the child's allergic illnesses was collected through parent-reported questionnaires. Mean serum MDA level was 1.28±1.22 (mmol/L). Mean serum MDA level was higher in children who had atopic dermatitis compared to those who did not, although this was not statistically significant. Children in higher serum MDA quartile had significantly higher prevalence of atopic dermatitis (trend test, $p<0.01$). In logistic regression analysis, one unit increase in serum MDA level significantly increased the risk of ever chronic respiratory disease (Odds Ratio=1.33, $p=0.03$). Children in the highest MDA level quartile were three times more likely to have atopic dermatitis than children in the lowest quartile (Odds Ratio=3.62, $p=0.02$). The finding of this study suggests that high serum MDA is associated with allergic diseases preschool children. This implies that supplementation with antioxidant vitamins may provide protection against oxidative stress in children with allergic diseases.

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METHODS OF IDENTIFICATION OF LIFE-THREATENING PROSTATE CANCER IN THE LONGITUDINAL STUDY. *A E Kettermann, L Ferrucci, E J Metter, H B Carter (Johns Hopkins University, Baltimore, MD 21287)

PSA is a widely recognized marker of prostate cancer. The rate of change of PSA (PSAV) has been linked to early detection of prostate cancer. Our study goal is to compare the efficacy of different PSAV calculation techniques for predicting life-threatening prostate cancer prior to clinical diagnosis. We examined 5 PSAV calculation techniques previously described in the literature. Each technique was used to calculate PSAV in 648 men (551 without prostate cancer, 81 with prostate cancer who were alive or died of another cause, and 16 who died of prostate cancer) from the Baltimore Longitudinal Study of Aging. The majority of PSAV determinations at 5-10 years prior to diagnosis demonstrated a strong association with cancer-specific survival. After adjusting for age and date of diagnosis in the Cox proportional hazards model, the hazard ratio of the 5 PSAV techniques ranged from 1.22 (95% confidence interval = 0.96 to 1.55; p-value=0.097) to 1.47 (CI = 1.16 to 1.88; p=0.002). The method with the highest hazard ratio utilized a man's complete PSA history. The predictive ability of PSAV is dependent on the method of calculation. Among men with multiple PSA measures, the ability to utilize the complete PSA history is crucial in identification of life threatening prostate cancer.

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SERUM GAMMA-GLUTAMYL TRANSFERASE HAS AN EFFECT ON HYPERTENSION PROGRESSION AMONG COMMUNITY-BASED POPULATION IN KOREA. J-Y Jeong, K-S Hong, *D-H Kim. (Department of Social and Preventive Medicine, Hallym University College of Medicine, Chuncheon, Kangwon-do 200-702, Korea)

Serum gamma-glutamyl transferase (GGT), clinical marker for excessive alcohol consumption and oxidative stress, is implicated in the development and progression of hypertension. This study was preformed to identify whether serum GGT level is associated with progression of hypertension among community-dwelling population in Korea. The study subjects were participants enrolled in Hallym Aging Study, population based cohort aged 45 or over constructed in 2004. Follow-up survey was conducted in 2007. They were invited to a general hospital and were measured for clinical tests. Structured questionnaire was used to collect information on socio-demographic factors, past medical history, and behavioral factors by trained interviewers. We analyzed whether GGT level at baseline have an effect on progression of hypertension in follow-up survey using multivariate logistic regression analysis. Out of 647 men and women participated in both baseline and follow up study, 230 subjects without hypertension based JNC-7 criteria at baseline survey were enrolled in the final analysis. Among 230 subjects without hypertension at baseline survey, 115 subjects (50%) were found to develop new hypertension at the follow-up survey for 3 years. Hypertension incidence rates according to GGT level (classified by quartile [Q]; Q1: <14, Q2: 14-19, Q3: 20-30, Q4: 30<) at baseline were 35.6, 52.6, 54.7, and 57.1%, respectively, and were not statistical significant. After adjusting for potential covariates, the adjusted odds ratio [aOR] comparing Q3 and Q4 to Q1 of baseline GGT for the risk of progression of hypertension were 2.59(95% Confidence interval[CI]=1.10-6.73) and 3.19(95% CI=1.14-8.93), respectively. These results suggest that higher serum GGT level was an independent risk factor of hypertension progression among community dwelling adults in Korea.

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BODY MASS INDEX AND MORTALITY IN AN ARSENIC-EXPOSED COHORT IN BANGLADESH. *B Pierce, T Kalra, M Argos, P Rathouz, H Ahsan (The University of Chicago, Chicago, IL 60637)

Body mass index (BMI) (kg/m2) has a U- or J-shaped relationship with all-cause mortality in Western and East Asian populations. However, this relationship is not well characterized in the Bangladeshi population, which has a BMI distribution shifted towards lower values. Using data on 11,444 individuals participating in the Health Effects of Arsenic Longitudinal Study in Araihazar, Bangladesh, we prospectively examined associations for BMI (measured at baseline) with all-cause mortality during ~4 years of follow-up within strata of key covariates (sex, age, smoking status, and education). Cox proportional hazards models adjusted for these covariates and BMI-related illness were used to estimate hazard ratios (HR) and 95% confidence intervals (95% CI) for BMI categories defined by the World Health Organization. We also tested interaction between BMI and arsenic exposure in relation to mortality. Severe thinness (BMI <16 kg/m2) was associated with increased all-cause mortality (HR=2.08; 95% CI: 1.41-3.05). The association between moderate thinness (16.0-16.9 kg/m2) and mortality was not statistically significant (HR=1.31; 95% CI: 0.85-2.01), but increasing BMI was strongly associated with decreased mortality (p-trend <0.001). Associations were generally stronger among males, smokers, individuals aged >50 years, and individuals with no formal education. When joint effects of waster arsenic and BMI were examined, the highest risk of mortality was seen among individuals with high water arsenic (>150 ug/L) and low BMI (HR=3.12; 95% CI: 1.84-5.30); however, no statistically significant interaction was observed. Underweight and malnutrition are major public health issues in this rural community in Bangladesh.

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ASSOCIATION BETWEEN C-REACTIVE PROTEIN AND INSULIN RESISTANCE AMONG PERUVIAN ADULTS *L Revilla, B Gelaye, T Lopez, S E Sanchez, K Hevner, A Fitzpatrick, M A Williams (Ministry of Health, Lima, PERU and University of Washington, Seattle, WA)

Objective: Insulin resistance (IR), a reduced physiological response of peripheral tissues to the action of insulin, is one of the major causes of type 2 diabetes. We sought to evaluate the relationship between serum C-reactive protein (CRP), a marker of systemic inflammation, and prevalence of IR among Peruvian adults. Methods: This population based study of 1,525 individuals (569 men and 956 women) was conducted among residents in Lima and Callao, Peru. Fasting plasma glucose, insulin, and CRP levels were measured using standard approaches. IR was assessed using the homeostasis model (HOMA-IR). Categories of CRP were defined by the following tertiles: <0.81 mg/l, 0.81–2.53 mg/l, and >2.53 mg/l. Logistic regression procedures were employed to estimate odds ratios and 95% confidence intervals [CI]. Results: Elevated CRP were significantly associated with increased mean fasting insulin and mean HOMA-IR levels (p<0.001). CRP was positively associated with fasting insulin (p<0.001) and HOMA-IR (p<0.001) in both men and women (p<0.001). Women with CRP level >2.53mg/l (upper tertile) had a 2.18-fold increased risk of IR (OR=2.18 95% CI:1.51-3.16) as compared with those in the lowest tertile (<0.81mg/l). An association of similar magnitude was observed for men. Those in the upper tertile had a 2.54-fold increased risk of IR (OR=2.54 95% CI:1.54-4.20) as compared with those in the lowest tertile. Conclusion: Our observations among Peruvians are in general agreement with reports from studies of other populations. Collectively, available evidence suggest that systemic inflammation, as evidenced by elevated CRP, may be of etiologic importance in IR and diabetes.

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THE RELATIONSHIP BETWEEN SERUM URIC ACID AND CHRONIC KIDNEY DISEASE AMONG APPALACHIAN ADULTS. *L Cain, A Ducatman, A Shankar (West Virginia University, Morgantown, WV 26506)

Higher serum uric acid levels are reported to be associated with cardiovascular disease (CVD). Recent studies have also shown that uric acid levels are associated with hypertension, a strong risk factor for chronic kidney disease (CKD). However, it is unclear whether serum uric acid is independently related to CKD. We examined the hypothesis that higher serum uric acid levels are positively related to CKD. We analyzed data from the C8 Health Study, a cross-sectional study of Appalachian adults residing in 6 communities in Ohio and West Virginia, who were aged ≥18 years and free of CVD (n=49414, 54% women). Serum uric acid was examined as gender-specific quartiles (quartiles 1-4, in women: <3.8 mg/dL, 3.9-4.6 mg/dL, 4.7-5.5 mg/dL, >5.5 mg/dL; in men: <5.4 mg/dL, 5.5-6.2 mg/dL, 6.3-7.1 mg/dL, >7.1 mg/dL). CKD was defined as an estimated glomerular filtration rate of <60 mL/min/1.73m2 from serum creatinine (n=2996). We found that increasing quartiles of serum uric acid are positively associated with CKD, independent of confounders such as age, gender, education, body mass index, smoking, alcohol intake, race-ethnicity, diabetes, hypertension, and serum cholesterol. Compared to the lowest quartile of serum uric acid (referent), the multivariable odds ratio (95% confidence interval) of CKD was 1.63 (1.39-1.91) for the 2nd quartile, 2.22 (1.91-2.58) for the 3rd quartile and 4.95 (4.28-5.71) for the 4th quartile, p-trend<0.0001. This association persisted in separate analysis among men (p-trend<0.0001) and women (p-trend<0.0001). In conclusion, higher serum uric acid levels are positively associated with CKD. Based on our results, a corollary observation is that at least part of the reported association between serum uric acid and CVD may be mediated by CKD.

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MEETING RECOMMENDATIONS FOR FRUITS AND VEGETABLES INTAKE AND PHYSICAL ACTIVITY AMONG US ADULTS WITH HIGH CHOLESTEROL. *J Fang, N L Keenan (CDC, Atlanta, GA 30341)

High cholesterol is an important modifiable risk factor for coronary heart disease (CHD). One of the National Cholesterol Education Program (NCEP) guidelines is Therapeutic Lifestyle Changes (TLC). Using 2007 Behavioral Risk Factor Surveillance System survey, we determined the degree of following American Heart Association's recommendations for healthy eating (5 and more servings of fruits and vegetables per day) and physical activity (moderate physical activities for >=30 minutes per day on >=5 days per week or vigorous physical activities for >=20 minutes per day on >=3 days per week) among US adults with high cholesterol. Among 363,667 adults aged 18 and above who checked cholesterol during the past 5 years, 37.3% (standard error (SE) 0.17) had high cholesterol. The risk of high cholesterol increased with age. Among the participants, 26.3% (SE 0.16) ate at least 5 servings of fruits or vegetables per day and 48.3% (SE 0.19) met physical activity level. The percentages were lower among those with high cholesterol than those without high cholesterol (23.8% vs 27.9 for healthy eating (p<0.001), 43.1% vs 51.7% for physical activities (p<0.001)). Compared to those without high cholesterol, the unadjusted odds ratios (ORs) of eating >=5 servings of fruits and vegetables and meeting physical activity level among those with high cholesterol were 0.81, 95% confidence interval (CI) 0.78-0.83 and 0.71, 95% CI 0.69-0.73, respectively. Adjusting for age, gender, race, income resulted in ORs of 0.81 (0.78-0.84) and 0.79 (0.76-0.81), respectively. Further adjustment for hypertension, diabetes, body mass index, CHD and stroke resulted in ORs of 0.83 (0.79-0.86) and 0.86 (0.83-0.89), respectively. In summary, US adults with high cholesterol were less likely than those without high cholesterol to follow NCEP guidelines on TLC. Education and counseling are needed among high cholesterol patients to lower CHD risk.

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THE PREVALENCE AND CORRELATES OF TAKING FOLIC ACID AND VITAMIN SUPPLEMENTS AMONG ADULTS AGED ≥45 YEARS WITH CARDIOVASCULAR DISEASE. *G Zhao, E Ford, C Li, A Mokdad (Centers for Disease Control and Prevention, Atlanta, GA 30341)

The benefits of folic acid and vitamin supplementation on primary and secondary prevention of coronary heart disease (CHD) or stroke remain controversial at present. To examine the percentages and likelihood of adults with CHD or stroke who reported taking folic acid or vitamin supplements versus adults without these conditions, we used self-reported data collected from 41,792 participants (aged ≥45 y) in 12 states and Puerto Rico in the 2006 Behavioral Risk Factor Surveillance System. Among all participants, significantly higher percentages of women than men reported taking folic acid or vitamin supplements (P<0.05 for both). After multivariate adjustment for demographics, smoking and alcohol drinking, women with CHD had a significantly lower adjusted prevalence (AP) and adjusted odds ratios (AORs) than women without CHD for taking folic acid supplements [AP: 3.9% versus 5.5% (P<0.05), AOR (95% confidence interval): 0.56 (0.39-0.81) for taking <1 time/day; AP: 50.0% versus 57.5% (P<0.01), AOR: 0.68 (0.60-0.79) for taking 1-4 times/day) or taking vitamin supplements (AP: 60.9% versus 69.9%, AOR: 0.66 (0.57-0.76)]. In contrast, men with CHD had a significantly higher AP (50.4% versus 46.2%, P<0.01) and AOR [1.17 (1.02-1.33)] of taking folic acid 1-4 time/day than men without CHD. In both sexes, adults with stroke were equally likely as those without to take folic acid or vitamin supplements after multivariate adjustment. Our results demonstrated that substantial variations exist in the prevalence and the likelihood of taking folic acid or vitamin supplements by gender and by CHD status, but not by stroke status.

400-S

THE RELATION OF FAMILY DISEASE HISTORY AND CARDIOVASCULAR DISEASE SUSCEPTIBILITY IN EARLY CHILDHOOD *J Min, S Cho, B Park, Y Kim, E Ha, H Lee, E Park, H Park (School of Medicine, Ewha Womans University, Seoul, South Korea)

Cross-sectional studies have identified family disease history (FHx) as a risk factor for hypertension (HTN) in school aged children. These relationships suggested that inherited characteristics may cause CVD susceptibilities from early years and influence latent or triggering effects on it. However early days effect from FHx was less investigated. This study aimed to examine the association between FHx and uric acids, as a CVD risk factor at three years of age. We used a hospital based birth-cohort of 239 children at Ewha Womans University Hospital, born ('01-03) and followed-up at 3yr. Information about FHx and childhood environment were from survey and uric acids was measured. FHx is defined as presence of heart disease, HTN, and CVD within the third pedigree. Mean differences of biochemical status were analyzed according to the number of FHx existence with general linear model. Then the association between the presence and the number of FHx and the high level of biochemical variables (categorized with their 75th percentile) was examined with logistic regression. In grandfather heart disease group showed 2 times higher uric acids level (1.25-4.82) after adjusted covariates. As the number of family member on FHx increased, the odds ratio for having higher uric acids level gradually raised (1.48 vs. 1.72 vs. 2.77). With consideration for the current parental age, the prevalence of family history will increase and its effects become more apparent in later childhood. The differential effects on the uric acids along with the number and the characteristics of family members suggested that the grandparental FHx be necessarily considered for the early preventive intervention on CVD.

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SERUM TAURINE AND RISK FACTORS FOR CORONARY HEART DISEASE. *O Wójcik, K Koenig, A Zeleniuch-Jacquotte, M Costa, Y Chen (Department of Environmental Medicine, New York University, New York, NY 10016)

Animal studies and small randomized clinical trials have shown that taurine (2-aminoethanesulfonic acid) is involved in bile acid conjugation, blood pressure regulation, anti-oxidation and anti-inflammation. Despite taurine's popularity as an ingredient in energy drinks, epidemiologic data on its health effects are limited. We first conducted a pilot study to evaluate the temporal reproducibility of serum taurine in women using stored samples from three annual blood donations of 30 participants in the New York University Women Health Study (NYUWHS). The coefficient of variation for serum taurine was 7% and the intraclass correlation coefficient for a single measurement was 0.48, which can be improved to 0.65 if the average of two yearly samples is used. We next examined the relationships between taurine and risk factors for CHD in a cross-sectional study using the mean serum taurine of two yearly samples from 200 participants in the NYUWHS. Mean serum taurine was positively related to dietary thiamine intake (correlation coefficient [r] = 0.18, p = 0.02), dietary fiber intake (r = 0.15, p = 0.04) and vigorous physical activity (p for trend = 0.02). Mean serum taurine was also lower in hypertensive than normotensive women (p = 0.06). The adjusted odds ratios for hypertension in increasing tertiles of mean serum taurine was 1.0 (reference), 0.72 (95% confidence interval, 0.31-1.70), and 0.33 (0.13-0.84), respectively. Serum taurine is related to some nutritional and lifestyle risk factors for CHD and may be protective against hypertension. We are currently conducting a nested case-control study in the NYUWHS to investigate whether serum taurine is associated with the risk of CHD.

402-S

INFLUENZA VACCINE AND CARDIOVASCULAR EVENTS IN ADULTS: A META-ANALYSIS. *V Perez, A E Aiello (University of Michigan, Ann Arbor, MI 48109)

Cardiovascular disease (CVD) remains the leading cause of mortality among adults. Influenza vaccination rates among individuals who have experienced a CVD event remain low. To quantify the efficacy of influenza vaccine on cardiovascular-specific events, including hospitalization and mortality, we performed a meta-analysis using random-effects modeling of all studies published up to January 2009. Search engines utilized included PUBMED, Cochrane library, and Web of Science. Forty-nine search term combinations were included using terms such as influenza vaccination, vaccine efficacy, cardiovascular disease, coronary artery disease, coronary heart disease, stroke, and myocardial infarction. Study design and setting, cardiovascular outcome(s), effect estimates and corresponding 95% confidence intervals [CI], and covariate adjustment were extracted from all studies included for analysis (N=19). Sub-group analyses were performed for studies reporting risk ratios (RRs) (n=12) and odds ratios (ORs) (n=7). Preliminary results show that vaccination resulted in a pooled reduction in cardiovascular events among adults by 21% for studies reporting RRs [RR=0.79, 95% CI: 0.75 to 0.83] and a 28% reduction for studies reporting ORs [OR=0.72, 95% CI: 0.59 to 0.86]. Methodological challenges in these studies, such as healthy vaccinee effects, should be considered in interpreting the results. This meta-analysis is the first to examine influenza vaccination on a wide-range of CVD-specific outcomes and highlights the necessity to consider selection biases before definitive conclusions regarding use of vaccination among adults at risk for experiencing a cardiovascular event are made. Further studies examining the possibility of the healthy vaccinee effect should be assessed.

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PREVALENCE OF METABOLIC SYNDROME AND ITS RELATIONSHIP WITH LEISURE TIME PHYSICAL ACTIVITY AMONG PERUVIAN ADULTS. B Gelaye, L Revilla, T Lopez, *S Sanchez, M A Williams (Ministry of Health, Lima, PERU and University of Washington, Seattle, WA)

Objective: Metabolic syndrome (MetS) is an important risk factor of cardiovascular disease. Previous studies have suggested an inverse relationship between physical activity and MetS. However, these findings were inconsistent; and few investigators have examined these associations among South Americans. We estimated the prevalence of MetS and its association with leisure time physical activity (LTPA) among Peruvian adults. Methods: This study of 1,675 individuals (619 men and 1056 women) was conducted among residents in Lima and Callao, Peru. Information about LTPA, socio-demographic, and other lifestyle characteristics were collected by interview. The presence of MetS was defined using the ATP III criteria. Results: Overall, the prevalence of MetS was 26.9% and was more common among women (29.9%) than men (21.6%). Habitual participation in LTPA was associated with a 23% reduced risk of MetS (OR=0.77; 95% CI: 0.60-1.03). There was an inverse trend of MetS risk with amount of LTPA (p=0.016). Compared with non-exercisers, those who exercised < 150 minutes/week had a 21% reduced risk of MetS (AOR= 0.79; 95% CI 0.60-1.04). Individuals who exercised ¡Ý 150 minutes/week, compared with non-exercisers, had a 42% reduced risk of MetS (AOR=0.58; 95% CI: 0.36-0.93). Associations of similar magnitudes were observed when men and women were studied separately. Conclusion: These data document a high prevalence of MetS and suggest an association with LTPA among urban dwelling Peruvians. Further prospective studies are needed to confirm these observations and to examine interventions that may promote increased physical activity in this population.

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ARSENIC IN DRINKING WATER AND STROKE HOSPITALIZATIONS: AN ECOLOGIC STUDY OF MICHIGAN COUNTIES. *L D Lisabeth, H J Ahn, J J Chen, S Sealy-Jefferson, J R Meliker (University of Michigan, Ann Arbor, MI 48109)

Elevated arsenic concentrations in drinking water are associated with adverse health outcomes, including vascular diseases. Few studies have assessed the association between low-level arsenic and stroke, the third leading cause of death and leading cause of disability in the US. This ecologic study investigates the association between low-level arsenic exposure and hospital admissions for stroke in 83 Michigan counties. Hospital admissions for stroke (principal ICD-9 codes: 433.xx, 434.xx, 436.xx) were identified from the Michigan Inpatient Sample (1994-2006). Population counts and county-level income and race data were obtained from the 2000 US census. Population-weighted county-level average arsenic exposure was estimated using state databases of arsenic in well water and population served by well water. A negative binomial regression model was used to investigate the association between arsenic and counts of stroke admissions accounting for population size and potential correlation among multiple years' data within each county. Models were adjusted for age, gender, race, income, and temporal trends in stroke admissions. Comparing counties at the 90th percentile of arsenic exposure (5.76 μg/L) to those at the 10th percentile (0.57 μg/L), there was a 6% increase in risk of stroke admissions (relative risk=1.06 (95% CI:1.02-1.09)). A small but significant (p<0.001) association was demonstrated between arsenic in drinking water and hospital admissions for stroke in Michigan counties. Given widespread exposure to low-level arsenic in drinking water, future research should investigate risk in an observational study with individual-level data on arsenic exposure and incident stroke.

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* = Presenter; S = The work was completed while the presenter was a student

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MEDITERRANEAN DIET AND NON-FATAL CARDIOVASCULAR DISEASE: A SPANISH COHORT OF YOUNG ADULTS. M A Martínez-González, M Bes-Rastrollo, E Toledo, Z Vázquez-Ruiz, J J Beunza, *A Alonso (Univ. of Navarra, Pamplona, Spain)

The Mediterranean diet is considered a model for healthy eating because of its association with increased longevity. However, there is no prospective evidence in Mediterranean countries assessing the association between this dietary pattern and non-fatal cardiovascular (CV) events. We assessed whether adherence to the Mediterranean diet was associated with reduced risk of CV disease in the SUN project, a dynamic prospective cohort in Spain started in 1999. This analysis included 13609 relatively young university graduates (mean age 38, 60% women) initially free of CV disease, recruited and followed up with biennial mail questionnaires. Diet was assessed with a validated 136-item food-frequency questionnaire. A 9-point score was computed to evaluate adherence to the Mediterranean diet (rich in fruits and nuts, vegetables, legumes, monounsaturated fats, fish, and cereals; but low in dairy and meat products and moderate in alcohol consumption). Incident clinical events were self-reported and confirmed by medical records. During 66,577 person-years follow-up, 100 incident events of CV disease were observed. A higher adherence to the Mediterranean dietary pattern (score >6) was associated with a lower risk of CV disease (hazard ratio (HR)=0.41, 95% confidence interval [CI]: 0.18-0.95) versus the lowest score (≤3), after adjustment for CV risk factors and other potential confounders. For each 2-point increment in the score, the adjusted HR were 0.79 (95% CI: 0.62-1.01) for CV disease and 0.73 (0.55-0.99) for coronary heart disease. In conclusion, a higher adherence to the Mediterranean diet in this educated and relatively young cohort was associated with a lower risk of CV disease.

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POPULATION-BASED ANALYSIS OF SUDDEN CARDIAC ARREST. *K Reinier, A Uy-Evanado, C Teodorescu, R Mariani, M Samara, K Gunson, J Jui, S S Chugh (Cedars-Sinai Medical Center, Los Angeles, CA 90048)

Sudden cardiac arrest (SCA) occurs without prior symptoms of coronary disease in up to 50% of individuals, and fewer than 10% of cases survive. Understanding the epidemiology of SCA would improve opportunities for prevention, but population-based studies of SCA are few. In the ongoing Oregon Sudden Unexpected Death Study, all cases of likely SCA in Multnomah County, Oregon (Pop. 660,000) from Feb 2002-Jan 2005 were prospectively identified from the county's emergency medical services (EMS) system, Medical Examiner, and 16 hospitals, with retrospective review of EMS and ME records to detect missed cases. SCA was defined as sudden unexpected collapse of likely cardiac origin; cases were adjudicated based on arrest circumstances, medical history, and autopsy if available. We identified 1180 SCA cases (annual incidence 60/100,000; 39% female, median age 70). Women suffered SCA nine years later than men. Blood or tissue samples were collected from 42% of subjects. Though SCA was rare in young people (4% age <35; 4% age 35-44) 41% of cases occurred at age <65. Most cases (65%) occurred without prior documented history of coronary disease; less than 10% had been evaluated and found to have severe left ventricular dysfunction, the only commonly-used clinical indicator for primary prevention of SCA. Our findings underscore the importance of community-based analyses for the accurate determination of SCA epidemiology and highlight the need for identifying better predictors of this condition. This study also demonstrates the feasibility of assembling a population-based bio-bank to identify novel predictors of SCA.

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ASSOCIATION OF HIP CIRCUMFERENCE WITH INCIDENT HYPERTENSION, DIABETES AND DYSLIPIDEMIA IN CHINESE ADULTS. *E Katz, MPH, RD, L Adair, PhD, J Cai, PhD, K North, PhD, K Truesdale, PhD, J Stevens, MS, PhD (University of North Carolina at Chapel Hill, NC 27514)

Studies in Caucasian populations have shown that after controlling for waist circumference and body mass index (BMI), a larger hip circumference may be protective for cardiovascular disease (CVD) related risk factors. To our knowledge, this effect has not been examined in a Chinese population. Our goal was to explore whether hip circumference was protective against incident CVD risk factors. Data were from the Peoples' Republic of China Study. Baseline information was collected in 1987-88 from 1,659 men and 2,482 women aged 24–84 years living in Guangzhou, China. Follow-up examinations were in 1993-94. Weight, height, waist and hip were measured. Risk differences (RD) comparing the sex specific 85th percentile to the 15th percentile of hip were computed for hypertension, diabetes, and abnormal serum lipids (total, low- and high- density lipoprotein (HDL) cholesterol, and triglycerides). RD estimates were obtained from logistic regression models and 95% confidence intervals (CI) were calculated using the delta method by the prvalue command in STATA 10.0. Models were stratified by sex and adjusted for age, waist and BMI. The RD was calculated at the mean covariate values. Collinearity of anthropometric measures was within limits based on a variance inflation factor less than 5. In women, an approximate 11 cm larger hip was associated with a RD(95% CI) of -0.11(-0.20, -0.01) for incident low HDL. There were no significant associations for all other models. In this population, greater mass in the lower trunk region might be protective for incident low HDL in women and neutral for the other CVD related risk factors examined.

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DEPRESSION AND ONSET OF CARDIOVASCULAR EVENTS: MODIFICATION BY DISABILITY OR INACTIVITY. *M M Glymour, M Avendano (Harvard School of Public Health, Boston, MA 02215)

Recent research suggests physical activity is a key pathway linking depression and cardiovascular events. We hypothesized that if so, modifiers of the link between depression and physical activity, e.g., limitations in activities of daily living (ADLs), should also modify the link between depression and cardiovascular disease. Health and Retirement Study participants age 50+ who reported no prior stroke or myocardial infarction (MI) were followed on average 8.2 years (n=19,547). We used Cox proportional hazards models to assess hazard ratios (HR) associated with elevated depressive symptoms (3+ items on an 8-item Centers for Epidemiologic Study of the Elderly scale) for onset of MI (1,843 events) or stroke (1,707 events). Baseline disability (1+ ADL) and physical inactivity (vigorous physical activity <3 times/week) were examined as potential modifiers using both stratification and interaction terms. Baseline depressive symptom elevation predicted a 36% increase in hazard of first stroke or MI (95% CI: 1.23-1.51). The HR was similar among the inactive (1.34; 1.20-1.51) and active (1.37; 1.09-1.71). The interaction between inactivity and depression was non-significant (p=0.91). Among those with no baseline ADL limitations the HR was 1.37 (1.21-1.54), but depressive symptoms did not predict onset of stroke or MI among those with 1+ ADL limitation (HR=1.13; 0.93-1.37). The interaction between disability and depression was marginally significant (p=0.07). Depressive symptoms predict cardiovascular events in both the active and inactive, but the association was attenuated among individuals with ADL limitations. Research should explore whether ADL disability and depression trigger common pathways that increase risk of stroke or MI.

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GENDER DIFFERENCES OF STROKE EPIDEMIOLOGY: THE EMMA STUDY (STEP 1). *A A Goulart, I M Bensenor, P A Lotufo (Hospital Universitario, Sao Paulo 05508-000, Brazil)

Objective. Stroke mortality rates in Brazil are the highest in Latin America due to not very well reasons mainly among women. To evaluate risk factors associated to stroke we applied the WHO-Steps methodology in a district hospital of Sao Paulo, Brazil (EMMA Study). Methods. We prospectively ascertained all suspected stroke cases from May, 2006 to April, 2008. Baseline characteristics and risk factors according to gender were performed, and the vital status was determined at 10, 28 and 180 days after the stroke. Chi-square test for categorical variables and ANOVA for continuous variables were applied for comparison between sexes. Results. A total of 485 first-event stroke (85.3% cerebral infarction; 14.7%, intracerebral hemorrhage) were considered for gender comparison. Both subtypes of stroke were more incidents among men compared to women (72.6% for intracerebral. hemorrhage and 51.5% for cerebral infarction, p=0.001). Mean age and socio-economic differences were observed according to gender. History of hypertension (51.1%), alcohol intake (82.7%), and smoking habit (67.4%) were significant more frequent among men than women with incident stroke. The total deaths were 58 (6.7%), 89 (10.3%) and 168 (19.5%) during the 10, 28 and 180, respectively. Nor subtypes of stroke neither the first-event strokes were associated to time of death. The early mortality was slightly higher among women compared to men (58.6%, p=0.06 for 10 days; 55.1% p=0.05 for 28 days and 52.4%, p=0.06 for 180 days). Adjusting for age did not materially change these findings. Conclusions. Despite male gender was associated with increased risk factors for stroke, and they had more intracerebral hemorrhage than female, women had slightly higher case-fatality rates.

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PERCHLORATE, THYROTROPIN, AND THYROID HORMONE IN INFANTS. *Y Cao, B C Blount, L Valentin-Blasini, J C Bernbaum, T M Phillips, W J Rogan (NIEHS, Epidemiology Branch, Durham, NC 27713)

Infants can be exposed to perchlorate from consumption of breast milk or infant formula. Perchlorate exposure might affect their thyroid function. Direct studies on perchlorate exposure and thyroid hormones in infants are lacking. We examined whether urinary perchlorate is associated with urinary T4 and TSH in infants; specifically, we examined whether perchlorate was associated with higher TSH in infant girls with low iodide, as it is in adult women. The urine and blood samples we used were from the Study of Estrogen Activity and Development (SEAD) which was a partly cross-sectional, partly longitudinal study designed to assess hormone levels of full term infants over the first twelve months of life. The study was conducted at the Children's Hospital of Philadelphia, the Hospital of the University of Pennsylvania, and affiliated clinics. Urinary perchlorate, thiocyanate, nitrate, iodide, thyroid stimulating hormone (TSH) and thyroxin (T4) were measured in 92, and blood TSH and T4 were measured in 50 full term infants between birth and 1 year of age. We found that perchlorate was not related to T4 or TSH in boys, but girls or infants with low iodide and higher perchlorate had higher T4 and TSH. Infants with higher thiocyanate had higher TSH and T4. Higher nitrate was associated with higher TSH. The associations of perchlorate with TSH in girls or infants with low urinary iodide replicate and extend the finding in adult women.

411-S

ESTIMATING ERROR IN USING OUTDOOR AND AMBIENT PM2.5 CONCENTRATIONS AS PROXIES FOR PERSONAL EXPOSURE: THE ENVIRONMENTAL EPIDEMIOLOGY ARRHYTHMOGENESIS IN THE WOMEN'S HEALTH INITIATIVE. *C L Avery, K T Mills, R Williams, K A McGraw, C Poole, R L Smith, E A Whitsel (University of North Carolina, Dept of Epi, Chapel Hill, NC)

A common feature of studies examining the association between particulate matter < 2.5 μm ($PM_{2.5}$, ug/m^3) and disease is the use of personal exposure proxies, e.g. outdoor $PM_{2.5}$ measured within two meters of participant homes or ambient $PM_{2.5}$ measured at distal monitoring sites. However, the outdoor-personal $PM_{2.5}$ correlation (*r*) has not been systematically and quantitatively assessed to determine the extent and sources of measurement error inherent in using outdoor $PM_{2.5}$ as a surrogate for personal exposure. We searched seven electronic reference databases for studies of the within-participant, outdoor-personal $PM_{2.5}$ correlation. The search identified 567 candidate studies, nine of which were abstracted in duplicate after meeting criteria applied by two authors. The studies represented 306 non-smoking participants aged 6-93 years in eight US cities among whom *r* (range 0.30-0.84) was estimated based on a median of seven outdoor-personal $PM_{2.5}$ pairs per participant (range 5-19) collected over seven to 472 days. Overall, there was little evidence for publication bias (funnel plot symmetric; Begg's log rank test P=0.8; Egger's regression asymmetry test P=0.4) and low potential for heterogeneity (Cochran's Q test P=0.3) of Fisher's z-transformed *r*. However, of the fourteen characteristics we examined, older mean ages, earlier publication dates, eastern longitudes and higher outdoor temperatures were associated with higher *r*. These findings were similar to those based on a contemporaneous meta-analysis of the ambient-personal $PM_{2.5}$ correlation. Collectively, they suggest that the moderate and heterogeneous outdoor-personal correlations merit greater consideration when evaluating the potential for bias in $PM_{2.5}$-disease associations. Although this work has been reviewed by EPA and approved for publication, it may not necessarily reflect official Agency policy.

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ASTHMA MORTALITY DIFFERS IN HISPANIC AND ASIAN SUBGROUPS. S Tran, *M Milet, B Gandhi, L Lutzker, R Kreutzer (California Department of Public Health, Richmond, CA 94804)

Asthma affects over 5 million Californians. While there is currently no cure for asthma, people with asthma can live healthy, productive lives. Asthma deaths, while rare, represent more severe, uncontrolled disease. Comparisons of asthma outcomes for minority race groups are seldom reported, despite that almost half of California's population is of Hispanic or Asian descent. We examined asthma deaths in Hispanic and Asian subgroups in California. Death data were from death certificates compiled by California Vital Statistics. We selected asthma deaths from 2000- 2004 for the following Hispanic and Asian subgroups: Puerto Rican/Cuban, Central/South American, Mexican; Chinese, Filipino, Indian, Japanese, Korean, Native Hawaiian/Pacific Islander, Vietnamese. Population denominators were estimated using data from the US Census and California Department of Finance. Calculated death rates were age-adjusted to the 2000 US population. Of the 2,541 asthma deaths in California in 2000-2004, 12% were Hispanic and 14% were Asian. The asthma death rate for all Hispanics was 8.7 per million, but ranged from 9.5 for Mexicans to 16.7 for Puerto Rican/Cubans. The rate for all Asians was 19.6 per million, but ranged from 12.9 for Japanese to 45.0 for Native Hawaiian/Pacific Islanders. There are substantial variations in asthma deaths among the different Hispanic and Asian subgroups. Native Hawaiian/Pacific Islanders and Puerto Ricans/Cubans suffer elevated asthma deaths that are masked by combining them into the broader Asian and Hispanic categories. This information is important for devising more targeted interventions to these high-risk groups.

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ISCHEMIC HEART DISEASE AND PARTICULATE MATTER 2.5 IN 51 COUNTIES, USA. *L Balluz, ScD, Xiao Jun Wen, MD, M Town, MS, J Sheperd, PhD, J Qulater, PhD, A Mokdad, PhD (CDC, Atlanta, GA)

The objective of this study was to examine the association between exposure to elevated annual average levels of Particulate matters (PM2.5) and ischemic heart disease (IHD) in the general population. We combined data from the Behavioral Risk Factor Surveillance System and the U.S Environmental Protection Agency (EPA) air quality database. We analyzed the data using SUDAAN software to adjust the effects of sampling bias, weights, and design effects. The prevalence of IHD was 9.6% among respondents who were exposed to an annual average level of PM2.5 AQI >60 compared with 5.8% among respondents exposed to an annual average PM2.5 AQI $\leq$60. The respondents with higher levels of PM2.5 AQI exposure were more likely to have IHD (adjusted odd ratio=1.6, 95% Confidence interval: 1.01-2.52) than respondents with lower levels of exposure after adjusting for demographics, smoking, body mass index, diabetes, hypertension, and hypercholesterolemia. Our study suggests that exposure to PM2.5 air pollution, at an annual average level of PM2.5 AQI > 60 may increase the likelihood of IHD. In addition to encouraging health related behavioral changes to reduce IHD, efforts should also focus on implementing appropriate measures to reduce exposure to unhealthy AQI levels.

414-S

ENVIRONMENTAL JUSTICE ANALYSIS OF AIR POLLUTANTS IN MEXICO CITY. *T M Sunbury, M S O'Neill (University of Michigan, Ann Arbor, MI 48109)

Background: Environmental injustice can occur when different subgroups of the population are disproportionately exposed to pollution. Objective: To understand whether populations in Mexico City, Mexico neighborhoods with lower socioeconomic position (SEP) are more likely to be exposed to higher concentrations of air pollutants than populations with higher SEP. Methods/Research Design: We examined cross-sectional associations between air pollution concentrations and measures of SEP at the level of the area geo-estadística básica (AGEB), the smallest geographic unit of the Mexican census (about 2500 inhabitants). Six Census 2000 AGEB variables (income, occupation, education, ethnicity, age, health insurance) were chosen and mapped. Air pollutant data was obtained from government operated monitoring stations (n=36) in Mexico City, Mexico (2000). Air pollution concentrations were interpolated for sulfur dioxide (SO2), carbon monoxide (CO), ozone (O3), nitrogen dioxide (NO2), and particulate matter less than 10 microns (PM10) using ordinary kriging; exposure estimates were calculated for each AGEB. Results: Lower SEP AGEBs are spatially distributed to outer areas of Mexico City and higher SEP AGEBs are in central Mexico City. Greater concentrations of PM10 and NO2 were found in lower SEP AGEBs, greater concentrations of SO2 were found in higher SEP AGEBs, and results were mixed for O3 and CO. Conclusions/Implications: Areas of lower SEP had increased concentrations of certain environmental air pollutants, but not others. Studies of health outcomes related to both exposures should consider these associations. Supported by the Department of Environmental Health Sciences, School of Public Health.

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CONTACT WITH BEACH SAND, CONCENTRATIONS OF FECAL INDICATORS, AND ENTERIC ILLNESS RISK. *C D Heaney, E Sams, K Brenner, R A Haugland, L Wymer, A P Dufour, T J Wade (University of North Carolina, Chapel Hill, NC 27599)

Recent studies of beach sand fecal contamination have triggered interest among scientists and in the media. Although evidence shows that beach sand can harbor fecal indicator organisms as well as fecal pathogens, illness risk associated with beach sand contact and fecal indicators is unclear. During 2003-2005 and 2007 beach visitors at seven beaches were enrolled in the study and asked about sand contact the day of their visit to the beach (digging in the sand; body buried in the sand). Ten to 12 days later participants were telephoned to answer questions about health symptoms experienced since the visit. At two beaches studied in 2007, beach sand was analyzed for concentrations of *Enterococcus*, *Bacteroides*, *B. thetaiotaomicron*, and F^+-specific coliphage. We completed 27,365 interviews during all trails. Across all trials, digging in the sand was positively associated with gastrointestinal (GI) illness (aIPR=1.14, 95% CI: 1.02-1.26) and diarrhea (aIPR=1.20-95% CI: 1.05, 1.36), but there was variation by beach. In 2007, we completed 4,999 interviews and analyzed 144 sand samples. A molecular *Enterococcus* measure (qPCR CCE/g) was positively associated with GI illness among those digging in sand (aOR per log10 increase in qPCR CCE/g=1.45; 95% CI 1.05-2.01) and buried in sand (aOR = 3.12; 95% CI 1.08-9.05). Relationships between fecal indicators and GI illness among nonswimmers in contact with sand were not consistently positive. This study demonstrated a positive relationship between sand contact activities and GI illness as a function of microbial sand quality. Relationships were not consistent across all beaches.

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PRENATAL EXPOSURE TO METHYLMERCURY AND ADHD-LIKE BEHAVIORS IN CHILDHOOD. *S Sagiv, D Bellinger, S Thurston, S Cabelli, C Amarasiriwardena, S Korrick (Harvard School of Public Health, Boston, MA 02115)

Methylmercury (MeHg) is a neurotoxicant, exposure to which occurs primarily via fish consumption. Associations between prenatal MeHg and neurodevelopment are inconsistent in previous studies, in part due to confounding by fish consumption. Consensus is critical to informing fish advisories given the known benefits of fish consumption to the developing brain. We investigated associations between peripartum maternal hair Hg levels (a proxy for prenatal MeHg exposure) and ADHD-like behaviors at 8 years of age using 2 assessments: 1) the NES2 Continuous Performance Test (CPT), and 2) the Conners' Rating Scale for Teachers (CRS-T). Participants came from a prospective study of children born 1993-1998 to mothers residing near a polychlorinated biphenyl (PCB)-contaminated harbor in New Bedford, Massachusetts. Median peripartum Hg level among 509 subjects was 0.4 ppm (range=0.03-9.2 ppm). Hg was associated with higher risk of errors of commission and errors of omission on the CPT with adjusted (including PCB adjustment) risk ratios of 1.32; 95% CI: 1.08-1.63 and 1.16; 95% CI: 0.94-1.44, respectively for the highest vs. lowest Hg quartile. Hg was not associated with ADHD-like behaviors measured with the CRS-T, including DSM-IV inattentive and impulsive/hyperactive subtypes. There was evidence for an association of Hg exposure with decrements in impulse control (errors of commission) and, to a lesser degree, sustained attention (errors of omission), consistent with CPT findings in previous studies of children with substantially higher MeHg levels. The lack of association with the CRS-T suggests that these assessments reflect different skills, with distinct Hg sensitivity on formal tests of impulsivity and attention.

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A PILOT STUDY OF THE ASSOCIATION BETWEEN URINARY ARSENIC CONCENTRATIONS AND BONE MINERAL DENSITY. *G Wu, Q Zhao, L Arendell, Z Chen (University of Arizona, Tucson, AZ 85719)

Arsenic exposure is a known risk factor of several chronic diseases, including some cancers and diabetes. Theoretically it is possible that arsenic may affect bone turnover by changing inflammatory factors. However, the association between arsenic and bone mineral density (BMD) has not previously been explored. In this study, we hypothesized that women who have high urinary arsenic concentrations are more likely to have low BMD. Study participants were 72 Hispanic and 138 non-Hispanic white women aged 41 to 70 years old from the Women's Breast and Bone Density Study conducted between 2001 and 2004 in Southern Arizona. Urinary arsenic and creatinine concentrations were measured from frozen samples. BMD was measured using dual-energy x-ray absorptiometry and total body and hip T-scores were calculated. Non parametric trend analysis and multiple linear regression analysis were used to test the association between quartiles of creatinine-normalized urinary arsenic concentrations and hip and total body T-scores. The results showed a significant inverse trend between total arsenic concentration and hip T-score ($p = 0.032$). After adjusting for age, height, and ethnicity, the highest quartile of arsenic concentration has a significantly lower hip T-score than the lowest quartile ($p = 0.041$). Similar, but not significant results were seen for the total body T-score. The results were not modified by menopausal status. Given the small size of this study, it did not have the statistical power for conclusive results. Larger prospective studies have been suggested.

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THE IMPACT OF OVER-CONTROL FOR TIME IN AIR-POLLUTION TIME-SERIES STUDIES OF HEALTH EFFECTS. *W D Flanders, M Strickland, L Darrow, M Klein, J A Sarnat, L Waller, S Sarnat, P Tolbert (Rollins School of Public Health, Atlanta, GA 30322)

Studies of the short term effects of air pollution often involve time series analysis, but control of confounding by unmeasured, time-varying factors remains a challenge. Investigators may attempt control by adjusting for longer time trends, typically using a case-crossover approach, by inclusion of appropriate time splines or functions, or a combination of these approaches. An important concern is the possibility of under- or over-control, that can lead to bias. Methods: We use Monte Carlo simulations and data from an extensive study of air pollution and emergency department visits in Atlanta to determine temporal trends. We then introduce a ''known'' effect of air pollution with a lag of 3 days, and analyze the simulated data in several ways, each a modification of a basic case-crossover model with matching on time ''windows'' of various widths ranging from 5 to 180 days. Results: Preliminary simulations suggest that for the situations considered, estimated effects were somewhat insensitive to the choice of time window within the range of 20 – 60 days provided we included within window linear or quadratic trends—estimates did not change substantially and remained fairly near the true value regardless of window width. However, estimates became unstable once the width of the windows was less than 20 or greater than 60. Discussion: Control of confounding depends on a priori considerations. Although these results provide information about the sensitivity of results to different windows for time control, the sensitivity may depend on underlying patterns that may differ from those we simulated. Together with other information, the results can help guide the approach to control of unmeasured confounders that vary with time.

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DEMONSTRATION PROJECT: ESTIMATING EXPOSURE TO DRINKING WATER CONTAMINANTS AMONG WOMEN SEEKING TO CONCEIVE USING ADMINISTRATIVE DATA. C A Porucznik, J A Vanderslice, *J D Panichello, K C Schliep, S D Firth, J B Stanford (University of Utah, Salt Lake City, UT)

Environmental exposures may be important to conception and fetal development, but testing and quantifying exposure for each participant would be prohibitive in a large population-based study. Water quality data are routinely collected for regulatory purposes, but determining which water system serves a certain address is often difficult. Further, water quality levels can vary within a distribution system. We developed a method for estimating exposures to contaminants in finished drinking water by combining water use data, collected directly from study participants, with water quality data from public water supplies. As part of an on-going prospective study of women trying to conceive, we collected information on their usual sources and quantity of drinking water at enrollment. We first linked the water quality testing results from state and federal databases to GIS layer delineating the areas served by that water supply. We then used a GIS to link each participant's address to the water system that served them, and the quality of water delivered by that system. Exposure estimates were generated by combining the water quality levels with the consumption patterns. Women identified with potentially high exposure based on this model might be selected for validation testing. This method of exposure assessment using administrative data allows for estimating women's exposure to analytes that might potentially affect conception or continuation of pregnancy without expensive water collection and analysis. We plan to apply this exposure assessment method to several other existing cohorts and to generate population-based distributions of potential exposure.

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ASSOCIATIONS BETWEEN URINARY ARSENIC CONCENTRATIONS AND SKELETAL MUSCLE MASS. *Q Zhao, A Grant, L Arendell, Z Chen (University of Arizona, Tucson, AZ 85724)

Background: Environmental exposure to inorganic arsenic is an indisputable source of increased risk of several human cancers and chronic diseases. Many chronic diseases and conditions may further accelerate muscle loss and increase a person's risk for sarcopenia (very low skeletal muscle mass), a condition that leads to impaired physical functioning and disability in older age. To date, there has been no study on the impact of arsenic exposures on sarcopenia. **Objectives:** The primary aim of this study is to examine whether women who have higher arsenic exposures have lower skeletal muscle mass. **Methods:** Participants in this pilot study included 210 Hispanic and non-Hispanic White women aged 41-70 years old from a cross-sectional study conducted in southern Arizona. Total body lean mass (TBLM) was measured using Dual-energy X-ray Absorptiometry. Skeletal muscle index (SMI) was calculated using appendicular lean mass divided by height squared. Arsenic concentrations and creatinine were measured from stored urine samples. Linear regression analyses were conducted to investigate associations between SMI (or TBLM) and creatinine normalized arsenic exposures. **Results:** The total urinary arsenic is significantly inversely related to TBLM ($p=0.005$) and SMI ($p=0.004$) in pre- but not in post-menopausal women after adjusting for age, ethnicity and height. While adjusting for body weight, the associations between arsenic and TBLM or SMI are no longer statistically significant. **Conclusions:** There were inverse relationships between urinary arsenic concentration and skeletal muscle mass in pre-menopausal women in this study. However, no such relationships were found in post-menopausal women.

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* = Presenter; S = The work was completed while the presenter was a student

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CARBON MONOXIDE AND BIRTH OUTCOMES: A META-ANALYSIS. *K Rappazzo, C Dilworth, C Hansen, L Messer, T Luben (University of North Carolina, Chapel Hill, NC 27599)

The literature regarding air pollutants and reproductive outcomes has grown considerably in the past few decades. In order to evaluate the relationships between air pollutants and birth outcomes, the authors performed a systematic review and meta-regression for the association between carbon monoxide (CO) exposure during pregnancy and the outcomes of birth weight and preterm birth. Twenty-five studies, covering 1987 to 2007, that reported point estimates for continuously coded CO levels (in parts per million [ppm]) were included in the final meta-analysis. The authors found no evidence of publication bias for any of the pregnancy outcomes examined (birth weight in grams, low birth weight, preterm birth and small-for-gestational age) based upon the Begg's test, Egger's test and visual inspection of funnel plots. Null associations were found between CO exposure and measures of birth weight; the random effects estimate for mean change in continuous birth weight (95% confidence interval (CI) per 1 ppm increase CO was 1.550 (-3.905, 7.004)) and random effects relative risk (RR) estimates for low birth weight and small-for-gestational age per 1 ppm increase in CO were 1.00 (0.97, 1.04) and 1.04 (0.92, 1.18), respectively. Higher exposure to CO was associated with a slight increase in preterm birth (RR = 1.02 (1.00, 1.04)). Carbon monoxide is consistently associated only with preterm birth, and may be a contributing factor to preterm birth occurrence.

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SOCIAL DISADVANTAGE AND INCREASED RISK OF CRASH RELATED HOSPITALISATION IN NOVICE DRIVERS: FINDINGS FROM THE DRIVE STUDY. *H Y Chen, R Q Ivers, A L C Martiniuk, S Boufous, T Senserrick, M Stevenson, R Norton (The George Institute, Sydney, NSW, Australia 2000)

Background: Previous studies examining the effect of socioeconomic status (SES) on risk of crash among young drivers have been limited by an inability to examine the severity of crash-related injuries, or to control for key confounders, such as driving exposure and rurality of residence. Methods: The DRIVE Study collected survey information on crash risk factors from 20,822 young drivers aged 17-24 years in 2003-04 and prospectively linked responses to crash-related hospitalisation data from New South Wales Health, Australia. Young drivers were tertiled as high, moderate or low SES based on one of the 2001 Socio-Economic Indexes for Areas (SEIFA)-the index of education and occupation. Poisson regression was used to model the risk of crash-related hospitalisation by level of social disadvantage, adjusting for multiple confounders including driving exposure and place of residence. Results: The rates of crash-related hospitalisation increased with increasing social disadvantage (chi-square test for trend: $p<0.01$). Results from multivariable models showed that drivers with low SES had approximately double the risk of crash-related hospitalisation (relative risk (RR): 1.8, 95% CI: 1.1-3.1) compared to those with high SES. This increased risk remained when controlling for multiple risk factors, including rurality of place of residence (RR: 1.9, 95% CI: 1.1-3.2). Conclusion: Young drivers of low SES have a significantly higher risk of being involved in hospitalised crashes compared to high SES drivers, even when key confounders are controlled for. Factors underlying road crashes for young drivers with social disadvantage need to be further investigated.

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A PROSPECTIVE LONGITUDINAL PILOT STUDY OF QUALITY OF LIFE (QOL) FOR PATIENTS UNDERGOING TRAUMATIC BRAIN INJURY (TBI). *D Ren, A K Wagner, E H Rogers (University of Pittsburgh, Pittsburgh, PA 15261)

Objectives: Traumatic Brain Injury (TBI) is among the most common causes of brain damage in the United States. Almost all of those surviving after severe TBI suffer a number of physical, cognitive, emotional, perceptual and behavioral problems, which leads to the decrease of Quality of Life (QoL). However, there is limited literature focusing on factors effecting QoL for TBI population, including premorbid QoL. The purpose of this study was to explore QoL trajectories for up to 12 months after severe TBI and determine how demographic, injury severity, and premorbid QoL factors affect those trajectories over time. Methods: This prospective study used longitudinal data collected from patient questionnaires and from medical records of subjects with severe TBI (N=36). In addition to demographic and injury related data, patient QoL was evaluated using the Modified Perceived QoL questionnaire. Data was collected regarding baseline, 6 month, and 12 month QoL. A mixed effects model for repeated measures was performed to examine the trajectories of QoL overall and for three subscales in patients after TBI at 6 and 12 month while controlling for age, gender, injury severity and QoL at baseline respectively. Results: The overall QoL measure and two subscales of QoL (Functional QoL and Vocational QoL) were significantly improved over time ($P<0.01$). There was a trend showing the improvement of Interpersonal QoL but this improvement did not reach statistical significance ($P=0.11$). Baseline QoL (overall and each subscale) was significantly and positively correlated with the overall post-TBI trajectory QoL score ($P<0.01$). Injury severity was significantly associated with only the functional QoL subscale ($P<0.05$). There were no age and gender effect on the QoL overall and each subscale ($P>0.10$). Conclusions: As a subjective measure of TBI outcome, the QoL of patients after TBI continues to improve over time. The baseline QoL before TBI appears to be a stronger factor than injury severity in predicting long term QoL for TBI patients.

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ELEVATED INJURY MORTALITY IN THE AGRICULTURAL HEALTH STUDY. J K Waggoner*, A Blair, G J Kullman, P K Henneberger, M Alavanja, F Kamel, C F Lynch, C Knott, S J London, D M Umbach, C J Hines, D P Sandler, J H Lubin, L E Beane Freeman, J A Hoppin (NIEHS/NIH/DHHS, RTP, NC 27709)

Mortality of farming populations differs from the general population, potentially due to healthy lifestyles. To evaluate the mortality experience among farm residents, data was used from the Agricultural Health Study, a cohort of 52,394 farmers and 32,346 spouses in North Carolina and Iowa enrolled between 1993-7. Standardized mortality ratios (SMRs) were computed for deaths occurring from enrollment through December 31, 2006, based on state-specific rates for age, race, gender, and 5-year calendar period. The healthy worker effect was still present after 10.8 years of follow-up, as evidenced by the lower mortality for all causes combined (SMR=0.56, 95% Confidence Interval (CI)=0.54-0.57) among the 5,514 deaths observed. Deaths from heart disease were almost half the expected (SMR=0.54, 95% CI=0.52-0.57); a deficit was also seen in all-cancer deaths (SMR=0.64, 95% CI 0.61-0.67). However, elevated risks were observed for specific accidental injuries. Among farmers, increased risks were seen for machinery-caused deaths (SMR=4.6, 95% CI=3.5-6.0), non-traffic motor vehicle accidents (SMR=3.4, 95% CI=2.2-5.1), and collisions with objects (SMR=2.5, 95% CI=1.4-3.9). Although agricultural residents experience lower overall mortality, fatal injuries continue to account for elevated mortality. While previously observed in other farming populations, increased mortality due to accidents is a new finding for this cohort. Agricultural accidents remain an important risk for farm residents, with machine and vehicle-related injury recognized as the leading cause of death in United States agriculture.

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ATTITUDES TOWARDS INJURY PREVENTION AND PERSONAL ATTRIBUTES: AN ONLINE SURVEY AMONG STUDENTS. *B Fischer, M Stark, C Kuehnast, C Trautner (University of Applied Sciences, Braunschweig/Wolfenbuettel, Germany)

The most important cause of injuries due to car accidents are the drivers, young people in particular. Campaigns for safer driving are costly, their effectiveness is controversial. Therefore, we asked students about their attitudes towards injury prevention, using an online questionnaire with 24 questions mailed to approximately 7000 students of our University of Applied Sciences. 1428 persons answered (mainly students, and a few staff), 797 of them were men, 623 women, and 8 values were missing. 91% of the participants were younger than 30 years of age. 87% considered car accident prevention an important or very important topic. Stricter law enforcement would motivate 52% to behave more carefully, whereas posters at the roadside would motivate only 15% ($p<0.05$. Men were siginificantly less concerned with safety issues compared with women. 75% of women, but only 47% of men ($p<0.05$) answered respecting speed limits was important. Logistic regression analysis revealed that having been caught by a speed camera was more likely in men (Odds Ratio, OR 1.64, 95% Confidence Interval, CI 1.31;2.05) and in participants who did ''multitasking'' (like eating or using the phone) while driving (OR 1.63, 95% CI 1.30;2.04). Conclusions from our study are limited to students. The results support the hypothesis that young women are more aware of safety issues than men and that preventive projects based on this approach might be effective.

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VALIDATION OF A PROGNOSTIC MODEL OF EARLY MORTALITY IN SEVERE HEAD INJURY. *J De La Cruz, D Lora, P-A Gómez, R-D Lobato (Hosp Univ 12 Octubre, CIBERESP, Madrid, Spain)

The aim of this study is to derive and validate a prognostic model of early death (48 hours) after a severe head injury (TBI). **Methods:** Derivation cohort (n=925, years 1990-2003): consecutive comatose patients admitted to a single center after TBI within 6 hours. Validation cohort (n=374, 2004-2006) was accrued from 7 centers (same inclusion criteria). Clinical and radiological variables easily available in routine clinical practice were documented within the first 6 hours after TBI. Penalised Maximum Likelihood Estimation (PMLE) was used to adjust for overfitting directly while developing the model. The optimal penalty was obtained by maximising the modified Akaike's information criterion. The internal validity of the reduced model was assessed with bootstrapping procedures, and its performance was assessed with respect to discrimination by the area under the operating receiver curve (AUC). External validation in a different sample of patients made possible to assess the statistical optimism of the model. **Results:** Out of 925 patients enrolled in the study, 407 (44%) died, 192 (47%) in the first 48 hours after TBI. The penalised reduced model contains 7 variables: age, motor response, pupil response, presence of shock, abnormal cisterns, subarachnoid blood and epidural hematoma. The discriminative ability of the model in the derivation and the validation set was respectively AUC= 0.938 (0.92-0.96) and AUC=0.891 (0.85-0.93). **Comments:** To facilitate application of this model for risk stratification in a clinical setting (e.g. selection in a trial) we created a score chart to estimate the outcome probability based on the values of the regression coefficient. Sensibility and specificity for different score values are presented.

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POTENTIAL RISK FACTORS FOR POST-DEPLOYMENT INJURY AMONG COMBAT VETERANS. *K F Carlson, N A Sayer, A A Gravely, S Noorbaloochi (VA Medical Center, Minneapolis, MN 55455)

Objective: To examine potential risk factors for post-deployment injury among Operations Enduring Freedom and Iraqi Freedom (OEF/OIF) veterans enrolled in the Department of Veterans Affairs (VA) healthcare system. Methods: A national sample of OEF/OIF combat veteran VA users was surveyed in 2008 to assess mental, behavioral, and physical health using standard validated measures. The sample was stratified by gender, race, and geographic region. Veterans' risk of medically-treated injury was estimated in reference to overall physical and mental health status; probable traumatic brain injury (TBI), posttraumatic stress disorder (PTSD), and depression; and health risk behaviors. Stratified odds ratios (OR) and 95% confidence intervals (CI) were calculated using survey logistic regression. Directed acyclic graphs guided development of multivariate models. Results were adjusted for non-response and weighted to represent the target population. Results: Of 1,227 veterans contacted, 754 (62%) responded. Nearly half of the population (47.3%; CI=42.0%-52.6%) reported sustaining at least one medically-treated injury since discharge. Increased odds of injury were associated with lower overall physical and mental health. Controlling for potential confounders, veterans with probable PTSD (OR=2.0; CI=1.2-3.3) and diagnosed depression (OR=2.6; CI=1.5-4.5) were more likely to have sustained an injury. Problem substance use was suggestive of increased risk (OR=1.6; CI=0.98-2.6). Conclusions: Results of this study suggest a large burden of post-deployment injury among OEF/OIF combat veteran VA users. Symptoms of PTSD and depression may be important indicators of increased risk. Further, longitudinal research examining these associations is warranted.

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RISK OF WORK-RELATED ASSAULT ON EDUCATORS WITH VIOLENCE HISTORIES. *S G Gerberich, N M Nachreiner, A D Ryan, S Erkal, T R Church, S J Mongin, M S Geisser, G D Watt, D M Feda, S K Sage (University of Minnesota, Minneapolis, MN 55455)

To investigate risks of work-related physical assault (PA) on those with violence histories, a 2-phase study (84% response) was conducted among Kindergarten – Grade 12 educators: 1) mailed 12-month retrospective survey of demographics and PA and non-physical violence (NPV) events; 2) mailed case-control survey. From 26,000 randomly selected state-licensed educators (6,469, eligible), exposure data were collected from cases (n=290) for the month before PA and, controls (867), in a randomly selected working month. Potential confounders were identified for multivariable logistic regression from directed acyclic graphs; re-weighting adjusted for potential biases. Odds ratios and 95% confidence intervals identified increased risks for prior histories (yes,no) of work- (17.33, 11.43-26.27) or non-work-related PA (2.03, 1.19-3.46). Compared with 0 times, risks increased with work-related PA histories, 1-3 (14.98, 9.71-23.12), 4-10 (21.53, 10.48-44.24), and 10+ times (43.69, 17.14-111.32) and non-work-related PA, 1-3 (1.76, 0.99-3.13) and 4-10+ (7.83, 1.67-36.69; risks also increased for histories of work-related: threats, 1-3 (3.56, 2.38-5.32), 4-10 (5.58, 3.11-10.01), 10+ times (11.78, 6.36-21.80); sexual harassment 1-3 (1.93, 1.27-2.93), 4+ times (3.52, 1.57-7.92); verbal abuse, 1-3 (2.07, 1.34-3.19), 4-10 (3.22, 1.88-5.50), 10+ times (6.62, 3.97-11.03); or bullying, 1-10 (1.51, 1.05-2.17), 10+ times (8.09, 4.02-16.29) and for non work-related: threats, 1-3 (1.66, 1.07-2.57) and 4+ versus 0 times (2.98, 1.09-8.14), and verbal abuse (1.51, 1.09-2.09) or bullying (1.70, 1.16-2.50) (yes,no). Results suggest opportunities for interventions and further research.

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A REALIST SYSTEMATIC REVIEW OF SCREENING PROGRAMS FOR INTIMATE PARTNER VIOLENCE IN HEALTH CARE SETTINGS. *P O'Campo, C Tsamis, M Kirst, F Ahmad (St. Michael's Hospital & University of Toronto, ON, Canada M5B 1W8)

Background: Intimate partner violence (IPV) is a major public health issue and has numerous adverse consequences including mortality, physical and mental health morbidity, excess physician and emergency room visits and hospitalizations. The thrust of recent health care initiatives focuses on the screening and identification of IPV to improve early detection and referrals to health and social services. At the same time, recent systematic reviews have concluded that there is currently insufficient evidence supporting the benefits of IPV screening interventions. We sought to re-evaluate the evidence on IPV screening programs using methods of Realist Systematic Review which focuses on both whether programs work and also program mechanisms that explain program success or failure. Methods: Unlike conventional systematic reviews, we utilize Pawson's Realist Review approach with its focus on program mechanisms and inclusion of various types of evidence such as the scholarly literature, key documents and interviews with key informants. Outcomes from the systematic realist review yields information about why IPV screening programs succeed or fail and is more conducive to informing the design of policies and programs than conventional reviews that focus on whether programs succeed. Results/Outcomes: We identified 11 programs implementing universal/routine IPV screening in health care settings. Programs that took a comprehensive approach, incorporating four program elements at multiple system-levels, were successful in increasing IPV screening and detection rates. Further implications of these findings for IPV screening intervention planning and implementation in healthcare settings will be discussed.

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A PROSPECTIVE ANALYSIS OF THE EFFECTS OF PRE-INJURY PSYCHOLOGICAL STATUS ON THE PSYCHOLOGICAL IMPACT OF INJURY DURING DEPLOYMENT IN SUPPORT OF THE WARS IN IRAQ AND AFGHANISTAN. D Sandweiss, MD, D Slymen, PhD, *C LeardMann, MPH, B Smith, MPH, PhD, M White, MPH, T Hooper, MD, MPH, G Gackstetter, DVM, PhD, MPH, P Amoroso, MD, MPH, T Smith, MS, PhD, for the Millennium Cohort Study Team (Naval Health Research Center, San Diego, CA 92106)

Background: Serious physical injury is associated with the development of mental health disorders. Previous studies that have examined the relationship of pre-injury psychological disorder and post-injury mental illness have assessed pre-injury psychological status retrospectively with conflicting results. Objective: To conduct a prospective analysis of the relationship of pre-injury psychological status and post-injury psychological morbidity. Methods: This study restricted its focus to participants of the Millennium Cohort Study, a 21-year longitudinal study of military personnel, who had deployed in support of the wars in Iraq and Afghanistan. Pre-injury and post-injury psychological status were assessed using self-reported data. Injury status was classified using data from the Joint Theater Trauma Registry and the Navy-Marine Corps Combat Trauma Registry. Ordinal regression was performed to examine pre-injury psychological distress and injury status with post-injury psychological distress adjusting for other covariates. Preliminary Results: This study consists of approximately 11,000 deployed military personnel who have baseline and follow-up data. About 10% of these screened positive for a baseline mental health disorder. Analyses are on going. Conclusions: To our knowledge, this is the first study to prospectively investigate mental health status prior to serious deployment-related physical injury with respect to developing post-injury psychological morbidity.

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EARLY MORTALITY EXPERIENCE AND A COMPARISON OF DATA SOURCES USED FOR MORTALITY ASCERTAINMENT IN A LARGE MILITARY COHORT. Besa Smith, MPH, PhD, Tomoko Hooper, MD, MPH, Gary Gackstetter, DVM, MPH, PhD, *C LeardMann, MPH, E Boyko, MD, MPH, L Pearse, MD, MPH, P Amoroso, MD, MPH, T Smith, MS, PhD; for the Millennium Cohort Study Team (Naval Health Research Center, San Diego, CA 92106)

Background: Mortality assessment remains complex in spite of the availability of multiple data sources due to inherent limitations or biases affecting accuracy and completeness of data capture. Objective: To describe the early mortality experience in the Millennium Cohort Study, a 21-year prospective study of individuals who have served in the US military. Methods: For US military members invited to participate in the Millennium Cohort Study in 2001, mortality data through 2006 were obtained from Social Security Administration Death Master File (SSA-DMF), Department of Veterans Affairs (VA) databases, and Department of Defense Medical Mortality Registry. Deaths identified by these three data sources, plus the National Death Index (NDI), were compared for years 2001 to 2004. Results: Unadjusted mortality rate for the Cohort was 8.1 per 10,000 person-years and 10.1 for the invited sample, 2001-2006. There were no substantial differences in mortality distribution between the Cohort and the invited sample. Comparing all four data sources, the VA identified the greatest proportion of total deaths (97.0%), followed by SSA-DMF (85.6%), and NDI (81.2%). Conclusion: Assessment of mortality in the Cohort and the probability-based invited sample suggest that the Cohort is reasonably representative of the US military as a whole. While findings indicate distinct advantages for each data source, the VA provided the most complete capture of mortality, largely because multiple sources are used.

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ANALYZING MUSCULOSKELETAL NECK PAIN, MEASURED AS PRESENT PAIN AND PERIODS OF PAIN, WITH THREE DIFFERENT REGRESSION MODELS: A COHORT STUDY. *A Grimby-Ekman, E M Andersson, M Hagberg (Sahlgrenska School of Public Health and Community Medicine, University of Gothenburg (UGOT), Sweden)

The aim of this longitudinal study of a group of young adults was to determine whether psychosocial factors, computer use, high work/study demands, and lifestyle are long-term or short-term factors, and whether these factors are important for developing or ongoing musculoskeletal neck pain. Three regression analyses (marginal logistic, Poisson and Markov transition logistic) were used to analyze the outcomes (present pain, number of years with pain, developing and ongoing pain). In a prospective cohort, started in 2002, 1204 Swedish university students answered web-based questionnaires. Perceived stress was a risk factor for present pain (PR=1.6), for developing pain (PR=1.7) and for number of years with pain (RR=1.3). High work/study demands was associated with present pain (PR=1.6); and with number of years with pain (RR=1.3). Computer use pattern (break pattern) was a risk factor for developing pain (PR=1.7), but also associated with present pain (PR=1.4) and number of years with pain (RR=1.2). Among life style factors smoking (PR=1.8) was found to be associated to present pain. By the use of different regression models different aspects of the neck pain pattern could be addressed and the risk factors impact on the pain pattern was identified. Short- and long-term risk factors were perceived stress, high work/study demands and computer use pattern (break pattern). For developing pain perceived stress and computer use pattern were risk factors.

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UPDATING PREDICTION MODELS IN STEAD OF DEVELOPING NEW PREDICTION MODELS. *K J M Janssen, K G M Moons, D E Grobbee, Y Vergouwe (UMC Utrecht, The Netherlands)

Prediction models (e.g. Framingham risk score) are valuable tools to differentiate between patients at high and low risk of a certain disease. Researchers often develop new prediction models when the accuracy of an existing prediction model is decreased in new patients. For example, there are over 60 prediction models to predict outcome after breast cancer. However, updating methods can improve the accuracy, avoiding the need to develop new prediction models. We compared five methods to update a prediction model that predicts the risk of postoperative pain. The updating methods varied in extensiveness, reflected by the number of model parameters that are re-estimated. The prediction model was updated in 752 patients and tested in 283 patients. We assessed the discrimination (ability to distinguish between patients with and without the outcome, expressed by the area under the ROC curve) and the calibration (agreement between the predicted risks and observed frequencies). Calibration of the original model was poor and substantially improved by all five updating methods, in both the updating and test set. The ROC area of the original model was 0.65 and did not improve with the simple recalibration methods. The more extensive updating methods resulted in an increased ROC area (0.70 to 0.72). In the test set, however, all updated models showed a similar ROC area as the original prediction model (around 0.66). Conclusion: simple updating methods improved the calibration of the original model to a similar extent as the more extensive updating methods. The gain in discrimination that resulted from the more extensive updating methods was not found in the test set. In general, updating methods should be considered before researchers develop new prediction models.

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TIME MODIFIED CONFOUNDING. *R W Platt, E F Schisterman, S R Cole (Department of Epidemiology, Biostatistics and Occupational Health, McGill University, Montreal, QC, Canada)

We define time modified confounding as occurring when the causal relationship between a time fixed or time varying confounder and the treatment or outcome changes over time. When the relationship between the confounder and treatment is modified over time, we propose an approach to account for time modified confounding using marginal structural models. An illustrative example and simulation shows that when such time modified confounding is present, a marginal structural model with inverse probability-of-treatment weights specified to account for time modified confounding remains approximately unbiased (true odds ratio (OR) 1.35, estimated OR 1.37) with appropriate confidence limit (CL) coverage (95%). Models that do not account for time modified confounding are biased (estimated OR 1.61). When time modified confounding is absent, specifying the inverse probability-of-treatment weights to account for time modified confounding in a marginal structural model remains unbiased with appropriate CL coverage, but may confer a loss of efficiency relative to methods that do not unnecessarily account for time modified confounding (observed efficiency loss $<0.1\%$). Careful specification of the treatment model is an important assumption of marginal structural models. Accounting for potential variation over time in confounding is an important consideration in epidemiologic inference. When the association between confounders and either the treatment or outcome changes over time, time modified confounding must be considered.

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WITHDRAWN

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BIAS AND CONFIDENCE LIMIT COVERAGE OF MARGINAL STRUCTURAL COX MODELS. *D Westreich, S R Cole, R Platt, E F Schisterman. (UNC-Chapel Hill Department of Epidemiology, Chapel Hill, NC 27599)

Standard analysis of observational data with time-varying confounding affected by prior exposure is known to be biased, by theory. Robins' marginal structural models provide asymptotically unbiased estimates of causal effects, but the extent of bias and confidence limit (CL) coverage in realistic scenarios remains unknown. We examine 432 scenarios varying 6 factors, namely: sample size (250, 500, 1000), exposure prevalence (0.2, 0.5), hazard function shape (flat, increasing), and 3 associations: (a) prior exposure and the time-varying confounder, time-varying confounder and (b) Weibull-distributed 15% events and (c) subsequent exposure (hazard/odds ratios from 0.5 to 5.0). For each scenario, we perform 5000 simulations. With reference to the average causal effect, we calculate the bias factor [exp (average bias)], 95% CL coverage, and root mean square error for standard (crude, adjusted) and marginal structural Cox models. Under strong confounding bias factors were large in standard analyses (1.49 crude, 0.61 adjusted), while the bias factor for the structural model was 1.00. Also under strong confounding, mean CL coverage was 95.3% for the structural model and $<70\%$ for standard analyses. Examining the root mean square error, the efficiency lost when using the structural model was generally offset by bias reduction, relative to standard analyses. Under realistic research conditions, there is meaningful bias and poor CL coverage when using standard analysis for observational data with time-varying confounding affected by prior exposure. Marginal structural Cox models provide unbiased estimates of the causal effect with appropriate CL coverage in theory and under practice conditions.

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DESCRIPTIVE AND CAUSAL MODIFICATION: A DISTINCTION THAT DIRECTS DATA-ANALYSIS AND PRESENTATION. *M J Knol, A W Hoes, D E Grobbee (Julius Center, University Medical Center Utrecht, Utrecht, The Netherlands)

In epidemiology there has been ample debate about (effect) modification. Modification is present when the relationship between a determinant and an outcome is not the same for all subjects. To clarify the different perspectives from which modification can be addressed in research and interpreted in practice, we introduce the terms descriptive and causal modification. We propose to use the term descriptive modification when the strength of the determinant-outcome relation varies across a third factor without the need to explain the nature of that modification. The aim is to identify clinically relevant subgroups, for example, whether the association between blood pressure and risk of heart disease is modified by age. This may direct group-specific treatment or prevention strategies. In descriptive modification, the strength of the occurrence relation should be presented in strata of the presumed modifier, either as a risk difference or relative risk. In causal modification the aim is to investigate whether two (or more) factors interact in producing disease due to an underlying causal mechanism. For example, whether the relation between smoking and bladder cancer is modified by a certain genotype. In assessing causal modification one reference category should be used to calculate the individual effects of the two causal factors and their combined effect. Subsequently, it can be calculated whether there is modification on an additive or multiplicative scale. The distinction between descriptive and causal modification directs data-analysis and presentation of modification and assists researchers to assess modification.

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SECULAR TRENDS IN OBESITY PREVALENCE: AGE, PERIOD, OR COHORT EFFECTS? *W Robinson, K Keyes (University of Michigan, Ann Arbor, MI)

In the 1980s-1990s, obesity prevalence increased dramatically in the U.S. Decomposing obesity trends into components attributable to age, period, and cohort effects may help elucidate the causes of these secular increases. Data were from 7 cross-sectional NHANES surveys, conducted between 1971 and 2006. Obesity was defined as body mass index (BMI) $\geq$30.0 for ages 20-74 years and BMI$\geq$95th percentile CDC 2000 cutpoints for ages 2-19 years. Obesity trends were decomposed using the median polish method. Obesity prevalence was arrayed by age and calendar-year groups in a 15 x 7 contingency table. Iterative subtraction of median row and column values isolated additive effects of age and period. Residuals (non-additive effects) were regressed on cohort indicator variables to estimate cohort effects. For age and period effects, log-linear regression was used to calculate risk ratios (RRs). Obesity prevalence increased across age (e.g., RR=0.6 [95% confidence interval (CI): 0.4, 0.8] for the 10-14 age groups vs. the 30-34 groups) and period (e.g., RR=1.65 [95% CI: 1.13, 2.33] for years 1999-2000 vs. 1989-91). There was not strong evidence of cohort effects. Results were consistent across sex and Black/White race. Strong period effects and consistency across age, sex, and Black/White race argue that time-varying, ubiquitous exposures drove U.S. secular increases in obesity. Hypotheses implicating the national food supply, mass media advertising, and universal physical activity patterns are compatible with our findings. Hypotheses implicating the built environment or site-specific (e.g., work, school) physical activity are incompatible, as these did not vary much in time or are not ubiquitous across age, respectively. Interventions to reverse obesity increases should target time-varying, ubiquitous environmental factors.

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SPATIAL ODDS RATIO OF DISEASE IN EPIDEMIOLOGICAL STUDIES WITH ORDINAL RESPONSES: A METHODOLOGY USING GENERALIZED ADDITIVE MODELS. *A C C N Mafra, R Cordeiro, D Cariello, L B Nucci (State University of Campinas – Unicamp, Campinas, São Paulo 13083-970, Brazil)

Logistic regression models are frequently used in epidemiological studies based on scales or outcomes that may have ordinal responses to analyze data, but without incorporating spatial distribution of disease. Some researchers categorize the response to binary form to use spatial analysis. In this study some new methods are presented to disseminate the possibility of new forms of studying the disease and, with this, to develop health. Generalized additive models to ordinal responses - proportional odds model, continuation-ratio model, adjacent-category logistic model – are presented and extended to obtain the spatial relative risk and map it through them. As an illustration, data from an incidence study of occupational accidents were adjusted with an ordinal response variable 'gravity of the accident' in three categories: serious, moderate and light. The analysis has found areas of increased relative risk for occupational accidents that varied depending on the level of comparison obtained in different fitted models. Some areas had twice the risk compared to the average of the region studied when comparing serious accident with moderate. In parametric variables studies can be found risk and protection factors. This brings the ability to analyze data by generalized additive models with attachments for epidemiological studies with ordinal response where the spatial relative risk has to be analyzed.

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LANDSCAPE EPIDEMIOLOGICAL SURVEY OF VALLEY FEVER IN GREATER TUCSON, ARIZONA. *J A Tabor, M K O'Rourke, M D Lebowitz, R B Harris (University of Arizona, College of Public Health, Tucson, AZ 85724)

Cost-effective approaches for enrolling subjects in community-based epidemiological studies face many challenges. Additional challenges arise when a neighborhood scale of analysis is needed to distinguish between individual- and group-level effects of environmental risk factors. A stratified, clustered, cross-sectional, address-based telephone survey of greater Tucson, Arizona, was conducted in 2002-2003. Subjects were recruited from direct marketing lists at census block group resolution using a geographic information system (GIS). Six strata were based on three landscape types and two demographic units. Census block groups were selected probability proportional to size and households within the block groups were randomly selected. The direct marketing lists accounted for 45% of the census households. Survey design effect on disease prevalence estimate was substantially reduced by landscape and demographic stratification. Poststratification by race-ethnicity classes was more robust at compensating for selection bias than by age or gender using. Address-based, clustered, telephone surveys provide a cost-effective and valid method to recruit populations using a GIS to design surveys and population survey statistical methods for analysis. Landscape ecology provides effective methods for identifying scales of analysis and units for stratification that can improve sampling efficiency when environmental variables of interest are strong predictors.

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LIBERATING INDIGENOUS PEOPLE FROM PROVINCIAL HEALTH ADMINISTRATIVE DATABASES: A MANITOBA (CANADA) DATA LINKAGE SUCCESS STORY. *B Elias, M Hall, C Kasper, A Doraty, C Burchill, P Martens, E Kliewer, A Demers, D Turner (University of Manitoba, Winnipeg, MB, Canada R3E 3P4)

Comparable and relevant information on the health of the indigenous population in Canada is lacking due to challenges identifying Indigenous peoples in provincial health administrative databases and national mortality databases. In the province of Manitoba, all residents are registered to receive health services. The Manitoba Health Registry (MHR) tracks these registrations and the services they use. Unfortunately, the MHR has undercounted FN individuals by about 35%. A new research initiative was undertaken to identify FN peoples in the provincial health information system for the purpose of informing health policies. A request was made to Indian and Northern Affairs Canada to gain access to the federal Indian Registry System (IRS) which identifies all Registered FNs in Canada. This database was linked to the MHR through a rigorous process of deterministic and probabilistic linkage based on name, gender, birthdate and geographic indicators. Linkage of the IRS data with the MHR has resulted in identification of approximately 95% of records, reducing the undercount of Registered FN individuals from 35% to 5%. Overall, this project resulted in a much greater ability to identify Registered FNs in the provincial health administrative databases. As well, researchers and policy makers will have accurate information about FN health service utilization and health status, such as chronic and infectious conditions (e.g., diabetes, cancers, asthma, arthritis, sexually transmitted diseases, respiratory infections, etc.), mental health conditions (anxiety, depression, suicidality, etc.). In summary, this initiative has paved the way for accurate and timely information.

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CLUES TO THE ETIOLOGY OF DISEASE CLUSTERS: A PRACTICAL METHOD. *D Smith, S Hoshiko (California Department of Public Health, Richmond, CA 94804)

Investigating a community disease outbreak or cluster, such as a cancer excess where environmental factors are suspected, can be time-consuming if not focused. We describe simple approaches to thinking about risk factors and their prevalence that can guide the investigator looking for plausible explanations for an observed excess. The calculation of the observed number of cases in the index community and the expected number, based on rates in a reference area, is typically the first step in a cluster investigation. The ratio of observed to expected cases, the standardized incidence ratio (SIR), reflects a combination of the relative risk (RR) of disease for a given risk factor and its prevalence in the index community. Therefore, given the SIR and plausible RRs for suspected causes, one can calculate the proportion of the index community that would have to have been exposed to have resulted in an SIR of the excess observed. Consider an index community that has twice the incidence as a reference area (SIR = 2). In this case, if a risk factor under consideration as a candidate for causing the cluster increases disease risk three-fold (RR = 3), and is normally present in 10% of the population, it would have to be exposing 70% of the individuals in the index community to effect the observed doubling of the overall SIR. The usual next step in an investigation examines the series of cases. We can screen for candidate exposures by calculating the proportion of cases that would be required to have a risk factor if that factor were responsible for the observed community SIR. We illustrate these methods with examples, including an investigation currently underway, and show how they can be used to help judge whether certain combinations of risk factors and exposure frequencies are plausible, and to rule in or out potential risk factors in a case series investigation.

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SIMPLE FORMULAS FOR EVALUATING THE POTENTIAL IMPACTS OF CONFOUNDING BIAS. *Y Chiba, K Azuma, J Okumura (Kinki University School of Medicine, Osaka 589-8511, Japan)

One of the central problems in causal inference from observational data is unmeasured confounding. This problem often stems from insufficient knowledge of important confounders or a lack of data on known potential confounders. When researchers discuss potential bias from failing to adjust for a confounder, they usually do so only qualitatively. A more convincing approach uses external data in adjustment or bias formulas. These formulas have been developed extensively. Recently, Lee and Wang (American Journal of Epidemiology 2008; 167: 86–9) presented simple formulas that can set the bounds of the confounding risk ratio, which implies bounds for the bias due to confounding, in the context of gauging the potential impact of population stratification bias. They derived the formulas under the assumption that the covariate is dichotomous and the true risk ratio is constant across the strata. Here, we extend their results to the case of a categorical covariate with an arbitrary number of categories and give the formulas without the assumption that the true risk ratio is constant across the strata. We show that the bounds can be constructed using only information about either the exposure–confounder or the disease–confounder relationship. The formulas are extended to the confounding odds ratio in case–control studies and we discuss those for the confounding risk difference. We demonstrate the application of these formulas using an example that may suffer from bias due to population stratification. The application of these formulas is demonstrated using an example that may suffer from bias due to population stratification. The formulas help to provide a realistic picture of the potential impact of bias due to confounding.

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DIFFERENCES BETWEEN MEN AND WOMEN WITH ONLY CELLULAR TELEPHONES AND THOSE WITH LANDLINE TELEPHONES. *L F Voigt, S M Schwartz, C I Li (Fred Hutchinson Cancer Research Center and University of Washington, Seattle, WA 98109)

The proportion of U.S. households with cellular but no landline telephone service increased from 2% in 2003 to 18% in 2008 and ~33% of adults <30 years of age live in households with only cell phones. Traditional random digit dialing (RDD) methods used to recruit controls for case-control studies include only households with landline telephones. We undertook this study to assess differences between women and men with landline phones and those with only cell phones. We called 9,000 cell phone numbers and interviewed 214 women and 223 men 20-44 years of age who resided in the 3-county Seattle-Puget Sound metropolitan area and did not have landline phones. We compared them to 358 women and 388 men of the same age with landline phone service. We successfully screened 38% of the cell phone numbers. 88% of eligible cell phone participants completed a short interview covering a range of health related exposures. 8% of those screened and 35% of those interviewed completed the interviews on the web. After accounting for age, female cell phone only users were 80% less likely to have had a birth, 70% more likely to be Hispanic, and 80% more likely to be non-White than landline controls, but were similar with respect to smoking history, hormonal contraceptive use, body mass index, mammography history, and family history of breast cancer. Male cell phone only users were twice as likely to be Hispanic and/or non-White, 30% less likely to be obese, and 60% less likely to have fathered a child than landline controls, but had similar smoking histories. Controls identified by landline RDD differ in several respects compared to controls with only cell phone service.

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USING CAUSAL DIAGRAMS OPTIONALLY AUGMENTED WITH FUNCTIONAL MAPPING TO UNDERSTAND COVARIATE BALANCE IN PROPENSITY SCORE MODELS. *O A Arah (Department of Epidemiology, UCLA School of Public Health, Los Angeles, CA 90095-1772)

Propensity score models are increasingly being used to estimate the causal effects of exposures in observational studies. A central concern in propensity score models is achieving covariate balance. Usually, this covariate balance is expected to be achieved for those variables included in the propensity score model. This study shows how to use traditional causal diagrams as well as those augmented with the functional mapping encoded in the propensity score to explain the attainment and consequences of covariate balance in propensity score models. The researcher uses functional mapping augmentation to replace solid directed edges between the exposure and other covariates with broken directed edges interconnecting the propensity score with its selected covariates and the exposure. The graphical rules of causal diagrams combined with the conditional independence properties of the propensity score can then be applied to check for the attainment and consequences of covariate balance. Using both traditional and augmented causal diagrams, this study demonstrates how outcome-only predictors are always balanced within strata of the exposure whether or not they are included in the propensity score model. Other types of variable such as confounders and exposure-only predictors must be included in the propensity score model in order to achieve covariate balance between the exposed and unexposed. Nonetheless, only imbalances in covariates which are on confounding paths lead to biased estimates of the causal effect of the exposure. All these findings are illustrated using Monte Carlo simulations.

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FORMALIZING VARIABLE SELECTION IN PROPENSITY SCORE METHODS. *O A Arah (Department of Epidemiology, UCLA School of Public Health, Los Angeles, CA 90095-1772)

The propensity score, defined as the probability that a study participant would have been exposed given their observed background characteristics, is a robust method for estimating unbiased exposure effect. Although it is becoming one of the most applied estimation methods for causal analysis in observational studies, the propensity score still suffers from confusions about its variable selection. This study uses statistical formalization and simulations to demonstrate that the current definition of the propensity score as true exposure-assignment modeling can be misleading for the effect estimation of point exposures using matching, stratification, or covariate adjustment. The most accurate and precise exposure effect estimate is obtained when the propensity score model selects confounding variables plus those related only to the outcome, but not those related only to the exposure. This 'best' model also yields the largest matched sample. Including sufficient confounders yields an unbiased exposure effect estimate. Additional inclusion of outcome-only or exposure-only predictors respectively creases or increases the variance of the exposure effect estimate without improving the point estimate. Non-collapsible effect measures such as the odds ratio require the inclusion of outcome-only predictors after adjusting for confounders. For the commoner point exposure effect estimation, the propensity score can be viewed as a robust functional mapping that mimics the outcome-model space. Propensity score models can then receive similar causal considerations for variable selection as estimation techniques aimed at outcome modeling.

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ESTIMATION OF SPATIAL RISK DISTRIBUTION IN CASE-CONTROL STUDIES USING MULTINOMIAL MODEL. *L B Nucci, A C C N Mafra, R Cordeiro (State University of Campinas – Unicamp, Campinas, São Paulo 13083-970, Brazil)

Case-control studies make a large contribution to epidemiological methodology, providing an efficient way of estimating population relative risk. Even with outstanding developments in geographic information systems and spatial analysis of data in the last 20 years, there still seems to be little use of the spatial dimension in case-control studies, although important studies have appeared in this area, particularly in the field of environmental epidemiology. This study aims to describe a multinomial model as a method to estimate risk factors in case-control studies where the cases are subclassified, including the geographic position of housing from cases and controls. The polytomous logistic model supports the calculation of specific risk for each sub-class of the response variable, but a semi-parametric generalized additive model (GAM) is more appropriate to include geographic coordinates as unidimensional splines and the co-variables. As an illustration we present an application of these models in a population based case-control study of dengue, with cases classified as severe or light. The analyses have found areas of increased risk as well as co-variables that influence the infection. The multinomial approach allows searching, in a unique analysis, the association among co-variables and one or some sub-classes of the cases, opening the possibility of individualized risk and protection factors identification for each sub-class studied which is of great epidemiologic interest, as well as GAM is able to estimate spatial distribution of the risk according to their severity.

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GENERALIZED ROC CRITERION FOR MULTIPLE BIOMARKERS WITH LIMITS OF DETECTION. *N J Perkins, E F Schisterman, A Vexler (NIH, NICHD/DESPR, Rockville, MD 20852)

Authors have shown that a best linear combination (BLC) of multiple biomarkers following a multivariate normal distribution can be formed parametrically that maximizes the area under the receiver operating characteristic curve (AUC). However, biomarkers are often measured with limits of detection (LOD). Common solutions, of omitting or naïvely replacing observations missing below the LOD, lead to negatively biased estimates of the AUC. Maximum likelihood methods have been developed for estimating the parameters of a bivariate normal distribution of two biomarkers with LODs. We generalize the bivariate likelihood for left censored normal random variables to p biomarkers with LODs, develop the point estimator and confidence interval for AUC and demonstrate asymptotic unbiasedness and nominal coverage probability, respectively. Simulations demonstrate that this method yields relative bias ranging from five to less than one percent of the AUC for various levels of correlation and missingness, bias similar in magnitude to estimates based on complete data. For motivation, we apply the methods to measurements of three different polychlorinated biphenyls in women with and without endometriosis to exemplify the discriminatory ability of a BLC of biomarkers each measured with LOD.

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DICHOTOMIZATION: WHY PRESENT ONE 2X2 TABLE WHEN N 2X2 TABLES ARE POSSIBLE (AND NONE ARE ''THE RIGHT'' ANSWER). *K Heavner, C V Phillips, I Burstyn (University of Alberta, Edmonton, AB, Canada T6G2L9)

Converting inherently continuous variables into categorical variables, most often dichotomous variables, is a common practice in epidemiology. National Health and Nutrition Examination Survey (NHANES) data on body mass index (BMI) and cholesterol were used to illustrate: 1) changes in the recommended cutoff over time; 2) that these changes may yield substantially different odds ratios (OR); and 3) that presenting results obtained from a range of cutoffs is a practical alternative to presenting a single OR. There were numerous recommended sets of BMI cutoffs since 1980, complicating comparisons of study results over time. In addition, there are several common data-driven cutoffs in the literature (including the mean, Xth percentile and those selected based on sensitivity analyses) which make it difficult to compare different samples, as each may yield a different cutoff. Presenting results of analyses using only one cutoff loses potentially important information and implies that it is the one and only cutoff that may be of interest to current and future readers and that it is ''the correct answer.'' Presenting the study results obtained for a range of exposure cutoffs is straightforward and may be as simple as plotting ORs versus exposure cutoffs. The OR curve is a step function for small samples and for extreme exposure cutoffs, when minor variations in the cutoff result in substantial changes in the OR. When only one OR is presented, readers are unaware whether it accurately represents the ORs obtained from a range of cutoffs or was chosen because it is the authors' preferred result, such as the maximum OR obtained from a range of cutoffs.

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INCONSISTENT METHODS USED TO ANALYZE DATA FROM THE SWEDISH CONSTRUCTION WORKERS' COHORT STUDY *K Heavner, C V Phillips, B Rodu (University of Alberta, Edmonton, AB, Canada, T6G2L9)

When data are not publicly accessible, researchers are obligated to describe in detail the available data and justify their analytic models. Analyses of a cohort of Swedish construction workers (n>330,000) which are often cited as the basis for tobacco policies were reviewed to investigate consistency in methodological choices (eg, eligibility criteria and tobacco use, age and body mass index (BMI) variables). Most of the 36 articles focused on occupational or tobacco use exposures and outcomes related to cancer or heart disease. Enrolment (1971-93) occurred in 3 phases. Inclusion of the 1st (1971-74) cohort was inconsistent, attributed to contradictory claims about the quality of tobacco use data. Exclusion of this cohort removed >130,000 participants (>2 million person-years). Conflicting descriptions make it unclear whether current or ever snus use was measured from 1971-74. Data about duration/amount of snus use (collected from 1978-93) were excluded from several analyses. Several BMI and age categories were used with little justification for the variation and no reference to categories used in previous analyses. In some cases, the enrolment methodology was poorly referenced as were previous articles that analyzed the same exposure or outcome. When 1 published article is viewed in isolation, readers may get an incomplete picture of how the data could have been analyzed. Only expert readers are likely to recognize the inconsistent methods in these studies and their potential effects as most were not acknowledged by the authors. This highlights the importance of improving the reporting of epidemiological methods and presenting multiple models or making data available for others to do so.

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ACCOUNTING FOR SELECTION/RESPONSE BIAS IN A STUDY OF THE PREDICTORS OF LOW BIRTH WEIGHT AMONG US- AND FOREIGN-BORN LATINAS. *K J Hoggatt, M E Flores, M Wilhelm, R Solorio, B R Ritz (University of California, Los Angeles, CA 90095)

We assessed differences in the prevalence of low birth weight (LBW) between US-born and foreign-born Latinas using data from a survey on prenatal exposures and behaviors. Survey data were collected on a nested case-control sample of women who gave birth in Los Angeles County in 2003. We assessed risk factors for LBW for US-born Latinas and foreign-born Latinas, compared to non-Latina Whites, in both the larger birth cohort and survey responder sample using a two-phase analysis to adjust for potential response bias in the latter. Compared to foreign-born Latinas, US-born Latinas were more likely to report higher education levels, income, prenatal vitamin use, private health insurance coverage, BMI, and more frequent teenage pregnancy, single motherhood, and tobacco or alcohol use. Estimated associations in the larger cohort indicated that US-born Latinas (odds ratio [OR] = 1.34, 95% confidence interval [CI] = (1.17, 1.53)) and foreign-born Latinas (OR = 1.32, 95% CI = (1.18, 1.49)) had nearly identical increased risks for LBW, when each was compared to non-Latina Whites. An analysis of the nested case-control group that did not account for differential selection and response yielded estimates that differed from those in the cohort; however the two-phase analysis of the nested sample yielded estimates that were similar to those for the entire birth cohort, despite the additional adjustment for factors available only for survey responders: US-born Latinas, OR = 1.18, 95% CI = (0.86, 1.62) and foreign-born Latinas, OR = 1.38, 95% CI = (0.95, 2.01), with each group compared to non-Latina Whites. Two-phase analytic methods can be useful for assessing and minimizing apparent response bias in nested studies such as ours, and these methods may be particularly useful in examples such as ours where response bias may be an important source of error.

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WHAT TO DO ABOUT COLLINEARITY. *E F Schisterman, N J Perkins, S L Mumford, A Roy, A Ye (NICHD, NIH, Bethesda, MD)

Collinearity is statistically defined as a near exact linear relation between variables leading to high correlation. Due to matrix inversion near zero, analysis of such data often leads to biased estimates and inflated standard errors. Epidemiologic research thrives on correlated data, such as mixtures of environmental toxicants or dietary intake and their relation to health outcomes. Regardless of origin, collinearity hinders estimation of direct, indirect and total risk. Using directed acyclic graphs (DAGs), we identify 5 fundamental causal structures that induce correlation between exposure variables. We evaluate the consequences of differing levels of collinearity in both linear and non-linear models for each. We present bias and standard errors of total and direct effect estimates for all 5 structures via closed form solutions for linear models and numerically for non-linear models. One statistical approach to avoid collinearity is to misspecify the model (i.e. exclude or combine particular variables as in ridge regression). We show the potential pitfalls of such a strategy by bias and mean squared error. In the cases of collinearity induced by confounding, collider stratification, and over-adjustment, we show models remaining unbiased when correctly specified even with levels of collinearity up to rho=0.99 and demonstrate the magnitude and direction of bias in effect estimates under model misspecification. Our graphical and tabular display of results provide insightful information into the role that collinearity might play in risk estimation and causal inference based on potential DAGs and correlations among measured and potential unmeasured risk factors, thus allowing researchers to improve discussion and decisions on potential risk factors and public health.

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DRIVER'S LICENSE SAMPLING FRAME COVERAGE: BIAS CAUSED BY OPTING-OUT. *M C Walsh, A Trentham-Dietz, L E Bautista, N C Schaeffer, F J Nieto, P A Newcomb, M Palta (University of Wisconsin–Madison, WI 53726)

Over the past few decades, increasing numbers of people are choosing to opt-out of population-based sampling frames due to concerns about privacy. To investigate the implications of using a driver's license sampling frame with incomplete coverage of the study base, we linked breast cancer cases who reported having a valid driver's license from the 2004-2008 Wisconsin Women's Health Study (N=2,988) with a list of licensed drivers from the Wisconsin Department of Transportation (WDOT). Cases completed structured telephone interviews to ascertain risk factor information. A total of 962 cases (32%) were found to have opted-out of the WDOT sampling frame (30% was expected based on data provided by the state). Selection probability ratios (SPR; Maclure 1990) were calculated to directly estimate the selection bias that may occur when using the driver's license sampling frame to select controls in a case-control study. Among cases, the SPR for a particular risk factor was the probability that a case with the factor was found on the WDOT sampling frame divided by the probability that a case without the factor was found on the WDOT sampling frame. Multivariate adjusted SPRs were estimated using generalized linear modeling with the log-link function. Cases with age < 40 (SPR=0.90), incomes either unreported (SPR=0.90) or greater than $50,000 (SPR=0.95), lower parity (SPR=0.95 per 1-child decrease), and users of hormones (SPR=0.93) or antidepressants (SPR=0.95) were significantly less likely to be covered by the WDOT sampling frame (α=.05 level). Several methods to adjust risk estimates from the Wisconsin Women's Health Study, including the use of propensity scores and the case SPR, are planned.

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RECEIVER-OPERATING CHARACTERISTIC OF ADIPOSITY FOR METABOLIC SYNDROME: HANDLS STUDY. *M A Beydoun, M F Kuczmarski, Y Wang, M Mason, M K Evans, A B Zonderman (National Institute on Aging, Baltimore, MD 21224)

BACKGROUND. Body fat percent (TtFM) or regional body fat may better predict the metabolic syndrome (MetS) and its component metabolic risk factors compared to common anthropometric indices. METHODS. Body mass index (BMI), waist circumference (WC), body composition by DXA and metabolic risk factors such as triglycerides (TA), HDL-cholesterol (HDL-C), systolic and diastolic blood pressures (SBP and DBP), fasting glucose (GLU), insulin resistance by homeostasis model assessment (HOMA-IR), uric acid and C-reactive protein (CRP) were measured in up to 933 adults from the Healthy Aging in Neighborhoods of Diversity across the Life Span (HANDLS) study. Receiver-operating characteristic (ROC) curves and logistic regression analyses were conducted. RESULTS. In predicting risk of MetS using obesity-independent NCEP criteria, percent body fat (TtFM) assessed using DXA measuring overall adiposity had no added value over WC. This was particularly true among women (Areas under curve; AUC=0.586 vs. 0.712 for TtFM and WC, respectively, $p<0.05$). Rib fat mass (RbFM) was superior to TtFM only in women for MetS (AUC=0.771 and 0.586 for RbFM and TtFM, respectively, $p<0.05$), and was superior to WC among African-American women in predicting MetS. Elevated Leg fat mass (LgFM) was protective against MetS. Among White women and African-American men, BMI was inferior to WC in predicting MetS. Optimal WC cut points varied across ethnic-gender groups and differed from those recommended by the NIH/NAASO. CONCLUSION. The present study provides evidence that WC is among the most powerful tools to predict MetS, and that optimal cut-points for various indices including WC may differ by sex and race.

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VALIDATION OF DIABETES REPORTING AMONG LATINA WOMEN WITH AND WITHOUT BREAST CANCER. *M Sanderson, V Gupta, G Peltz, A Perez, M Johnson, M K Fadden (Meharry Medical College, Nashville, TN 37208)

In most studies, diabetes has been associated with increased breast cancer risk, however in a recent study of Latina women we found a slight decrease in breast cancer associated with diabetes (odds ratio 0.70, 95% confidence interval 0.45-1.08). Paradoxically, Latina women have high rates of diabetes, but fairly low rates of breast cancer. We assessed the validity of diabetes reporting among Latina women with and without breast cancer to determine whether diabetes reporting may have accounted for our findings. We used data from a case-control study of breast cancer among Latina women age 30 to 79 conducted between 2004 and 2008 on the Texas-Mexico border. In-person interviews were completed with 191 incident breast cancer cases, 511 high-risk controls who had diagnostic mammograms, and 468 low-risk controls who had two consecutive negative screening mammograms (with respective response rates of 97%, 83% and 74%). This analysis is restricted to the 149 cases, 467 high-risk controls, and 394 controls for whom we had complete medical records. Reporting of diabetes or borderline diabetes was quite high among these women with low-risk controls slightly underreporting diabetes (sensitivity = 0.87, specificity = 0.87) relative to high-risk controls (sensitivity = 0.90, specificity = 0.92) and cases (sensitivity = 0.89, specificity = 0.95). Our findings suggest that inaccurate diabetes reporting did not account for the reduced risk of breast cancer associated with diabetes in our study of Latina women. Should larger studies confirm our results, the reduction in breast cancer risk among diabetic women may help explain the lower incidence of breast cancer among Latina women than non-Hispanic white women.

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THE CO-OCCURRENCE OF ASTHMA AND FOOD ALLERGY ANAPHYLAXIS MORTALITY IN THE US. *A M Branum, L J Akinbami, S L Lukacs (National Center for Health Statistics, Hyattsville, MD 20782)

Food allergy and asthma are potentially serious health conditions of children and adults with significant public health burden. Anaphylactic reactions may closely resemble severe asthma attacks, as respiratory compromise is often a major part of the anaphylactic response. Food allergy and asthma often coexist and asthma may be a risk factor for severe anaphylactic reactions to food. The objective of this analysis was to determine if there is a greater association between asthma and food allergy anaphylaxis deaths, versus anaphylaxis deaths due to other reasons. Data from the 2000-2005 US Multiple Cause of Death files were analyzed. Cases were identified as records with the ICD-10 codes T78.0 and T78.1 (anaphylactic reactions to food and adverse reactions to food) and controls included deaths primarily due to unspecified anaphylaxis and angioneurotic edema (T78.2-T78.4). Exposure odds ratios (EOR) were calculated to determine the odds of having asthma. From 2000-2005, there were 123 cases where death was primarily due to severe reactions to food. The odds of asthma as an accompanying cause of death were 79 percent greater among deaths primarily due to adverse reactions to food compared to anaphylaxis due to other reasons (EOR=1.79 [95% CI: 1.01, 3.15]). These results demonstrate that asthma is more likely to be reported among deaths coded as food allergy anaphylaxis compared to other anaphylaxis deaths. Although the interpretation of these results is restricted to deaths, this analysis further corroborates the potentially important relationship between asthma and severity of food allergy reactions.

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A RANDOMIZED CONTROLLED TRIAL COMPARING A COMPUTER ASSISTED INSULIN INFUSION PROTOCOL WITH A STRICT AND A CONVENTIONAL PROTOCOLS FOR GLUCOSE CONTROL IN CRITICALLY ILL PATIENTS. *A B Cavalcanti, E Silva, A J Pereira, M Caldeira-Filho, F P Almeida, G A Westphal, R Beims, C C Fernandes, T D Correa, M R Gouvea, J Eluf-Neto (Universidade de Sao Paulo, Sao Paulo 01246903, Brazil)

Purpose: To evaluate blood glucose (BG) control efficacy and safety of three insulin protocols in medical intensive care unit patients (MICU). Methods: This was a multicenter, randomized controlled trial, involving 167 MICU patients with at least one BG measurement $\geq$150 mg/dL and one or more of the following: mechanical ventilation; systemic inflammatory response syndrome; trauma or burns. The interventions were: Computer assisted insulin protocol (CAIP), with insulin infusion maintaining BG between 100mg/dL-130mg/dL; Leuven protocol, with continuous insulin maintaining BG between 80mg/dL-110mg/dL; or conventional treatment: subcutaneous insulin if glucose >150mg/dL. Main efficacy outcome was the mean BG and safety outcome was the incidence of hypoglycemia ($\leq$40 mg/dL). Results: Mean BG was 125.0 mg/dL, 127.1 mg/dL and 158.5 mg/dL for CAIP, Leuven and conventional treatment, respectively (P=0.34, CAIP versus Leuven; P<0.001, CAIP vs. conventional). In CAIP, 12 patients (21.4%) had at least one episode of hypoglycemia, versus 24 (41.4%) in Leuven, and 2 (3.8%) in conventional treatment (P=0.02, CAIP vs. Leuven; P=0.006, CAIP vs. conventional). Conclusions: The CAIP is safer than and as effective as the standard strict protocol for controlling glucose in MICU patients. Hypoglycemia was rare under conventional treatment. However, BG levels were higher than with IV insulin protocols.

458-S

A GEOGRAPHIC INFORMATION SYSTEM (GIS)-BASED ALTERNATIVE TO ''CRUISING AND COUNTING'' FOR PRE-LISTING OF HOUSEHOLDS IN GEOGRAPHIC SAMPLES. *M T Lowe, K M Flick, B R McClellan, L E Palmer, K M Bloom, E B Clark, S D Firth (University of Utah, Salt Lake City, UT 84108)

The National Children's Study (NCS) uses random stratified geographic sampling to select a representative sample of US households for the cohort. The NCS selects counties or aggregations of several rural counties as primary sampling units (PSU). PSUs are geographically divided further into strata, from which study segments (neighborhoods) are randomly selected. Standard practice is to pre-list each segment, to determine the number of dwelling units (DU), by ''cruising and counting'', i.e. systematically driving the segment streets to count DUs. We evaluated a GIS workstation-based alternative for pre-listing. For each of the 15 NCS study segments in Salt Lake County, we obtained GIS data for census and street boundaries, tax assessor parcels, and new 6-inch aerial imagery. Using ArcMap 9.2, GIS published map files were generated. Two research assistants independently conducted a GIS workstation-based pre-listing of the study segments using these map files. We also conducted a traditional ''cruising and counting'' pre-listing of the study segments. The total count of DUs in the 15 segments was 6438 by the cruising and counting approach and 6252 by GIS-based method. The counts from the two methods differed by 5% or less for 12 of the 15 segments (and 3% or less for 8 of these 12), 5-10% for one segment, and >10% for 2 of the segments. The amount of staff time required for ''cruising and counting'' was three-fold the time required for the GIS method. GIS workstation-based counts were sufficiently precise for pre-listing, and provide an economical, time-saving, reduced carbon emission alternative to traditional ''cruising and counting''.

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EPIDEMIOLOGY IN THE NEWS AND WHY IT IS WRONG. P Bergen, C V Phillips, *K J Goodman (University of Alberta, Edmonton, AB, Canada T6G2L9)

One of the great frustrations of having expertise in a scientific field of popular interest is how popular presentations distort the scientific information. Epidemiology is often criticized as junk science, but this criticism seems to stem less from the real serious failures in scientific conduct (publication biases, ignoring errors and uncertainty) than from unsupported pronouncements in the popular press. We conducted a systematic review to identify the top popular press health stories/themes of 2008 that involved epidemiologic claims, and to assess whether the research supported the published conclusions and claims made in press releases, author interviews, and news stories. The two biggest stories with epidemiologic claims were not based on any epidemiology: there is no such research supporting worries about bisphenol A, and worries about vaccination causing autism flatly contradict the evidence. Other stories (about vitamins, screening tests, pharmaceuticals, body fat) were driven by epidemiologic results. Methodological limitations were amplified into misinformation as results were dumbed-down for the public, and conclusions often went well beyond what the research supported. Discoveries of null effects were typically downplayed by researchers and the press. The year's major descriptive epidemiology result, drops in US disease rates, did not stop the mantra that upcoming generations will die younger than their parents. We found that ostensible authorities, including study authors, are as much to blame for misleading reporting as journalists. Stereotypical journalistic motives (sensationalism, financial influences) explain some of the misinformation, though more generally it seems that researchers and reporters have a flawed understanding of scientific inference.

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ASSESSING THE LINEARITY ASSUMPTION FOR THE INSTRUMENTAL VARIABLE ANALYSIS WITH BINARY OUTCOMES. *R Ionescu-Ittu, M Abrahamowicz, J A C Delaney (McGill University, Montreal, QC, Canada H3A1A1)

Instrumental variables (IV) methods using the 2-stage least square (2SLS) analysis are increasingly used in pharmacoepidemiology to control for unobserved confounding. Yet, this method relies on the assumption that the true treatment effect is consistent with the risk difference (RD) model, which implies a linear effect of the treatment (Tx) on the probability of the outcome. If the true effects are consistent with non-linear (e.g. logistic) models, the 2SLS IV estimates are biased. However, in practice it is unknown if the true relationship conforms to the linear or the logistic (non-linear) model. We propose and validate in simulations an empirical criterion for discriminating between the two models. If the true model is logistic, then the RDs vary depending on the absolute level of risk in the untreated. Thus, assuming an incorrect RD model induces a spurious interaction between the treatment and the underlying risk (as defined by other observed covariates), which can help assessing the validity of the 2SLS model. We simulated a hypothetical study with binary outcomes arising from either (1) logistic or (2) linear model. Individual *risk* scores were estimated from the logistic model with all covariates, but no Tx effect. We then tested, at $\alpha \leq 0.05$, the *risk*-Tx interaction in the linear model that included all covariates and the Tx. As expected, the interaction was statistically significant in only 5% of the 1,000 samples in which data was generated from the linear RD model. In contrast, the interaction was significant in $\geq$95% of the 1,000 samples generated from the logistic model. The statistical significance of the *risk*- Tx interaction could help guiding the selection of the best analytic approach in IV-based studies.

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INTERACTION-BASED METHOD TO DETECT UNOBSERVED CONFOUNDING IN PHARMACOEPIDEMIOLOGY: AN ALTERNATIVE TO INSTRUMENTAL VARIABLES. *M Abrahamowicz, L Bjerre, J LeLorier, Y Xiao (McGill University, Montreal, QC, Canada H3A1A1)

The instrumental variables (IV) methodology that uses physician preference-based instruments is gaining popularity in pharmacoepidemiology. Yet, the method is difficult to apply within the logistic regression framework. We propose an alternative method that applies for any type of regression analysis (including logistic), which uses the same physician preferences as a mean to detect unobserved confounding by indication. We postulate that confounding by indication is more likely to occur if the treatment received by a patient diverges from physician's apparent preferences toward one of the drugs, as such discrepancy suggests the observed treatment choice was influenced by the unobserved patient's characteristics. Accordingly, in the presence of unobserved confounding, the *observed* treatment effect will vary depending on the strength of such discrepancies. Thus, we use a *technical* interaction between (i) a measure of discrepancy between physician preference and the treatment prescribed, and (ii) the treatment, as an indication of unobserved confounding. (Physician preferences are estimated in preliminary analyses of individual treatment choices, after adjusting for observed patient characteristics). To assess the proposed method, we simulated a hypothetical large pharmacoepidemiological study with a binary outcome. In multiple logistic analyses, the postulated treatment-discrepancy interaction was statistically significant in 51-64% of simulated samples when the unmeasured confounding was present, vs only 5-6% of samples without confounding. Compared with the conventional logistic model, the interaction model also reduced by >50% the relative bias of the estimated treatment effect.

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SUBGROUP-SPECIFIC EFFECTS IN THE ABSENCE OF THE OVERALL EFFECT: IS THERE REALLY A CONTRADICTION? *M Abrahamowicz, M-E Beauchamp, D Da Costa (McGill University, Montreal, QC, Canada H3A1A1)

Interpretation of subgroup analyses in epidemiology remains controversial. A recent paper argues that the combination of (a) a stratum-specific effect, and (b) the absence of overall effect of the exposure or intervention, is unlikely to truly reflect an effect limited to one subgroup [Weiss, *Cancer EpiPrevBio* 2008]. Using 2x2 tables, for a hypothetical *population*, it demonstrates that such an occurrence would imply an implausible ''qualitative'' interaction with exposure having opposite effects in the two strata. Yet, in practice, inference about exposure effects relies on a limited *sample* and criteria such as ''statistical significance'' or confidence intervals. We used stochastic simulations to investigate an alternative interpretation for the above combination of findings (a) and (b). We simulated a study of the effect of binary exposure X on the binary outcome Y, with a binary stratification variable Z. X was associated with Y only in the subgroup with Z=1, and had no effect if Z=0. We varied sample size (N), prevalence of Z (p_z), and OR for the X-Y association (when Z=1). We then tested, in separate logistic models: (1) the main effect of X (pooled across strata of Z), and (2) the X*Z interaction. We used conventional $p<0.05$ criterion to declare ''statistically significance''. For moderate N=200-500, and exposure effect limited to a relatively small subgroup ($p_z<0.30$), in up to 50% of the simulations we got the ''apparently contradictory'' pattern of: (i) ''significant'' interaction, and (ii) a ''non-significant'' overall effect. In most of these samples, the effect of X in the subgroup with Z=1 was also ''significant''. Thus, the above pattern may often represent an effect limited to one subgroup, rather than a ''qualitative'' interaction.

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METHODOLOGICAL ISSUES IN A RETROSPECTIVE CANCER INCIDENCE STUDY. *J M Buchanich, A O Youk, G M Marsh, Z Bornemann, S E Lacey, K J Kennedy, N A Esmen (University of Pittsburgh, Graduate School of Public Health, Center for Occupational Biostatistics and Epidemiology, Pittsburgh, PA 15261)

Objective: To highlight the obstacles encountered while conducting a retrospective cancer incidence study in the United States. Methods: The authors conducted central nervous system (CNS) cancer incidence tracing for a large occupational cohort of jet engine manufacturing workers from 1976 to 2004 in the 24 states which comprised 95% of the cohort deaths. The cohort of approximately 224,000 employees was matched with the cancer registry data; all CNS cancer matches were requested with their diagnostic data. Results: The authors spent approximately 700 hours completing applications and obtaining the cohort matches. Approximately 70% of the cases were identified in the facility state. In addition to the large amount of time involved, identified issues include: complicated approval processes, high costs, temporal differences among the registries and registry difficulty performing the matching. Several states do not allow individual-level data to be used for research purposes at all. Conclusions: Researchers can gain important cancer incidence information by matching retrospective cohorts to multiple state cancer registries. However, they should carefully weigh the time and costs required and plan accordingly. Despite some serious obstacles, many of which are potentially resolvable, cancer incidence studies of retrospective cohorts using multiple cancer registries are feasible.

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ESTIMATING ABSOLUTE RISKS IN THE PRESENCE OF NONCOMPLIANCE: AN APPLICATION TO A WOMEN'S HEALTH INITIATIVE RANDOMIZED TRIAL. *S Toh, S Hernández-Díaz, R Logan, J Robins, M Hernán (Harvard School of Public Health, Boston, MA 02115)

Noncompliance with the assigned treatment is common in randomized controlled trials. An intention-to-treat (ITT) analysis, while providing a valid test of the null hypothesis, may fail to detect serious adverse effects that would have been detected in the absence of noncompliance. Using data from the Women's Health Initiative estrogen-plus-progestin trial, we used inverse probability weighting to estimate both absolute and relative measures of risk associated with continuous estrogen-plus-progestin use (i.e., the effect under full compliance), and the incidence of invasive breast cancer, modeled as a failure-time outcome, under different dose-response modeling assumptions. As estimating the effect of continuous treatment (a non-dynamic regime) may be of little interest in some cases, we also estimated the effect under the dynamic treatment ''take hormone therapy until adverse events occur, then stop taking hormone therapy.'' In contrast to an ITT hazard ratio of 1.2 (95% confidence interval [CI]: 1.0, 2.5), 8-year continuous estrogen-plus-progestin use was associated a hazard ratio of 2.4 (95% CI: 1.4, 3.9). The estimated 8-year risk difference (cases/100 women) was 0.7 (95% CI: -0.2, 1.6) in the ITT analysis, compared to 1.1 (95% CI: 0.1, 2.0) in the adherence-adjusted analysis. Results were robust across various dose-response models. The hazard ratio for the dynamic treatment regime was 2.3 (95% CI: 1.4, 3.7). Adjusting for noncompliance with inverse probability weighting provides both absolute and relative measures of risk on a failure-time outcome, and allows for flexible modeling.

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465-S

GLUTATHIONE GENES AND AUTISM. *K Bowers, C Newschaffer, M D Fallin (Johns Hopkins University, Baltimore, MD 21205)

Introduction: The Autism Spectrum Disorders (ASD) are characterized by impaired language, nonverbal communication abilities, social cognition and stereotyped behaviors. The etiology of autism may involve gene-gene (GXG) and/or gene-environment (GXE) interaction. To address this complexity, we evaluated main genetic effects, GxG interactions and GXE interactions for association with ASD, focusing on genes related to the antioxidant glutathione (GSH), given its role in oxidative stress and the potential relationship to autism etiology. Methods: GSH genes were selected based on their location in autism linkage regions, level of expression in brain, and degree with which their expression correlated with expression of other GSH genes.We genotyped tagSNPs, potentially functional SNPs and SNPs in conserved regions among 318 nuclear families with at least one ASD child from the AGRE repository.Odds ratios and 95% confidence intervals were estimated using conditional logistic regression (CLR) of 1:3 case:pseudo-control matched sets per trio, using a robust variance estimator to account for multiple children per family. P-values were generated using likelihood ratio tests. GXG interaction was evaluated using logic regression, also in a CLR framework.GXE interaction by stress during pregnancy was evaluated via stratified CLR. Results: Several SNPs located in the genes Cystathionine Gamma-Lyase, Alcohol Dehydrogenase 5, Gamma-Glutamylcysteine Synthetase and Glutaredoxin 3 showed significant or suggestive association with ASD. In addition, several SNPs had heterogeneous odds ratios comparing mothers who experienced pregnancy stress versus mothers who did not. Conclusion: This research suggests potential genes and environmental factors for follow-up analyses to further explore an association between oxidative stress and autism.

466-S

HAZARDOUS AIR POLLUTANTS AND AUTISM IN NORTH CAROLINA AND WEST VIRGINIA. *A E Kalkbrenner, J L Daniels, C Poole, J C Chen (Department of Epidemiology, University of North Carolina)

Recent exploratory studies have suggested a role for air pollutants in autism etiology. We compared exposure to hazardous air pollutants (HAPs) among 397 children with autism and 2997 children with speech and language impairment from the records-based Autism and Developmental Disabilities Monitoring Network in North Carolina (born 1994, 1996) and West Virginia (born 1992, 1994). Exposures to ambient concentrations of 35 metal, particulate, and volatile organic HAPs in the census tract of the child's birth residence were estimated from the 1996 National Air Toxics Assessment annual-average model based on emissions data from point, area, and mobile sources. Odds ratios (OR) and 95% confidence intervals comparing the sample 80% to the 20% HAP concentration were estimated using logistic models and log-transformed HAPs, adjusting for design variables (surveillance year, state), a priori confounders from the birth certificate and census (maternal education, age, smoking in pregnancy, race, marital status, census median household income), and covarying HAPs. We used semi-Bayes models to stabilize estimates. Most ORs for known human neurotoxicant HAPs and metals were near-null (e.g. arsenic, 1.0 [0.8, 1.3], 0.21 vs. 0.03 ng/m3), though some were inversely associated (lead, 0.8 [0.5, 1.2], 3.1 vs. 0.3 ng/m3) and others slightly elevated (mercury, 1.2 [0.8, 2.0], 0.3 vs. 0.1 ng/m3). ORs were elevated for methylene chloride (1.4 [0.8, 2.5], 610 vs.183 ng/m3), quinoline (1.3 [0.9, 1.9], 0.005 vs. 0.0001 ng/m3) and styrene (1.6 [1.0, 2.7], 41 vs. 5 ng/m3), of these, only methylene chloride was previously reported. Although limited by ecologic exposure estimates, our results support a role for some air pollutants in autism etiology.

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PATTERNS OF CORTISOL REACTIVITY ARE ASSOCIATED WITH MEMORY DEFICITS IN LOW INCOME MEXICAN CHILDREN. *K Z LeWinn A E Hubbard, L C Fernald (University of California, San Francisco, CA 94143)

Dysregulated cortisol reactivity is associated with worse cognitive performance in children. However, previous research is limited by analyses ill-suited to modeling the dynamic nature of cortisol responsivity. In the current study, we used HOPACH (Hierarchical Ordered Partitioning and Collapsing Hybrid) clustering to identify distinct patterns of cortisol responses to a mild stressor, and then modeled the associations between cluster membership and memory performance. We used a sample of 611 Mexican children in the lowest 20% of the income distribution (mean age 4.5; SD=0.85) participating in a poverty-alleviation program. During an at-home cognitive testing protocol, saliva samples to assess cortisol were collected upon arrival, and 20 and 50 minutes thereafter. We identified six distinct patterns of cortisol reactivity with HOPACH clustering and used linear regressions to model the associations between cluster group membership and age adjusted z-scores on the Woodcock-Muñoz tests of long-term and short-term memory; analyses were adjusted for covariates (e.g. time of testing, sociodemographic characteristics). In the analysis of cortisol responsivity, the cluster exhibiting a standard diurnal decrease during the testing period served as our reference group (n=80). In comparison to this group, ''prolonged responders'' (i.e. cortisol increasing over time; n=73) scored significantly lower on the long-term memory (β=-0.36; p=0.019), and short-term memory tasks (β=-0.29, p=0.03); ''high reactors'' (i.e. response of large magnitude with recovery; n=45) scored significantly lower on the short-term memory task only (β=-0.42, p=0.03). These findings are consistent with previous work and suggest that there may be specific memory deficits associated patterns of cortisol reactivity.

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ARE HOMICIDES, SUICIDES AND MOTOR VEHICLE ACCIDENTS ASSOCIATED WITH EPILEPSY? A POPULATION-BASED STUDY. *C S Kwon, M F Liu, H Quan, N Jette (University of Calgary, Calgary, AB, Canada T2N 2T9)

Purpose: Compare the incidence of homicides, suicides and motor vehicle accidents (MVA) between individuals with and without epilepsy. Methods: Individuals with and without epilepsy were identified using linked administrative databases (health care insurance plan registry, vital statistics, discharge abstract database, emergency room visits and physician claims databases) between 1996 and 2003 in a Canadian health region with a 1.4 million population. An epilepsy case was defined as anyone who had 2 physician claims, 1 hospitalization or 1 emergency room visit coded with an ICD-9 or 10 epilepsy code any time during a two year period. Four non-epilepsy subjects were matched to one epilepsy case by age (within 1 year) and sex. The incidence of homicides, suicides and MVAs in 2003-2004 was determined using these linked administrative data. Results: 10,240 individuals with epilepsy and 40,960 controls without epilepsy were identified. Mean age was 39.0 ± 21.3 (range 0.12-99.4) and 48.5% were female. One year incidence for cases and controls was: 0.86% and 0.24% (p<0.001) for homicide, 0.41% and 0.10% (p<0.001) for suicide and 0.53% and 0.29% (p=0.008) for MVAs. The odds ratio for those with epilepsy was 2.7 (95% CI 2.0-3.7) for homicides, 3.4 (95% CI 2.1-5.4) for suicides and 1.7 (95% CI 1.2-2.4) for MVAs after adjustment for comorbidities. Conclusion: This large population-based study demonstrated that those with epilepsy are more likely to experience homicides, suicides and MVAs than those without epilepsy. As they are vulnerable to homicides, suicides and MVAs, those with epilepsy should be included in the target population of social prevention programs.

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IMPACT OF A HEALTHY DIET DURING AGES 18-24 ON THE RISK OF PARKINSON'S DISEASE. *S L Rhodes, S Costello, Y M Bordelon, B Ritz (UCLA School of Public Health, Los Angeles, CA 90059)

Smoking and coffee literature suggests that Parkinson Disease (PD) cases are more likely to refrain from unhealthy behaviors, implying they are more likely to be compliant with recommendations of healthy behaviors. However, studies of diet and PD indicate that control subjects refrain from unhealthy behaviors (e.g., consuming red meat and saturated fat) and partake in healthier behaviors (e.g., consuming fruits, vegetables, whole grains, and seafood). Together these observations present an apparent paradox: do PD cases comply with "healthy behaviors" as indicated by inverse smoking and coffee associations, or refrain from them as observed in diet research. We recruited incident PD cases and population-based controls from 2000-2007 in the Central Valley of California and collected dietary data for several potentially relevant age periods. In analysis of 374 PD cases and 345 controls, we observed an estimated increased risk of PD with increasing meat consumption and decreased risk of PD with increasing seafood, vegetable, fruit, and tea intake, particularly in those reporting these dietary behaviors between ages 18 and 24. The effects of seafood and tea were more pronounced in men than in women. Our dietary data support the hypothesis that controls, not PD cases, partake in healthier dietary behaviors and that these behaviors as young adults might be etiologically relevant, particularly in men.

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PERSONALITY TRAITS INFERRED FROM OCCUPATIONAL CHARACTERISTICS DIFFER BETWEEN PARKINSON'S PATIENTS AND CONTROLS. *N Gatto, V Relys, Y Bordelon, B Ritz (UCLA, Los Angeles, CA 90095)

Researchers have suggested that a distinct personality characterized by introversion, rigidity and over-cautiousness could be associated with Parkinson's disease (PD), a debilitating neurodegenerative movement disorder. No study has assessed personality before PD onset, and it is not known whether patterns in premorbid personality exist prior to PD diagnosis. We used the longest held job reported on occupational history questionnaires by 355 incident PD patients and 335 population controls enrolled in the Parkinson's Environment Gene Study (PEG) to infer personality traits. Jobs were coded using 1990 US Census Occupational Classifications, and then assigned scores developed by Roos and Treiman (1980) and updated by England and Kilbourne (1988) based on the premise that every job requires some degree of handling data, people and objects. In our study population, the job of longest duration was held for an average 28% of lifetime. All cases had worked at their longest held job prior to diagnosis an average 34.5 ($\pm$14.1) years; controls for 35.2 ($\pm$14.6) years prior to study entry. Consistent with the hypothesis that a distinct premorbid personality characterizes PD patients, in logistic regression models adjusted for age, sex, education, race/ethnicity and smoking, compared to controls, cases were less likely to work in occupations requiring the ability to make generalizations, judgments or decisions based on measureable or verifiable criteria (OR = 0.86, 95% CI 0.73, 1.00), and tended not to work in occupations that required adaptability to situations involving feelings, ideas or facts from a personal viewpoint (OR = 0.87, 95% CI 0.74, 1.02). Results from this study provide some support for a premorbid Parkinsonian personality.

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THE PREVALENCE OF MIGRAINE AND OTHER HEADACHE DISORDERS IN MILLENNIUM COHORT ACTIVE-DUTY, RESERVE AND NATIONAL GUARD MEMBERS. T Hooper, *N Granado, G Gackstetter, A Scher, C Jankosky, E Boyko, T Smith (Naval Health Research Center, San Diego, CA 92106)

Introduction: Little research has been published on the prevalence of headache disorders in the US military population, especially a representative sample of active-duty, Reserve and National Guard members. Our objective was to characterize migraine and other headache disorders in the context of demographic, behavioral, and other characteristics in a large population-based military cohort. Methods: A representative sample (n=77,047) of US active-duty, Reserve and National Guard members completed a baseline questionnaire from July 2001 to June 2003 for The Millennium Cohort Study. Women were oversampled and comprised approximately 25% of the study population. The vast majority (87%) were $\leq$ 44 years. Migraine and other headache disorders were assessed using the following headache measures: self-reported history of provider-diagnosed migraine, recurrent severe headache within the past year, and headaches/bothered a lot within the past 4 weeks. Results: The overall baseline prevalence of self-reported provider-diagnosed migraine was 11%, the prevalence of self-reported recurrent severe headache was 13%, and lastly, the prevalence of headaches/bothered a lot was 6%. Analyses by age, sex, rank, and race/ethnicity are underway. Conclusion: Previous research on the prevalence of migraine in the civilian population (13% based on non-patient interviews using standard diagnostic criteria) suggests underdiagnosis due to substantial proportions of individuals not seeking medical care. Thus, self-reported provider-diagnosed migraine in the military may represent a higher headache burden in this population.

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OVERWEIGHT AND OBESITY TRENDS AMONG ACTIVE DUTY MILITARY PERSONNEL—A 10-YEAR PERSPECTIVE. R Bray, *C Reyes, S Jones (RTI International, Washington, DC)

Objective: Examine a 10-year snapshot of data from a large probability sample and determine if overweight and obesity have become an increasing problem in the U.S. military, assess the factors contributing to these conditions, and whether differences exist compared to the civilian population. *Design/Measures*: The Health Related Behaviors Survey Among Active Duty (AD) Personnel uses a representative random sample of the U.S. military. Data from four survey years (1995–2005) of this cross-sectional study were analyzed using an average sample size of 15,500 per year. The prevalence and risk of overweight and obesity were determined according to sociodemographic and health behavior variables. *Results*: The prevalence of overweight in the military increased by 3 percentage points over 10 years (t-test = 7.81, p-value = <.0001), while obesity increased by 8 percentage points (t-test = 13.61, p-value = <.0001). The overall prevalence for both conditions increased by 11 percentage points (t-test = 10.89, p-value = <.0001). Independent risk factors for overweight and obesity were older age, African American race and Hispanic ethnicity, Navy, Enlisted forces, married individuals, heavy drinkers, non-heavy smokers, and screening positive for depression (only for obesity). *Conclusions*: An increasing trend in overweight and obesity across the 10-year span was observed. Increases occurred among all demographic groups, and the problem was especially critical for obese personnel and older age groups. While the military has a lower prevalence of both conditions compared to the civilian population, these increases highlight difficulties in identifying new DoD efforts to improve the health, readiness, and quality of life of the Active Forces.

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HOUSEHOLD FOOD INSECURITY IS ASSOCIATED WITH SYMPTOMS OF NEUROLOGICAL DISORDER IN ETHIOPIA: EVIDENCE FROM THE GILGEL GIBE GROWTH AND DEVELOPMENT STUDY. *A M El-Sayed, C Hadley, F Tessema, A Tegegn, J A Cowan, Jr, S Galea (University of Michigan, Ann Arbor, MI 48105)

Food insecurity has been shown to be associated with poor health in developing countries. Using data from the Gilgel Gibe Growth and Development Study, we assessed the relation between food insecurity and risk for neurological symptoms in southwest Ethiopia. Data on food security, gender, age, household assets, and self-reported neurological symptoms were collected from a population-based representative cohort study (N=900) in rural southwest Ethiopia. We used bivariate chi-square tests and multivariate logistic regression models to assess the relation between food insecurity and risk for a range of neurological symptoms. In multivariate models taking into account age, gender, and household socioeconomic status, food insecurity was associated with seizures (Odds ratio (OR)=2.78, 95% Confidence intervals (CI)=1.59, 4.84), extremity weakness (OR=1,69, 95% CI=1.23, 2.33), tremors/ataxia (OR=2.46, 95% CI=1.69, 3.57), aphasia (OR=2.70, 95% CI=1.45, 5.03), carpal tunnel syndrome (OR=2.52, 95% CI=1.67, 3.79), spinal pain (OR=1.77, 95% CI=1.28, 2.46), and vision dysfunction (OR=2.18, 95% CI=1.59, 3.00), but was not associated with extremity numbness. There is clear evidence of co-occurrence between food insecurity and neurological symptoms; however the directionality of these associations is unclear. It is biologically plausible that food insecurity leads to greater neurological symptoms or, conversely, that neurological symptoms result in limited capacity to obtain food and greater food insecurity. Future research should assess the causal mechanisms relating food insecurity to neurological symptoms.

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DEVELOPMENT OF ESTIMATES OF DIETARY NITRATES, NITRITES, AND NITROSAMINES FOR USE WITH THE SHORT WILLET FOOD FREQUENCY QUESTIONNAIRE. *J Griesenbeck, M Steck, J Huber, Jr, J Sharkey, A Rene, J Brender, (School of Rural Public Health, Texas A&M Health Science Center, College Station, TX)

Studies have suggested that nitrates, nitrites, and nitrosamines have an etiologic role in adverse pregnancy outcomes and chronic diseases. Although an extensive body of literature exists on estimates of these compounds in foods, the data varies in quality, quantified estimates, and relevance. We developed estimates of nitrates, nitrites, and nitrosamines for food items listed in the Short Willet Food Frequency Questionnaire (WFFQ) as adapted for use in the National Birth Defects Prevention Study. Reference databases were searched for literature reflecting nitrate, nitrite, and nitrosamine values in foods. Relevant published literature was reviewed; only publications reporting results for items listed on the WFFQ were selected for inclusion. The references selected were prioritized according to relevance to the current U.S. population. Based on our estimates, vegetables contain the highest levels of nitrate, contributing as much as 189 mg/serving. Meats and beans contain the highest levels of nitrites with values up to 1.84 mg/serving. Alcohol, meat and dairy products contain the highest values of nitrosamines with a maximum value of 0.53 μg/serving. To our knowledge, these are the only estimates specifically designed for use with the adapted WFFQ and generated to represent food items available to the U.S. population. The estimates provided may be useful in other research studies, specifically in those exploring the relation between exposure to these compounds in foods and adverse health outcomes.

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WEIGHT PATTERNS DURING MIDDLE AGE CHARACTERIZED BY FUNCTIONAL PRINCIPAL COMPONENTS ANALYSIS ARE ASSOCIATED WITH WEIGHT STATUS AT AGE 25 YEARS. *M E Waring, C B Eaton, T M Lasater, K L Lapane (Department of Community Health, Brown University, Providence, RI 02912)

Background: Obesity, weight gain, and weight cycling during middle age increase disease risk. The timing and duration of overweight/obesity and weight changes may be important for explaining risk. Functional methods may be useful for characterizing weight trajectories to further our understanding of health impact of weight. Methods: Using a subset of the Framingham Heart Study Cohort limited-access dataset (n = 1305), we conducted a functional principal components analysis (fPCA) of biennially-measured body mass index (BMI) from 40 to 60 years. Scores from the principal component (PC) functions defined weight patterns. Gender-specific logistic regression models provided estimates of association. Results: PC functions described overall weight status (normal weight, overweight, obese), weight changes (loss, no change, gain), and weight cycling. Associations of education, smoking, and alcohol use and weight patterns differed by gender. BMI $\geq$ 25 kg/m^2 at 25 years was the strongest correlate: adjusted odds ratios and 95% confidence intervals were 13.2 (6.3 – 28.1) for men and 3.6 (2.2 – 6.1) for women for overall overweight and 106.8 (41.8 – 272.8) for men and 18.5 (9.7 – 35.4) for women for overall obese. BMI $\geq$ 25 kg/m^2 at 25 years was also associated with increased odds of weight loss and cycling and decreased odds of weight gains. Conclusions: fPCA appears useful for describing weight patterns. The strong link between BMI at 25 years and weight patterns during middle age supports previous findings that weight tracks across the lifecourse and suggests that prevention of unhealthy weight patterns needs to begin earlier in life.

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EVALUATION OF THE SOY ISOFLAVONES, DAIDZEIN AND GENISTEIN IN JAPANESE AND WESTERN POPULATIONS. *R Evans, A Sekikawa, T Kadowaki, K Miura, J D Curb, L H Kuller (University of Pittsburgh, Pittsburgh, PA 15261)

The aim of this study was to measure and compare the distributions of daidzein and genistein concentrations in the circulation of Japanese and North American populations. In addition, the levels were evaluated for associations with other analytes and with measures of sub-clinical atherosclerosis.CHD mortality among the Japanese is low, although many Japanese of the post WWII birth cohort have adopted a westernized lifestyle. We are interested in the soy isoflavones: daidzein and genistein, as soy intake is very high in Japan and the isoflavones may have cardiovascular protective properties. We conducted a population-based cross-sectional study of 730 men aged 40-49:313 Japanese and 417 N. Americans examining subclinical atherosclerosis (coronary calcification and carotid intima-media thickness). Among them we randomly selected 94 Japanese, 54 Caucasians and 48 African-Americans to measure daidzein and genistein. Daidzein and genistein were analyzed by GC-MS. The distributions of daidzein and genistein concentrations were far higher in the Japanese than in the Caucasians and African-Americans (median (interquartile range) nM) 85.8 (28.6 to 211.4) vs. 1.8 (0.7 to 8.7) and 1.6 (0.8 to 6.6), respectively for daidzein and 452.2 (152.4 to 951.1) vs. 6.9 (5.1 to 15.8) and 6.0 (2.4 to 15.7), respectively for genistein. In Caucasians, daidzein was negatively associated with triglyceride and positively with HDLc. Similarly, genistein levels were positively associated with adiponectin in Caucasians and African Americans. No association of the isoflavones with measures of subclinical atherosclerosis was observed. The results emphasize the vast difference in circulating levels of soy isoflavones between Japanese and N. American populations. The results suggest that both the low N. American and the high Japanese concentrations may elicit physiological effects.

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DIET QUALITY AND BONE MASS IN YOUNG ADULT WOMEN. *S Zagarins, A Ronnenberg, S Gehlbach, R Lin, E Bertone-Johnson (University of Massachusetts, Amherst, MA 01003)

Existing studies of the relationship between diet and bone have largely focused on associations between bone and individual nutrients or dietary components. However, evaluating overall diet quality allows for simultaneously considering many dietary components shown to be important in bone health. Although diet quality scores have been established for use in studies of chronic disease in older adults, none have been designed specifically for studies related to bone mass or for use in younger populations. To determine whether existing diet scores are associated with bone mass, we assessed diet quality and peak bone mass in a cross-sectional study of 186 women aged 18-30. Bone mass measures were calculated using dual-energy x-ray absorptiometry. Diet quality scores evaluated 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. These scores were calculated used data obtained from a modified version of the Harvard food frequency questionnaire. Neither the AHEI nor the RFS were associated with bone mineral content in multivariable linear regression adjusting for variables associated with frame size (AHEI: $\beta\pm$SE: 0.27$\pm$1.0, p=0.82; RFS: $\beta\pm$SE: 0.50$\pm$1.9, p=0.80). Results were similar for size-adjusted measures of bone mass. These null findings suggest that existing diet quality scores may not be appropriate for use in studies of bone mass. Because scores measuring overall diet quality are important for epidemiologic research, a score specifically tailored to reflect bone-specific dietary components would benefit future research.

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VALIDATION OF NUTRIENT INTAKE BY QUESTIONNAIRE (FFQ) AGAINST 24-HOUR RECALLS IN ADULT ADVENTISTS IN US AND CANADA. *K Jaceldo-Siegl, S Sharma, S Knutsen, J Sabaté, K Oda, G Fraser (Loma Linda University, Loma Linda, CA 92350)

Measurement errors associated with FFQ assessment attenuate relative risk estimates in diet and disease relationships. Subgroup analysis could further compound such errors if an exposure is estimated differently according to gender and race. To examine the performance of the Adventist Health Study-2 (AHS) FFQ, we assessed its validity against repeated recalls in 461 black and 550 non-black calibration study participants (age 30 years and older) of the AHS-2 cohort. Race-specific, gender-stratified correlation coefficients (r) with 95% confidence interval (CI), corrected for attenuation from within-person variation in the recalls, were calculated for selected energy-adjusted macronutrients, fatty acids, micronutrients, and fiber. Coefficients were generally higher in non-blacks compared to blacks. For macronutrients, r ranged from 0.52-0.86 in non-blacks and 0.26-0.73 in blacks; within each race, the highest r was for animal protein, 0.73 (0.67-0.78, 95%CI) in black females and 0.86 (0.82-0.90, 95%CI) in non-black males. For fatty acids, r ranged from 0.34-0.88 in non-blacks and 0.23-0.71 in blacks. In both races, r for minerals ranged from 0.44-0.95; with iron being the highest in non-black males (r=0.95; 0.93-0.96, 95%CI), and lowest in black females (r=0.44; 0.35-0.53, 95%CI). For vitamins, r in blacks was higher in females (0.42-0.74) than males (0.12-0.68), but somewhat higher in males (0.24-0.86) than females (0.46-0.78) in non-blacks. For fiber, r in blacks was 0.62-0.64, and 0.74 in non-blacks. Validity coefficients of the AHSFFQ were weak to high for macronutrients, fatty acids and vitamins, moderate to high for minerals and fiber, and differed by gender and race.

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DIETARY PATTERNS AND THEIR ASSOCIATIONS WITH HEALTH BEHAVIORS. *E R Cho, A Shin, S-Y Lim, J Kim (Molecular and Nutritional Epidemiology Branch, Research Institute, National Cancer Center, Gyeonggi-do, Korea)

Dietary habits, including dietary patterns, have shown to be associated with the risk of chronic diseases, including cancer. Dietary habits are also closely related with other health-related behaviors. The objective of this study was to evaluate Korean dietary patterns using food frequency questionnaire and to assess their association with lifestyle risk factors, such as smoking, alcohol consumption, physical activity and supplement use. The study population included 10,090 participants (5,723 men and 4,367 women) aged 30 years and older between August 2002 and December 2006 from the National Cancer Center in South Korea. Dietary patterns were analyzed by factor analysis using a 16-item food frequency questionnaire. The associations between dietary patterns and lifestyle risk factors were investigated by logistic regression analysis. We identified three major dietary patterns: western pattern, healthy pattern, and traditional pattern. Current smoking was positively associated with western pattern (p=0.001) and traditional pattern (p=0.012) in men; whereas inversely associated with the healthy pattern in both genders (p<0.001). Alcohol consumption was positively associated with the healthy pattern in men (p=0.045), while inversely associated in women (p=0.007). Physical activity and supplement use were positively associated with the all patterns in both genders, except traditional pattern in women. The results suggest that health behaviors are strongly associated with dietary patterns. Possible confounding effect of other risk behaviors should be considered appropriately in conducting nutritional epidemiological study.

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EATING PATTERNS AND NUTRITIONAL CHARACTERISTICS ASSOCIATED WITH SLEEP DURATION. *S Kim, L A DeRoo, D P Sandler (NIEHS, Epidemiology Branch, Research Triangle Park, NC 27709)

Inadequate sleep duration may increase the risk of obesity and metabolic diseases. Particular eating behaviors also have been related to higher energy intake and subsequent weight gain. Authors examined whether eating pattern may be an intermediary behavior that explains the observed relationship between sleep duration and obesity. Using a principal component analysis of 8 meal and snack frequency items in different times across the day, we identified two major components characterizing eating patterns in 27,983 women in the Sister Study: 1) eating during conventional hours and 2) preponderance of snacks over meals. Comparing adjusted mean component scores by sleep duration categories (<5, 5-5.9, 6-6.9 7-7.9 8-8.9, 9-9.9 and $\geq$10 hours a day), the score for eating during conventional hours increased with increasing sleep duration up to 8-8.9 hours: mean of -0.64 (95% confidence interval: -0.77, -0.50) in women sleeping <5 hours daily versus 0.04 (95% CI: 0.01, 0.07) among those with 8-8.9 hours of sleep. The snacking score decreased with increasing sleep duration. Women with long ($\geq$10 hours) sleep duration had similar scores for both eating patterns to those with short (<6 hours) sleep duration. The eating patterns among short sleepers were also related to higher intake of energy, fat and sweets, and lower intake of fruits and vegetables. There may be circadian variation in physiologic response to foods. Our results are consistent with the hypothesis that disrupted eating patterns in habitual short sleepers contribute to development of obesity and metabolic diseases via poor nutritional composition and altered physiologic responses to nutrients.

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LONG-TERM IMPACT OF A SCHOOL-BASED INTERVENTION ON KNOWLEDGE, DIETARY INTAKES AND PHYSICAL ACTIVITY AMONG PRIMARYSCHOOL CHILDREN. S Nichols, *M Francis (University of the West Indies, St. Augustine, Trinidad and Tobago)

In this study, we evaluated the long-term impact of a school-based nutrition intervention programme on knowledge, dietary intakes and physical activity among children attending primary school. Half of the schools meeting the inclusion criteria were assigned to the intervention group (IVG) while the other half was assigned to the non-intervention group (NIVG). The intervention consisted of a short curriculum based on six one-hour modules based on the Bloom Taxonomy for mastery conducted over a one month. Modules consisted of theoretical and practical activities that fostered learning of the key concepts such as food groups, nutrients and their functions and portion sizes and participation in physical activity. A pre-tested standardized questionnaire was used to collect demographic and behavioral items at baseline and 15 months later in a random sample of participants. A total of 268 students participated in the 15-month follow-up study . In regression analyses controlling for age gender, BMI and relevant baseline levels, intervention was associated with lower reported levels of consumption of fried foods, high sugar/high fat snack and sodas and significant increases in the in the consumption of fruits and vegetables. Furthermore, intervention was associated with significantly higher levels of knowledge of lifestyle behaviors. In Conclusion, the school-based intervention had a long-term impact on dietary behaviours and knowledge levels.

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BIRTH WEIGHT AND BREAST-FEEDING IN RELATION TO ADULT SERUM ANTIOXIDANT VITAMINS, OXIDATIVE STRESS MARKERS, CHOLESTEROL, TRIGLYCERIDES AND GLUCOSE. *J Nie, R W Browne, M Trevisan, J Dorn, J L Freudenheim (University at Buffalo, Buffalo, NY 14214)

Perinatal factors including early nutrition may contribute to chronic disease development. We examined associations of birth weight and having been breast fed with adult serum concentrations of cholesterol, triglycerides, glucose, antioxidant vitamins (A, C, E, beta-cryptoxanthin, lutein/zeaxanthin, beta-carotene, and lycopene) and markers of oxidative capacity and stress (glutathione (GSH), plasma thiobarbituric acid-reactive substances (TBARS), glutathione peroxidase, and trolox equivalent antioxidant capacity) in a cross sectional study of 1628 participants randomly selected from two counties in Western New York. Participants were aged 35-79, 39% males and 94% Caucasians. We used multiple linear regression for associations with breast-feeding status and analysis of covariance for those with birth weight. The breast-fed group had significantly higher beta-cryptoxanthin (mean difference/standard error=0.014/0.005, ug/ml) compared to those not breastfed. Compared to birth weight less than 5.5 lbs, those of more than 8.5 lbs had significantly lower TBARS (mean/SE=1.34/0.03 vs. 1.43/0.03, nmol/ml) and higher GSH (55.86/0.89 vs. 52.03/1.10, mg/dl); and those of 7-8.5 lbs had significantly higher beta-carotene (0.201/0.008 vs. 0.163/0.016, ug/ml) and higher vitamin C (1.25/0.03 vs. 1.10/0.06, mg/dl), particularly among females, as well as borderline lower glucose (102.94/1.19 vs. 107.78/2.27, mg/dl, p=0.06). Differences in birth weight and exposure to breast milk may have implications for adult antioxidant levels and for oxidative stress.

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RELATIONSHIP OF LIVER INJURY WITH BODY COMPOSITION IN THE UNITED STATES POPULATION. *C E Ruhl, J E Everhart (Social & Scientific Systems, Inc., Silver Spring, MD 20910)

Nutritional diseases, especially overweight and obesity, are major contributors to liver disease, of which fatty liver disease is the most common form in the US. We examined the individual and relative contributions of body composition, measured using dual-energy x-ray absorptiometry (DXA), to the most common marker for liver injury, elevated serum alanine aminotransferase (ALT), among 11,936 adults negative for viral hepatitis in the 1999-2004 National Health and Nutrition Examination Survey. Trunk fat, extremity fat, trunk lean soft-tissue, and extremity lean soft tissue masses, divided by height squared, were categorized as quintiles and logistic regression odds ratios for elevated ALT were calculated. Elevated ALT was associated with higher fat and lean mass ($p<0.001$) after adjustment for alcohol consumption and other liver injury risk factors in separate models for each DXA measure. Trunk fat was strongly associated with elevated ALT ($p<0.001$) in models also including one or more of the other three measures, none of which were independently related to ALT. In models that contained all four DXA measures, the odds ratio for the highest relative to lowest quintile of trunk fat/ht2 was 14.7 (95% confidence interval 6.3-34.4) for men and 7.4 (95% CI 3.6-15.0) for women. Because body composition measures are correlated, relationships were further evaluated in models containing trunk fat and the residual of one of the other measures regressed on trunk fat. Trunk fat remained the dominant body composition measure. These results support the hypothesis that liver injury can be induced by metabolically active intra-abdominal fat.

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CONCORDANCE BETWEEN CHILD AND PARENT RESPONSES TO A BRIEF DIETARY INTAKE SURVEY. *S Hajna, T J Wade, P J LeBlanc (Brock University, St. Catharines, ON, Canada L2S 3A1)

Dietary intake is one of the major determinants of pediatric obesity. Due to the logistical constraints and high monetary costs associated with the use of comprehensive dietary assessment tools to determine the strength of this relationship (e.g. 24-hour recall), many researchers have limited their analyses to either child or parent surveys. However, as children age, the accuracy of parental reporting may be questionable. In order to assess the effects of using a single source of data and the accuracy of parental reports, it is important to assess the concordance between child and parent responses in regards to the child's dietary intake. As such, this study assessed the concordance between child and parent responses to an 11-item dietary survey used in the Heart Behavioral Environmental Assessment Team (HBEAT) study of 11 to 13 year-olds. The survey, a modified version of the Canadian Community Health Survey Cycle 3.1, was designed to collect data on a child's current fruit, vegetable, 'fast' food, juice, beverage and sweet intake. A cross-sectional study design was implemented using the responses of 1128 child-parent dyads. Spearman correlations (r) were used to assess the degree of agreement between paired child-parent responses. The findings indicate moderate agreement between responses ranging from r=0.40 to r=0.69 ($p<0.001$), which is higher than that observed in other dietary surveys. There was also consistency across child age. When multiple data sources may not be available and use of a full dietary assessment may not be feasible, these findings suggest that the HBEAT dietary survey produces comparable results between child and parent responses for this age group.

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 * = Presenter; S = The work was completed while the presenter was a student

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DIETARY GLYCEMIC INDEX AND LOAD AND THE INCIDENCE OF UTERINE LEIOMYOMATA IN BLACK WOMEN. R G Radin, J R Palmer, L Rosenberg, S Kumanyika, *L A Wise (Slone Epidemiology Center, Boston, MA 02215)

Background: Hyperinsulemia is associated with high dietary glycemic index (GI) and glycemic load (GL), and may promote tumorigenesis by increasing insulin growth factor-1 levels or increasing the bioavailability of estradiol. Previous studies suggest that high GL is a risk factor for endometrial and ovarian cancers, which like UL, are hormone-dependent tumors. There have been no studies of GL or GI in relation to UL. **Methods**: In the Black Women's Health Study (1997-2007), biennial questionnaires were used to follow 21,431 premenopausal women for incident UL. Dietary intake was assessed in 1995 and 2001 with a food frequency questionnaire. Carbohydrate content and GI for food items were obtained from standard databases. We derived incidence rate ratios (IRR) and 95% confidence intervals (CI) using Cox regression with control for potential confounders. **Results**: There were 5,642 new cases of UL reported during 157,928 person-years of follow-up. Cumulative-averaged GI and GL were not associated with UL risk overall. However, there was a weak positive association among women under age 35, whose case status is less likely to be misclassified. IRRs were 1.17 (95% CI 1.01-1.36, p-trend=0.04) for highest relative to lowest quintile of GI and 1.15 (95% CI 0.98-1.35, p-trend=0.06) for highest relative to lowest quintile of GL. Results were similar within categories of BMI and physical activity. Restricting the sample to women who reported a recent Pap smear, a marker for gynecologic surveillance, did not alter the associations. **Conclusions**: These data suggest that high dietary GI and GL may be associated with an increased risk of UL among young U.S. Black women. Further studies are needed to confirm these findings.

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GENERALIZABILITY OF DIETARY PATTERNS ASSOCIATED WITH INCIDENCE OF TYPE 2 DIABETES – CONCORDANCE OF EXPLORATORY AND CONFIRMATORY ANALYSIS, *F Imamura, A H Lichtenstein, G E Dallal, P F Jacques (USDA Human Nutrition Research Center on Aging, Boston, MA 02111)

Reduced rank regression (RRR) has been used to derive dietary pattern scores that predict linear combinations of disease biomarkers. However, the generalizability of these patterns is unknown. We examined the generalizability of RRR-derived patterns of the three prior cohort studies: Nurses Health Study, European Prospective Investigation into Cancer and Nutrition Potsdam Study and Whitehall II Study. For pattern-testing confirmatory analyses, dietary patterns from the three studies were applied to data from the Framingham Offspring Study (FOS, N=2,879) as the independent dataset. Exploratory RRR analyses were also performed to derive pattern scores from the FOS dietary data with the food groupings of the three prior studies. Each score was tested for predictability of type 2 diabetes (T2D) risk by survival analysis. Consumption of meat products, refined grains, and soft drinks were found to be predictive in all confirmatory dietary pattern scores, whereas fried foods, eggs, alcoholic beverages, and some fruits and vegetables were predictive in some, but not all, confirmatory scores. Regardless of the specific food groupings, the exploratory scores significantly predicted T2D risk; hazard ratios (HR, [95% confidence interval]) based on a continuous increase of the standardized scores, ranging from 1.60 (1.37 to 1.88) to 1.79 (1.50 to 2.12). The US-based confirmatory pattern also predicted T2D risk (HR: 1.48 [1.27 to 1.72]), but the European confirmatory patterns were less predictive. These data suggested that dietary patterns predicting T2D risk may not be generalizable or applicable to different populations.

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KNOWLEDGE OF TRANS FATTY ACID AND NUTRITION-RELATED BEHAVIOURS AMONG ADULT FEMALES IN TRINIDAD. S NICHOLS, *N Dalrymple (University of the West Indies, St. Augustine, Trinidad and Tobago)

The consumption of trans fatty acids (or ''trans fats'') is known to increase the risk of coronary heart disease by raising levels of LDL cholesterol and lowering levels of HDL cholesterol. In this study, the nature of the associations between knowledge of trans fats and nutrition-related behaviours were assessed. A cross-section of 1,800 females 18 years and over completed a self-administered questionnaire consisting of socio-demographic, anthropometric, dietary, physical activity, nutrition label use and other health behaviour. Approximately 62% of participants reported purchasing the household groceries at least half of the times each month. 29% of participants reported being knowledgeable about trans fats. In multivariate regression controlling for age, ethnicity, education, employment status, marital status and presence of children under 18 in the household, persons who were knowledgeable about trans fats reported; greater nutrition label use ($p<0.001$), lower levels of purchases of foods at risk for high levels of trans fats ($P<0.001$), lower intakes of foods known to contain high levels of trans fats ($p<0.05$), higher intakes of food that do not contain trans fats (p,0.001). They were also more likely to report greater participation in moderate-to-high intensity activities outside of their occupations ($p<0.001$), better quality of life and a greater satisfaction with their current health ($p<0.01$) than persons who reported having no knowledge of trans fats. In this study, knowledge of trans fats was associated with positive nutrition-related behaviours.

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A META-ANALYSIS OF RED OR PROCESSED MEAT INTAKE AND PROSTATE CANCER. *D D Alexander, C A Cushing (Exponent Inc., Health Sciences Practice, Wood Dale, IL 60191)

Epidemiologic investigations have led to the discovery that certain dietary factors, such as consumption of foods containing lycopene or selenium, may modify the risk of prostate cancer. However, the potential role that red or processed meat may play in prostate carcinogenesis remains unclear. Therefore, we conducted a quantitative assessment and systematic review of epidemiologic cohort and nested case-control studies to clarify any potential associations. We identified 14 studies of red meat and 10 studies of processed meat that were published through January, 2008. Random effects models were utilized to generate summary relative risk estimates (SRRE) for the highest categories of intake vs. the lowest, and sensitivity analyses were conducted to examine potential sources of heterogeneity. No association between red meat consumption and total prostate cancer was observed (SRRE = 1.01, 95% CI: 0.97-1.05; p for heterogeneity = 0.349). Meta-analysis of 8 studies of advanced prostate cancer resulted in a similar association (SRRE = 1.01, 95% CI: 0.94-1.09). A marginally significant association between processed meat and total prostate cancer was observed, although the summary effect was weak in magnitude and the estimates across studies were variable (SRRE = 1.07, 95% CI: 1.00-1.16; p for heterogeneity = 0.095). Furthermore, there was no significant association between processed meat intake and advanced prostate cancer (SRRE = 1.10, 95% CI; 0.95-1.27). An examination of intake-response on a study-by-study basis was not indicative of a positive pattern of increasing risk with increasing consumption of red or processed meat. The results of this meta-analysis are not supportive of a causal association between red or processed meat intake and prostate cancer.

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NUTRIENT INTAKE OF ADVENTIST HEALTH STUDY-2 PARTICIPANTS VARIES BY VEGETARIAN STATUS. *A B David, K Jaceldo-Siegl, G E Fraser (Loma Linda University School of Public Health, Loma Linda, CA 92350)

The Adventist Health Study-2 (AHS-2) prospective cohort study was begun in 2002 to investigate the association between dietary factors and the risk of cancer in adult Adventists residing in the United States and Canada. AHS-2 participants provide the unique opportunity to assess the effects of diet patterns virtually in the absence of smoking and alcohol consumption as confounding parameters. This report evaluates the nutrient profile of 61627 respondents by vegetarian status. Dietary intake was assessed by a 204-item quantitative food frequency questionnaire that included questions about vegetarian and non-vegetarian food items and supplement use. Nutrient composition was based on NDS-R 5.03.35 database, and vegetarian status was determined by amount and frequency of consumption of meats, fish, dairy, and eggs. One-way analysis of variance was performed using Stata 8.0. Self-reported semi-, pesco-, lacto-ovo-, and vegan-vegetarians comprise 9, 9, 36, and 4 percent, respectively, of the AHS-2 cohort. The remaining 42 percent reported regularly consuming meats. Intake of the following nutrients were significantly different ($p<0.0005$) by vegetarian status: calories, fat, carbohydrate, protein (animal, vegetable, soy, and total), cholesterol, total saturated and mono- and poly-unsaturated fatty acids, fiber, Vitamins A, C, and E, and linoleic, alpha-linolenic, eicosapentaenoic, and docosahexaenoic fatty acids. Vitamin B12 intake did not differ significantly between the groups ($p=0.140$). These relationships persist when controlling for age, gender, and race/ethnicity. The nutrient intake pattern of the AHS-2 cohort varies significantly by vegetarian status, with the notable exception of Vitamin B12.

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DIETARY INTAKE OF MENAQUINONES AND OVERALL CANCER INCIDENCE AND MORTALITY IN THE EPIC-HEIDELBERG COHORT. *K Nimptsch, S Rohrmann, J Linseisen (German Cancer Research Center, Heidelberg, Germany)

Background: Anticarcinogenic effects of vitamin K have been demonstrated in several laboratory studies. We previously observed an inverse association between dietary intake of menaquinones (vitamin K2), but not phylloquinone (vitamin K1) and the risk of prostate cancer. Based on the growth inhibitory effects of menaquinones as observed in a variety of cancer cell lines, we hypothesized that menaquinones intake may be associated with overall cancer incidence and mortality. Methods: We used data from 25,540 participants of the prospective EPIC-Heidelberg cohort who completed a food frequency questionnaire at recruitment (1994-1998). Dietary intake of menaquinones was estimated using HPLC-based food composition data. Multivariate adjusted hazard ratios (HR) and 95% confidence intervals (CI) were estimated using Cox proportional hazards models. Results: During a median follow-up time of more than 10 years, 1755 incident cancer cases occurred (758 women, 997 men) out of which 458 (156 women, 302 men) were fatal. Dietary intake of menaquinones was non-significantly inversely associated with overall cancer incidence in the entire cohort (HR top versus bottom quartile 0.86, 95% CI 0.73-1.01, $p_{trend}=0.08$). The association was stronger for cancer mortality (HR 0.72, 95% CI 0.72-0.98, $p_{trend}=0.02$). Sex-specific analyses revealed that the inverse associations were restricted to male subjects, mainly driven by significant inverse associations with prostate and lung cancer. Conclusion: The findings of this study suggest that dietary intake of menaquinones is associated with a reduced risk of incident and fatal cancer in male subjects.

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VALIDITY OF ADOLESCENT DIET RECALL BY MIDDLE AGED ADULTS. *J E Chavarro, B A Rosner, S Isaq, L Sampson, C Willey, P Tocco, C Chumlea, W C Willett, K B Michels (Harvard Medical School, Boston, MA 02115)

Few studies have evaluated the validity of adolescent diet recall after many decades. Yearly diet records (DRs) were collected between 1943 and 1970 among children and adolescents participating in the Fels Longitudinal Study: an ongoing study of growth, development and aging. Between September 2005 and January 2006, on average 48 years after DR collection, all active study members who had been between 13 and 18 years of age when the DRs were collected were asked to complete a 124-item food frequency questionnaire (FFQ) pertaining to their diet during their high school years. Complete FFQs and at least 1 DR were available for 72 participants. The authors calculated Spearman correlation coefficients between food, food group and nutrient intakes from the DRs and FFQ, and de-attenuated them to account for the effects of within-person variation in the DRs on the association. For foods, the median de-attenuated correlation coefficient was 0.19 with a wide range from -0.40 for beef, pork or lamb sandwich to 0.97 for diet soda with caffeine. The median de-attenuated correlations for nutrient intakes was 0.20 (range = -0.07 for iron to 0.54 cholesterol). Correlations for food groups were slightly higher (median = 0.24, range = -0.35 for breads to 0.52 for hot beverages). The de-attenuated correlation between DRs and FFQs was less than or equal to 0 for approximately 5 percent and greater than or equal to 0.30 for approximately one third of the food groups and nutrients examined. Although the validity of recall for specific dietary factors is poor, this FFQ may be useful in studies with hypotheses focused on foods and nutrients with adequate validity of recall.

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SLEEP PATTERNS BEFORE, DURING, AND AFTER MILITARY COMBAT DEPLOYMENT IN SUPPORT OF THE WARS IN IRAQ AND AFGHANISTAN. *A D Seelig, I G Jacobson, B Smith, MPH, PhD, T I Hooper, MD, MPH, E J Boyko, MD, MPH, G D Gackstetter, DVM, MPH, PhD, P Gehrman, PhD, CBSM, C A Macera, MS, PhD, T C Smith, MS, PhD, for the Millennium Cohort Study Team (Naval Health Research Center, San Diego, CA 92106)

Research has shown that lack of sleep may have deleterious effects on health, yet population-based studies examining the sleep patterns of US military personnel are lacking. This study investigates the relationship between sleep duration and deployment in support of the wars in Iraq and Afghanistan. The Millennium Cohort Study is a 21-year longitudinal study designed to determine the long-term health effects of military service. Baseline data collected from July 2001 to June 2003 and follow-up data collected from June 2004 to February 2006 include information on sleep duration, trouble sleeping, military occupation, demographics, mental and physical health, and combat-related exposures. Deployment information is available from electronic military data. Millennium Cohort participants who completed a baseline and follow-up survey were included in this study. Participants were placed into one of three exposure groups based on their deployment status and timing of follow–up survey completion: non-deployer, survey completed post-deployment, or survey completed during deployment. Follow-up sleep duration was compared across the three deployment groups using ANCOVA to adjust for baseline sleep duration, military, demographic and occupational factors. Self-reported sleepiness and trouble sleeping were also examined using logistic regression. Of the approximate 48000 individuals with longitudinal data and no deployment prior to baseline, 73% were nondeployers between baseline and follow-up, 22% deployed between their baseline and follow-up surveys, 5% filled out their follow-up survey during deployment. Analyses are ongoing. Determining the sleep duration and prevalence of sleep disorders of military personnel may help guide future policy to promote healthy sleep during deployment, consequently perhaps mitigating or reducing comorbid mental health morbidity.

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* = Presenter; S = The work was completed while the presenter was a student

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PROSPECTIVE ANALYSIS OF POSTTRAUMATIC STRESS DISORDER AND DEPRESSION AMONG MILITARY PROFESSIONAL CAREGIVERS DEPLOYED TO THE WARS IN IRAQ AND AFGHANISTAN. *I G Jacobson, MPH, C A LeardMann, MPH, T C Smith, MS, PhD, B Smith, MPH, PhD, T S Wells, DVM, MPH, PhD, E J Boyko, MD, MPH, M A K Ryan, MD, MPH; for the Millennium Cohort Study Team (Naval Health Research Center, San Diego, CA 92106)

Military personnel providing care during combat deployments in support of the wars in Iraq and Afghanistan may be at increased risk for posttraumatic stress disorder (PTSD) and depression. This prospective analysis used data from the Millennium Cohort Study, a 21-year longitudinal study designed to assess the long and short-term health effects of military service on health, and focused on the mental health of military healthcare workers and chaplains who completed both baseline (2001) and follow-up questionnaires (2004). PTSD and depression symptoms were identified using the PTSD Patient Checklist Civilian version and the Patient Health Questionnaire 9-item screening tools, respectively. Multivariable logistic regression modeling was used to determine the risk of newly-reported or persistent PTSD and depression symptoms at follow-up among military professional caregivers who experienced combat exposures while deployed. These individuals as well as personnel who did not experience combat exposures while deployed were compared with nondeployed personnel. Of more than 43,000 Millennium Cohort participants with complete longitudinal data, approximately 12% were caregivers. Of the caregivers that deployed, about 70% reported exposure to combat or trauma. Analyses are ongoing. Quantifying the risk of PTSD and depression over time among military personnel providing care to their fellow service members is critical to understanding the scope of these mental health problems in this specialized group of military professional caregivers.

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A PROSPECTIVE STUDY OF SHIFT WORK AND DEPRESSION IN POLICE OFFICERS. *J M Violanti, J E Slaven, L E Charles, A Mnatsakanova, M E Andrew, T A Hartley, C M Burchfiel (State University of New York at Buffalo, Department of Social and Preventive Medicine, Buffalo, NY)

This study prospectively examined shift work and change in depressive symptoms over a three-year period in 70 randomly selected police officers. The Center for Epidemiological Studies Depression (CES-D) scale was used to measure depression. Shifts were measured using data from daily payroll records over a five-year period prior to examination. Officers were classified by shift (day, afternoon, or night) based on the hours worked per shift. The association between shift work and change in CES-D scores was analyzed by analysis of variance. Mean age of the sample was 40.4 years; 61.4% were males. Officers working the day shift exhibited a trend toward greater mean increases in depressive symptoms (3.6 ± 9.0) than those on afternoons (0.6 ± 5.9) and nights (0.9 ± 4.5), $p=0.287$. Unmarried officers on day shifts had a larger increase in mean CES-D (7.9 ± 9.7) compared to afternoon (1.6 ± 4.0) or night (0.2 ± 4.3) shifts, $p=0.128$. After adjustment for age, gender, and smoking status, the results were only slightly attenuated: day (7.1 ± 2.3), afternoon (3.1 ± 3.6), and night (0.9 ± 4.0), $p=0.413$. In contrast, the mean change in CES-D was similar across shifts for married officers. Contrary to expectations, officers working day but not night shifts had an increase in depressive symptoms over time. Marital status appears to influence this association. Further research is needed to clarify additional factors associated with day shift work that may exacerbate depression.

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THE MILLENNIUM COHORT STUDY: A 21-YEAR CONTRIBUTION TO THE UNDERSTANDING OF MILITARY HEALTH. *T Smith, B Smith, I Jacobson, C LeardMann, K Welch, L Farnell; for the Millennium Cohort Study Team (Naval Health Research Center, San Diego, CA 92106)

Military service confers unique occupational exposures, and sometimes intensive stressors, that may have profound impact on long-term health. Most studies of military-related exposures are limited by retrospective and cross-sectional design, convenience sampling, and/or short follow-up. The Millennium Cohort Study was established in 2000 to follow the health of participants through 2022. The Cohort consists of three separate panels enrolled in 2001, 2004, and 2007, which total over 150,000 participants from all service branches and includes both active duty and reserve and National Guard personnel. Participants from all three panels have completed a baseline assessment and are surveyed at three year intervals through 2022. At least one follow-up has been completed for over 70% of the cohort submitting baselines in 2001 or 2004. More than 40% of the Cohort has deployed in support of the wars in Iraq and Afghanistan. The study team has produced over 25 peer-reviewed publications and over 100 presentations at scientific meetings on topics including reliability and validity and prospectively assessed posttraumatic stress disorder, depression, weight change, exercise, alcohol use, and smoking. The Millennium Cohort Study is setting a new standard for prospective evaluation of the long-term health consequences of military occupational exposures, both among active military personnel as well as among the growing number of cohort members who have separated or retired from military service and entered the civilian population. The rigorous design and strength of these data will allow the project to address complex issues of national public health importance for years to come.

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THE ASSOCIATION OF FREQUENCY AND DURATION OF DEPLOYMENT AND FUNCTIONAL HEALTH AMONG SERVICE MEMBERS DEPLOYED IN SUPPORT OF THE WARS IN IRAQ AND AFGHANISTAN. *B Smith, D Wingard, M Ryan, D Slymen, C Macera, T Patterson; for the Millennium Cohort Study Team (Naval Health Research Center, San Diego, CA 92106)

Background: Research from previous military conflicts has indicated that veterans may be at risk for anxiety disorders, cognitive dysfunction, lower health-related quality of life, and lower functional status. Recent reports suggest service members returning from Iraq and Afghanistan have significant mental health morbidity. Deployment length, itself, has been related to psychological distress, although it is unknown whether those who deploy multiple times are more likely to report lower functional status or mental health problems. This study prospectively investigates the mental and physical health of a large, population-based US military cohort in relation to deployment. Methods: The Millennium Cohort is a 22-year longitudinal study launched in 2001. Participants in the current study submitted baseline (June 2001–July 2003) and follow-up (June 2004–February 2006) questionnaire data. Using the 36-item Short Form Health Survey for Veterans to measure functional health, analysis of covariance was used to assess mental and physical functioning changes for personnel with multiple and extreme deployments. Results: On average, mental and physical functioning scores decreased significantly among participants who deployed >9 months, or were deployed with combat exposures. Overall scores changed, on average, by <2 points. Conclusions: Statistical differences in adjusted means of mental and physical functioning scores were small and may have little clinical significance. Results suggest a consistency in mental and physical functioning over almost 3 years, regardless of deployment, among a large military cohort.

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PROSPECTIVE INVESTIGATION OF NEW-ONSET RESPIRATORY ILLNESS AMONG DEPLOYED MILITARY PERSONNEL. *B Smith, C Wong, T Smith, M Ryan, E Boyko, G Gackstetter, G Gray; for the Millennium Cohort Study Team (Naval Health Research Center, San Diego, CA 92106)

Background: The current conflicts in Iraq and Afghanistan may expose troops to environmental conditions adversely affecting respiratory health though new-onset respiratory illnesses following these deployments have not been described. Methods: Participants are from the Millennium Cohort Study, a 22-year longitudinal study launched in 2001. Five self-reported new-onset respiratory outcomes were examined: 1) respiratory symptoms (persistent or recurring cough or shortness of breath); 2) chronic bronchitis or emphysema; 3) asthma; 4) asthma with respiratory symptoms; and 5) any one of the aforementioned respiratory illnesses. Logistic regression was used to evaluate the association of respiratory illness with cumulative deployment length, after adjusting for confounders. Results: After exclusions, 47,875 service members were available for analyses, of which 25% had deployed between baseline and follow-up. Among deployers 14% had new-onset of any respiratory illness. Prevalences of new-onset respiratory outcomes were as follows: 11% any respiratory illness, 11% respiratory symptoms, 1.2% emphysema or chronic bronchitis, 1.2% asthma, and 0.5% asthma with respiratory symptoms. Participants with more cumulative days deployed were at elevated risk for self-reported new-onset respiratory symptoms and any respiratory illness. Conclusions: Greater cumulative deployment length was associated with increased odds of new-onset respiratory symptoms and any respiratory illness. The concern for respiratory health persists as troops continue to deploy. Further prospective analyses are essential to clearly understand respiratory illnesses which may be associated with deployment.

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AGING POPULATIONS - NEW CHALLENGES FOR EPIDEMIOLOGIC RESEARCH. *C Scheidt-Nave (Department of Epidemiology and Health Monitoring, Robert Koch Institute, Berlin, Germany)

Patterns of morbidity and associated health care needs change as an ever growing part of the population reaches old and very old age. In this context epidemiologic research needs to shift focus from specific diseases and acute events to new health concepts, such as multimorbidity, frailty, and functional decline. Methods used for the assessment of health, modifiable risk factors, and health outcomes have to be newly developed or adapted to the needs of older persons. Population-based studies of the elderly face the challenge of high non-response rates, compromising the validity of findings from surveys and longitudinal studies. Thus, new strategies for population-representative sampling are needed, considering the diversity of older populations with regard to living circumstances, specific impairments (e. g. cognitive decline), and attitudes towards life. The symposium aims to bring together leading experts on the epidemiology of aging, in order to discuss these methodological challenges and recent advancements to overcome them. Individual symposium contributions will address (1) Sampling and recruitment issues in epidemiologic studies of the elderly, (2) Concepts of multimorbidity and frailty with particular focus on the implications for health care services research, (3) Assessment of cognitive status in population-based studies.

Speakers:
Elizabeth J. Samelson, PHD – ''Issues in Conducting Epidemiologic Research in Elders: Lessons from the MOBILIZE Boston Study''
Christa Scheidt-Nave, MD, MPH – ''Operationalizing Multimorbidity and Autonomy for Health Services Research in Aging Populations – the Berlin OMAHA Study''
Orna Intrator, PhD –''Minimal Data Set on Chronically Ill people in the U.S''.
Lenore J. Launer, PhD – ''Assessment of cognitive impairment and dementia in population-based studies''

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ISSUES IN CONDUCTING EPIDEMIOLOGIC RESEARCH IN ELDERS: LESSONS FROM THE MOBILIZE BOSTON STUDY. *E J Samelson, PhD (Department of Medicine, Harvard Medical School Institute for Aging Research, Hebrew SeniorLife, Boston, MA)

Conducting research in elderly populations is important but challenging. The authors describe specific challenges that have arisen and solutions that have been used in carrying out The MOBILIZE Boston Study, a community-based prospective cohort study focusing on falls among 765 participants of age 70 years and older, enrolled during 2005-07. To recruit older individuals, face-to-face interactions are more effective than less personal approaches. Use of a board of community leaders facilitated community acceptance of the research. Establishing eligibility for potential participants required several interactions, so that resources must be anticipated in advance. Assuring a safe and warm environment for elderly participants and providing a positive experience are of the utmost priority. Adequate funding, planning, and monitoring are required to provide transportation and a fully accessible environment in which to conduct study procedures as well as to select personnel highly skilled in interacting with elders. It is hoped that this report will encourage and inform future epidemiological research in this important segment of the population.

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OPERATIONALIZING MULTIMORBIDITY AND AUTONOMY FOR HEALTH SERVICES RESEARCH IN AGING POPULATIONS – THE BERLIN OMAHA STUDY. *C Scheidt-Nave, J Fuchs, M Busch, A Ernert, U Hapke, M Holzhausen, H Knopf, J Six-Merker, J Welke, P Martus (Department of Epidemiology and Health Monitoring, Robert Koch Institute, Berlin, Germany)

Multimorbidity and frailty are important concepts to assess health problems and health care needs specific to the elderly. The Berlin OMAHA study aims to develop a conceptual framework to monitor health and health care needs in the population 65 years and older. The study is part of the Berlin AMA (Autonomy Despite Multimorbidity in Old Age) research consortium www.ama.consortium.de funded by the German Ministry of Education and Research. Based on a Berlin inner city random sample of 2000 persons 65 years and older, the OMAHA study seeks to (1) optimize response rates and identify barriers and facilitators to study participation; (2) to characterize the population according to objective health and functional status, self-perceived health and level of autonomy, health-related quality of life, personal, social and medical resources, health care services utilization, and sociodemographic background; (3) to examine specific patterns of morbidity and functional impairment in relation to subjective and objective outcome measures in cross-sectional and longitudinal analyses, considering potential confounders or effect modifiers. A baseline visit comprises a standardized self-administered questionnaire, a computer assisted personal interview, and standardized measurements and functional tests. The study cohort is followed by brief telephone contacts after 6 and 18 months and a follow-up visit after 12 months. Multimorbidity and frailty are defined using various established indices. While all efforts are taken to keep participation thresholds as low as possible (e. g. first contacts are made by letter and followed by announced home visits; frail or ill persons have the choice of home visits; a core set of questions is translated into various languages; proxy-interviews are permitted in the case of serious illness), selective participation remains a challenge to be met.

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MINIMAL DATA SET ON CHRONICALLY ILL PEOPLE IN THE U.S. *O Intrator, PhD (Brown University, Providence, RI)

The Minimum Data Set (MDS) was originally developed in 1988-90 under a US government contract with a consortium of researchers following a mandate by the 1987 Nursing Home Reform Act that required that nursing homes conduct comprehensive assessment of their residents' needs in order to create clinically appropriate care plans. Originally implemented in approximately 17,000 US nursing homes in 1990-91, its' 1994-95 version 2.0 was implemented in 1996. A 1998 government mandate of universal computerization and submission of assessments to a national repository resulted in about 10 million assessments per year. The MDS includes over 300 data items and is completed upon admission, discharge, significant change, and at least quarterly. The assessments enable a health care provider to assess key domains of physical and cognitive function, social support, and service use. While the MDS was constructed as a clinical tool, many researchers have used it to study care provision in nursing homes. Summary outcome scales were designed to measure cognitive and physical function, mood, pain, etc. Aggregate measures assist regulators and payers to determine payment levels and assure quality, consumers to select facilities, and providers to manage resident care. Regular assessments make it is possible to use this data to study the natural process of aging in the nursing home, and to test the impact of newly administered treatments. As assessments are conducted at transition times, the MDS can be used to study implications of transitions. Recently, Brown University researchers are developing a website for policy makers and researchers that provides longitudinal information on nursing homes aggregate to the provider, market and state levels, making it possible to examine how the health care system performs to meet the needs of frail older patients.

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MEASURING COGNITIVE FUNCTION IN OLDER POPULATIONS. *L J Launer, PhD (National Institute on Aging)

The importance of describing and understanding the trajectory of cognitive decline and dementing processes is becoming increasingly important as the population ages. Cognitive testing is now implemented in large single and multi-center observational studies and clinical trials. Two main goals cognitive testing are to screen for further evaluation for dementia, or as an outcome of interest. This discussion will focus on measuring cognitive function as an outcome. Specific challenges to implementing and analyzing data on cognitive function in older subjects will be discussed including selection of the appropriate tests for the research question and sample, implementing the tests, quality control, and statistical analyses.

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PRACTICAL BAYESIAN METHODS FOR EPIDEMIOLOGY. *R MacLehose (University of Minnesota, Minneapolis, MN)

Bayesian statistical methods have made enormous advances in the previous 20 years. These methods can offer novel solutions to challenging epidemiologic problems. However, a disconnect exists between the statistical literature, where many of these methods are developed, and applied sciences, like epidemiology, where researchers are not typically trained in their use. Thus, despite the numerous advantages these methods hold, relative to frequentist methods, they have not been widely adopted by practicing epidemiologists. This session will introduce practical modern Bayesian methods that can both solve challenging problems of epidemiologic data analysis and be implemented by members of the epidemiologic community at large.

Session Chair: Richard MacLehose (University of Minnesota)

Speakers:
Sander Greenland, ''Translating graphical models into statistical methods''
Paul Gustafson, ''Bayesian estimation of disease prevalence in hard-to-sample populations''
Lawrence McCandless, ''Bayesian Adjustment for Unmeasured Confounding in Observational Studies''
Richard MacLehose, ''Bayesian Hierarchical Modeling of Dose-Response Curves''

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TRANSLATING GRAPHICAL MODELS INTO STATISTICAL METHODS. *S Greenland (Department of Epidemiology and Department of Statistics, University of California, Los Angeles, CA)

Directed acyclic graphs, in the form of Bayesian belief networks and causal diagrams, have become valuable tools for planning and analyzing studies. The focus of these developments in epidemiology have mostly been qualitative, with graphical models used primarily for illustrating and identifying sources of bias, and for identifying measurements needed for valid estimation. The corresponding statistical methods have focused on testing statistical null hypotheses implied by the causal null assumptions encoded in the graph as deleted arrows. Translation of graphical constraints into statistical models has received less attention in epidemiology, especially for estimation. The translation is important because, in observational studies, identification of target effects depends on constraints untestable with graphical rules. I review basic testing implications of graphs, describe some modeling and estimation implications of graphs, and explain some crucial parametric-modeling concepts that basic graphical treatments do not capture. These concepts show that, rather than rely on unsupportable arrow deletions to achieve identification, we may use ''soft'' constraints in the form of relaxation penalties or prior distributions. Moreover, to facilitate credible prior assignments and inference, we must derive interpretations of results from these constraints when the constraints are false.

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BAYESIAN ESTIMATION OF DISEASE PREVALENCE IN HARD-TO-SAMPLE POPULATIONS. *P Gustafson, C Xia, R Gustafson, R S Hogg, M Gilbert (University of British Columbia, Vancouver, BC, Canada V6T1Z2)

Motivated by a recent survey of the MSM population in Vancouver, Canada, we consider Bayesian techniques for estimating disease prevalences in populations which are partly unreachable in surveys. In particular, when survey weights are available for sampled individuals, we consider extrapolating results to include the portion of the population which is hidden, i.e., those with probability zero of being sampled (and hence infinite survey weight in the counterfactual event they were sampled). We consider practical issues of Bayesian modeling and computation for this problem. We also discuss some theory describing how well such a scheme is likely to work in plausible circumstances. This is based on determining how much uncertainty about disease prevalence would remain even if a sample of infinite size could be obtained

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BAYESIAN ADJUSTMENT FOR UNMEASURED CONFOUNDING IN OBSERVATIONAL STUDIES. *L C McCandless, P Gustafson, A R Levy, S R Richardson (Simon Fraser University, Burnaby, BC, Canada V5A 1S6)

Recent years have witnessed new innovation in Bayesian techniques to adjust for unmeasured confounding. A challenge with existing methods is that the user is often required to elicit prior distributions for high dimensional parameters that model competing bias scenarios. This can render the methods unwieldy. We propose a novel methodology to control for unmeasured confounding that chooses default priors for the bias parameters. The confounding effects of measured and unmeasured variables are modelled as exchangeable within a hierarchical Bayesian framework. We illustrate the method in a data example from pharmacoepidemiology and study the impact of different priors on the results.

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BAYESIAN HIERARCHICAL MODELING OF DOSE-RESPONSE CURVES. *R MacLehose, D Dunson, D Richardson (University of Minnesota, Minneapolis, MN)

Epidemiologic studies frequently estimate dose-response curves that describe the association between a continuous exposure variable and an outcome. In situations where the study data are stratified into subgroups, estimated dose-response curves can be unstable and perform poorly due to small sample sizes or high correlation in the data, leading to estimators with high mean square error. Bayesian hierarchical models can perform well in such situations by borrowing strength between effect estimates. When modeling multiple dose-response curves, each stratum-specific dose-response curve is shrunk toward an overall mean dose-response curve to aid in estimation. We present a Bayesian hierarchical model for dose-response curve estimation, utilizing an exchangeable hierarchy of spline coefficients. Specific recommendations are given for implementation in common software packages. We implement this model in an occupational cohort study of lung cancer among textile workers exposed to chrysotile asbestos. The scientific question of interest is the dose-response association at different periods of time-since-exposure, which we investigate using a generalized version of a distributed lag model.

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STUDYING CAUSATION IN HIGHLY SELECTED SAMPLES: PREGNANCIES, PATIENTS, AND TRIAL PARTICIPANTS. *Katherine Hoggatt, *M. Maria Glymour, ScD (Department of Epidemiology, University of Michigan, Ann Arbor, MI)

Working with highly selected samples raises difficulties of internal validity (selection bias), external validity (generalizability), and efficiency. However, many important causal questions in epidemiology require estimation of causal effects in highly selected samples (e.g., people who have survived to a specific age; patients diagnosed with a condition; immigrants; married people or divorcees; and an especially important group, clinical trial participants). This session addresses some specific examples of highly selected samples, illustrating the possible biases introduced by the selection process, the extent to which these theoretical biases are important in actual data, and possible approaches to overcoming the biases via either study design or analytic techniques.

Speakers:
Eric Tchetgen – ''Efficiency considerations for the study of gene-environment interaction under case-control sampling''
Pascaline Dupas, PhD – ''What can we learn from randomized field experiments in social policy? Addressing the challenge of environmental dependence''
Sonia Hernandez-Diaz, MD, DrPH – ''Is preeclampsia really a disease of primiparous women?''

Discussant:
Thomas Koepsell, MD, MPH (Department of Epidemiology, University of Washington School of Public Health)

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EFFICIENCY CONSIDERATIONS FOR THE STUDY OF GENE-ENVIRONMENT INTERACTION UNDER CASE-CONTROL SAMPLING. *E T Tchetgen, PhD (Departments of Epidemiology and Biostatistics, Harvard School of Public Health, Boston, MA)

Data obtained from a standard case-control study may be conceived as a random 'biased-sample' of exchangeable observations, where data on units is obtained retrospectively by first sampling based on the outcome with respect to a known non-representative marginal probability distribution of the outcome and subsequently sampling the covariates conditional on the outcome status. When analyzed as if sampled 'prospectively', no statistical efficiency loss is usually incurred from ignoring the sampling design so long as the distribution of covariates is unrestricted. This talk will discuss and provide intuition as to why this no longer holds when some prior knowledge is available that restricts the covariates' distribution in some fashion. Special emphasis is given to the case-only estimator of geneXenvironment interaction which is now widely used in genetic epidemiology applications where gene and environment are known to be independent.

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WHAT CAN WE LEARN FROM RANDOMIZED FIELD EXPERIMENTS IN SOCIAL POLICY? ADDRESSING THE CHALLENGE OF ENVIRONMENTAL DEPENDENCE. *P Dupas, PhD (Department of Economics, UCLA and faculty affiliate of the Poverty Action Lab at MIT)

The field of development economics has recently started to use the methodology of randomized controlled trials as a way to inform social policy in less developed countries. Randomized trials make it possible to vary one factor at a time and therefore provide ''internally'' valid estimates of the causal effect of a program or policy. But because trials are inevitably conducted at a relatively small scale and often with highly selected samples, field trials are often criticized for lacking ''external'' validity: Their results are not generalizable because their effect is highly dependent on the environment in which they were carried out. This presentation will review the key challenges posed by environmental dependence and discuss design strategies that can be used to limit the trade-off between internal and external validity. I will provide examples from research conducted in Kenya on mosquito net pricing.

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IS PREECLAMPSIA REALLY A DISEASE OF PRIMIPAROUS WOMEN? *S Hernández-Díaz, S Toh, S Cnattingius (Harvard School of Public Health, Boston, MA 02115)

To investigate whether preeclampsia is more common in first pregnancies due to a selection of low-risk women in subsequent pregnancies, we performed a retrospective cohort study of 758,247 primiparous mothers who had their first births recorded in the Swedish Medical Birth Register between 1987 and 2004. We estimated the incidence of preeclampsia during the first pregnancy. Among those with and without preeclampsia in the first pregnancy, we estimated the proportion of women who had a second pregnancy and the incidence of preeclampsia. We repeated the procedure up to the fourth pregnancy. We also simulated a population where the likelihood of a subsequent pregnancy was equal among women with and without a history of preeclampsia. We then estimated the risk of preeclampsia among multiparous women in such hypothetical population, standardizing the analysis by the pregnancy frequency observed in women without preeclampsia. The risk of preeclampsia was 4.1% in the first pregnancy and 1.6% in later pregnancies overall. The proportion of women having another pregnancy was only 3-5% lower after having a pregnancy with preeclampsia. The standardized risk of preeclampsia in parous women overall was 1.7%. However, the risk was 14.8% in the second pregnancy for women who had preeclampsia in the first pregnancy and 31.9% for women who had preeclampsia in the previous two pregnancies. The risk for multiparous women without a history of preeclampsia was around 1%. Having preeclampsia in one pregnancy is a poor predictor for pregnancy recurrence but a strong predictor for preeclampsia recurrence in future gestations. The lower overall risk of preeclampsia among parous women was not explained by fewer conceptions among women with a history of preeclampsia.

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MATCHING IN COHORT STUDIES: RETURN OF A LONG LOST FAMILY MEMBER. *T Stürmer, *C Poole (UNC Gillings School of Global Public Health, Department of Epidemiology, Chapel Hill, NC)

Matching used to be a standard procedure to control for confounding in cohort studies before the use of multivariable models. With the exponential increase in the application of propensity scores to control for confounding in non-experimental research, matching has resurfaced. As noted by Steve Cole, propensity scores and positivity were major themes spanning several sessions at last year's SER meeting. We will extend this theme in a direction not previously covered but with increasing activity. Matching on e.g., the propensity score or the disease risk score provides intuitive control for confounding in cohort studies leading to exchangeability of exposed and unexposed that can be directly assessed and communicated. If unexposed matches can be found for all exposed individuals, matching leads to a causal interpretation of the exposure effect in the exposed without assuming uniformity of effects. Several aspects of matching, however, need further exploration. These include the optimum matching strategy, the role of exposed individuals for whom no unexposed match can be found, the need to take matching into account when estimating the exposure-outcome association, and efficiency. We propose a symposium with speakers addressing most of these issues from various angles using empirical examples to illustrate their findings.

Co-Chairs Til Stürmer and Charles Poole

Speakers:
Mark Lunt,(University of Manchester, UK) – ''Matching strategies when a good match is hard to find''
Ben Hansen, (University of Michigan) – ''Matching with propensity and prognostic scores'' Peter Cummings, University of Washington – ''Individual Matching to address unmeasured confounders''

Discussant:
Charlie Poole, UNC

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MATCHING WITH PROPENSITY AND PROGNOSTIC SCORES. *B Hansen (University of Michigan, Ann Arbor, MI)

Propensity score matching aims to arrange matched comparisons resembling randomized ones in certain salient respects. When baseline data are sufficiently rich, it is often successful at this. This talk presents two ways of sharpening the technique. First, although it handles multiplicity of covariates relatively well, covariates related strongly to exposure but only weakly to outcomes tend to distract the propensity score, to the detriment of efficiency (Brookhart et al, 2006). Second, propensity matching in pairs has the limitation that it generally sets aside many of the available unexposed subjects, omitting them from the final analysis. If baseline data are readily available but outcomes are not, then this selectivity may help focus data collection; but often outcome and baseline data arrive together, in which case pair matching is likely to be wasteful (Hansen, 2004). Full matching (Rosenbaum, 1991) reduces this waste, aligning exposed and unexposed subjects as well or better than matched sampling would have done while using as many unexposed subjects as have suitable matches in the exposed group (Hansen & Klopfer, 2006). Prognostic scores (Hansen, 2008), which often coincide with risk or disease scores, go further still, training the focus of the adjustment on the most relevant covariates and combinations of covariates. As a method of adjustment unto itself, prognostic scoring has liabilities not shared with propensity scores, and delimiting these liabilities is a topic of current research; but they can be safely combined with propensity scores in various ways, with corresponding benefits for precision. The talk illustrates these enhancements to propensity score matching.

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MATCHING IN COHORT STUDIES. *P Cummings (Department of Epidemiology and the Harborview Injury Prevention and Research Center, Seattle, WA)

Matching in a cohort study or clinical trial can be sometimes be done within each person. For example, the ability of a padded protector to prevent hip fractures could be studied by covering one hip and using the other hip as a control. Comparison within each person would avoid imbalance due to dropouts or missing data and control for the propensity to fall and the risk of fracture in a fall. Matching of exposed and unexposed persons can be efficient because risk ratios, rate ratios, or hazard ratios can be estimated using information only from matched sets with at least one outcome; data from matched sets without any outcomes is not necessary. A matched analysis is sometimes feasible when an unmatched analysis is not. For example, in the United States data are available for all vehicle crashes with a death. It is therefore possible to estimate the association of seat belt use with death by comparing belted and unbelted occupants in the same vehicle. Furthermore, a matched analysis can sometimes control for potential confounding variables that are difficult to measure; by comparing occupants in the same vehicle, confounding by vehicle design features, distance to the nearest hospital, ambulance response time, and vehicle speed at the time of the crash can be eliminated.

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LATE BREAST CANCER RECURRENCE IN OLDER WOMEN. *J L F Bosco, T L Lash, M N Prout, A M Geiger, R Haque, S S Thwin, R A Silliman; for the BOW Investigators (Boston University Medical Center, Boston, MA 02118)

Little is known about the risk of recurrence among older women with early stage breast cancer who remain disease-free 5-years after diagnosis. With the growing number of breast cancer survivors, it is important to understand what happens beyond the 5-year period. Older women ($\geq$65 years) diagnosed with early stage breast cancer (1990-1994) who survived disease-free 5-years after diagnosis were followed for an additional 5-years or until a diagnosis of recurrence, second primary, death or disenrollment from the HMOs involved in the study. We examined predictors of recurrence during this period using Cox proportional hazards regression. Most of the 5-year disease-free survivors (n=1277) were <75 years old (67%), non-Hispanic white (81%), and had node negative (77%) and estrogen receptor positive (ER+) tumors (73%). Among those with ER+ tumors, 26% did not receive tamoxifen. Five percent (n=61) of women disease-free at 5-years had a recurrence in the subsequent five years; 25% local, 9.8% regional, and 66% distant. The median time to late recurrence was 2.8 years. Higher recurrence rates were experienced by women who were node positive (Hazard Ratio [HR]=3.9; 95% Confidence Interval [CI]=1.5, 10.1), had poorly differentiated tumors (HR=2.5; 95%CI=0.9, 6.6), received breast conserving surgery without radiation therapy (HR=2.4; 95%CI=1.0, 5.8) or were ER+ but did not receive adjuvant tamoxifen (HR=2.4; 95%CI=0.7, 8.1). Receipt of adjuvant chemotherapy (HR=1.2; 95%CI=0.5, 2.7) was not associated with late recurrence. Among this cohort of older breast cancer survivors, tumor characteristics continue to predict recurrence after 5 years, supporting the importance of appropriate therapy for primary tumors.

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CHANGE IN BODY SIZE AND SURVIVAL AMONG WOMEN DIAGNOSED WITH BREAST CANCER ON LONG ISLAND, NY. *P T Bradshaw J Ibrahim, P E Abrahamson, J Stevens, J Satia, S L Teitelbaum, A I Neugut, M D Gammon (University of North Carolina, Chapel Hill, NC 27599-7435)

Greater body weight at or before breast cancer diagnosis is associated with decreased survival, which may be due to the unfavorable hormonal environment associated with obesity. However, results are inconsistent for post-diagnosis weight gain, which is common among women with breast cancer. We investigated this association among 1,508 women from Long Island, NY diagnosed with breast cancer in 1996-1997. Shortly after diagnosis and again after about 5 years, subjects were interviewed to gather information on pre- and post-diagnostic breast cancer-related factors, including self-reported anthropometric measures and other potential covariates. Mortality was determined by the National Death Index. We used proportional hazards regression with time-varying covariates to relate changes in body weight over time to mortality, adjusting for confounders, while employing a selection model to account for missing data. All-cause (n=308) and breast cancer-specific (n=164) mortality at about 8 years post-diagnosis was higher for women who lost more than 5% [adjusted hazard ratio (HR) (95% confidence interval (CI)): 4.9 (3.2-7.5) and 6.3 (3.6-11.8), respectively] or gained more than 10% [HR: 3.3 (1.8-6.2) and 3.1 (1.3-7.1)] of body weight during the follow-up period, compared to those who maintained their pre-diagnosis weight (+/- 5%). Results were similar when alternative missing data mechanisms were considered in a sensitivity analysis. These results indicate that women should be cautioned against the weight gain commonly experienced in the years after diagnosis with breast cancer.

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LONG-TERM AND RECENT RECREATIONAL PHYSICAL ACTIVITY AND SURVIVAL AFTER BREAST CANCER: THE CALIFORNIA TEACHERS STUDY. *C West-Wright, K Henderson, J Sullivan-Halley, G Ursin, D Deapen, P Horn-Ross, L Bernstein; CTS Investigators (University of Southern California, Los Angeles, CA 90033)

Introduction: Physical activity is a modifiable risk factor for breast cancer. The relationship between physical activity and breast cancer survival is not as clearly defined as is the association with risk. **Methods:** We assessed whether long-term and recent recreational physical activity is associated with breast cancer survival in the California Teachers Study, a prospective cohort. Between cohort entry (1995-1996) and December 31, 2004, 3539 women with complete data on physical activity were diagnosed with a first primary invasive breast cancer. By December 31, 2005, 460 of these women had died, 221 from breast cancer. At cohort entry, women provided detailed information on long-term and recent moderate and strenuous recreational physical activity. Average level of long-term overall activity (from high school through age 54 years) was defined as low ($\leq$0.50 hr/wk/yr of combined moderate and strenuous activity), intermediate (0.51-3.0 hr/wk/yr of either moderate or strenuous activity and neither moderate nor strenuous of more than 3.0 hr/wk/yr) or high ($>$ 3.0 hr/wk/yr of either moderate or strenuous activity). Relative risks (RR) and 95% confidence intervals (CI) were estimated using Cox proportional hazards methods with age as the time metric. Multivariable models were adjusted for race/ethnicity, estrogen receptor status, disease stage, and baseline information on number of comorbid conditions, body mass index, and total caloric intake. **Results:** Women with high long-term overall activity had a 47% decreased risk of breast cancer death (RR=0.53, 95% CI=0.35-0.80), and women with an intermediate level of long-term overall activity had a 35% decreased risk of breast cancer death (RR=0.65, 95% CI=0.45-0.93), compared to women with low long-term overall activity. Long-term overall activity was consistently associated with risk of breast cancer death across strata of estrogen receptor status and disease stage. Recent (within 3 years of joining the cohort) overall activity, but not long-term overall activity, was associated with death from causes other than cancer (primarily cardiovascular and cerebrovascular deaths) in this group of patients (n=177; p-trend=0.01). **Conclusions:** These results suggest that increased long-term recreational physical activity prior to breast cancer diagnosis may decrease the risk of breast cancer death and that increased recent recreational physical activity may lower the risk of dying from causes other than cancer.

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AGE AT FIRST BIRTH AND BREAST CANCER HISTOLOGY IN RELATION TO MORTALITY. *S Warren Andersen, P A Newcomb, J M Hampton, L Titus-Ernstoff, K M Egan, A Trentham-Dietz (University of Wisconsin, Dartmouth Medical School, Moffitt Cancer Center)

Age at first childbirth (AFB) was more strongly associated with lobular than ductal breast cancer histology in our studies. The same mechanisms influencing breast cancer histology may affect prognosis. We examined breast cancer mortality by AFB and histologic subtype. Data arise from 20,221 invasive breast cancer cases diagnosed between 1988 and 2000 and enrolled in a population-based study in three states. All women completed risk factor telephone interviews. Date and cause of death were obtained from the National Death Index. As of December 2005, 2,886 participants died from breast cancer. Hazard rate ratios (HR) and 95% confidence intervals (95% CI) were calculated using Cox proportional hazards regression models for breast cancer mortality. Models were stratified on state, year of interview and age at diagnosis, and adjusted for body mass index, menopausal status, stage of disease and time from diagnosis to interview. Among lobular breast cancer cases, women with AFB between the age of 25 and 29 had a negative association with breast-cancer mortality when compared to women with early AFB (AFB $<$20 years) (HR, 0.50; 95% CI, 0.32-0.80). Comparison of women with AFB $\geq$ 30 years to women with early AFB resulted in a non-significant association with breast cancer mortality (HR, 0.89; 95% CI, 0.54-1.48). Among ductal cases, comparisons of women with AFB between age 25 and 29 or AFB $\geq$ 30 years to women with early AFB resulted in null associations (HR, 0.91; 95% CI, 0.79-1.06; and HR, 1.05; 95% CI, 0.88-1.25, respectively). Differences in patterns of breast cancer survival according to reproductive characteristics may be disguised unless histologic types are considered.

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DEVELOPING FEASIBLE MEASURES OF WEALTH IN HEALTH RESEARCH. *C Cubbin, C Pollack, B Flaherty, M Hayward, P Braveman (University of Texas, Austin, TX 78712)

Background: The standard survey method to measure wealth is by accumulated economic resources offset by accumulated debt, or ''net worth.'' Despite its independent associations with health, net worth is rarely included in health research, in part because of respondent burden. The purpose of this study was to develop more feasible measures of wealth for survey research on health disparities. Methods: Using the 2004 Survey of Consumer Finances (SCF, ages 25-64) and the 2004 wave of the Health and Retirement Survey (HRS, ages 50+), we created 4 reduced measures of net worth based on dollar values of the most prevalent items, dollar values of the highest proportion items, a yes/no index of the prevalent items, and a yes/no index of the highest proportion items. These were tested against the gold standard measure (based on all available sources of assets and debts) for two health indicators: fair/poor health status and current smoking. Other variables included age, gender, race/ethnicity, marital status, education, and income. Results: In both datasets, we found independent associations between net worth (however measured) and the health indicators after controlling for the other variables. However, net worth based on dollar values of the components tended to have stronger associations with health compared to the gold standard measure. In contrast, net worth based on a summary index (yes/no) had weaker associations with health compared to the gold standard measure. The strength of association between the other variables with each health measure was nearly identical, regardless of which method was used to measure wealth. Conclusions: Measures of wealth with reduced respondent burden are feasible and should be more widely adopted in health research.

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ASSOCIATIONS OF FAMILY INCOME TRAJECTORIES AND ADULTHOOD MENTAL ILLNESS IN THE PANEL STUDY OF INCOME DYNAMICS, 1968–2003. *V Johnson-Lawrence, M Cerdá, S Galea (University of Michigan, Ann Arbor, MI 48109)

It is well established that parental and subsequent adult socioeconomic status are associated with mental health over the lifecourse. However, the extent to which income patterns over the lifecourse affect mental health is not well understood. This analysis evaluated the associations between family income trajectories between 1968 and 2001 and mental illness in 2003 in a sample of 7954 adults aged 18 and older in 2003 from the ongoing Panel Study of Income Dynamics. Mental illness was assessed as a history of psychiatric problems that often interfered with daily activities. Latent class growth mixture models were used to create income trajectory groups. Analyses supported a three trajectory model described as low-decreasing (n=395, mean 2003 income $18810), low-stable (n=1832, mean 2003 income $30639), moderate (n=3635, mean 2003 income $52564), and high (n=2092, mean 2003 income $101446). Income trajectory group membership was entered as a covariate in a logistic model estimating the odds of mental illness in 2003. The model was adjusted for age, gender, education, and race/ethnicity. The odds of mental illness among those in the low-decreasing and low-stable groups were 4.9 and 4.7 times the odds of those in the high trajectory group (95% confidence intervals (CI): 2.0-11.8 and 2.4-9.3, respectively). Those with higher education were less likely to have mental illness (odds ratio (OR) =0.9, 95% CI: 0.8-1.0), as well as those who self-reported race/ethnicity as black compared to white (OR=0.4, 95% CI: 0.3, 0.7). Further analyses are warranted to assess the mechanisms that may explain the association between income trajectory membership and subsequent mental illness.

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DO THE WEALTHY HAVE A HEALTH ADVANTAGE? AN APPLICATION OF MARGINAL STRUCTURAL MODELS. *A Hajat, J Kaufman (University of North Carolina, Chapel Hill, NC)

Wealth reflects one's stock of resources and is less subject to the dramatic fluctuations of income over time. Wealth can also be construed as a measure of social hierarchy, reflecting cumulative financial advantage potentially over decades or even generations. An elevated position in the social hierarchy can provide tangible and intangible benefits, many of which can directly impact one's health. This study uses the Panel Survey on Income Dynamics, an American longitudinal survey which began in 1968. Because of the many time-varying covariates, marginal structural models are used to estimate the causal effect between wealth and several health outcomes, namely mortality, general health status, smoking, obesity and hypertension. Cox proportional hazards models (for mortality as the outcome) and binomial regression models (for all other health outcomes) are used to estimate causal parameters relating wealth to health outcomes, adjusting for time-dependent and independent confounders. Preliminary results show no association between wealth and mortality (hazard ratio = 1, 95% confidence interval: 0.95, 1.05). Those with zero or even negative wealth have the same risk of death as those with high levels of wealth, even after controlling for time-dependent and independent covariates. Work is ongoing to ascertain the causal parameters for the other four health outcomes. Although preliminary, these results support other studies. If confirmed, the results imply being asset rich may not positively affect health, adjusting for sociodemographic and health characteristics. One possible explanation is that since most Americans have the majority of their assets in their homes, an illiquid and difficult asset to access, wealth may not impact health outcomes directly.

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DOES FALLING INTO POVERTY IN MIDDLE AGE INCREASE RISK OF CARDIOVASCULAR DISEASE ONSET? *A Nandi, M M Glymour (Harvard School of Public Health, Boston, MA 02215)

Many observational studies report that socioeconomic disadvantage predicts cardiovascular disease (CVD). However, recent longitudinal studies dispute the causality of this claim, and attribute the association between health and socioeconomic status (SES) primarily to the influence of health on SES. Time-varying confounders of health and SES may bias these analyses, but have not been fully addressed in prior research. Health and Retirement Study 1992 enrollees were classified as poor (<=25th percentile of self-reported earnings, threshold defined in 1994) or non-poor at biennial interviews through 2006. The sample included those who were non-poor at baseline; born 1931-41; who participated in both the 1992 and 1994 waves; and had 1+ follow-up (n=5,115). Inverse probability of treatment (IPT) weighted logistic regression models were used to estimate the effects of falling into poverty on the incidence of CVD (defined as heart disease or first stroke, 994 events) between 1996 and 2006. We compared results restricting or not restricting to those who remained in poverty throughout follow-up. IPT weights were used to account for time-varying covariates (employment status, health behaviors, health status) potentially affected by prior exposure and time-fixed covariates (race/ethnicity, region of birth, parental SES, education, baseline wealth). Declines into poverty predicted non-significant increases in the odds of CVD in IPT weighted pooled logistic regression models. The association was larger when restricting to those who experienced persistent poverty. Estimates of the effects of SES on CVD are sensitive to assumptions regarding the underlying causal structure. This debate has important implications for shaping health-relevant policies.

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* = Presenter; S = The work was completed while the presenter was a student