001

DEVELOPMENT OF HIERARCHICAL MODEL ON LIFESPAN MOTOR FUNCTION ASSESSMENT ON MUSCLE STRENGTH SUBDOMAIN. *Y-C Wang, E Wang, R Gershon, J-S Lai, C Nowinski, D Reuben, Z Rymer (Rehabilitation Institute of Chicago, Chicago, IL)

Aims: The National Institutes of Health (NIH) Toolbox is a 5-year initiative aiming to assemble brief, comprehensive measures for the assessment of neural function across diverse study designs and populations. It has a particular emphasis on measuring outcomes in clinical trials and functional status in large cohort studies, e.g., epidemiological studies and longitudinal studies. This study reports on work from the Toolbox motor domain team. Methods: Psychometric properties of the hand-held and grip dynamometers were reviewed. The norms issue across the lifespan was evaluated via meta-analysis. Results: Hand-held and grip dynamometers showed good test-retest reliabilities ($r \geq 0.90$), were easy to administer and efficient. Researchers often reported average performance of all subjects on grip strength by age groups. Overall, evaluating upper limb muscles had higher reliability than lower limb muscles. Muscle strength above 250 N by hand-held dynamometer was suggested to be under-estimated. The mean grip strength of the women was about 69% that of men. Dominant hand was stronger in right-handed subjects but not for left-handed subjects. Grip strength increased dramatically with age, peaked at 20–30, and decreased slowly due to aging. Results of muscle strength on either upper or lower limbs were lack of comparability as reported results often combined demographic information such as gender and age. Conclusions: Hand-held and grip dynamometer has great potential in Toolbox but need to be modified to overcome the limitations.

002-S

ANEMIA AND DEMENTIA AMONG ELDERLY: THE SAO PAULO AGEING AND HEALTH (SPAH) STUDY, BRAZIL. I M Benseñor, *I S Santos, P A Lotufo, P R Menezes, M Scazufca (University of Sao Paulo, Brazil)

There is conflicting evidence concerning the association between low hemoglobin levels and cognitive decline. A case-control performed in a sample of a US population disclosed these diseases were not related. In contrast, a cross-sectional study in India showed an association of low-levels of hemoglobin and cognitive dysfunction. We addressed a cross-sectional population-based study among 1,948 elderly (≥65 years-old) people living in a poor neighborhood in the city of Sao Paulo, Brazil to evaluate the relationship between anemia and dementia. Diagnosis of dementia was based on DSM-IV criteria; diagnosis of anemia was established according to World Health Organization (WHO) criteria. 60.9% of the participants were women. Dementia occurred in 5.1% (5.3% of women, 4.7% of men), anemia was found in 10.2% (12.1% of men and 8.8% of women, $p = 0{,}009$). A univariate analyses showed a significant difference in anemia prevalence among patients with (18.2%) and without dementia (9.8%). However, this association was no more significant after age-adjustment (Odds Ratio, 1.4; 95% confidence interval, 0.8–2.5). This result was similar when each gender was analyzed separately. Other socioeconomic variables as place of birth, school-years and income did not change materially this association. Concluding, in this sample of very low-income elderly people, anemia and dementia were not associated.

003-S

DIETARY INTAKES AND COGNITIVE STATUS A DOZEN YEARS LATER: RESULTS FROM A COHORT OF ELDERLY FRENCH WOMEN (E3N STUDY). *M N Vercambre, M C Boutron-Ruault, K Ritchie, F Clavel-Chapelon, C Berr (INSERM ERI 20, Villejuif, F-94805 France)

To evaluate the potential impact of long-term nutrition on age-related cognitive impairment, we analyzed longitudinal data from 4,809 French women (born between 1925–1930) of the E3N cohort, an epidemiological study initiated in 1990. An extensive dietary history questionnaire was sent to all participants in 1993. In 2006, a questionnaire including 8 Instrumental Activities of Daily Living (IADL) and a 19 item proxy Likert-scale relating to recent cognitive change (DEcline-Cognitive = DECO) was sent to an informant, permitting to assess functional and cognitive status more than a decade after dietary assessment. The associations between nutritional intakes in the past and age-related impairment were measured using multivariable logistic regression models adjusting for sociodemographic, lifestyle and medical factors. Women observed to have recently declined in terms of cognitive ability (DECO score less than 33 - a validated cut-off point for dementia screening) had significantly lower previous intakes of dietary fibers, w3-fatty acids, vitamin C and vitamin B6, as compared to the functionally- and cognitively- healthy women (normal IADL among telephone use, medication, budget and transportation and DECO score ≥ 33). Regarding foods, these women consumed significantly less poultry, fish and animal fats but had higher intakes of sweet manufactured products. These results support the hypothesis of a long-term neuroprotective effect of certain nutrients (anti-oxidants, poly-unsaturated fats and B-group vitamins) and suggest a future role for dietary intervention early in life to reduce cognitive decline. Further research is needed to elucidate the specific pathway involved.

004

CYSTATIN C AND RISK OF INCIDENT AGE-RELATED CATARACT OVER 15 YEARS. *M D Knudtson, R Klein, K E Lee, B E K Klein (University of Wisconsin—School of Medicine and Public Health, Madison, WI 53726)

It has been hypothesized that renal dysfunction may increase the risk of age-related cataract. There is increasing evidence that cystatin C is a promising biomarker of renal disease. Cystatin C has been linked to other systemic diseases (e.g. cardiovascular disease), but to our knowledge has not been examined with regard to the development of age-related cataract. In this study, we investigated this relationship in the population-based Beaver Dam Eye study. In 2007, cystatin C was measured from stored serum drawn at the baseline examination in 1988–90 ($N = 4628$). Three types of age-related cataract (nuclear, cortical and posterior subcapsular) were measured from slit-lamp and retinal illumination photographs taken at the baseline, 5, 10 and 15-year follow-up examinations. The population ranged in age from 43–86 years and was 56% female at baseline. After controlling for age, sex, history of smoking and heavy drinking, total cholesterol, glycosylated hemoglobin, C-reactive protein and use of oral steroids, cystatin C was associated with the incidence of cortical (odds ratio, 95% confidence interval per log standard deviation increase: 1.27, 1.08–1.50) and posterior subcapsular cataract (1.24, 1.02–1.50), but not nuclear cataract (1.09, 0.97–1.23). In summary, serum cystatin C is associated with the incidence of two types of age-related cataract. Whether the mechanism is from oxidative stress, other metabolic changes related to renal function or common genetic etiologies of renal function and lens pathology requires further study.

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005

MULTIPLE SENSORY LOSS AND INCIDENCE OF FUNCTIONAL IMPAIRMENT. *M Fischer, K Cruickshanks, B Klein, R Klein, C Schubert, T Wiley, T Tweed (University of Wisconsin-Madison, Madison, WI 53726)

In a prospective study of participants in the Epidemiology of Hearing Loss Study and Beaver Dam Eye Study, the joint effect of hearing, vision and olfactory loss on the incidence of functional impairment was evaluated. Sensory capacities and function were measured in 1998–2000 and 2003–05. Hearing loss was defined as a pure-tone threshold average (PTA) (at 0.5, 1, 2 and 4 kHz in the better ear) of greater than 25 dB while vision loss was considered present if the current binocular visual acuity was 20/40 or worse. Olfactory loss was defined as the correct identification of less than six of the eight odors tested in the San Diego Odor Identification Test. The Activities of Daily Living (ADL), Instrumental Activities of Daily Living (IADL), and a frailty index (including information on ability to rise from a chair, time to walk 10 feet at a usual pace, handgrip strength in the dominant hand and peak expiratory flow rate) were used to measure functional abilities. There were 1702 subjects at risk for functional impairment (mean age = 66 years). Significant independent effects of hearing loss, after adjustment for vision loss, olfactory loss, age, gender and other covariates, were observed for IADL impairment incidence (odds ratio (OR) = 1.5, 95% confidence interval (CI) = 1.1,2.1) and frailty (OR = 1.6, 95% CI = 1.1,2.3) but not for ADL impairment. Regarding the joint effect of multiple sensory impairments, after adjustment for all covariates, individuals with hearing, vision and olfactory loss were 2.9 times as likely to develop an IADL impairment than those with no sensory loss (95% CI = 1.0,8.6). The decline of multiple sensory abilities impacts future physical function in older adults.

006

ATHEROSCLEROSIS AND INCIDENCE OF COGNITIVE IMPAIRMENT. *E M Krantz, K J Cruickshanks, C R Schubert, B E K Klein, R Klein, F J Nieto, C W Acher (University of WI, Madison, WI 53726)

Objective: To measure associations between atherosclerosis and incidence of cognitive impairment. Methods: Intima-media thickness (IMT) of the carotid artery (measured by ultrasound) and cognitive impairment (defined by <24 points on the Mini-Mental State Exam or report of Alzheimer's disease) were measured at the 5-year follow-up exam of the Epidemiology of Hearing Loss Study, a population-based study of older adults in Beaver Dam, Wisconsin. Cognitive status was reassessed at the 10-year follow-up exam and used to calculate 5-year incidence of cognitive impairment. The maximum IMT value of the near and far walls of the common carotid artery, internal carotid artery, and carotid bifurcation for the left and right side was used in analyses. Logistic regression was used to estimate associations between carotid IMT and incident cognitive impairment. Results: Of 1614 participants (aged 53–94 years) who were cognitively unimpaired at the 5-year exam, 77 (5%) became cognitively impaired by the 10-year exam. This incidence rate varied by IMT, with 10% showing cognitive decline among participants with IMT values in the upper quartile versus 3% for those with IMT values in the lower 3 quartiles. Adjusting for age and sex, elevated carotid IMT values (upper quartile vs. lower 3 quartiles) were significantly associated with greater odds of incident cognitive impairment (Odds Ratio (OR) = 1.96, 95% Confidence Interval (CI) 1.21–3.20). This association remained when smoking, education, and olfactory impairment were added to the model (OR = 1.77, 95% CI 1.05–2.99). Conclusions: Our results suggest that atherosclerosis may contribute to cognitive decline, with increased risk among those with highly elevated carotid artery IMT values.

007

THE ASSOCIATION BETWEEN INTAKE OF PROTEIN RICH FOODS AND RISK OF HIP FRACTURES. *D Thorpe, R Knutsen, K Oda, S F Knutsen (Dept. of Epidemiology and Biostatistics, School of Public Health, Loma Linda University, Loma Linda, CA 92350)

The role of protein as well as plant og animal sources of protein for bone health is still unclear. We studied the association between intake of legumes and meat on risk of hip fractures in a population with relatively low protein intake.A total of 28,315 Caucasian females, of which 50% are lacto-ovo-vegetarian, enrolled in the AHS-2, a large NCI funded cohort study. All women completed a comprehensive lifestyle questionnaire, including a detailed food frequency questionnaire, at baseline. A short follow-up questionnaire which included information on hip fracture due to minor trauma/fall since enrollment, was mailed out after 2 years. All women with prevalent osteoporosis and/or a history of hip fracture at baseline as well as those with missing values on the exposure variables and confounders were excluded for analyses. In total, 124 reported having a hip fracture during the 2-year follow-up period. In multivariate analyses, risk of hip fracture was positively associated with age [OR = 1.13(95% confidence interval (CI): 1.11–1.16)] and inversely associated with protein-containing foods such as legumes [OR = 0.11(95% CI:0.02–0.53)] (>1 times/day vs ±1 times/week. Similarly, an inverse association was found with meat intake (OR = 0.58 (95% CI:0.29–1.15)](1+ times/week vs never) although this did not reach statistical significance. Limiting the analyses to vegetarians (never use meat), did not change the protective effect of legumes[OR = 0.13 (95% CI:0.025–0.70] for the same comparisons. We conclude that protein intake seems to be important for fracture risk and more studies are needed to assess the role of vegetable protein versus animal protein.

008

CUMULATIVE ANTICHOLINERGIC EXPOSURE IS ASSOCIATED WITH POOR MEMORY AND EXECUTIVE FUNCTION IN OLDER MEN. *L Han, J Agostini, H Allore (Yale University Program on Aging, New Haven, CT 06511)

To examine the longitudinal relationship between cumulative anticholinergic exposure and cognitive function, we followed a cohort of 544 community-dwelling male veteran aged 65 years or older with diagnosed hypertension for memory and executive function over a two year period. The outcomes were assessed annually using Hopkins Verbal Recall (HVR) and the Instrumental Activities of Daily Living (IADL) scales, respectively. Anticholinergic medication use was ascertained using participants' primary care visit records and quantified as a time-varying predictor using a clinician-rated anticholinergic score. A mixed effects linear regression model was used to control for both baseline and time-dependent confounders while accounting for interdependence among repeated measures on the same person. After adjusting for a priori selected potential risk factors, including age, education, cognitive and physical function, comorbidities and severity of hypertension, a one-unit increase in the total anticholinergic burden per three months was associated with a −0.32 (95% confidence interval: −0.58 to −0.05) and −0.10 (95% CI = −0.17 to −0.04) point decrease in HVR and IADL outcomes, respectively. The association was attenuated but remained statistically significant for both memory (−0.29, 95% CI = −0.56 to −0.01) and executive function (−0.08, 95% CI = −0.15 to −0.02) after further adjustment for concomitant use of non-anticholinergic medications. Sensitivity analyses using alternative measures for cumulative anticholinergic exposure yielded consistent results. These findings suggest that chronic use of anticholinergic medications may have negative impact on verbal memory and executive function in older men.

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009-S

ADIPOSITY AND BONE MINERAL DENSITY IN OLDER MEN: OPPOSING RELATIONSHIPS OF SUBCUTANEOUS AND INTERMUSCULAR FAT DEPOTS. *L M Yerges, I Miljkovic-Gacic, J A Cauley, Y Sheu, V W Wheeler, C H Bunker, A L Patrick, J M Zmuda (University of Pittsburgh, Pittsburgh, PA 15261)

Although low body weight is a risk factor for osteoporosis, emerging data suggests that increased adiposity may be associated with decreased bone mineral density (BMD). Studies examining these relationships have measured body fat with DXA which cannot distinguish between subcutaneous (SAT) and intermuscular adipose tissue (IMAT). To investigate these relationships further, we analyzed body composition in 1754 Afro-Caribbean men aged $\geq$40 from the population-based Tobago Bone Health Study. Cortical BMD, muscle cross-sectional area, total adipose tissue area (TAT), and percentage SAT and IMAT at the proximal tibia were measured by peripheral quantitative computed tomography. We used analysis of covariance to test for associations between quartile of adipose tissue measures and BMD while adjusting for age, mixed African ancestry, height, muscle area and body weight. Higher TAT was associated with a lower cortical BMD ($p < 0.001$; quartile $1 = 1132 \pm 1.6$ mg/mm^3 vs. quartile $4 = 1110 \pm 1.7$ mg/mm^3). A higher percentage of IMAT was also associated with lower cortical BMD ($p < 0.001$). In contrast, men with a higher percentage of SAT had greater cortical BMD ($p < 0.001$). Additional adjustment for diabetes and physical activity yielded similar findings. These results indicate that not only is total adiposity potentially important in determining BMD among older men, but that different fat depot compartments may have opposing associations with BMD. Additional research is needed to better understand the mechanisms underlying these contrasting relationships.

010

MARITAL STATUS, LIVING ARRANGEMENTS, SOCIAL CONTACTS AND COGNITIVE DECLINE IN THE EAST BOSTON-EPESE STUDY. A Loerbroks, R J Glynn, D A Evans, and *T Stürmer (Brigham and Women's Hospital, Harvard Medical School, Boston, MA)

Marital status, living arrangements, and social contacts could be associated with cognitive decline in older adults. These associations were examined using data from the East Boston cohort of the Established Populations for the Epidemiologic Studies of the Elderly. This population-based cohort was initiated in 1982/1983 and enrolled 3,809 adults aged 65+. Exposures were marital status/living arrangements, the number of close friends, close relatives, children, and the number of monthly in person contacts with these people. Cognitive function was assessed by the Short Portable Mental Status Questionnaire (SPMSQ) and the East Boston Memory Test (EBMT). Test scores at baseline and after 3 or 6 years were classified as low/medium/high. Decline was defined as transition to a lower category. Multivariable risk ratios (RR) of cognitive decline and 95% confidence intervals (95% CI) were estimated by log-linear regression. Whereas marital status/living arrangements were unrelated to cognitive decline over 3 years, having 1 or more close friends or relatives (versus having none) was associated with a lower risk of cognitive decline according to the SPMSQ (RR = 0.81, 95% CI:0.68,0.97) and the EBMT (RR = 0.64, 95% CI:0.54,0.76). These associations were stronger in women (RR = 0.69, 95% CI:0.56,0.87 and RR = 0.55, 95% CI:0.41,0.75, respectively) than in men and attenuated when cognitive decline was examined over 6 years. In conclusion, having 1 or more close friends or relatives seems associated with a lower risk of cognitive decline, particularly in women. Having 1 or more close friends or relatives might be an important marker of a lowered risk or protective, possibly via social support.

011-S

A GEOGRAPHICALLY WEIGHTED REGRESSION ANALYSIS OF THE ASSOCIATION BETWEEN COUNTY-LEVEL HOSPITAL SUPPLY AND SELF-CARE DISABILITY RATES AMONG OLDER ADULTS. *S Y Liu (Department of Community Health, Brown University, Providence, RI 02904)

Almost 10% of community-dwelling adults who are 65 and older have a self-care disability. Rates of self-care disability among community-dwelling older adults may be associated with area resources. I used a geographically weighted regression (GWR) model to examine whether the relationship between self-care disability rates among older adults and hospital supply display geographical variation. Global regression assumes the relationship between the exposures and the outcome is constant. GWR models allow local parameters to be estimated where coefficients are functions of location in space (Fotheringham, Brundson and Charlton, 2002). Adaptive kernels accounted for nonuniformity in county size. Data was from the 2000 US Census and the 2000 Area Resource Files. Other county-level characteristics included in the model were proportion unemployed, proportion living in poverty and below, and proportion of the population who was Black. In the fully adjusted model, the number of hospitals in a county was significantly associated with self-care disability rates among older adults ($p < 0.05$). According to maps of the parameter values and t-values, model fit varied spatially. Area-level characteristics associated with self-care disability rates among older adults have spatial variability that should be considered in future analysis.

012

SERUM CYSTATIN C AND THE INCIDENCE OF AGE-RELATED MACULAR DEGENERATION. *R Klein, M D Knudtson, K E Lee, B E K Klein (University of Madison Wisconsin, Madison, WI 53726)

Cystatin C is abundant in retinal pigment epithelium (RPE) cells in the eye and has been hypothesized to play a role in the pathogenesis of age-related macular degeneration (AMD), the leading cause of legal blindness in the US. We examined the relationship of serum Cystatin C measured from stored frozen samples in 3,335 persons who were examined in the population-based Beaver Dam Eye Study in 1988–90 and were seen in at least one or more of 3 follow-up examinations 5-years apart. Chronic kidney disease (CKD) was defined by an estimated glomerular filtration rate (eGFR) calculated from serum creatinine. AMD was ascertained from masked gradings of fundus photographs using the Wisconsin Age-Related Maculopathy Grading System. The mean serum Cystatin C level was 0.88 mg/dL (standard deviation [SD] = 0.21) and 3.1% had CKD at baseline. The 15-year cumulative incidence of early AMD was 14.3%, 2.0% for exudative AMD (one type of late AMD), and 1.3% for geographic atrophy (another type of late AMD). While controlling for age, sex, and smoking status at baseline, log-transformed serum Cystatin C was associated with the 15-year cumulative incidence of early AMD (odds ratio [OR] per SD 1.17, 95% confidence interval [CI] 1.02, 1.35, p = .02) and exudative AMD (OR per SD 1.39, 95% CI 1.02, 1.90, p = .04) but not geographic atrophy (OR per SD 0.90, 95% CI 0.58, 1.40, p = .64). There was no relation of either serum creatinine or presence of CKD with either incident early AMD, exudative AMD or geographic atrophy. The associations of Cystatin C and incident early AMD and exudative were present only in persons without CKD. These findings suggest a possible non-renal effect of serum Cystatin C on the incidence of early AMD and exudative AMD.

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013-S

SERUM C-REACTIVE PROTEIN AND HEARING LOSS IN OLDER ADULTS. *W H Zhan, K J Cruickshanks, C R Schubert, B E K Klein, R Klein, F J Nieto, M Y Tsai, E Krantz (University of WI, Madison, WI 53726)

Background: Emerging evidence suggests that chronic inflammation may play a role in the decline of auditory function with aging. Objective: To explore the association of a marker of chronic inflammation, high sensitivity C-reactive protein (hsCRP), with hearing loss. Methods: Serum levels of hsCRP were recently measured from stored samples obtained in 1988–90 as part of the population-based Beaver Dam Eye Study of adults aged 43–84 years. Hearing thresholds were measured by audiometry in 1993–95 as part of the Epidemiology of Hearing Loss Study in the same cohort. Hearing loss was defined as a pure-tone average of thresholds at 500, 1000, 2000, and 4000 Hz greater than 25 decibels of hearing level in the worse ear. Logistic regression analyses were conducted adjusting for potential confounders. Results: The mean age of the participants (n = 3529) was 65.6 years. Higher hsCRP was associated with the prevalence of hearing loss (age- and gender-adjusted Odds Ratio (OR) comparing 4th vs. 1st quartile = 1.62; 95% Confidence Interval (CI) 1.29–2.04). Further adjustment for occupational noise exposure, education, smoking status, history of ear infection and family history of hearing loss only slightly altered the estimate (OR = 1.56, 95% CI 1.22–1.99). On average, participants were 17% more likely to have hearing loss with every quartile elevation in hsCRP (age- and gender-adjusted OR = 1.17; 95% CI 1.08–1.25). Conclusion: Levels of hsCRP measured 5 years before hearing were associated with prevalence of hearing loss in older adults, suggesting that inflammatory processes may contribute to the development of age-related hearing loss.

014

READING ABILITY AND RACE-ETHNIC DIFFERENCES IN COGNITIVE TESTING. *J E Dunn, B Harty, A Stoddard, R Gavett, S Weintraub (New England Research Institutes, Watertown MA)

Differences in reading ability, perhaps from disparities in educational quality, may account for race and ethnic differences seen in cognitive test scores. We analyze data from a single-site observational Women's Health Initiative ancillary study (Cognitive Change in Women) to determine if any of 18 neuropsychological tests differ by race/ethnicity adjusting for age and education, and whether reading ability [American National Adult Reading Test score (ANART)] affects any such differences. Study participants were 461 European-American (EA) and 47 African-American (AA) women age 60+, without history of dementia and with complete data on variables of interest. Mean raw and z-scores for each test were compared between race-ethnic (RE) groups, adjusting in turn for age and education, and age, education, and ANART score. Fourteen raw test scores differed significantly by RE($p < .05$), adjusting for age and education. Adjusting additionally for ANART score reduced this to 10, and differences were reduced in magnitude for all but 2 scores. Comparison of z-scores showed that adjusting additionally for ANART score reduced RE differences the most for the Boston Naming test(0.56), Digit Span(0.43) and Controlled Oral Word Association(FAS) (0.32) test scores, and WMS-R Logical Memory I and II(0.31–0.32). Ten of the remaining 13 Z-scores showed enough(>30%) effect of ANART adjustment to suggest that reading ability was acting as a confounder. These findings confirm prior observations that differences in reading ability, independent of education, may account for some RE differences in cognitive test scores and extends these findings to woman with relatively high levels of education.

015-S

LACK OF CHOICE IN CAREGIVING INCREASES THE CARER'S RISK OF STRESS. *K H Winter, E L DeFries, E M Andresen (University of Florida, Gainesville, FL 32610)

The purposes of this study were to compare caregivers who chose to provide care to those without choice, and determine how/whether caregiver choice impacts a caregiver's stress. Using a caregiving module appended to the 2005 North Carolina Behavioral Risk Factor Surveillance System (BRFSS), we identified 341 informal caregivers. Stress was self-reported by participants using a 5-point scale of increasing severity and dichotomized at 3+ points. We found marked differences between carers with and without a choice with respect to the caregiver's relationship to the recipient, caregiver status, level of burden, hours of care provided per week, and activities of daily living (ADL) and instrumental ADL scores. Adjusted binomial logistic regression was used to assess the risk of stress given lack of choice. In the fully adjusted model, caregivers without a choice were 3.11 (95 % confidence interval: 1.6, 5.9) times more likely to report stress compared to those with a choice in caring. High objective burden also increased stress. Non-choosing caregivers were most commonly the primary caregiver of a parent. The finding that lack of choice increases the risk of self-reported stress highlights the need for increased social and financial support for individuals who are unable to provide support to family members with disability.

016-S

OBESITY IN NORTHEAST PENNSYLVANIA, 2002–2006. *N Shah and S Lesko (NE Regional Cancer Inst., Scranton, PA 18510)

The authors sought to examine the prevalence of obesity in northeast Pennsylvania and to identify associated risk factors. A cross-sectional analysis of population-based data obtained by telephone interview was conducted. Obesity was defined as a Body Mass Index of 30+. Logistic regression was used to examine relationships between obesity and age, sex, race, education, tobacco and alcohol use, employment, marital status, and rural residence. Of 6,422 subjects, 1,572 (25%; 95% confidence interval [CI] 24%–26%) were obese. A figure that was significantly higher than the corresponding figure for the United States (23%). Risk of obesity was positively associated with age and disability and negatively associated with education, smoking, alcohol use, and part-time employment. Compared to18–29 year olds, the odds ratio [OR] for obesity among those 45–64 was 2.0 (95% CI 1.5–2.7). Compared to those without a high school education, the OR among college graduates was 0.57 (95% CI 0.44–0.73). Compared to nonsmokers, the OR among smokers was 0.65 (95% CI 0.55–0.77). Compared to those who never consume alcohol, the OR among current drinkers was 0.69 (95% CI 0.61–0.80). Compared to full-time workers, the OR among part-time workers was 0.75 (95% CI 0.60–0.93); among the disabled it was 2.1 (95% CI 1.6–2.7). Compared to those who reside in urban counties, the OR among residents of rural counties was 1.2 (95% CI 1.0–1.3). The data suggest that the prevalence of obesity is higher in northeast Pennsylvania than the country as a whole. The data also demonstrate relationships between obesity and age, education, tobacco and alcohol use, employment, and place of residence. Further investigation is needed to determine how the high prevalence of obesity contributes to the burden of cancer in this community.

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017

PREDICTING MORTALITY USING A NOVEL BIOMARKER OF IMMUNE FUNCTION. *A E Aiello, PhD, J B Dowd, PhD, M N Haan, DrPH (Department of Epidemiology, Center for Social Epidemiology & Population Health, University of Michigan-School of Public Health, Ann Arbor, MI)

Persistent Cytomegalovirus (CMV) infection has been identified as a crucial marker of age-related alterations to the immune system and has been linked to several inflammatory conditions. Using data from a population based sample of 1500 elderly Latinos, we examined whether baseline antibody levels to CMV predict all-cause and cause-specific mortality. Yearly interviews tracked baseline health conditions and mortality status. Baseline fasting blood samples were tested for CMV antibody levels and other clinical markers associated with mortality (C-reactive protein, HDL and LDL cholesterol, and homocysteine). Cox-proportional hazards regression models estimated hazards ratio (HR) for the effect of baseline immunoglobulin G antibody levels to CMV and risk of subsequent mortality over 8 years, while controlling for baseline health conditions and clinical risk factors. Antibody response to CMV at baseline was only moderately associated with mortality over follow-up but the association remained significant even after control for several known clinical and health-related markers of mortality (HR = 1.07, 95% CI: 1.01, 1.14). Our results suggest that CMV antibody may levels provide important information beyond conventional clinical markers of deteriorating health in the elderly. Further studies are needed to identify the immunological mechanisms by which CMV may influence mortality.

018-S

HEALTH RISK BEHAVIORS OF MIDDLE SCHOOL STUDENTS IN THE UNITED STATES. *W H Oglesby and S J Corwin (University of South Carolina, Columbia, SC 29208)

Leading causes of morbidity and mortality among all age groups in the United States are related to the following: behaviors that contribute to unintentional injuries and violence; tobacco use; alcohol and other drug use; sexual behaviors that contribute to unintended pregnancy and STDs, including human immunodeficiency virus (HIV) infection; unhealthy dietary behaviors; physical inactivity; and overweight. These health risk behaviors are often established during youth and extend into adulthood. Research on the health risk behaviors of high school youth has been conducted using the Youth Risk Behavior Survey (YRBS). These nationally representative findings show high levels of engagement in risky health behaviors of high school aged youth. Few empirical studies, however, have been conducted nationally to document the health risk behaviors of middle school youth. Although the Centers for Disease Control and Prevention (CDC) created a middle school version of the YRBS, it has not been widely implemented like the high school version. A recent review of the technical and scientific literature revealed eighteen behavioral surveillance studies conducted by schools, districts, or state departments of education using the middle school version of the YRBS. Surprisingly, very few of these studies were published in peer-refereed journals or listed in leading bibliographic databases (ERIC, PubMed, PsychInfo, etc.) leaving the scientific literature improperly informed about the health risk behaviors of middle school youth. In this session, we will review the methodology, instrumentation, and results of the eighteen behavioral surveillance studies conducted using the middle school version of the YRBS; compare/contrast findings across demographic and geographic variables; and discus strategies to accelerate behavioral surveillance research on middle school youth (including using less divisive health areas such as injury prevention as a way to stimulate additional behavioral surveillance on HIV risk behaviors). Increased behavioral surveillance research on middle school youth is needed to uncover behaviors that put youth at higher risk for negative health outcomes including HIV infection. The absence of empirical evidence documenting high risk behaviors creates misperceptions, improperly informs behavioral interventions, and can exacerbate health disparities.

019

THE ASSOCIATION OF PHYSICAL ACTIVITY AND FITNESS LEVELS ON BONE DENSITY: CARDIA FITNESS STUDY. *J Pinchoff, M Carnethon, T Church, A Hankinson, D R Jacobs, Jr, C E Lewis, P J Schreiner, B Sternfeld, O D Williams, S Sidney (Northwestern University, Chicago, IL 60611)

Low bone mineral density (BMD) is a major public health concern among adults. Approximately 10 million Americans over age 50 have osteoporosis; however, certain lifestyle factors may prevent bone loss. Using data from the Coronary Artery Risk Development in Young Adults (CARDIA) study, we examined the association of self reported physical activity (PA) and cardiorespiratory fitness, measured via symptom-limited maximal graded exercise treadmill testing, with BMD. Participants were recruited from 4 US cities, with 7 follow-up exams over 20 years. Whole body BMD scans were taken at the year 20 exam using Dual X-ray Absorptiometry (DXA). We conducted cross-sectional analyses of 2400 participants (47% of year 20 cohort, 44% black, mean age 45.3 years) with available DXA data. From multivariable linear regression analyses to adjust for age, race, body mass index (BMI), and field center, PA score and fitness measures were positively associated with BMD in middle-aged men ($n = 1032$) and pre- and peri-menopausal women ($n = 852$). For every 200 exercise unit (EU) increase in PA, mean BMD was 0.02 g/cm^2 higher in men (SE = 0.002, $p < 0.001$) and 0.004 g/cm^2 higher in pre- and peri-menopausal women (SE = 0.002, $p < 0.07$). Fitness (per 2 minute longer treadmill duration) was significantly positively associated with BMD in men (0.02 g/cm^2 SE = 0.004) and pre- and peri-menopausal women (0.01 g/cm^2 SE = 0.004) (both $p < 0.001$). Among postmenopausal women ($N = 247$) associations between PA and BMD or fitness and BMD were not statistically significant. Higher PA and fitness may be important in maintaining higher BMD levels in middle-aged adults.

020

FACTORS ASSOCIATED WITH CIGARETTE SMOKING AMONG AMERICAN INDIAN YOUTH IN MINNEAPOLIS-ST PAUL. *J Forster, I Brokenleg, K Rhodes, G Lamont, J Poupart (University of Minnesota, Minneapolis, MN 55454)

Reported prevalence of cigarette smoking among American Indian youth is higher than other racial/ethnic minorities, and limited data indicate that this disparity is especially pronounced in the Upper Midwest of the U.S. The purposes of this study are to measure traditional and recreational tobacco use among American Indian youth in an urban Upper Midwest area, and to identify social and environmental factors associated with recreational tobacco use (cigarette smoking). As part of a community-based participatory research project, a convenience sample of 336 American Indian youth age 11 to 18 were given a self-administered survey. Data were analyzed using bivariate chi-square tests and multivariate logistical stepwise regression. Almost 37% reported cigarette smoking in the previous 30 days, with about three times more in the older age group as in the youngest age group ($p < .0001$). Social exposure to cigarette smoking was very common; more than three-fourths reported living with an adult who smokes, and 44% have a brother and/or sister who smoke. Yet more than 65% reported a household rule against them smoking, and 43% report that no one is permitted to smoke in their home. Youth who smoke report buying cigarettes at a high rate and smoking on school property. Yet household rules and hearing of someone getting caught smoking at school have an independent negative association with likelihood of being a smoker. These results indicate that American Indian youth in this area have not benefited from a statewide focus on youth smoking prevention, but they also suggest several pathways to reduce cigarette smoking among urban American Indian youth.

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021-S

PHYSICAL ACTIVITY AND BREAST DENSITY. *T Kalra, J Flom, J Ferris, M B Terry (Columbia University, Mailman School of Public Health, New York NY 10032)

Physical activity in adulthood has been shown to be inversely associated with breast density, an intermediate marker of breast cancer, but there has been limited research investigating whether adolescent physical activity is also associated with density after adjusting for adult physical activity. We examined the association of adolescent and adult physical activity and mammographic density using prospective data from the National Collaborative Perinatal Project (NCPP) and the Early Life Factors on Adult Health Study. A self-administered questionnaire was used to collect information on duration and intensity of adolescent and adult physical activity. Of the 154 women, ages 38 to 46, that provided mammograms, 113 completed a long questionnaire that asked about adolescent physical activity. Using both multivariate linear and logistic regression models, we observed no overall association between participating in physical activity as an adult or as an adolescent and mammographic density. Multivariate adjusted analyses, stratified by BMI, revealed that an increase in adult activity, measured in metabolic equivalents (METs), was associated with a decrease in breast density among with women with a BMI less than 25 kg/m^2 (Odds Ratio = .82, 95% CI: .66–1.0 per 10 MET units). These results suggest that adult physical activity may be inversely associated with breast density among women with a BMI less than 25 kg/m^2. Thus, the pathway by which physical activity is associated with breast cancer risk may include breast density, but the complex relationship with physical activity and BMI needs to be investigated further.

022

IMPACT OF OBESITY, PHYSICAL INACTIVITY, SEDENTARY LIFESTYLE, AND OTHER SOCIAL FACTORS ON BEHAVIORAL PROBLEMS AMONG US CHILDREN. *G K Singh, M K Kenney, M D Kogan, and M Siahpush (MCH Bureau, Rockville, MD 20857)

This study examined the impact of obesity, physical activity, sedentary activities, sleep behavior, and other sociodemographic factors on the prevalence of behavioral problems among 67,404 US children aged 6–17 years. Data from the 2003 National Survey of Children's Health were used to calculate a factor analytic index and a dichotomous measure of behavioral problems in children. The continuous and binary outcome measures were derived from 11 items that asked parents to rate their children on a set of negative behaviors, including arguing, bullying, disrespect, not getting along with others, disobedience, irritability, lacking empathy and conflict resolution strategies, and feelings of worthlessness, depression, and detachment. Least squares regression showed higher levels of behavioral problems associated with obesity, physical inactivity, geographic mobility, and higher levels of TV viewing, recreational computer use, sleeplessness, and lower levels of social participation, familial support, socioeconomic position, and neighborhood safety. Adjusted odds of serious behavioral problems, estimated by multivariate logistic regression, increased by 30% for obese children, 59% for 3+ hours/day of TV viewing, 50% for 4+ hours/day of computer use, 108% for physically inactive children, 178% for children experiencing inadequate sleep during the entire week, and by 73–82% for children with low social participation, social support, and family income. White, black, and mixed race children had at least 31–56% higher odds of behavioral problems than Hispanics. Health promotion strategies aimed at modifying obesity-related behaviors may lead to improved behavioral/emotional health in children.

023

AQUATIC EXERCISE AND QUALITY OF LIFE IN PERSONS WITH OSTEOARTHRITIS. *L Cadmus, PhD, M B Patrick, PhD, MHA, M L Maciejewski, PhD, T Topolski, PhD, B Belza, PhD, RN, D L Patrick, PhD, MSPH (University of Washington, Seattle, WA 98195)

Purpose: To evaluate the effectiveness of a community-based aquatic exercise program for symptom management and improved quality of life among persons with osteoarthritis. Methods: 249 adults with osteoarthritis were enrolled in a 20-week randomized controlled trial of a pre-existing community-based aquatic exercise program vs. usual care. Intervention group participants (n = 125) were asked to attend at least two aquatic exercise sessions per week. Control group participants (n = 124) were asked to maintain usual activity levels. Measures of health status, impairment, activity limitation, self-efficacy, and quality of life were collected at baseline, 10 weeks, and 20 weeks. Body mass index (BMI), self-rated health, and comorbidity were tested as possible moderators of the relationship between aquatic exercise and quality of life. Results: Aquatic exercise had a positive impact on quality of life ($p < .01$). This effect was moderated by BMI ($p < .05$) such that benefits were observed among obese participants (BMI >30), but not among normal weight or overweight participants. Conclusions: Given the preponderance of existing community aquatics programs, aquatic exercise offers a therapeutic and pragmatic option to promote quality of life among individuals who are living with both obesity and osteoarthritis. Future investigation is needed to replicate these findings and develop strategies to increase participation in aquatics programs. Original study funded by CDC U48/CCU00954.

024

VARIATION IN PREGNANCY-RELATED RISK FACTORS AMONG FOREIGN- VS. US-BORN MOTHERS, BY RACE/ETHNICITY. T Ramadhani, *M A Canfield, D K Waller, M Royle, A Correa, and the National Birth Defects Prevention Study (Department of State Health Services, Austin, TX 78756)

We analyzed data on 5,008 control mothers from the National Birth Defects Prevention Study, with deliveries from 10/1997–12/2003, to examine the relationship between foreign-born mothers and selected pregnancy related risk factors (sociodemographic characteristics, behaviors, and maternal conditions). Overall and race/ethnic-specific odds ratios (ORs) and 95% confidence intervals (CIs) were calculated for each factor in foreign-born mothers, using US-born mothers as the referent. Foreign born white mothers were three times more likely than US-born white mothers to be 35+ years of age and less likely to have attained 12+ years of education. With respect to behavioral characteristics, US- and foreign-born white mothers were similar. Foreign-born (vs. US-born) Hispanic mothers were much older, less educated and had a lower household income (e.g., adjusted OR for $50,000+ vs. lowest income group = 0.34, 95% CI = 0.19–0.58). They were also less likely to drink, binge drink, smoke, use illicit drugs, or have an unplanned pregnancy. Foreign-born black women were less likely to be teenagers or to smoke, but also less likely to use folic acid supplements. Regarding maternal conditions, foreign born mothers were less likely overall to report a diagnosis of hypertension during pregnancy or to be obese prior to pregnancy, but more likely to be underweight. The obesity finding was highly significant in all 3 racial/ethnic groups. Compared to US-born mothers, foreign-born mothers exhibit pregnancy related behaviors and have maternal conditions that tend to favor healthier outcomes.

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025

GROUP AND TEMPORAL DYNAMICS AS THE DETERMINANTS OF INTER-GROUP DIFFERENCES IN BEHAVIORAL DISORDERS.

*C J Hall, G Kaplan, S Galea (U of Michigan, Ann Arbor, MI 48104)

There has been substantial attention over the past decades paid to understanding racial/ethnic differences in health indicators. Nearly all these efforts have relied on parametric epidemiologic approaches that assume independence of key determinants and no interrelation between independent variables and health ''outcomes''. We used RePAST (Recursive Porous Agent Simulation Toolkit) to create a computational platform for studying the development of drug addiction in the general population and to assess factors that drive inter-group differences in drug addiction. We developed an agent-based model where agents (persons) have individual characteristics [race, socio-economic position (SEP), and access to drugs], a simple social network, and are influenced by local neighborhood conditions. All agents had equal probability of drug addiction, independent of their race and SEP, while availability of drugs was a function of neighborhood properties, with more availability in more disadvantaged and minority areas. We assumed the proportion of an agent's friends who are addicted to drugs correlates to the agent's likelihood of addiction. We found that for small networks, doubling the network influence can cut addiction rates by more than half, and similar, but smaller, differences occur for larger networks. We also found that increasing the addictiveness of a drug by 15% can lead to a four-fold increase in the amount of network influence needed to obtain similar addiction rates. Greater network influence was associated with narrowing of inter-group disparities in addiction. Efforts to mitigate inter-group differences in behavioral disorders need to take into account the complex dynamics of social and structural influences over the lifecourse.

026

RACE AND SHARED DECISION-MAKING: PERSPECTIVES OF AFRICAN-AMERICAN PATIENTS WITH DIABETES.

*M E Peek, A Odoms-Young, M T Quinn, R Gorawara-Bhat, S C Wilson, M H Chin (the University of Chicago, Chicago, IL 60637)

Introduction: Shared decision-making (SDM) is an important component of patient-centered health care and has been linked to positive health outcomes such as better diabetes control. African-American patients experience SDM less often than whites, a fact which may contribute to racial disparities in diabetes outcomes. We explored patient perceptions of how race influences SDM between African-American patients and their physicians. Methods: We conducted in-depth interviews (n = 24) and five focus groups (n = 26) among a purposeful sample of African-American diabetes patients at an urban academic medical center. We used trained race-concordant interviewers with experience discussing health and communication issues. Each interview/focus group was audio-taped, transcribed verbatim and imported into Atlas.ti software. Coding was conducted using an iterative process and each transcription was independently coded by two members of the research team. Results: Qualitative analysis of the interview and focus group transcripts showed that there was heterogeneity in patients' perceptions about the importance of race in the shared decision-making process. While some patients reported that race played no role in communication patterns between African-Americans and their doctors, others described adverse events and experiences that they attributed to race. Patients identified physician bias/discrimination and/or cultural discordance as issues that may influence physician-related SDM behaviors (e.g. less likely to share information [test results] and more likely to be domineering with African-American patients). They also identified mistrust of white physicians, prejudice and internalized racism as patient-related issues that may influence African-American patients' SDM behaviors (e.g. less forthcoming with physicians about health information, more deference to physician advice, less likely to adhere to treatment regimens). Conclusion: Problematic issues such as perceived bias, discrimination, and mistrust may negatively influence how both patients and physicians engage in shared decision-making, and exacerbate existing racial disparities in the quality of patient/provider communication.

027

PREDICTING USE OF A HEALTH PROFESSIONAL FOR CESSATION AMONG US YOUTH AND YOUNG SMOKERS.

*S Davis, A Malarcher, D Barker, J Gable, P Mowery, G Giovino (Centers for Disease Control and Prevention, Atlanta, GA 30341)

An estimated 9 million youth in the US smoke daily and over 50% of high school smokers try to quit smoking each year. To examine use of a health professional in a quit attempt among young smokers, we used data from the 2003 National Youth Smoking Cessation Survey, a nationally representative, prospective telephone survey of current smokers aged 16–24 years. Logistic regression was used to identify predictor variables of use of a health professional for cessation at 12 month follow-up. Interactions were assessed with sex, age, and race. Among 1,063 young smokers, 60% felt highly confident in quitting, 61% had a family member's health seriously impacted by smoking, and 15% used a health professional for cessation between baseline and follow-up. Persons with a family illness due to smoking were more likely to use a health professional than those without a family illness (Odds Ratio = 1.72, 95% Confidence Interval = 1.05,2.77). Significant interactions were found between age and confidence in quitting, race and confidence in quitting, and age and addiction level. For example, among all racial/ethnic groups, those with high levels of confidence were less likely to use a health professional than persons with low confidence. Non-Hispanic black persons with moderate confidence were more likely to use a health professional than those with lower confidence; this relationship was not seen among other racial/ethnic groups. The use of a health professional by young smokers in the US is low. Programs are needed to encourage young smokers to talk with a health care provider about cessation incorporating messages that address family history of a smoking-related illness, quit confidence, and addiction.

028-S

RACE-SPECIFIC PREDICTORS OF BREAST CANCER RISK AMONG SCREENED POSTMENOPAUSAL WOMEN IN THE UNITED STATES.

*K R Ylitalo, R P Ojha, E L Evans, L A Fischbach, M J Felini (UNT Health Science Center, Fort Worth, TX 76107)

Racially stratified breast cancer risk prediction models may provide useful information regarding risk factor variations. We utilized Breast Cancer Surveillance Consortium (BCSC) data to determine race-specific predictors of 1-year breast cancer risk. We evaluated postmenopausal women (n = 1,642,824) without previous breast cancer diagnosis who underwent screening in the BCSC catchment area. Data from baseline mammograms were linked to cancer registry and pathology data to determine breast cancer incidence within 1-year of baseline screening. Best subset selection was used to ascertain pertinent predictors of 1-year breast cancer risk for race-specific (Black or White) and overall (Black and White combined) models. Discriminatory accuracy was assessed by a concordance (c) statistic for each model. Risk predictors for combined races included age >45 years, dense breast tissue, first-degree relative with breast cancer, previous breast procedure, and current HRT use (c = 0.58). Risk predictors for White women included age >45 years, dense breast tissue, first-degree relative with breast cancer, and previous breast procedure (c = 0.58). Risk predictors for Black women included dense breast tissue, first-degree relative with breast cancer, previous breast procedure, no current HRT use, and natural menopause (c = 0.59). Our study reveals unique predictor combinations for each race and reiterates the utility of race-specific breast cancer risk prediction models for generating potentially meaningful information that may be otherwise subdued in unstratified models. Variant predictors derived from race-specific models may be useful for customizing prevention programs.

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029

OFFSPRING GENDER AND BREAST DENSITY. *J Ferris, J Flom, T Kalra, M B Terry (Columbia University Mailman School of Public Health, New York, NY 10032)

Several epidemiologic studies have assessed the association between offspring gender and breast cancer risk; however the results have been inconsistent. Breast density is a strong intermediate marker of breast cancer but little is known whether pregnancy characteristics, including gender of offspring, are associated with breast density. We contacted former female participants of the New York site of the U.S. National Collaborative Perinatal Project who were born between 1959 and 1963 and prospectively followed for seven years. We successfully traced and enrolled 263 women in adulthood. Mammograms were collected on 154 women and breast density was measured using a computer-assisted mammogram reading program on 145 women. We examined the association between offspring gender and percent breast density, adjusting for race, age at interview, age at first birth, income, education and BMI. We estimated these associations using linear regression with percent density as the outcome. In a multivariate model, women with only female offspring had a modest increase in breast density ($\beta = 5.8$, 95% CI $= -1.0$ to 12.6), while women with only male offspring had no change in breast density ($\beta = 0.8$, 95% CI $= -5.2$ to 6.9). If replicated, these data suggest that differences in gender offspring, which are associated with differing hormonal environment, may result in breast density changes.

030-S

ALCOHOL INTAKE OVER THE LIFE COURSE AND MAMMOGRAPHIC DENSITY. *J Flom, J Ferris, T Kalra, M B Terry (Columbia University Mailman School of Public Health, New York, NY 10023)

Alcohol is an established, and modifiable, risk factor for breast cancer. Alcohol has also been associated with breast density, a strong indicator of breast cancer risk. Few studies of density have assessed alcohol consumption patterns over the lifecourse. We undertook a study of alcohol use during adolescence, 20's, 30's and 40's. We contacted former female participants of the New York site of the U.S. National Collaborative Perinatal Project who were born between 1959 and 1963 and collected epidemiologic data including detailed history of lifetime alcohol use, by age, type, frequency and duration ($n = 263$). 188 (71%) participants had a mammogram and 82% consented to share copies. We evaluated breast density using Cumulus software and estimated the associations using multivariate linear regression. 70% of participants reported ever consuming alcohol in their 20's, 30's or 40's. At survey, 46% of participants were non-drinkers, 44% drank 1–6 drinks per week, and 10% drank 7 or more drinks per week. There was no significant difference in percent density in women who reported current drinking of 1–6 drinks per week compared to non-drinkers (-2.9 percent (95% CI $= -7.9$–2.1)), however, women who drank 7 or more drinks per week had on average 10.2 percent (95% CI $= 2.6$–17.9) higher breast density compared to non-drinkers, adjusted for age, race, BMI, exogenous hormone use, parity and education. Overall, we observed a higher breast density among women with higher current alcohol use. We observed similar positive findings between drinking in the thirties and forties and breast density but not for drinking during earlier periods. These results suggest that the association between alcohol and breast cancer may work through breast density.

031-S

PHYSICAL ACTIVITY AND ENDOMETRIAL CANCER RISK IN THE NIH-AARP DIET AND HEALTH STUDY. *G Gierach, S Chang, L Brinton, J Lacey, Jr, A Hollenbeck, A Schatzkin, and M Leitzmann (National Cancer Institute, Rockville, MD 20892)

In line with recognition of a strong hormonal etiology, both obesity and physical activity have been postulated to affect endometrial cancer risk. While obesity has been consistently related to risk, studies have derived inconsistent results for physical activity. We examined relationships of activity patterns with endometrial cancer risk in the NIH-AARP Study cohort, which included 109,621 female members with no history of cancer, ages 50–71, who completed in 1995–1996 a mailed questionnaire capturing daily routine and vigorous physical activity. Of these, 70,351 completed a second questionnaire with additional activity measures (1996–1997). State cancer registry linkage identified 1,052 primary endometrial cancers through December 2003. In multivariate proportional hazards models (including body mass index, BMI), increasing frequency of vigorous activity (any period of $\geq$20 minutes of activity causing increased breathing, heart rate or sweating) was associated with reduced endometrial cancer risk in a dose-response manner (p for trend $= 0.02$) (RR for $\geq$5 times/week vs. never/rarely $= 0.77$, 95% CI: 0.63, 0.95). The association with vigorous activity was restricted to overweight and obese women, with no relation seen among thin women (BMI <25) (p for interaction $= 0.12$). We observed no associations with risk for light/moderate, routine or occupational physical activities. However, risk did increase with number of hours of daily sitting (p for trend $= 0.03$). The potential effects on risk of vigorous activities, as well as a possible interaction with BMI, may suggest directions for future research aimed at clarifying underlying mechanisms, including those relating to hormonal alterations.

032

CROSS CONTINENTAL REPRODUCIBILITY STUDY ON IMMUNOHISTOCHEMICAL MARKERS OF BREAST CANCER. *D O Malaka, A Khramtsov, O A Oluwasola, A Odetunde, A G Falusi, D Huo, O I Olopade (University of Chicago, Chicago IL)

African American women experience a disproportionate burden of aggressive hormone receptor negative breast cancer for reasons that remain unknown. Recently, a much higher proportion of ''triple-negative'' (estrogen receptor, ER; progesterone receptor, PR; human epidermal growth factor 2, HER2) breast cancer was reported in indigenous African women. As interlab variability in immunohistochemical (IHC) tests may be a barrier to further epidemiologic studies of breast cancer heterogeneity, we conducted a validation study of breast cancer biomarkers in a well-established lab at Chicago and a newly-established IHC lab in Nigeria. 232 breast tumor blocks were evaluated for ER, PR, and HER2 at both labs using tissue microarrays(TMA) technique. Web-based conferences were held periodically to discuss IHC staining protocols, standardized scoring systems and to resolve discrepant cases. Whole slide imaging was used for joint review by pathologists and kappa statistic (k) was used to indicate concordance of the two labs. Initially, the agreement was 79% ($k = 0.29$) for ER, 85% ($k = 0.48$) for PR, and 75% ($k = 0.28$) for HER2 between the two labs. Antigen retrieval techniques and scoring methods were identified as important reasons for discrepancy. After quality assurance and training, the agreement was 82% ($k = 0.37$) for ER, 88% ($k = 0.62$) for PR, and 92% ($k = 0.66$) for HER2. We found web-based conference with TMA and digital microscopy a useful, cost-effective tool for quality assurance of IHC, consultation and collaboration between distant labs. Improved quality in testing of tumor biomarkers will reduce misclassification in epidemiologic study of breast cancer subtypes.

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033-S

RACIAL DISPARITIES IN CERVICAL CANCER BY RESIDENTIAL AREA-LEVEL MEASURES IN THE DETROIT METROPOLITAN AREA. *C Pirtle, S C Grady, J Darden, M H Rahbar, L Jezierski, E Velie (Michigan State University, East Lansing, MI 48824)

Racial disparities in cervical cancer (CC) incidence rates have been documented by numerous studies, but the extent to which specific area-level measures influence these disparities is unclear. Authors examined the effects of residential area-level measures on invasive CC incidence rates (IRs) for Black Non-Hispanic and White Non-Hispanic women in the Detroit Metropolitan Area, 1998–2002. CC data were obtained from the Detroit Metropolitan Surveillance Epidemiology and End Results (SEER) registry (n = 1581 cases). Area-level (census tract) characteristics and denominator populations were obtained from the United States (US) Bureau of the Census, 2000; measures included the Darden/Kamel Socioeconomic (SEP) Index (low, medium or high), racial segregation (≥90% white, ≥50% black or mixed), and centralization (urban, inner suburb or outer suburb). CC data were standardized to the 2000 US population and age-adjusted IRs and rate ratios (RRs) were computed for each of the area-level strata. Overall, Black women had a significantly higher IR of CC compared to White women (RR = 1.84; 95% Confidence Interval (CI) = 1.67–2.05). Within area-level strata, Black women had significantly higher IRs of CC than White women within low SEP areas (RR = 1.48; 95% CI = 1.27–1.72), racially mixed but not segregated areas (RR = 1.49; 95% CI = 1.08–2.06), and inner suburbs but not urban areas (RR = 1.51; 95% CI = 1.13–2.02). Although Black women living in medium SEP, and segregated areas were at increased risk for CC, these numbers did not reach statistical significance. Findings demonstrate that while area of residence influences CC incidence, racial disparities still persist within similar areas of residence.

034-S

JOINT EFFECTS OF EARLY LIFE AND REPRODUCTIVE FACTORS, HIGH BODY MASS INDEX, AND POSTMENOPAUSAL BREAST CANCER RISK. *S Nechuta, J Gardiner, A Schatzkin, C Schairer, E Velie (Michigan State University, E Lansing, MI 48824)

High body mass index (BMI) is associated with increased postmenopausal breast cancer (BC) risk. It is not known whether reproductive events and other early life exposures modify this association by altering the susceptibility of the breast to hypothesized hormonal effects of obesity. We examined joint effects and potential biological interactions of BMI and early life/reproductive factors on postmenopausal BC risk among non-Hormone Therapy users in the prospective BCDDP cohort study 1973–1998 (n = 18,473, cases = 1,236). We quantified departures from additivity by estimating the relative excess risk due to interaction (RERIs) using hazard ratios (HRs) from Cox proportional hazard models. Adjusted joint exposure HRs for dichotomized factors (vs. joint lowest risk) were elevated (as were single exposure HRs) for high BMI (≥25 kg/m2) and age at menarche < 13 (1.3; 95% confidence interval (CI): 1.1–1.5), height >65 inches (1.3; CI: 1.1–1.6), age at first birth ≥25 (1.5; CI: 1.3–1.8), and family history of BC (1.6; CI: 1.4–2.0), but RERIs were non-significant and small, suggesting no evidence for additive interaction. On the other hand, we found a significant interaction between parity (parous/nulliparous) and low/high BMI (RERI = −0.47; CI: −0.86, −0.09). Compared to parous women with low BMI, the HR for nulliparity and high BMI was 1.1 (CI: 0.8–1.4), for nulliparous women with low BMI was 1.4 (CI: 1.1–1.7), and for parous women with high BMI was 1.2 (CI: 1.1–1.4). The interaction between BMI and parity suggests that in postmenopausal women, joint exposure to high BMI and nulliparity does not increase risk, while lean nulliparous and heavy parous women have increased BC risk.

035-S

NIGHT SHIFT WORK AND RISK OF EPITHELIAL OVARIAN CANCER. *J L Marino, K L Cushing-Haugen, K G Wicklund, M A Rossing (University of Washington & Fred Hutchinson Cancer Research Center, Seattle, WA, 98109)

Background: Working at night has been associated with risk of female breast and colorectal cancers, and with endometriosis, possibly because of circadian disruption and melatonin suppression caused by exposure to light at night. Methods: The authors conducted a population-based case-control study in Washington State that included 812 women aged 35–74 years diagnosed with epithelial ovarian cancer from 2002–2005 and 1,313 controls. During in-person interviews, women described all jobs held for at least 4 months after reaching 25 years of age; for each job, they indicated whether they had worked during the hours of midnight to 4:00 a.m. Logistic regression was used to calculate odds ratios (ORs) and 95% confidence intervals (CIs) associated with a history of working at night. Results: Overall, the risk of ovarian cancer was slightly elevated among women who had worked at night (adjusted OR 1.2, CI 1.0–1.5). This increase in risk was most evident for serous tumors (OR 1.4, CI 1.1–1.7), among which an increased risk was noted for both borderline (OR 1.6, CI 1.0–2.4) and invasive (OR 1.3, 1.0–1.7) subtypes. Conclusion: Our results provide some initial support for the hypothesis that exposure to light at night, or some other aspect of night work, may influence risk of ovarian cancer.

036

ORAL CONTRACEPTIVES AND RISK OF ALL CANCERS COMBINED AND SITE-SPECIFIC CANCERS IN SHANGHAI. *K A Rosenblatt, D L Gao, R M Ray, Z C Nelson, K J Wernli, W Li, and D B Thomas (University of Illinois at Urbana Champaign, Champaign, IL 61820)

The risk of all cancers combined and 12 site-specific cancers (breast, colon, gallbladder, liver, lung, ovary, pancreas, rectum, stomach, thyroid, uterine cervix, and uterine corpus) in relation to oral contraceptive (OC) use was examined in a prospective study in Shanghai, China. History of exposure to OCs and breast cancer risk factors was assessed by an in person baseline interview administered to 267,000 female textile workers between 1989 and 1991. The cohort was followed until July, 2000 for incident cancer cases. Cox Proportional Hazards analysis was used to calculate incidence rate ratios (RR) for specific types of cancer in women who ever used OCs and by length of use. The risk of uterine corpus cancer was reduced in women who ever used OCs (RR = 0.68, 95% Confidence Interval (CI) = 0.45–1.04) and there was a trend of reduction in risk with increasing duration of use (p = 0.015). The risk of rectal cancer was increased in women who ever used OCs (RR = 1.31, 95% CI = 0.98–1.75) and risk increased with increasing duration of use (p = 0.017). The risk of colon cancer was increased only in women who used OCs for 10 years or more (RR = 1.56, 95% CI = 1.01–2.40). OC use was not related to the risk of other cancers studied. Our findings confirm observations from previous studies with respect to uterine corpus/ endometrial cancer but suggest an increased risk of colorectal cancer, associated with OC use, which has not been universally observed in other studies.

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037-S

TRENDS IN DIETARY SUPPLEMENT USE IN A COHORT OF POST-MENOPAUSAL WOMEN FROM IOWA. *K Park, L Harnack, D R Jacobs, Jr (University of Minnesota, Minneapolis, MN 55454)

Although it is widely known that the use of dietary supplements is common in the United States, little is known about use patterns among older Americans. Thus, we examined trends in the prevalence of use of various types of dietary supplements and the contribution of supplement use to total nutrient intake in a cohort of older women. We analyzed food intake and dietary supplement use in a cohort of women who were 55–69 years of age in 1986 (baseline measure) and 68–87 years of age 2004 (follow-up measure) in the Iowa Women's Health Study. The proportion of women who reported using one or more dietary supplements increased substantially between baseline (66%) and follow-up (85%). Moreover, a substantial proportion of women reported using multiple dietary supplements, 38% using 2–3 and 27% using 4 or more dietary supplements in 2004. The most commonly used products were multi-vitamins, calcium, vitamin C, and vitamin E. Dietary supplements contributed substantially to total intake for many nutrients at baseline and their contribution became relatively greater at follow-up for most nutrients examined. For most nutrients no decline in intake was observed, as might have been expected in an aging group. Rather, nutrient intakes increased for many nutrients, primarily due to the rising use of dietary supplements. The use of dietary supplements in older individuals is of particular importance because of the potential benefits of maintaining nutrient intake levels despite potentially declining food intake. However, the possibility that there are risks from eating a large proportion of purified nutrients from dietary supplements rather than deriving them from foods should be studied, especially in the elderly.

038-S

NUTRITION OF PALESTINIAN PRESCHOOLERS: RESILIENCE AND VULNERABILITY. *S Massad, F J Nieto, M Palta, M Smith, M Guillot, R Clark, A Thabet (University of Wisconsin-Madison, Madison, WI 53726)

The authors examined factors associated with nutritional resilience/vulnerability among preschoolers in the Gaza Strip, where political violence and deprivation are omnipresent. The authors used a cross-sectional random sample of kindergartens to select 350 preschoolers 3–6 years of age in 2007. Multinomial logistic regression was used to compare resilient (adequate nutrition) and vulnerable (stunted) groups with those with moderate nutrition as the referent group. There was considerable variation in child nutritional status, with the prevalence of nutritional resilience and vulnerability ranging between 21.6–52.8% and between 2.8–27.0%, respectively, in the localities in this study. Factors associated with nutritional resilience were child age (odds ratio [OR] per month of age increment = 0.95, 95% confidence interval [CI]: 0.92, 0.98), normal birth weight (OR = 7.13, 95% CI: 1.91, 26.60), active hand- or spoon- feeding between age 2 and 4 years (OR = 3.48, 95% CI: 1.36, 8.93),and residential stability in the past 2 years (OR = 2.10, 95% CI: 1.08, 4.08). Factors predictive of nutritional vulnerability were higher scores on the maternal depression scale (OR = 1.35, 95% CI: 1.05, 1.74) and maternal elementary versus higher schooling (OR = 2.54, 95% CI: 0.93, 6.94). These findings suggest more comprehensive interventions addressing the needs of both children and families exposed to political violence and deprivation, targeting maternal mental health as well as child health, and promoting positive feeding practices.

039

DIET AND SURVIVAL FROM OVARIAN CANCER AMONG WOMEN IN COOK COUNTY, ILLINOIS. *T A Dolecek, F G Davis, R T Campbell, C E Joslin (University of Illinois at Chicago, Chicago, IL 60621)

Understanding factors that contribute to improved survivorship is of growing importance, particularly for cancers with subpopulation survival differences such as ovarian. We examined the effects of dietary intake patterns on survival among women diagnosed with epithelial ovarian cancer during 1994–1998 who participated in a case-control study conducted in Cook County, Illinois. Pre-diagnosis usual diet was assessed using information from a validated food frequency questionnaire. Deaths in the cohort were ascertained through December 2005 from the National Death Index. The analysis included 341 cases with 52% deceased after an average follow-up of 10.1 years. Hazard ratios (HR) adjusting for relevant covariables and 95% confidence intervals (CI) were obtained from Cox regression models. Longer survival was observed for women reporting higher intakes of yellow vegetables (upper to lower tertile, HR = 0.63, CI = 0.42–0.99, p-trend = 0.07). Survival effects of alpha-carotene, a micronutrient abundantly found in the respective food group, were consistent with those observed for yellow vegetables. Favorable effects on survival were also indicated with higher intakes from all vegetables excluding regular potatoes (upper to lower tertile, HR = .69, CI = .47–1.00, p-trend = 0.05). Conversely, a survival disadvantage was seen among women consuming higher intakes of ham and lunch meats (upper to lower tertile, HR = 1.46, CI = 1.01–2.12, p-trend = 0.12) and red meats (upper to lower tertile, HR = 1.43, CI = 0.96–2.12, p-trend = 0.03). Adverse effects on survival were also suggested for higher intakes of milk products. Our evaluation indicates that usual dietary factors may impact survival both favorably and unfavorably after a diagnosis of ovarian cancer.

040-S

IDENTIFICATION OF NEIGHBORHOOD-BASED PROFILES OF FRUIT AND VEGETABLE INTAKE AMONG 4TH-GRADE CHILDREN LIVING IN DENMARK. *C Svastisalee, H Skov-Petersen, M T Damsgaard, M Rasmussen, R Kroelner, B Holstein, P Due (Univ. of Copenhagen, Copenhagen, Denmark)

To identify neighborhood profiles of fruit and vegetable intake for 4th grade children living in Denmark, we obtained fruit and vegetable gram intake levels from those participating in the 2003 Pro Children Study (N = 1919). We aggregated intake by school, and determined percent consumption using the World Health Organization's daily recommendation for fruit and vegetables. We created neighborhood and food outlet profiles for each school using information from: school principal surveys, statistics databanks, as well as commercial and government-based business registers. Spatial patterning via clustering of food outlet measures and socioeconomic indicators were used to determine 'profiles' of schools with high and low fruit and vegetable consumption, while regression methods were employed to assess the association between the percentage of students consuming recommendation levels and corresponding determinants. Overall, 12 school profiles were prominently characterized according to the percentages of low income and ethnic minority students, residential unemployment, and school proximity to any food outlet. Furthermore, students living in the capital region were more likely to have higher intakes of fruit and vegetables (p = 0.0109) than those living on the Western coastal region. Percentage of unemployment (p = 0.0143) and schools with at least one store selling fruit and vegetables in the vicinity (p = 0.0175) were positively associated with students meeting recommendations for fruit and vegetable intake. Findings suggest regional differences in fruit and vegetable intake may be influenced by local surroundings.

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041

NUMBER OF 24-HOUR DIET RECALLS NEEDED TO ESTIMATE ENERGY INTAKE. R Magner, *Y Ma, B Olendzki, T Hurley, I Ockene, K Schneider, J Hebert (University of Massachusetts, Worcester, MA 01604)

Background: Accurate estimation of caloric intake is important in assessing the effect of diet on health. Nutritional data in many epidemiologic studies are obtained from 24-hour diet recall interviews (24HR). It is important to know how many 24HRs are needed for the best estimate of energy intake. Methods: 79 healthy women completed 7 24HRs over a 14-day period during which energy expenditure was determined by the doubly labeled water method (DLW). Linear mixed models were used to evaluate effect of call sequence and day of week on 24HR energy intake. Mean daily energy intake by number of recalls was compared to the estimate from DLW. Number of 24HRs needed for an accurate estimate of caloric intake was also calculated using a traditional formula. Results: Most participants were White, well-educated, and sedentary. Mean age was 49 years. Mean body mass index was 27. Mean energy expenditure from DLW was 2115 kcal/day. 24HR energy intake (mean = 1501 kcal/day) was lowest at call 1. Calls 2 (mean = 2246, p = 0.007) and 3 (mean = 2315, p = 0.001) had higher intake compared to call 1. Intake at calls 4 to 7 did not differ from that at call 1. Energy intake did not differ by day of the week. Mean energy intake from the first 2 calls (1769 kcal/day) better approximated true energy expenditure than did a single call (mean = 1672) (p = 0.02). Averaging the first 3 calls (mean = 1815) provided improvement over averaging the first 2 (p = 0.02). Additional calls did not improve energy estimation. Conclusions: The first 24HR represents underreporting of energy intake. Two 24HRs provided improvement over a single call. Three 24HRs are required for the best energy intake estimate. These results differ from the 11 calls estimated using a traditional formula.

042-S

DIETARY VITAMIN K, SERUM UNDERCARBOXYLATED OSTEOCALCIN (UCOC) AND PROSTATE CANCER RISK. *K Nimptsch, S Rohrmann, J Linseisen (German Cancer Research Center, Heidelberg, Germany)

Although anticarcinogenic activities of vitamin K have been observed in various cancer cell lines, including prostate cancer, epidemiologic studies on the association between dietary vitamin K and risk of cancer are scarce. Serum ucOC has been suggested as a biomarker of vitamin K supply. We conducted a case-control study nested in the prospective cohort study EPIC-Heidelberg including 250 prostate cancer cases (125 advanced cases) and 492 matched controls. Multivariate adjusted odds ratios (OR) for dietary vitamin K and the prediagnostic ratio of serum undercarboxylated to total intact osteocalcin (ucOC/iOC ratio) in relation to prostate cancer were calculated by conditional logistic regression. In addition, we tested for effect modification by a polymorphism in the vitamin epoxide reductase gene (VKORC1, rs2359612), which determines the recycling rates of vitamin K. Dietary intake of menaquinones (vitamin K_2), but not phylloquinone (vitamin K_1) was significantly inversely associated with prostate cancer [ORs (95% confidence interval), highest vs. lowest quartile, were 0.40 (0.20–0.81) for total and 0.32 (0.12–0.84) for advanced prostate cancer]. The ucOC/iOC ratio was not associated with total [OR (95% CI) per 0.1 increment 1.01 (0.90–1.13)] and non-significantly positively associated with advanced prostate cancer [OR (95% CI) 1.15 (0.96–1.38)]. No significant effect modification by VKORC1 genotype was observed. The results suggest an inverse association between dietary menaquinone and total and advanced prostate cancer risk. This association is mirrored by non-significantly increased risks of advanced prostate cancer in subjects with high ucOC/iOC ratio, which is indicative of a poor vitamin K supply.

043-S

VALIDATION OF A FOOD FREQUENCY QUESTIONNAIRE MEASUREMENT OF DIETARY ACRYLAMIDE INTAKE USING HEMOGLOBIN ADDUCTS OF ACRYLAMIDE AND GLYCIDAMIDE. *K Wilson, H Vesper, P Tocco, L Sampson, J Rosen, K-E Hellenas, M Tornqvist, W Willett (Harvard School of Public Health, Boston, MA 02115)

Acrylamide, a probable human carcinogen, is formed during high-temperature cooking of starchy foods. Epidemiological studies of acrylamide intake and cancer risk have generally been null. However, the validity of food frequency questionnaire (FFQ) measures of acrylamide intake has not been established. We developed a food composition database for acrylamide and calculated intake from an FFQ in the Nurses' Health Study II. We measured hemoglobin adducts of acrylamide and its metabolite, glycidamide, in a random sample of 342 women. Correlation and regression analyses were used to assess the relationship between acrylamide intake and adducts. The intraclass correlation coefficient (ICC) was used to assess the consistency of adduct levels over time in 45 women. The correlation between acrylamide intake and the sum of acrylamide and glycidamide adducts was 0.31 (95% CI: 0.20–0.41), adjusted for laboratory batch, energy intake, and age. Further adjustment for BMI, alcohol intake, and correction for random within-person error in adducts gave a correlation of 0.34 (CI: 0.23–0.45). The ICC for the sum of adducts was 0.77 in blood samples collected 1 to 3 years apart. Intake of potato chips, yams, coffee, breakfast cereal, French fries, prune juice, and popcorn significantly predicted adduct levels in multiple regression analysis. In conclusion, we found moderate correlations between acrylamide intake and hemoglobin adduct levels of acrylamide and glycidamide in non-smoking women. Within-person consistency in adduct levels over time was high, suggesting that a single measure of this biomarker may be useful in epidemiologic studies.

044-S

DIETARY ACRYLAMIDE INTAKE AND RISK OF PREMENOPAUSAL BREAST CANCER IN THE NURSES' HEALTH STUDY II. *K Wilson, L Mucci, W Willett (Harvard School of Public Health, Boston, MA 02115)

Acrylamide, a probable human carcinogen, is formed during high-temperature cooking of starchy foods. It is widespread; approximately 30% of calories consumed comes from foods containing acrylamide. Animal studies show that acrylamide increases the risk of hormonally-related cancers, particularly mammary tumors, in rats. It is not clear whether the level of acrylamide in foods has a significant impact on human breast cancer risk. We studied the association of acrylamide and breast cancer risk among 94,021 premenopausal women in the Nurses' Health Study II. We calculated acrylamide intake from food frequency questionnaires in 1991, 1995, and 1999, using a specially developed acrylamide food composition database. From 1991 through 2003, we documented 1044 cases of invasive breast cancer. We used Cox proportional hazards models to assess the association between acrylamide and breast cancer risk. The multivariate-adjusted relative risk of premenopausal breast cancer was 0.93 (95% confidence interval: 0.77–1.14) for the highest versus lowest quintile of acrylamide intake. The p-value for a linear trend across quintiles was 0.88. Results were similar among non-smokers only and for estrogen and progesterone receptor positive and negative cancers. We found no associations between intake of foods high in acrylamide, including French fries, coffee, cereal, potato chips, potatoes, and baked goods, and breast cancer risk. In conclusion, we found no evidence that acrylamide intake, within the range of U.S. diets, is associated with increased risk of premenopausal breast cancer. However, a modest association could have been missed because subtle differences in food preparation could cause substantial variation in the acrylamide content of foods.

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045

IODINE AND ITS SOURCE FOOD INTAKE AND RISK OF THYROID CANCER IN KOREAN WOMEN.

*M-H Shin, J H Chung, J H Kim, Y I Son (Sungkyunkwan University, Suwon 440–746, South Korea)

The incidence of female thyroid cancer is rapidly increasing in Korea, where large amount of seaweed is consumed and massive seaweed intake is a traditional remedy for postpartum recovery. To investigate the possible effect of iodine and its source food intake on thyroid cancer risk, we conducted a hospital-based case-control study. We interviewed 158 pathologically confirmed female thyroid cancer patients and 144 controls between April, 2006 and December, 2007. We used a 115-itemed food frequency questionnaire which included major source foods for iodine intake in Korea, such as seaweed, laver, and Japanese anchovy. Iodine intake was calculated based on 45 foods for which the iodine contents were published by the Korean Health Industry Development Institute. We also asked them postpartum seaweed intake habit; the number of childbirth with postpartum seaweed intake, and the duration, daily frequency and amount of seaweed intake after a child birth. Since energy intake among cases was systematically lower than controls, all dietary intakes were adjusted for energy intake of controls (1790Kcal). There were slightly higher intake of seaweed, laver, and Japanese anchovy among cases than controls, but the association was not significant ($p = 0.08$, 0.23, and 0.08, respectively). The iodine intake was not associated with thyroid cancer risk ($p = 0.75$), either. For the postpartum seaweed intake habit, the number of childbirth and daily frequency and amount of seaweed intake were not associated with thyroid cancer risk. However, the average duration of seaweed intake had inverse association with the thyroid cancer risk ($p = 0.04$). Further study with larger number of participants is needed.

046

CHARACTERISTICS OF DAIRY FOOD CONSUMPTION IN THE ADVENTIST HEALTH STUDY-2 (AHS-2) POPULATION.

G. E Fraser, *K Jaceldo-Siegl, S Knutsen (Loma Linda University, CA 92350)

The Adventist population has a wide range of dairy food consumption. Many lacto-ovo vegetarians obtain much of their fat and protein from dairy sources and particularly emphasize these foods, as may omnivore Adventists. Others trend toward veganism and eat sparingly of these products. These foods are of great biological interest at present being possibly implicated in the risks of colorectal cancer (decreased), and prostate and ovarian cancers(increase). As a source of saturated fat they are probably also implicated in risk of cardiovascular disease. In AHS-2 we are able to measure intake of dairy fat and dairy protein with good validity using both food frequency and dietary recall methods on a representative subsample. Mean intake (standard deviation) of dairy fat and protein respectively are 4.03 (4.94) and 5.74 (6.56) grams per day, using food frequency questionnaire data. The validity correlations of these measures when compared to the mean of six 24 hour recalls is 0.62 and 0.64 (corrected for with-in person error in the recalls). The intra-class correlations are 0.62 and 0.64 respectively. A comparison of food frequency results from Black and non-Black subjects showed intake of dairy fat was 18.5% lower in blacks ($p < 0.0001$) and dairy protein was 19.1% lower ($p < 0.0001$). Results will be presented by age, gender, race and vegetarian status. The distribution of intake of dairy fat and dairy protein did not show bimodality that could reflect a high dairy subgroup of vegetarians. However the standard deviations were quite high. This population provides high quality dietary data on these variables with a wide range of intake that will allow powerful analyses when evaluating their effects on risk of disease.

047

IS NUT INTAKE ASSOCIATED WITH RISK OF CONGESTIVE HEART FAILURE? RESULTS FROM 16 YEAR FOLLOW-UP OF THE ADVENTIST HEALTH STUDY.

*S S Sharma, K Oda, S Knutsen (Dept. of Epidemiology and Biostatistics, School of Public Health, Loma Linda University, Loma Linda, CA 92354)

Heart failure will affect one in five Americans 40 years of age or older. The development of heart failure has been associated with intrinsic cardiac pathology, genetic mutations, alcohol, viral infections and chemotherapeutic agents. Recent studies show that modifiable lifestyle factors may also play a role. Our study aims to identify the role of diet on the risk of congestive heart failure (CHF). A total of 5,148 subjects were identified who have participated in two large cohort studies, the Adventist Health Study-1 (AHS) in 1976 and the AHS-2 in 2002. At baseline in 1976, subjects completed a comprehensive lifestyle questionnaire including a validated food frequency questionnaire. Incidence of CHF during 16-year follow-up was determined through self-report on the questionnaire in 2002. Among those without prevalent CHF in 1976, 139 subjects developed CHF during the 16-year follow-up. In an age-adjusted model with education, BMI and gender, meat intake was positively associated with CHF while soy and nut intake showed an inverse association. When including all relevant foods in the model, the association with nuts remained statistically significant; odds ratio (OR) for less than once/day, 1–2 times/day, and 3+ times/day respectively was 0.68 (95% CI: 0.23–2.02), 0.38 (0.13–1.14), and 0.27 (0.08–0.90) compared to those who eat nuts less than once/month ($p(\text{trend}) = 0.001$). The positive association with meat intake and soymilk was no longer statistically significant. Our findings support the role of certain dietary factors for the risk of CHF. Further studies are needed from other populations, and with better assessment of CHF.

048

RELIABILITY OF ESTIMATES OF SERUM AND URINARY SOY ISOFLAVONES.

*G E Fraser, K Jaceldo, T Butler, L Beeson (Loma Linda University, CA 92350)

Many studies have used serum estimates of soy isoflavones as an index of dietary intake. Yet, an imprecisely measured variable has reduced correlation with other variables. As a measure of long-term morning serum levels it will contain much random error, as the serum half-life of these compounds is relatively short (6–8 hours) and subjects often eat these foods in a sporadic fashion. A spot serum estimate largely reflects intake of soy foods from the previous day. We obtained repeat fasting serums from 28 subjects from Adventist Health Study-2, initially randomly chosen but finally a group who could provide the second sample during a two week window. The two samples were separated by 1–2 years. Of these subjects, 22 also completed a brief 1-page questionnaire about their intake of soy-containing foods during the previous day. The intra-class correlation coefficient(ICC) for serum isoflavones was low at 0.20 (95% confidence interval 0.0–0.45). Incorporating data from the previous day's diet effectively in effect estimated an ICC as if all subjects ate at their long-term averages the previous day. This ICC was much higher at 0.39. Although we did not obtain two urinary estimates, the validity correlation from one overnight urine compared to repeated dietary recalls, has the algebraic implication of an ICC that is at least 0.50 and probably higher. This however is over a shorter time period of about 6 months. We conclude that using serum isoflavone levels to predict disease risk will lead to severely attenuated estimates. Urinary values are to be preferred. For short half-life biological variables, the method that we describe allows the formation of a variable with more stable performance characteristics.

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049-S

DIETARY PATTERNS DURING PREGNANCY: FACTOR ANALYSIS AND LATENT CLASS ANALYSIS. *D Sotres-Alvarez, A Herrring, A M Siega-Riz (University of North Carolina, Chapel Hill, NC 27599)

Dietary patterns (DP) are used to study the effect of overall diet on health outcomes. They are usually derived empirically using principal components (PCA) or cluster analysis. Unlike PCA, confirmatory factor analysis (CFA) and latent class analysis (LCA) enable us to account for correlated errors, test if dietary patterns are uncorrelated, and assess goodness-of-fit. LCA shares the same goal as cluster analysis but in addition it can include complex models. Few studies have used LCA to empirically derive DP. The objective of this study was to compare DP derived by these 3 methods using data from pregnant women in the Pregnancy, Infection and Nutrition Study recruited between 2000 and 2005. Diet intake during the 2nd trimester was assessed with a 119-item food frequency questionnaire; 1177 women had complete data. Four orthogonal DP were identified with EFA on 105 binary foods (consume or not): 'prudent', 'refined-processed', 'Western', and 'salads/alcohol'. Factor loadings from CFA (performed on DP derived by EFA with loadings >0.3) were similar to those of EFA. However, the 'prudent' DP was correlated with 'salads/alcohol' and 'refined-processed' DP (r = 0.57 and 0.56 respectively), and the 'Western' DP with 'refined-processed DP (r = 0.45). Other correlations were not significant. A 3-class LCM was selected: 'prudent' class (25%), 'meat & sweets' class (30%) and a 'very high calories & fat' (45%) class. A 'Prudent' DP was identified well using either CFA or LCA. Women with high scores in the 'Western' and 'refined-processed' DP were in the latent class 'very high calories & fat' whereas women with low scores were in the latent class 'meat & sweets'. DP derived using different methods enhance DP's interpretation and provide more confidence that they are robust.

050

EVALUATION OF NUTRIENT INTAKES OF MEN AND WOMEN AT LOW CANCER RISK BASED ON PHYSICAL ACTIVITY AND BMI. *I Csizmadi, P J Robson, L E Kelemen (Alberta Cancer Board, Calgary, AB, T2N 4N2 Canada)

The 2007 Report on Food, Nutrition, Physical Activity, and the Prevention of Cancer recommends that individuals maintain a low body mass index (BMI) (18.5–23.5 kg/m^2) and engage in ≥30 minutes of daily physical activity. It is unclear, however, if physically *inactive* individuals with lower BMI are at similarly lower cancer risk as those who are *active*, since they may consume lower intakes of specific nutrients. We explored differences in dietary intake adequacy between inactive and active women (n = 2222) and men (n = 518) aged 31 to 70 years, with BMIs between 18.5–23.5 kg/m^2 using baseline data reported in *The Tomorrow Project*, a province-wide cohort study in Alberta, Canada. Food and nutritional supplement intakes were estimated from a food frequency questionnaire. Dietary Reference Intakes (DRIs) for calcium, iron, folate, and vitamins A, B12, C, and D were used as criteria of nutrient adequacy. Physical activity level (PAL: ratio of total energy expenditure to basal metabolic rate) was estimated using self-reported physical activity and anthropometric data. Differences in the proportions of individuals who achieved DRI levels were examined by strata of low vs high activity (PAL: ≤1.6 vs >1.6) and evaluated with the χ^2 1df test statistic. As expected, mean total energy intake was lower ($p < 0.0001$) for inactive vs active subjects with BMI 18.5–23 among both women (1476 vs 1626 kcal/d) and men (1895 vs 2201 kcal/d). While nutrient inadequacies were observed for all nutrients regardless of sex, PAL and supplement use, the prevalence in all groups was ≥30% for dietary folate, vitamin D and calcium. When dietary and supplement intakes were assessed, a lower proportion of inactive vs active women achieved DRI levels ($p < 0.05$) for vitamins A (86% vs 91%), B_{12} (84% vs 88%), C (90% vs 94%), folate (52% vs 58%) and calcium (≤50years of age: 40% vs. 47%). No significant differences were noted in the proportion of inactive vs active men who achieved DRI levels for the nutrients examined. Among women with healthy BMIs, the interrelation between inactivity, lower energy intake and inadequate intake for nutrients associated with cancer risk warrants further exploration.

051-S

MEAT, TOTAL IRON, AND HEME IRON INTAKE IN RELATION TO COLORECTAL ADENOMA IN ASYMPTOMATIC WOMEN. *L Ferrucci, A Flood, A Schatzkin, P S Schoenfeld, B D Cash, R Sinha, and A J Cross (National Cancer Institute, Rockville, MD 20852)

The current epidemiologic literature suggests a positive association between red and processed meat intake and colorectal neoplasia. The rich iron and heme iron content of these foods could at least partly explain this association. Utilizing an iron database being developed at the National Cancer Institute, we examined the relationship between meat, total iron, heme iron and colorectal adenoma among asymptomatic women (40–79 years of age) participating in a multi-center colonoscopy screening study (CONCeRN Study). Included in this analysis were 807 participants (158 with prevalent adenoma and 649 without) who completed self-administered risk factor and food frequency questionnaires. Unconditional logistic regression, comparing the fourth to the first quartile, found an elevated, though not statistically significant, risk for colorectal adenoma with red meat [odds ratio (OR) = 1.75; 95% confidence interval (CI): 0.94–3.25], but not for processed meat (OR = 0.87; 95% CI: 0.49–1.53). Total iron (OR = 1.47; 95% CI: 0.81–2.67) and heme iron (OR = 1.26; 95% CI: 0.69–2.28) from red meat were not associated with colorectal adenoma. Although there was little association between estimated values of total iron and heme from meat and colorectal adenoma, there was a suggestive, though not statistically significant, association with red meat in this population of asymptomatic women.

052

FOOD SUPPLEMENTATION AND GROWTH IN A COHORT OF CHILDREN IN THE US/MEXICO BORDER. F A Puentes *V M Cardenas (University of Texas School of Public Health, El Paso, TX 79902)

We analyzed data on 342 Hispanic children ages 9 to15 months-old who were measured during the second visit of the Pasitos Cohort Study, which followed for seven years at 6-month interval visits, children recruited from the border communities of El Paso, Texas, and Ciudad Juarez, Chihuahua, Mexico, to describe the natural history and determinants of H. pylori infection. Children in the US side were recruited among Women Infant and Children (WIC) program recipients, while children in the Mexican side were recruited among Mexican Institute of Social Security beneficiaries, a State-run health insurance plan which does not provide food supplementation. Weight and height measurements were taken at each visit and the 2000 CDC growth reference was used to obtain anthropometric indexes. A cross-sectional analysis of this subset showed that 3.6% (or 12/340) and 6.5% (or 22/334) had stunting (height/age Z-scores <-2) and wasting (weight/height Z-scores <-2), respectively, and no differences were found by country. However, the analysis of the entire distribution of the Z-scores showed that participants in Mexico were significantly thinner than their US counterparts (difference Z-score for weight/height = −0.5, t-test p-value < 0.005). Multiple linear regression analyses showed that this difference held (â = −0.5, p-value < 0.005) after controlling for mother's educational attainment, breastfeeding and crowding. These differences could be due to several factors such as different rates of childhood infections, and feeding behaviors including food supplementation through the WIC. Future analyses of this data should describe the growth of the children in this cohort longitudinally.

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053

COUNTRY OF BIRTH AND DIETARY INTAKE OF MEXICAN AMERICAN CHILDREN AND ADOLESCENTS. *K Eldeirawi (College of Nursing, University of Illinois at Chicago, Chicago, IL 60612)

Previous studies have shown differences in dietary intake by immigration status and acculturation in Mexican American adults but little is known about the association country of birth and diet in Mexican American children. The purpose of this analysis was to examine associations of dietary intake and country of birth among 2,836 Mexican American children and adolescents 3–17 years of age who were examined in the third National Health and Nutrition Examination survey, 1988–1994. Dietary data were based on a single 24-hour dietary recall which was administered at the examination centers. Weighted bivariate and multiple linear regression models were carried out to compare dietary intake by country of birth (United States versus Mexico). Compared to Mexico-born Mexican American children and adolescents, those born in the United States consumed significantly more calories from total fat and saturated fat and less calories from carbohydrates after adjusting for age, sex, educational level of the family reference person, body mass index, and total caloric intake. In multiple linear regression analyses, US-born participants had significantly less intakes of total carbohydrates, total carotenes, copper, fiber, magnesium, phosphorous, potassium, vitamin A, vitamin B6, and vitamin C and higher consumption of total saturated fatty acid, total fats, and sodium after adjusting for covariates. The current study showed wide variations in dietary consumption in Mexican American children and adolescents by country of birth. In general, immigrant Mexican children had ''healthier'' diet compared to their peers born in the US. Further research is needed to examine how diet change in immigrant populations and how these changes might affect the risk of chronic diseases in immigrant children.

054-S

ANTIBIOTIC USE IN INFANCY AND RISK OF ASTHMA IN CHILDREN OF MEXICAN DESCENT. *K Eldeirawi and V Persky (University of Illinois at Chicago, Chicago, IL 60612)

Although frequent use of antibiotics early in life has been linked with the risk of asthma in children, the effect of antibiotics independent of early childhood infections and Tylenol utilization in infancy has not been well delineated. In this population based cross-sectional study of school children of Mexican descent, the authors assessed the associations of frequency of antibiotic use in the first year of life with lifetime doctor-diagnosed asthma after controlling for covariates including Tylenol use and history of ear infections as well as other childhood infections in infancy. In this study, parents of 2,023 children completed a questionnaire which collected data on doctor-diagnosed asthma, antibiotic use in infancy, early childhood infections, demographic characteristics, and other potential confounding variables. Any use of antibiotics in the first year of life was significantly associated with ever doctor-diagnosed asthma (Odds Ratio = 2.34, 95% confidence interval (CI): 1.54, 3.55) after adjusting for age, gender, having a regular place for health care, parental history of asthma or allergies, and ear infections as well as Tylenol use in infancy. There was a statistically significant dose-response relationship between frequency of antibiotic utilization and the risk of asthma ($p < 0.0001$). Compared with children who did not use antibiotics in infancy, the adjusted odds ratios for asthma were 1.84 (95% CI: 1.15, 2.93) and 3.41 (95% CI: 2.07, 5.61) for receiving antibiotics for 1–2 and ≥ 3 times in the first year of life, respectively. Our findings suggest a significant and a dose-dependent association of antibiotic use in infancy and the risk of asthma in school aged children. Reasons for the observed associations need further research.

055

NEUROTOXICITY, NEPHROTOXICITY, AND MERCURY EXPOSURE AMONG CHILDREN WITH AND WITHOUT DENTAL AMALGAM FILLINGS. *X Ye, H Qian, P Xu, L Zhu, M P Longnecker, H Fu (School of Public Health, Fudan University, Shanghai, China)

A scientific review panel for the U.S. Food and Drug Administration recently identified the need for more data on the health risk of mercury exposure from dental amalgam among susceptible populations. We evaluated impacts of low level inorganic mercury exposure on renal function, and neurobehavioral and neuropsychological performance among children. Dental histories for 435 children aged 7–11 years in five schools from Xuhui, Shanghai were checked by dentists. Of them, 198 with confirmed amalgam fillings were recruited (exposure group). Reference children ($n = 205$) were those who never had dental amalgam treatment. In May 2004, each child provided a urine sample for measurements of total mercury, n-acetyl-â-D-glucosaminidase activity, microalbumin, and creatinine (Cr). The Child Behavior Checklist, Eysenck Personality Questionnaire, and intelligence screening tests were administered. The geometric mean urinary mercury concentration was 1.6 μg/g Cr for children with and 1.4 μg/g Cr for children without amalgam fillings. No differences were found between children with and without fillings for either renal function biomarker, or on neurobehavioral, neuropsychological, or intelligence tests. In conclusion, although urinary mercury concentration was slightly elevated among children with amalgam fillings, we found no evidence of adverse effects on the outcomes evaluated. These results agree with those from recent trials in developed countries.

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PATTERNS OF GROWTH IN WAIST DURING ADOLESCENCE. *L Rasmussen-Torvik, J Pankow, D Jacobs, Jr, J Steinberger, A Moran, A Sinaiko (University of Minnesota, Minneapolis, MN 55454)

Reversal of alarming population trends in obesity may require targeted prevention in children. Data on change in abdominal obesity during adolescence may help with this effort. This analysis was undertaken to determine whether the rate of change in waist circumference is dependent on baseline waist circumference and Tanner stage. Participants ($n = 236$) in a longitudinal study of cardiovascular risk had measurements of waist at mean ages 13 (baseline), 15 and 19. Differences between rate of change in waist circumference (growth curve slopes) were tested with interaction terms in mixed regression models. The slope of the growth curves did not differ based on quartile of baseline waist ($p = .14$). Individuals in all waist quartiles, on average, experienced growth in waist from ages 13 to 19 with those in the top quartile of having markedly larger waists over the entire course of the study. The slope of the growth curves differed based on baseline Tanner stage ($p = .0001$). Growth curve slopes showed that individuals at Tanner 4 and 5 at baseline experienced less growth in waist from ages 13 to 19 (overall average growth of 2.3 cm in each group) than did individuals at Tanner 1, 2 or 3 (overall average growth of 7.8 cm for Tanner 1 and 2, overall average growth of 9.4 cm for Tanner 3). In conclusion, there was substantial tracking of waist circumference during adolescence and waist in the top quartile at age 13 predicted ongoing abdominal obesity through adolescence. Some growth in waist during this period appears to be due to normal sexual maturation as individuals with lower Tanner scores at age 13 tended to have more rapid growth in waist from ages 13 to 19.

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ASSOCIATION BETWEEN MATERNAL LIFESTYLE DURING EARLY PREGNANCY AND SUBSEQUENT CHILDHOOD OBESITY IN JAPAN. *K Suzuki, D Ando, M Sato, T Tanaka, N Kondo and Z Yamagata (University of Yamanashi, Chuo, Japan)

We previously clarified the association of maternal lifestyle during early pregnancy, including smoking and breakfast consumption, with childhood obesity and overweight at 5 years of age. In this study, we aimed to show that this association continued up to 9–10 years of age in the same study area. The study population comprised 1276 children born between 1991 and 1997, in Japan, and their mothers. The dependent variables, namely, childhood overweight and obesity at 9–10 years of age were defined as international cutoff value. Maternal lifestyles during early pregnancy were used as independent variables. Anthropometric data were collected from 996 of these children (follow-up rate: 78.1%). Maternal smoking during early pregnancy was found to be associated with obesity in the 9- to 10-year-old children (adjusted odds ratio (OR): 2.9; 95% confidence interval (CI): 1.0–8.2). Further, we found that children whose mothers skip breakfast are likely to become obese (adjusted OR: 2.4; 95% CI: 1.0–5.6).On the other hand, there was no association between maternal lifestyle during early pregnancy and childhood overweight. Childhood overweight might also be caused by childhood lifestyle. Our results suggested that the effect of these environmental factors on childhood overweight might be more pronounced at 9–10 years of age than at 5 years of age. Moreover, our results clarified that both maternal smoking and skipping breakfast during early pregnancy might be independent risk factors for childhood obesity. These results suggested that both maternal smoking and dietary habits during pregnancy may be considered while considering the association between fetal environment and post-delivery development.

058

RELIABILITY OF REPORTED BREASTFEEDING DURATION AMONG REPRODUCTIVE-AGED WOMEN FROM MEXICO. *L A Cupul-Uicab, B C Gladen, M Hernández-Ávila, M P Longnecker (Center for Population Health Research, Instituto Nacional de Salud Pública, Cuernavaca, México)

Breastfed children have lower risk of infectious diseases, post-neonatal mortality and chronic diseases later in life. Epidemiologic studies often rely on reported history of previous breastfeeding, hence data on the accuracy and precision of recalled histories allow improved interpretation of these findings. Reliability of two reported breastfeeding durations was evaluated in 567 reproductive-aged women from Mexico using information obtained from serial questionnaires applied after weaning. The median time from weaning until first report was 9.2 months and between the two reports 4.8 months. Means and differences of the reports were compared. Determinants of poor recall (difference between reports of >20%) was evaluated using logistic regression. Reliability of reported breastfeeding duration was high (Intraclass correlation, 0.94) and varied little across levels of selected variables. Overall, differences between reports were usually less than a month and for 68% the difference was ≤0.5 months. Predictors of poorer recall were having ≥4 children, and time between reports of >2 months. The only predictor of better recall was greater age of the baby at weaning. In this population with long duration of breastfeeding (median 8 months) reliability was high and differences between reports were small. Education was not an important predictor of recall. Studies that use reported breastfeeding duration may want to consider the effect of these variables on recall.

059-S

RELATIONSHIP BETWEEN PRENATAL ALCOHOL EXPOSURE AND DEPRESSIVE SYMPTOMS IN CHILDREN. *M Sato, K Suzuki, D Ando, T Tanaka, N Kondo, and Z Yamagata (University of Yamanashi Chuo, Japan)

Maternal alcohol consumption during pregnancy leads to various disorders such as fetal alcohol spectrum disorders. In these disorders, alcohol-related neurodevelopmental disorders exerts remarkable effects on child developments related to their psychological problems. Especially, a significant relationship has been reported between prenatal alcohol exposure (PAE) and depressive status in children; this is also consistent with the anatomical perspective. Recently, a remarkably high incidence of pediatric depressive status has been observed in Japan. Therefore, the purpose of this study was to examine the association between PAE and the self-reported of depressive symptoms in children between the ages of 10 and 15 years old. The initial cohort comprised 1276 infants born in between 1991 to 1997 and their mothers in Japan. The each mother was interviewed about their lifestyles including their alcohol consumptions. In 2007, depressive status of the children was determined using Birleson's depression self-rating scale for children. As a result, there were 877 out of 1276 data successfully obtained satisfying with both data of the children and their mothers, and the follow-up rate was 68.7%. A total of 84 mothers (9.6%) consumed alcohol during pregnancy. The odds ratio between PAE and depressive status was 2.2(95% CI 1.1–4.2) using a multiple logistic regression analysis. This study found that PAE was significantly associated with depressive status in a community-based study. Furthermore, whether the children's depressive status were congenital or acquired the each of possibilities are complexly related so that more specific studies are required to clarify them.

060-S

EFFICACY OF SUCCIMER CHELATION FOR MERCURY AT BACKGROUND LEVELS IN 2 YEAR OLDS. *Y Cao, PhD, A Chen, MD, PhD, R L Jones, PhD and W J Rogan, MD (NIEHS, Research Triangle Park, NC 27709)

Objective: Determine efficacy of succimer in reducing Hg. Design/Methods: The Treatment of Lead-exposed Children trial is a randomized trial that enrolled 780 children between 1994 and 1997. The children were 12 to 33 months old, with blood leads of 20 to 44 μg/dL. 396 children got succimer and 384 placebo, both provided by McNeil Labs. The courses of succimer were 26 days long, with the 1st 7 days at a higher loading dose. CDC analyzed the blood sample drawn about 1 week before randomization, and the sample drawn 1 week after treatment began, which was the nadir of blood lead, for blood Hg using the same lab and method as is used for the National Health and Nutrition Examination Survey analyses. Results: Hg and ln Hg were skewed, so we modeled ln(Hg post Rx/Hg pre Rx). Inspection of the stratified data suggested different effects at higher levels, so we included baseline Hg as well as an Hg by Rx group interaction. We saw a strong effect of baseline Hg on ln (Hg post Rx/Hg pre Rx): $\beta = -0.2$, $p \leq 0.01$; the terms for Rx group and RxχHg were small (both 0.04), of opposite signs, and not significant. Conclusions: Succimer has little or no effect on background Hg. An effect at higher concentrations is not excluded by these data, since we have only 146 total children ≥1μg/L Hg.

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MOTHER'S AGE AT MENARCHE AND OFFSPRING GROWTH.

*O Basso, M L Pennell, A Chen, M P Longnecker (NIEHS (NIH, DHHS), Research Triangle Park, NC 27709)

Recent findings suggest that early menarche in mothers may be associated with faster childhood growth and higher body mass index (BMI).[1] We explored this association in about 26,000 mother-child pairs enrolled in the Collaborative Perinatal Project, a study conducted in the 1960s in 12 US centers. We examined the influence of mother's age at menarche on child height, weight, and BMI at birth and ages 1, 3, 4, 7, and 8 years using linear regression models that accounted for correlations in measurements from the same child. Each model included center, mother's smoking at registration, whether a child was breastfed, live birth order, socioeconomic index, mother's age and, depending on the model, mother's height, weight, or BMI. Children born to mothers with menarche at $\leq$11 years tended to be taller than those born to mothers with menarche at $\geq$15 years. At age 7, the coefficients for Whites were 1.6 cm (95% confidence interval: 1.1, 2.1) in boys and 1.8 (1.3, 2.3) in girls. Among Blacks, the corresponding estimates were 1.1 (0.7, 1.6) in boys and 1.3 (0.8, 1.7) in girls. From age 7, children born to women whose age at menarche was $\leq$11 years had higher weight and BMI than children whose mother's age at menarche was 15 or older. Among Whites, earlier menarche was associated with a 0.3 kg/m^2 (0.1, 0.5) higher BMI in boys and 0.4 (0.2, 0.6) higher in girls. In Blacks, the estimated differences were 0.4 (0.2, 0.5) in boys and 0.2 (0.0, 0.4) in girls. Estimates at age 8 were similar. These findings suggest that mother's age at menarche is associated with differences in growth patterns in offspring.

1. Ong et al. PloS Med. 2007;4: e132

062

THE ASSOCIATION OF PARENTING STYLES WITH TIME SPENT WATCHING TELEVISION AMONG CHILDREN.

*C R Isasi, T A Wills, and M Ainette (Albert Einstein College of Medicine, Bronx, NY 10461)

The study examined the association of dimensions of parenting styles (monitoring, nurturing, harsh, destructive arguing, parent/child conflict, emotional and instrumental support) with time spent watching television (TV) in a community sample of children (N = 316). The sample was 52% female, 19% were African-American, 12% Latino, 49% White, and 20% other race/ethnicity. The mean age of participants was 9.3 (SD = 0.56), mean body mass index (BMI) was 19.8 (SD = 5.0). Forty five percent of the children watched TV $\geq$3 hrs/day on weekdays and 46% watched TV $\geq$3 hrs/day on weekends. BMI was higher among girls and Latinos. TV time was higher in girls and African-Americans. BMI was significantly correlated with time spent watching TV. There was an inverse correlation of parental nurturing with TV during weekends ($r = -0.11$, $p < 0.05$) and of parental monitoring with TV time during weekdays ($r = -0.12$, $p < 0.05$). Parent/child conflict, harsh parenting and destructive arguing were correlated with TV time on weekends ($r = 0.17$, $p < 0.01$; $r = 0.20$, $p < 0.01$; $r = 0.21$, $p < 0.01$, respectively). In multiple regression model, after adjustment for potential confounders such as age, gender, ethnicity, and parental education, parental monitoring remained inversely associated with TV time on weekdays ($\beta = -0.08$, $p < 0.05$). Parent/child conflict ($\beta = 0.08$, $p < 0.05$), harsh parenting ($\beta = 0.17$, $p < 0.01$), and destructive arguing ($\beta = 0.09$, $p < 0.01$) remained significantly associated with TV time on weekends after the adjustment for potential confounders. The study findings indicate that positive and negative aspects of parenting are associated with sedentary behaviors in children.

063

FEBRILE CONVULSION FOLLOWING VACCINATION WITH MMRV IN A MANAGED CARE SETTING.

*S J Jacobsen, B K Ackerson, L S Sy, P Saddier, T N Tran, T L Jones, J F Yao, F Xie, S M Marcy (Kaiser Permanente Southern California, Pasadena, CA 91101)

A combined measles, mumps, rubella, varicella live vaccine (MMRV, Merck and Co., Inc., US) was recently licensed in the US. Pre-licensure clinical trial data showed a significant increase in fever following vaccination as compared to the vaccines given separately (MMR+V). This large, observational, retrospective cohort study was undertaken to assess the incidence of febrile convulsion and the general safety of MMRV post-licensure. This planned interim analysis included all 14,263 children 12–60 months of age who received MMRV in January-September 2006 in a managed care organization. Subjects were optimally matched on age, sex and date of vaccination to children who received MMR+V concomitantly in 2005, before MMRV licensure. Potential cases of febrile convulsion were identified through administrative data and adjudicated by expert panel, according to pre-specified criteria. During the 30 days post–vaccination, there were 43 and 48 potential convulsion cases in the MMRV and MMR+V groups, respectively. After review of available medical charts and adjudication, there were 33 cases of confirmed febrile convulsion, 14 (0.98/1000) and 19 (1.33/1000) in the MMRV and MMR+V cohorts, respectively (RR = 0.7, 95% CI = 0.2, 3.0). In days 5–12 following vaccination, a pre-specified period of interest, the respective numbers were 7 (0.49/1000) and 3 (0.21/1000) (RR = 2.3, 95% CI = 0.6, 9.0). In this interim analysis, the risk of febrile convulsion was not found to be different in children vaccinated with MMRV vs. MMR+V in the month following vaccination. The numerical increase observed in days 5–12 may be due to a true effect, chance, or potential biases.

064

INCIDENCE RATES OF INJURIES IN ATTENTION DEFICIT HYPERACTIVITY DISORDER.

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Our objective was to determine if those with newly diagnosed ADHD have higher rates of serious injuries after diagnosis compared those of the same age and sex without ADHD, and see if the use of medication influenced the injury rate. The Deseret Mutual Benefits Administrators (DMBA) is a nationwide, health insurance database of 61,000 individuals. Claims for 1997 to 2004 were searched for ADHD diagnoses (ICD-9 Codes 314.00–314.9). National Drug Codes for prescription medications used to treat ADHD were obtained. For each newly diagnosed case of ADHD we then searched injury claims (ICD-9 Codes 800.00–957.00). A total of 810 individuals were diagnosed with ADHD between January 1, 1998 and December 31, 2004. Age, sex, and injury specific incidence rates and RR's were calculated for those with ADHD and those without ADHD. We also performed subanalyses on the ADHD population based on the use of stimulant medications. Those with newly diagnosed ADHD experienced higher risk for many injuries including skull fractures (RR = 5.26, 95% CI 2.71–9.25); burns (RR = 7.99, 95% CI 4.44–13.30); skull fractures (RR = 5.25, 95% CI 2.71–9.25) Rates were higher in those under age 20 and males. Those with newly diagnosed ADHD are at higher risk for subsequent injury.

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065-S

PERMISSIVE HYPERCAPNIA AND RISK FOR BRAIN INJURY AND DEVELOPMENTAL IMPAIRMENT IN A STATEWIDE COHORT OF CHILDREN BORN AT VERY LOW BIRTHWEIGHT. *E W Hagen, M Sadek-Badawi, D P Carlton, M Palta (University of Wisconsin-Madison, Madison, WI 53726)

Permissive hypercapnia is a respiratory care strategy for premature neonates that accepts levels of partial pressure of carbon dioxide (PCO2) above the normal range in the blood in order to reduce risk for lung injury. It is not clear whether this strategy increases risk for brain injury and subsequent developmental impairment. The goal of this study is to determine whether permissive hypercapnia is associated with higher risk for intraventricular hemorrhage (IVH) and early childhood behavioral and functional outcomes among very low birthweight (<1500g) infants. Infants were classified as having received a permissive hypercapnia (N = 122) or normocapnia (N = 235) strategy of care during the first 24 hours after birth according to an algorithm based on PCO2 values and respiratory treatment decisions abstracted from medical records. Diagnosis of IVH and indicators of baseline illness severity were also abstracted from medical charts. Behavioral outcomes (total, internalizing, and externalizing problems), functional outcomes (social, self care, and mobility) and family SES were determined by parent telephone interview when children were 2–3 years. Logistic regression was used to evaluate odds ratios for IVH for permissive hypercapnia compared to normocapnia, adjusted for baseline illness severity. Ordinary linear regression was used to evaluate differences in behavior and function scores between children by treatment strategy, adjusted for baseline severity and SES. Infants classified as having received a permissive hypercapnia strategy of care were not more likely to have IVH than those with normocapnia (OR = 0.85, 95% CI: 0.47, 1.5). There were no differences in any of the behavioral or functional scores between children who had a permissive hypercapnia or a normocapnia strategy. The results of this study suggest that permissive hypercapnia does not increase risk for IVH and subsequent developmental impairment among very low birthweight children. This strategy of care seems to be safe for immature brains.

066-S

GASTROINTESTINAL ILLNESS AND FIRST-TIME SEIZURES IN CHILDREN. *E Martin, A Adler, H Blume, J Gentsch, D Christakis, A Berg, S Gospe, D Zerr (Children's Hospital Research Institute, Seattle, WA 98101)

First-time childhood seizures are typically characterized as febrile or unprovoked. Nonfebrile children with a seizure during mild acute illness (nonfebrile illness seizure) do not fit into this classification and have been excluded from epidemiological studies in the past. We studied the underlying viral illnesses and clinical outcomes in children with first-time seizures with and without fever. 70 children were enrolled in the emergency department at the time of their 1st seizure and followed monthly for seizure recurrence. Children with gastrointestinal (GI) illness at the time of their 1st seizure (n = 22) were more likely to have a nonfebrile seizure compared to children with other acute illnesses (Relative risk (RR): 2.2; 95% confidence interval (CI): 1.2, 3.9). The children with GI illness were more likely to have a cluster of seizures at the initial episode (RR: 3.0; 95% CI: 1.7, 5.3). Of 15 children with GI illness and stool samples at enrollment, 12 (80%) were positive for rotavirus. The overall incidence of a 2nd seizure episode was 24.6 per 100 child-years (95% CI: 15.3, 39.6). We used Cox regression to compare rates of a 2nd seizure between illness groups. Children with a GI illness at the time of their 1st episode had a reduced hazard of a 2nd episode compared to children with other illnesses (Hazard Ratio: 0.22; 95% CI: 0.05, 0.97). The incidence of a 2nd seizure in the GI illness group was 7.4 per 100 child-years (95% CI: 1.8, 29.8). We conclude that the specific underlying viral illness, rather than fever alone, is an important factor in understanding the epidemiology of first-time childhood seizures in the setting of illness.

067-S

THE ROLE OF GENDER AND AGE IN THE PREVALENCE OF ASTHMA IN THE UNITED STATES, 1999–2004. *M K McHugh, E Symanski, G L Delclos (The University of Texas School of Public Health, Houston, TX 77030)

Asthma is a serious health problem that affects millions of Americans. We used the National Health and Nutrition Examination Survey (1999–2004) with 29,402 subjects aged 2–85 years to estimate the prevalence of asthma (assessed by self-reported diagnosis of asthma by a doctor or other health professional) in the U.S. population, as well as among subgroups on the basis of sociodemographic and lifestyle factors. We also evaluated whether gender modifies the association between these factors and asthma. All statistical analyses incorporated sample weights and accounted for the complex sampling design. In those aged 2–19 years, the prevalence of asthma was 17.1% for males (95% confidence interval [CI] = 14.9–19.5) and 13.4% for females (95% CI = 12.3–14.6). For adults aged ≥20 years, the prevalence of asthma was 9.8% for males (95% CI = 8.9–10.8) and 13.7% for females (95% CI = 12.5–15.1). In multiple logistic regression models, significant differences were found in the prevalence of asthma by race/ethnicity and body mass index in all age groups, as well as by smoking history and income level among adults. In stratified analysis, the odds ratio among adolescents aged 12–19 years was elevated for females (adjusted odds ratio [aOR] = 1.65, 95% CI = 1.26–2.18) compared to males (aOR = 0.94, 95% CI = 0.57–155). No differences were detected by gender for children aged 2 to 11 years. In the only group among adults where we detected effect modification by gender, males aged 20–39 years (aOR = 2.19, 95% CI = 1.63–2.93) had an increased prevalence of asthma compared to females of the same ages (aOR = 1.29, 95% CI = 0.91–1.84). Our finding that the effect of gender varied by age group warrants further investigation.

068-S

THE RISK OF INSULIN RESISTANCE SYNDROME AND OXIDATIVE STRESS BEFORE THE POSTNATAL CATCH-UP GROWTH. *J W Min, B H Park, Y J Kim, E-H Ha, H Y Lee, E A Park, Y S Hwang, H S Lim, H Park (School of Medicine, Ewha Womans University, Seoul, Korea)

The aim of this study was to verify the consequential insulin resistance syndrome(IRS) risk from born as small for gestational age(SGA) in early days of life. We used a hospital based birth-cohort of 150 children at Ewha Womans University Mok Dong Hospital, born from 2001 to 2003 and took the check up program at 3y. We compared the risk of IRS and the oxidative stress(OS) between SGA and AGA by the level of glucose intolerance, blood pressure(BP), lipid profile, urinary levels of 8-Hydroxy-2' deoxyguanosine (8-OH-dG) and Malondialdehyde (MDA) with general linear model. At 3y of age, the 59.4% of SGA did not achieve the catch-up growth yet and statistically significant difference presented on physical growth between AGA and SGA (BMI: 15.16 Vs. 15.63kg/m2, Height: 96.59 Vs. 99.92cm, Weight: 14.14 Vs. 15.61kg). However SGA had higher waist-hip ratio and conditional weight gain, as well as higher cholesterol, MDA, 8-OH-dG, LDL, triglyceride, glucose to insulin ratio(GIR), cholesterol and diastolic BP level than AGA. Among the SGA, catch-up group demonstrated higher MDA, 8-OH-dG, LDL, triglycerides, GIR, cholesterol than those who did not complete the catch-up growth. Especially, SGA with catch-up growth had higher MDA (log transformed, 0.21 Vs. 0.14), LDL(102.78 Vs. 94.85) and lower HDL(51.77 Vs. 54.80), insulin(4.26 Vs. 5.66) than AGA with catch-up growth, although SGA did not experienced the adiposity rebound. In conclusion, to deal with the raised risk of IRS and OS among SGA, risk screening is required during early childhood period even in the absence of the catch-up growth.

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069-S

EARLY LIFE FACTORS AND BODY MASS INDEX IN CHILDREN UP TO AGE 10: AN INITIAL INVESTIGATION OF POSSIBLE ASTHMA PREDICTORS.

*A Gallagher, J Liu, W Karmaus, B Cai, S H Arshad, R Kurukulaaratchy, S Matthews (University of South Carolina, Columbia, SC 29208)

Background: Maternal smoking during pregnancy is associated with overweight in childhood. Yet few studies have considered the roles of environmental tobacco smoking (ETS) during and after pregnancy and placenta weight in the development of childhood overweight. Our objective was to determine the effect of these early life factors on the body mass index (BMI) of children up to age 10. Methods: We used data from a birth cohort study of 1,556 children born on the Isle of Wight, UK, between 1989 and 1990 and followed at birth and ages 1, 2, 4 and 10 with the original intent of examining asthma development. Our analyses were restricted to 935 singletons with complete data for the main predictors and covariates. Children's height, weight, and their exposure to ETS were collected at each follow-up visit. Results: Boys of mothers who smoked during pregnancy had a .39 kg/m2 higher BMI than those whose mothers did not. In girls, those with two parents who smoked during pregnancy had a BMI that was 0.68 kg/m2 higher than those who did not have parents who smoked. In girls, for every 100 gram increase in placenta weight, BMI increased by 0.08 kg/m2 ($p = 0.08$). Paternal smoking during pregnancy and postnatal exposure to ETS were not found to have long term effects on BMI. Conclusion: These findings suggest that the intrauterine environment may play an important role in the development of a higher BMI in children. Future research should examine the relationship between placenta weight and BMI and explore the effect of these intrauterine environment factors on BMI in the context of asthma.

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PILOT STUDY OF URINARY BIOMARKERS OF STEROID HORMONE LEVELS IN YOUNG GIRLS IN CALIFORNIA.

*G C Windham, B Sternfeld, J Deardorff, J Darbinian, L Greenspan, N Gee, W L Lasley, L H Kushi (CA Dept of Public Health, Richmond, CA 94804)

In a prospective study we are assessing puberty by breast and pubic hair development (Tanner staging), but measuring hormone levels would help elucidate endocrine control. Integrated measures of steroid metabolites in urine have been used to assess ovarian function in women, so we conducted a pilot study to examine the distribution and variation of hormone metabolite levels in young girls. During a baseline exam, girls recruited from the Kaiser Permanente HMO provided spot urine specimens for measurement of environmental exposures, and we used an aliquot to measure the primary metabolites of estrogen (estrone conjugates or E1C) and progesterone (abbreviated PdG), by enzyme-linked immunoassay. Anthropometric measures were made and a questionnaire administered to the mother. The 257 girls were 6–7y (pre-menarche) and had a diverse racial distribution (60% non-White). Hormone metabolites were detectable in all but one. Mean hormone levels were lowest in Blacks, particularly for PdG. The mean E1C was higher in the 28 girls who were Tanner stage 2 or more ($p < 0.1$), but PdG was not. Similarly, pubertal girls were more likely than others to have categorized E1C levels in the top 15%, which remained after adjustment for age and race (odds ratio 3.9, compared to E1C levels below the median). Further analyses will assess additional factors. In conclusion, detection of estrogen excretion several years prior to the first expected ovulation may indicate periods of unopposed estrogen stimulation. Collection of serial urine samples for measurement of day-to-day hormone variation would be important to capture peak levels and to better characterize differences by co-factors.

071-S

THE INFLUENCE OF MOTOR PROFICIENCY AND PHYSICAL ACTIVITY PATTERNS ON THE RISK OF OVERWEIGHT AND OBESITY IN CHILDHOOD.

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This cross-sectional study examined the relationships among motor proficiency, physical activity and overweight/obesity and estimated the impact of motor proficiency on physical activity patterns and their influence on body composition. Participants included 1287(646 males, 641 females) District School Board of Niagara(DSBN) students, making use of data from the Physical Health Activity Study(PHAST). All participants were in grade 6, aged 11–12 years. Students had anthropometric, motor proficiency (Bruininks-Oseretsky Test of Motor Performance) and physical activity pattern assessments(Participation Questionnaire). Descriptive statistics found a significant difference between obesity(%) in the case-group and non case- group (30.1 vs. 8.2, $p < 0.0001$) and a higher participation in school-based activities in the normal weight vs. obese group(4.6+2.0 vs. 4.0+1.5, $p = 0.002$). Ordinal logistic regression analysis showed that those who participated in more school-based activities were less likely to be in a higher bmi group(odds ratio(OR) = 0.77,95% CI = 0.65–0.91). Also, individuals in the case group were almost eleven times more likely to be in a higher bmi group (OR = 10.9, 95% CI = 1.8–64.8), and being female increased the chance of being in a higher bmi category by two times (OR = 2.0, 95% CI = 1.12–3.58). Future research should further explore motor proficiency and overweight/obesity and focus on promoting school-based activity interventions for children.

072

FOOD ALLERGY AMONG U.S. CHILDREN: PREVALENCE AND HOSPITAL VISITS.

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Childhood food allergy is a serious condition that can be life threatening. Food allergy prevalence is reportedly increasing among children, but there have been no estimates made using national data. In addition, national estimates of emergency department (ED) visits and hospitalizations due to food allergy and anaphylaxis among children have not been previously examined. The objectives of this analysis were to produce these estimates using U.S. national survey data. Three national surveys were used to produce these estimates for the US population: National Health Interview, National Hospital Discharge, and National Hospital Ambulatory Care. In the period 1997–2006, reported food allergy increased nearly 40% among children under age five, from 3.7 to 5.1% ($z^2 = 8.5$, $p < 0.01$), and 32% among ages 5–17 ($z^2 = 20.7$, $p < 0.01$), from 3.1 to 4.1%. Between 2003–2005, there were an estimated 122,358 (95% CI: [68,300, 176,416]) ED visits among children under age 17 for food allergy or anaphylaxis, mainly dermatitis from ingested food. Nearly 80% of these visits were by children under age five. In the same period there were 2,005 (95% CI: [998, 3,012]) food allergy-related hospitalizations among children under age 17. In contrast to food allergy-related ED visits, most food allergy-related hospitalizations were for anaphylactic shock due to tree nuts or peanuts. Data from nationally representative health surveys confirm an increase in food allergy prevalence among children. This increasing prevalence may present a large burden for affected families. Increasing public health education efforts will be necessary to raise awareness among parents, schools, and healthcare professionals in order to reduce the severe reactions that can accompany food allergy and may result in hospitalization.

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TRENDS IN U.S. INFANT SEX RATIO BY PLURALITY AND GESTATIONAL AGE.

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The U.S. sex ratio has changed over recent decades. This trend has been attributed to environmental influences. However, trends have not been consistent across all births, particularly by race. This analysis examines U.S. sex ratio by plurality and gestational age to determine if trends in artificial reproduction and improved fetal survival have impacted sex ratio. U.S. natality files from 1972–2004 were analyzed. Male birth proportion was calculated as the dependent variable for each year. Data were stratified by plurality (singleton, multiple), gestational age (<33, 33–36, ≥37 weeks), and race. Log binomial regression was performed with year as the independent variable and 1972 as the referent. Spline terms were used to assess changes in trend due to increased artificial reproduction (after 1985), and improved gestational age-specific survival (after 1990). Sex ratio decreased linearly among white singletons only. Artificial reproduction did not contribute to this decrease. Male births actually increased among multiple births after 1985 (0.004% per 10 years, 95% CI [0.002, 0.007]). Improved survival did not explain the decreasing sex ratio; white singleton male births <33 weeks increased after 1990 ($\beta = 0.0004$, 95% CI [0.0001, 0.0009]), while term male singleton births decreased (−0.002% per 10 years, 95% CI [−0.002, −0.001]). There were no significant trends among black births. This analysis indicates inconsistent trends in male birth proportion over time according to race, plurality, and gestational age. These results do not explain changes in sex ratio over time, but the only monotonic decrease occurred for white term singletons. This suggests a pervasive environmental influence on sex ratio is less likely and changes may be due to natural variation.

074-S

WHY ARE ARAB-AMERICANS AT LOWER RISK FOR PRETERM BIRTH THAN WHITES?

*A M El-Sayed and S Galea (University of Michigan, Ann Arbor, MI 48109)

Research suggests that Arab-Americans are at lower risk for preterm birth (PTB) than whites in the United States (US). We assessed factors that might explain the lower likelihood of PTB among Arab-Americans compared to whites in Michigan, the state with the largest number of Arab-Americans in the US. We used vital statistics data documenting all births in Michigan between 2000 and 2005. Stratified analyses and manual stepwise logistic regression model building were used to assess whether maternal age, parity, education, marital status, tobacco use, and/or maternal birthplace (in the US or not) mediated the association between ethnicity and PTB risk. As expected, Arab ethnicity was associated with lower PTB risk compared to whites in an unadjusted model [OR = 0.85; 95% confidence interval (CI) = 0.80–0.89]. Arab mothers were more likely to be married, less likely to use tobacco during pregnancy, and more likely to be foreign born than whites. Arab ethnicity remained associated with lower PTB risk compared to whites in models accounting for maternal age, parity, education, marital status, and tobacco use; each of these variables individually explained up to 18% of the association between Arab ethnicity and PTB risk. However, Arab ethnicity was no longer associated with PTB risk when maternal birthplace was taken into account. In the final, fully adjusted model accounting for all hypothesized mediators, there was no statistically significant association between Arab ethnicity and PTB risk (OR = 1.02; 95% CI = 0.97–1.08). Maternal birth outside the US was the primary explanation for the apparent lower risk of PTB among Arab-Americans compared to whites. Future research may fruitfully consider risk behaviors that could account for the role of maternal birthplace on PTB risk.

075

A SURVEY-BASED STUDY OF REPRODUCTIVE OUTCOMES AMONG COSMETOLOGISTS.

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Cosmetologists are exposed to a large number of chemicals that have been shown to cause reproductive toxicity in animal models. Despite this knowledge, few studies have examined whether cosmetologists are at increased risk for reproductive and health problems compared to women in other occupations. Thus, we conducted an analysis of data from an ongoing cross-sectional survey-based study comparing reproductive and health outcomes among cosmetologists (n = 321) to women of the same age (21 to 55 years) working in other occupations (n = 387). The results showed that the cosmetologists were not at increased risk for infertility, miscarriage, or stillbirth compared to women in other occupations. Further, among women with at least one live birth, cosmetologists were not at increased risk for having a child with an adverse health outcome compared to their counterparts. However, cosmetologists were more likely to report premature ovarian failure (POF) (odds ratio (OR) 2.81; 95% confidence interval (CI) 0.91, 8.65), hot flashes (OR 1.75; 95% CI 1.22, 2.51), depression (OR 1.44; 95% CI 1.00, 2.08), muscle weakness (OR 1.61; 95% CI 1.05, 2.48), and throat irritation (OR 1.68; 95% CI 1.09, 2.59) than women in other occupations after adjustment for age, race, marital status, body mass, education, smoking, and alcohol. Among the hairdressers, POF was not associated with exposure to any of the 44 chemical exposures examined. These results suggest that cosmetologists are not at higher risk for pregnancy-related adverse outcomes, but they may be at higher risk for other health problems. Enrollment of participants is continuing. Supported by NIOSH R01 OH008579.

076

MATERNAL OBESITY AND THE RISK OF INFANT DEATH IN THE U.S.

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Maternal obesity (defined as prepregnancy body mass index [BMI] ≥ 30 kg/m^2) is associated with increased risk of neonatal death. It association with infant death, postneonatal death, and cause-specific infant death needs to be better quantified. We studied the association between maternal obesity and the risk of infant death using 1988 U.S. National Maternal and Infant Health Survey. A case control analysis of 4,265 infant deaths (2,667 neonatal deaths and 1,598 postneonatal deaths) and 7,293 controls was conducted using SUDAAN software. Self-reported prepregnancy BMI and weight gain were used in primary analysis, while those in medical records were used in a subset of 4,308 women. Compared with normal weight women (prepregnancy BMI 18.5–24.9 kg/m^2) with weight gain during pregnancy 0.30–0.44 kg/week, obese women had increased risk of neonatal death and overall infant death. For infant death, the adjusted odds ratios and 95% confidence intervals were 1.75 (1.28–2.39), 1.42 (1.07–1.89), 1.59 (1.00–2.51), and 2.87 (1.98–4.16) if their weight gain during pregnancy were <0.15, 0.15–0.29, 0.30–0.44, ≥0.45 kg/week, respectively. Maternal obesity was strongly associated with neonatal death from pregnancy complications or disorders relating to short gestation and unspecified low birth weight. Obese women with highest weekly weight gain also had increased risk of neonatal death from respiratory conditions or birth defects. The subset with medical records had similar results for recorded prepregnancy BMI and weight gain. Maternal obesity is associated with increased risk of overall infant death, mainly due to neonatal death.

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077

THE ASSOCIATION BETWEEN ERECTILE DYSFUNCTION AND LIFESTYLE FACTORS IN US ADULT MALES: NHANES 2001–2004. *J P Hughes and D J Brody (National Center for Health Statistics, Hyattsville, MD 20782)

Erectile dysfunction (ED) affects approximately 1 of 5 US adult males. Little is known about lifestyle factors associated with ED. Data from the National Health and Nutrition Examination Survey (NHANES) were used to examine the relationship between ED and obesity, smoking, alcohol consumption, and physical activity in males 20 or more years of age. ED status was obtained in a private self-interview from the question "Many men experience problems with sexual intercourse. How would you describe your ability to get and keep an erection adequate for satisfactory intercourse?" Responses were always or almost always, usually, sometimes, and never able. ED was defined as sometimes or never able to get and keep an erection. Other variables included in the analysis were age, race/ethnicity, education, poverty income ratio, use of anti-hypertensive medication, and self-reported diabetes. The prevalence of ED was 19.5% with the age-specific prevalence increasing from 5.1% in the 20–39 year old age group to 82.4% in the 80 or more years of age group. The prevalence was 1.4 (95% CI: 1.2–1.8) times higher in the obese than in normal weight and 1.2 (1.0–1.4) times higher in the overweight. For former smokers, the prevalence was 2.2 (2.0–2.6) times higher than for never smokers. ED prevalence for those drinking 7 or more drinks a week was 0.5 (0.4–0.6) the prevalence of non-drinkers. Those reporting being more physically active had a prevalence 0.7 (0.6–0.8) times the prevalence of those less active. After adjustment for all other variables, the only lifestyle factors that remained significant were physical activity and smoking. Although causality cannot be determined from a cross-sectional study, the results suggest that increasing physical activity may be beneficial in reducing ED.

078-S

DIABETES TRENDS AMONG DELIVERY HOSPITALIZATIONS IN THE UNITED STATES, 1994–2004. *S Albrecht, E Kuklina, D Jamieson, M Whiteman, A Kourtis, S Posner, W Callaghan (Centers for Disease Control and Prevention, Atlanta, GA 30341)

Diabetes in pregnancy is associated with an increased risk of maternal and neonatal morbidity. To examine trends in the national prevalence of diabetes among delivery hospitalizations and to examine characteristics of these hospitalizations, we used cross-sectional data for 1994–2004 from the Nationwide Inpatient Sample, a nationally representative survey of inpatient hospitalizations. Diagnoses codes were selected for gestational (GDM), Type 1, Type 2, and unspecified diabetes. Odds ratios (ORs) and 95% confidence intervals (CIs) were adjusted for maternal and hospital characteristics using logistic regression. The overall rate of diabetes among delivery hospitalizations was 4.3/100 deliveries. GDM accounted for the largest proportion of delivery hospitalizations with diabetes (84.7%), followed by Type 1 (7%), Type 2 (4.7%), and unspecified diabetes (3.6%). From 1994 to 2004, the rates for GDM, Type 1 and Type 2 diabetes increased significantly overall and within each age group (15–24, 25–34, $\geq$35 years) ($p < 0.05$). The largest percent increase for all ages was for Type 2 diabetes (346%). By age group, the greatest percent increases for each diabetes sub-type were among the two younger groups. Significant predictors of diabetes at delivery included age $\geq$35 vs. 15–24 years (OR = 4.80, 95% CI 4.72–4.89), urban vs. rural location (OR = 1.14, 95% CI 1.11–1.17), and Medicaid/Medicare vs. other payment sources (OR = 1.29, 95% CI 1.26–1.32). Given the increasing prevalence of diabetes among delivery hospitalizations particularly among younger women, it will be important to monitor trends in the pregnant population and target strategies to minimize risk for maternal/fetal complications.

079

MATERNAL ANTHROPOMETRIC RISK FACTORS FOR PRETERM BIRTH IN THE BLACK WOMEN'S HEALTH STUDY. *L A Wise, J R Palmer, L J Heffner, L Rosenberg (Slone Epidemiology Center, Boston, MA 02215)

Studies of the association between prepregnancy body mass index (BMI (kg/m^2) and preterm birth have been mixed, and some show variation by gestational weight gain and parity. Using data from the Black Women's Health Study, we estimated the odds of spontaneous preterm birth associated with prepregnancy BMI among 7,324 singleton infants born to women ages 21–44 who delivered during 1995–2003. We compared mothers of 597 infants born 3 or more weeks early with mothers of 6,727 infants of longer gestation. We used generalized estimating equation models to derive odds ratios (ORs) and 95% confidence intervals (CI) for preterm birth, with adjustment for potential confounders. Associations were examined according to total gestational weight gain (<25, 25–34, $\geq$35 pounds) and parity status. Women at the extremes of prepregnancy BMI had the highest odds of preterm birth. Relative to normal weight women (BMI = 20–24), adjusted ORs for preterm birth associated with BMIs of <20 (underweight), 25–29 (overweight), 30–34 (obese), and $\geq$35 (very obese) were 1.37 (95% CI = 1.00–1.88), 0.88 (95% CI = 0.70–1.09), 1.20 (95% CI = 0.93–1.56), and 1.35 (95% CI = 1.01–1.80), respectively. Compared with normal weight women who gained 25–34 pounds during pregnancy, women with low (<25 pounds) gestational weight gain had elevated ORs for preterm birth in all BMI categories. Very obese women who gained 25–34 pounds and underweight women who gained $\geq$35 pounds had similar odds of preterm birth compared with normal weight women who gained 25–34 pounds. The associations did not vary appreciably by parity, and were similar after the exclusion of pregnancies complicated by maternal medical conditions.

080

HURRICANE KATRINA EXPERIENCE, POST-TRAUMATIC STRESS DISORDER AND BIRTH OUTCOME. *X Xiong, E W Harville, D R Mattison, K Elkind-Hirsch, G Pridjian, P Buekens (Department of Epidemiology, Tulane University, New Orleans, LA 70112)

The authors sought to study the effect of Hurricane Katrina and mental health on birth outcomes. 219 women from the New Orleans and 79 women from the Baton Rouge (less exposed) areas were interviewed during pregnancy about their experience of the hurricane, post-traumatic stress disorder (PTSD) using the Posttraumatic Stress Checklist, and depression using the Edinburgh Depression Scale. High hurricane exposure was defined as having 3 or more severe experiences of the hurricane (i.e. feeling her life was in danger, illness or injury to self or family member, walking through floodwaters, severe home damage, not having electricity more than one week, having a loved one die, or seeing someone die). The frequency of low birth weight (LBW) was higher in women with high hurricane exposure (14.0 %) than women without high hurricane exposure (4.7 %), with an adjusted odds ratio (aOR) of 3.3; 95 % confidence interval (CI): 1.13–9.89; after adjustment of confounders such as race and income. The frequency of preterm birth (PTB) was higher in women with high hurricane exposure (14.0 %) than women without high hurricane exposure (6.3 %), with aOR of 2.3 (0.82–6.38). The frequency of LBW was higher in women with PTSD (23.1%) and with depression (11.6%) than that in women without PTSD (9.1%) and without depression (9.4%). The aORs and 95% CI of LBW for women with PTSD and depression were 3.1 (0.79–12.6) and 1.3 (0.42–3.79). The authors conclude that women who had high hurricane exposure and PTSD are at an increased risk of having low birth weight infants.

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IMPACT OF PREECLAMPSIA ON PLACENTAL WEIGHT AND FETAL GROWTH: PRETERM VERSUS TERM BIRTHS.

*X Xiong, H Xu, S Q Wei, W D Fraser (Department of Epidemiology, Tulane University, New Orleans, LA 70112)

Few studies to date have examined the effect of preeclampsia on placental weight and fetal growth according to preterm and term births. The authors analyzed data from a case-control study at three hospitals in Quebec, Canada, between January 2003 and March 2006. A total of 86 preeclamptic cases and 239 controls were included. Preeclampsia was defined as blood pressure $\geq$ 140/90 mm Hg and $\geq$ 1 + proteinuria after 20 weeks of gestation. Outcome variables mainly include placental weight (g), newborn length and head circumference (cm), birth weight (g) or low birth weight (LBW, %), gestational age (week) or preterm birth (PTB, %) and small-for-gestational age (SGA, %). Multivariate regression was performed to adjust for potential confounding variables. Infants born to mothers with preeclampsia had significantly poor birth outcomes (i.e., lower placental weight and birth weight, or shorter body length and head circumference, or shorter gestational age, or higher rate of LBW, PTB and SGA), as compared to the controls (all statistics: $p < 0.01$). The differences were even more significantly seen in infants born preterm (<37 weeks). However, for the infants born to mothers with preeclampsia at term ($\geq$ 37 weeks), there was no difference in the outcome variables between the cases and controls ($p > 0.05$). In fact, the mean placental weight and birth weight were higher in the cases than in the controls (e.g., placenta weight: 548.1 g vs. 506.8 g). The authors conclude that infants born to mothers with preeclampsia at term have fetal growth and neonatal outcomes similar to that of babies born to mothers without preeclampsia.

082

EXPERIENCE OF HURRICANE KATRINA AND RISK OF POST-TRAUMATIC STRESS DISORDER AND DEPRESSION AMONG PREGNANT WOMEN.

X Xiong, *E W Harville, D R Mattison, K Elkind-Hirsch, G Pridjian, P Buekens (Department of Epidemiology, Tulane University, New Orleans, LA 70112)

The authors sought to study the effect of Hurricane Katrina on mental health in pregnant women. 219 women from New Orleans and 79 women from Baton Rouge (less exposed) areas were interviewed during pregnancy about their experience of the hurricane, post-traumatic stress disorder (PTSD) using the Posttraumatic Stress Checklist, and depression using the Edinburgh Depression Scale. High hurricane exposure was defined as having 3 or more severe experiences of the hurricane (i.e., feeling her life was in danger, illness or injury to self or family member, walking through floodwaters, severe home damage, not having electricity more than one week, having a loved one die, or seeing someone die). Cutoffs of 50 and 12 were used to define PTSD and depression, respectively. The frequency of PTSD was higher in women with high hurricane exposure (9.7 %) than women without high hurricane exposure (1.6 %), with an adjusted odds ratio (aOR) of 7.0; 95 % confidence interval (CI): 1.41–43.5; after adjustment for maternal race, age, education, smoking, family income, parity, and history of low birth weight. Moreover, the risk of PTSD and depression increased with increasing number of the severe experiences of the hurricane. Compared to women without the severe experience of the hurricane, the aORs and 95% CIs of depression for women with 1, 2, 3, and 4 or more severe experiences of the hurricane were 1.8 (0.33–9.52), 1.2 (0.20–7.00), 1.6 (0.29–9.25), and 6.8 (1.34–34.7), respectively. The authors conclude that women who had high hurricane exposure are at a significantly increased risk of having PTSD and depression.

083-S

DIETARY FAT AND THE RISK OF ENDOMETRIOSIS.

*B L Trabert, V L Holt, D Scholes, A J de Roos, U Peters (Fred Hutchinson Cancer Research Center, University of Washington, and Group Health Cooperative, Seattle, WA 98105)

Endometriosis is a prevalent gynecologic disorder defined by the presence of endometrial tissue outside the uterus affecting 5–10% of US reproductive age women. Dietary fat consumption may have a potential role in the etiology of endometriosis through its effects on steroid hormone levels. We examined dietary risk factors for endometriosis using a population-based case-control study. Cases were 314 Group Health Cooperative (GH) enrollees ages 18–49 with newly diagnosed, surgically confirmed endometriosis between 1996 and 2001. Controls were 690 randomly selected age-matched female GH enrollees without a history of endometriosis. Dietary exposures, including fat, were measured using the validated Women's Health Initiative food frequency questionnaire. All analyses were adjusted for age, year of enrollment, energy intake, race/ethnicity, parity, alcohol use and smoking. Results: The highest quartile of total fat consumption was associated with a 50% decrease in risk of endometriosis compared to the lowest quartile (odds ratio (OR) 0.5; 95% confidence interval (CI) 0.2–0.9). Saturated fat intake was similarly associated with a decreased risk of endometriosis (highest vs. lowest quartile: OR 0.5; 95% CI 0.3, 1.0). Increasing quartile of saturated fat consumption was associated with a decreased risk of endometriosis (p-trend = 0.04). Monounsaturated-, polyunsaturated-, and trans fat consumption demonstrated similar trends, albeit not statistically significant. Conclusion: Our study suggests that dietary fat consumption may influence the development of endometriosis, a finding that requires further corroboration.

084

RISK FACTORS FOR A PROLONGED LENGTH OF STAY IN WOMEN HOSPITALIZED FOR PREECLAMPSIA IN TEXAS.

*Z D Mulla, B S Nuwayhid, K M Garcia, K F Flood-Shaffer, J W Van Hook, R M Hampton (Texas Tech University Health Sciences Center, El Paso, TX 79905)

We aimed to identify correlates of a prolonged length of stay (PLOS) in a cohort of women hospitalized for preeclampsia or eclampsia in Texas. Statewide hospital discharge data were obtained, and the records of women who were discharged in 2004 and/or 2005 with a principal discharge diagnosis of preeclampsia or eclampsia were extracted using ICD-9-CM codes. A retrospective cohort study was conducted to identify demographic and clinical risk factors for PLOS. PLOS was defined as a stay greater than 5 days. Odds ratios (OR) for PLOS were calculated using logistic regression. Generalized estimating equations were used to account for a small group of women who were hospitalized multiple times during the study period for preeclampsia. A total of 21,203 records were analyzed. The crude incidence of PLOS was 17.5%. Advancing maternal age was positively associated with PLOS: For every 10-year increase, there was a 20% increase in the odds of PLOS (adjusted OR = 1.20, 95% confidence interval [CI]: 1.13–1.28). The strongest risk factor for PLOS was the presence of renal disease: Adjusted OR 5.81 (95% CI: 3.97–8.50). Medicaid beneficiaries had a statistically significant 9% reduction in the odds of PLOS compared to patients who were not Medicaid beneficiaries (Adjusted OR = 0.91, 95% CI: 0.84–0.99). Factors that were associated with an increased odds of PLOS included renal disease, preeclampsia or eclampsia superimposed on pre-existing hypertension, diabetes, and obesity (adjusted ORs between 1.61 and 5.81). Protective factors were Medicaid beneficiary status, being admitted from the emergency department, and being of other race/ethnicity.

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085-S

OCCUPATIONAL RISK FACTORS AND LOW BIRTHWEIGHT IN THE NURSES' HEALTH STUDY II COHORT. *J A Tackett, C C Lawson, E A Whelan, E N Hibert, B Grajewski, D Spiegelman, and J W Rich-Edwards (National Institute for Occupational Safety and Health, Cincinnati, OH 45213)

Although nurses are frequently exposed to physical demands and chemicals at work during pregnancy, results from studies of these effects on fetal growth are inconclusive. We investigated the relationship between certain occupational exposures and term low birthweight (LBW) among participants in the Nurses' Health Study II. In 2001, data were obtained from a self-administered questionnaire on occupational and lifestyle factors during the most recent pregnancy. A total of 6,159 term births were analyzed. Logistic regression was used to model the risk associated with term LBW and work schedule, standing, lifting, and exposure to chemicals and x-ray radiation. Of the 6,159 term births, 58 (0.9%) were LBW (weighed less than 5.5 pounds). For every hour of standing, the risk of delivering a LBW infant at term was increased by 15% [95% confidence interval (95% CI): 1.02 – 1.29], after adjusting for age, parity, and other occupational factors. Number of hours worked per week [odds ratio (OR) = 1.02, 95% CI: 0.99, 1.04] and heavy lifting (number of times the subject lifted 25 pounds or more per day) (OR = 0.96, 95% CI: 0.91, 1.02) showed no relation to term LBW. These data from a large cohort study of U.S. nurses suggest that prolonged standing at work may increase the risk of having a LBW infant. Measures to limit standing during pregnancy may decrease the incidence of term LBW in infants of women working in this profession.

086

IS PRIOR PREGNANCY LOSS ASSOCIATED WITH AN INCREASED RISK FOR BIRTH DEFECTS? *J Kucik, C J Alverson, A Correa (Centers for Disease Control and Prevention, Atlanta, GA 30333)

Prior pregnancy loss is a common event that has been associated with higher prevalence of some birth defects; however, the extent to which it is associated with other birth defects is not known. We investigated the association of prior pregnancy loss with the birth prevalence of 66 birth defects. Cases for prevalence estimation were infants with birth defects born between 1994–2003 to women who had experienced at least one prior pregnancy and who were ascertained by a population-based surveillance program that uses active case ascertainment. Crude prevalence per 10,000 live births were computed by prior pregnancy loss status (0, 1+). Using no prior pregnancy loss as the referent group, Poisson regression models were used to estimate prevalence ratios (PR) and 95% confidence intervals (CI) accounting for maternal age group (±24, 25–34, 35+ years) and race/ethnicity (White, Black, Hispanic) through stratification or adjustment. 8,787 infants with birth defects were born to women having at least one pregnancy, and 4,877 (56%) of those women had at least one pregnancy loss. The overall prevalence of birth defects among those who had experienced a prior loss was 4.6 per 100 live births compared to a prevalence of 1.7 per 100 among those who had not (PR = 2.7, CI = 2.5–2.8). Prior pregnancy loss was associated with a higher prevalence ($p < 0.05$) for 57 of the 66 defects analyzed (PR ranging from 1.9 to 5.4). Among the study population, 35% of all infants with birth defects are born to women with a history of prior pregnancy loss. A maternal history of prior pregnancy loss is strongly associated with an increased prevalence for many birth defects.

087

MATERNAL AGE, BIRTH ORDER, AND RACE: DIFFERENTIAL EFFECTS ON BIRTHWEIGHT. *G K Swamy, MD, S Edwards, A Gelfand, PhD, M L Miranda, PhD (Duke University, Durham, NC 27710)

OBJECTIVE: To determine how maternal age and birth order jointly influence birthweight and whether effects are disparate for race subgroups STUDY DESIGN: A population-based cross-sectional study using North Carolina Detailed Birth Records from 1999–2003 was performed. Analysis was limited to 308,117 singleton term live births with no congenital anomalies, no maternal medical conditions, and no alcohol or tobacco use. Multivariate linear regression modeling was used to determine the contribution of advancing maternal age and birth order on birthweight, controlling for gestational age, infant sex, maternal education, marital status, and race. RESULTS: Non-Hispanic Black (NHB) women were more likely to be younger, have lower education, and be unmarried as compared to Non-Hispanic whites (NHW) and Hispanics (H). Mean birthweight was less for NHB (3275 g) as compared to NHW (3515g) and H (3389g). Overall, mean birthweight consistently increased with maternal age through the mid-30s. Both the lower and upper extremes of maternal age had a significant effect on birthweight for NHW (15–19 years and 35+ years, $p < .0001$), but only age < 25 years was a significant contributor to birthweight for NHB and H, $p < .0001$. However, birth order had a greater influence on birthweight with the largest incremental increase from first to second births. While the relationship of increasing birth order and birthweight occurred across all three race subgroups, NHB had a smaller relative increase in birthweight than did NHW and H (75.6g vs.115.3g and 109.6g). CONCLUSION: Overall, birth order exerts greater influence on birthweight than maternal age but has differing effects within racial subgroups, thus providing important insights into the racial disparities in pregnancy outcomes.

088

ASSOCIATION OF 5-MINUTE APGAR SCORE WITH EXEMPTION FROM MILITARY SERVICE AND WITH COGNITIVE FUNCTION. *V Ehrenstein, L Pedersen, M Grijota, G L Nielsen, K J Rothman, H T Sørensen (Boston University, Boston, MA 02115)

Apgar score is used for rapid assessment of a newborn's condition after birth. We aimed to examine the association of 5-minute Apgar score with rates of exemption from the army; with prevalence of pre-existing neurologic diseases leading to exemption; and with cognitive function. From the Danish Medical Birth Registry (MBR) we extracted data on Apgar score and other perinatal characteristics. These were linked with corresponding records of mandatory draft board evaluations, which include physical examination and an intelligence test. Draft board records were available for 1996–2003 in one Danish conscription district. Of the 19559 draft-liable men born as singletons in 1978–1983, 136 (0.7%) had a 5-minute Apgar score <7 while 1143 (6%) had a score of 7–9. 7119 (36%) of the men received service exemption, including 203 (1%) because of a pre-existing neurologic disorder. Among men whose 5-minute Apgar scores were <7, 7–9, and 10, respectively 45%, 40%, and 36% were considered unfit for the army; 8%, 2% and 1% were exempt with a pre-existing neurologic disorder (eg, epilepsy); and 28%, 24%, and 22% had low cognitive function. After accounting, in a log-binomial regression model, for perinatal characteristics recorded in the MBR, lower 5-minute Apgar scores remained associated with greater prevalence of neurologic conditions leading to rejection (prevalence ratio [PR] = 7.7 [95% confidence interval, CI]: 4.0–14.8, for Apgar<7; PR = 1.4 [95% CI: 0.8–2.6] for Apgar 7–9, compared with Apgar = 10). The analogous PRs for low cognitive function were 1.2 (95% CI: 0.8–1.8) and 1.1 (95% CI: 0.9–1.3). Certain indicators of adult neurologic function are present at birth and are measurable with the Apgar score.

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PERICONCEPTIONAL MULTIVITAMIN USE IS ASSOCIATED WITH REDUCED RISK OF SMALL FOR GESTATIONAL AGE BIRTHS IN THE DANISH NATIONAL BIRTH COHORT. *J M Catov, E A Nohr, L M Bodnar, V K Knudson, S F Olsen, J Olsen (University of Pittsburgh PA)

Periconceptional multivitamin (MV) use may be related to risk of growth restriction. We related timing and frequency of periconceptional MV use to the risk of small for gestational age (SGA) births. Women in the Danish National Birth Cohort (n = 26,133) reported at 10.8 weeks (SD 3.6) the number of weeks of MV use during a 12 week period (LMP-4 to LMP+8). SGA cases were those weighing <5th percentile based on fetal growth curves (n = 1408). Cox regression was used to estimate the relation between frequency (weeks) and timing of use (preconception [LMP-4 to LMP+2] and post-conception [LMP+3 to LMP+8]) to SGA risk. Regular users (4–6 weeks) and partial users (1–3 weeks) were compared to non users. Overall, 18,551 women (71%) reported any MV use in the periconceptional period and they had a reduced risk of SGA (HR 0.78, 95% CI 0.67, 0.93) compared to non-users after adjustment for age, body mass index, smoking, parity, chronic hypertension, and gestational age at enrollment. A total of 7,332 women reported regular MV use in the pre and post conception periods; 3,666 reported regular use only in the post-conception period; and 7,553 reported some use in either period. Women with regular pre and post conception use had a reduced risk for SGA (HR 0.81 [0.70, 0.93]) as did women with regular post conception use only (HR 0.76 [0.64, 0.91]). The relation between partial post conception use and SGA risk was attenuated but still detectable among women with some or no preconception use (HR 0.79 [0.63, 0.99]; HR 0.78 [0.67, 0.91]). Regular periconceptional MV use was associated with a reduced risk for SGA. If causal, use immediately after conception may be the critical exposure window.

090-S

GENETIC VARIABILITY IN INHIBINS AND MENSTRUAL CYCLE CHARACTERISTICS. *K Taylor, C Small, C Dominguez, S Sherman, M Epstein, W Tang, M Wilson, M Bouzyk, and M Marcus (Emory University, Atlanta, GA)

Inhibin á, âA and âB (INHA, INHBA and INHBB) are three related genes that are integral to the process of ovulation. Their protein products combine to form activins and inhibins, which regulate secretion of follicle-stimulating hormone. We genotyped 26 linkage disequilibrium-tagging polymorphisms identified in HapMap to saturate the known variability in the extended gene regions of the inhibin genes, and determined whether they were associated with menstrual function. We achieved good coverage; genotyping was successful for most HapMap LD bins. In the prospective study, 470 women collected urine samples (source of DNA) and recorded menstrual cycle information and covariates in a daily diary for one year or until the end of a pregnancy. This analysis is limited to the 365 non-Hispanic white women. Mixed linear models were used to examine the association between each SNP and menstrual cycle length and bleed length, accounting for correlation across cycles. Logistic regression was used to examine long cycles and cycle variability. Two SNPs were associated with menstrual cycle length in days (â ± SE: −3.5 ± 1.7 and 1.1 ± 0.5). These two SNPs were in LD (R2 = 0.95). Two SNPs were associated with the odds of having long cycles (OR and 95% CI: 3.57 (1.19, 10.0); 3.33 (1.27, 9.09)); one was associated with the odds of having variable cycles (3.4 (1.3, 8.9)); and three were associated with bleed length (â ± SE: −0.81 ± 0.34, 0.78 ± 0.30, 0.58 ± 0.24). After correcting for multiple comparisons, none of these associations were statistically significant at the á = 0.05 level, but haplotype analyses are underway. The associations were not changed substantially by adjusting for established predictors of menstrual function.

091-S

HOW MIGHT EARLY PREGNANCY LOSS INCREASE FECUNDABILITY IN THE NEXT CYCLE? EFFECTS OF EARLY LOSS ON HORMONE LEVELS AND SEXUAL INTERCOURSE. *A M Jukic, C R Weinberg, A J Wilcox, D D Baird (NIEHS, Durham, NC 27709)

There is evidence that women have an elevated probability of conceiving in the menstrual cycle immediately after an early pregnancy loss (before six weeks gestation). We explored two possible pathways for such an effect: hormonal changes that enhance fecundability or sexual intercourse that is more frequent and/or better-timed. We used within-woman differences between cycles in urinary hormone measurements and pattern-of-intercourse information from women in the North Carolina Early Pregnancy Study. Specifically, two types of 3-cycle analysis units (triads) were created. Early loss triads were centered on early loss cycles that were preceded by a non-conception cycle and followed by either a conception or non-conception cycle. Non-conception triads were centered on non-conception cycles. The first cycle established a baseline for evaluating within-woman effects of the middle cycle on the third cycle. There were 23 early loss triads and 80 non-conception triads. Post-loss cycles had a slower rate of estrogen rise (p = 0.08), a steeper mid-cycle decline in the ratio of estrogen to progesterone (p = 0.06), and the suggestion of a more favorable pattern of sexual intercourse (p = 0.19), relative to post-non-conception cycles. The ratio result is consistent with faster luteinization which, in conjunction with a steeper progesterone rise, has been positively associated with conception. However, we did not find a more rapid progesterone rise in post-loss cycles. These data do not support the hypothesis that early losses affect the hormonal pattern of the subsequent cycle in ways that enhance fecundability. There was a possible increase in well-timed sexual intercourse.

092

SUPPLEMENTATION WITH OMEGA-3 FATTY ACIDS AND ATOPY SYMPTOMS IN INFANTS: A RANDOMIZED CONTROLLED TRIAL. *I Romieu, A Barraza-Villarreal, L Hernandez, C Escamilla, P Sly, L Neufeld, J Rivera, U Ramakrishnan (Instituto Nacional de Salud Pública, Cuernavaca, Morelos, Mexico)

Background: Early life appears to be crucial in the development of the immune system. Omega-3 polyunsaturated fatty acids (n-3 PUFA) could play a role in preventing the development of allergic diseases. Methods: 1041 women were randomized to receive either DHA supplementation or placebo from 22 weeks of pregnancy until term. Newborns were followed up to 18 months without breaking the treatment code. IgE blood levels were obtained for 697 women and 69% were classified with positive test to atopic (IgE ≥ 0.35 IU/ml; n = 483) and 11.5% (IgE ≥3.5 IU/ml; n = 80) were classificated with moderate-high atopy. Infants attended a medical visit every 3 months to record atopic signs and symptoms. The occurrence of atopic dermatitis (based on Objective SCORAD) was compared between supplement groups using poisson regression models. Results: Among positive atopic women there was no significant difference in the risk of atopy in their offspring (group 1: 14.2% and group 2: 16.6% p = 0.48). However offspring of women with moderate-high atopy in group 2 were more likely to have atopy (group 1: 8.5% vs group 2: 27.3%, p = 0.025). Conclusion: These preliminary results indicate a statistical interaction between atopic condition of the mother and treatment: a significant difference between groups in the risk of atopy among offspring of mother with moderate-high atopy.

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093

POTENTIAL IMPACT OF DIFFERENTIAL CLASSIFICATION OF LOW BIRTHWEIGHT INFANT DEATHS BY STATE.

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Differential classification of low birthweight infants as a fetal death or an infant death has the potential to impact the reported infant mortality rate (IMR) of a state or country. The definition of fetal death varies across the 50 states, but is generally defined to be delivery of a fetus without signs of life with a gestational age of at least 20 weeks and a birthweight of at least 350g or 500g. However, in the US there is no minimum gestational age or birthweight to define a live birth and fetuses born prior to viability may be classified as an infant death or a fetal death. The authors used the linked Birth/Infant Death records from the CDC WONDER On-line Database for the US 1998–2002 to estimate the potential impact of differential classification for deaths of infants weighing less than 500g. During 1998–2002, 15,107,572 births and 106,020 infant deaths were reported in the US with an averaged IMR of 7.02 deaths/1,000 live births. Overall, deaths of infants with a birthweight <500g accounted for 16% of all infant deaths: 17% of white and 26% of black infant deaths. The fraction of deaths <500g reported by each state ranged from a low of 4.3 % by Alaska to a high of 31.1 % by Delaware. Recalculating the IMR by eliminating these deaths resulted in a narrowing of the range of average IMRs reported by each state, a reordering of the rank order among the different states, and brings the overall IMR for the US to 5.5/1,000 live births for that time period. These findings suggest differential classification across the 50 states of deaths among infants weighing <500g at birth, and may account for some of the disparity in the IMR seen between the different states and regions.

094

UNCULTIVATED MICROBES ASSOCIATED WITH BACTERIAL VAGINOSIS AMONG YOUNG, SEXUALLY ACTIVE WOMEN.

*C L Haggerty, D N Fredricks, P A Totten, V Short, S Astete, R B Ness (University of Pittsburgh, Pittsburgh, PA 15261)

Background: As the etiology of bacterial vaginosis (BV) is not well understood, we sought to determine the relationships between several novel microbes and BV among a population of women considered at high risk for sexually transmitted disease. Methods: Vaginal swabs from 40 women participating in the Gynecologic Infections Follow-through (GIFT) Study were evaluated by PCR for Clostridia-like bacterial vaginosis designated bacterial vaginosis associated bacteria 2 (BVAB2) and BVAB3, as well as a *Megasphaera*-like bacterium, *Ureaplasma parvum*, and *Leptotrichia sanguiengens/amnionii*. Logistic regressions were used to determine the relationships between each microbe and BV by Nugent score on Gram stain. Mean Gram stain scores were compared between women testing positive and negative for each organism. Results: All of the bacteria examined were frequently identified among women with BV, with prevalence rates ranging from 44% to 77%. BVAB2 (odds ratio (OR) 3.1, 95% confidence interval (CI) 1.3–7.3), BVAB3 (OR 2.6, 95% CI 1.4–4.9), and *Megasphaera*-like bacterium (OR 2.6, 95% CI 1.2–5.3) were all associated with BV. Higher mean gram stain scores were evident among women testing positive for BVAB2 (6.7 ± 2.7 vs. 4.5 ± 2.5, $p < 0.05$), BVAB3 (7.6 ± 0.8 vs. 4.6 ± 3.0, $p < 0.05$), *Megasphaera*-like bacterium (6.7 ± 2.8 vs. 4.6 ± 2.5, $p < 0.05$), and *L. sanguiengens/amnionii* (6.6 ± 2.0 vs. 4.7 ± 3.7, $p = 0.06$). Conclusions: BVAB2, BVAB3, *Megasphaera*-like bacterium, and *L. sanguiengens/amnionii* are common pathogens associated with BV and higher Gram stain Nugent scores among young, sexually active women.

095

NOVEL BACTERIAL VAGINOSIS-ASSOCIATED BACTERIA PREDICT INCIDENT PELVIC INFLAMMATORY DISEASE.

*C L Haggerty, D N Fredricks, P A Totten, V Short, S Astete, R B Ness (Univ. of Pittsburgh, PA 15261)

Background: Since up to 70% of pelvic inflammatory disease (PID) cases are nongonococcal/nonchlamydial and have an unidentified microbiologic etiology, we examined the relationships between novel BV-associated bacteria and incident PID. Methods: Cases were 20 women who experienced histologically confirmed PID during the 3 year follow-up of the Gynecologic Infections Follow-through Study. Vaginal swabs from visits occurring most immediately preceding and within 9 months of PID, and endometrial biopsy specimens collected at PID diagnosis were analyzed. PCR was compared among cases and 20 controls who did not experience PID signs or symptoms, matched by clinic site, age, and length of follow-up. Analyses were adjusted for *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (NG). Results: Among the cases, vaginal and endometrial PCR were highly correlated for Clostridia-like BVAB3 (Pearson's correlation(r) = 0.6, p = 0.01) and a *Megasphaera*-like bacterium (Pearson's r = 0.5, p = 0.05). Vaginal *U. parvum* (relative risk (RR) 1.3, 95% confidence interval (CI) 1.0–1.7) and *L. sanguiengens/amnionii* (RR 1.2, 95% CI 0.9–1.6) modestly predicted incident PID. Among women testing positive for each organism, mean vaginal 16S rDNA copies/mL of Clostridia-like BVAB2 ($3.4^6 \pm 5.9^6$ vs. $9.7^4 \pm 1.2^5$, $p < 0.001$) and *Megasphaera*-like bacterium ($3.1^5 \pm 6.0^5$ vs. $6.7^4 \pm 9.2^4$, $p < 0.001$) were significantly higher among women who developed PID. Conclusions: Vaginal colonization with BVAB2 and *Megasphaera*-like bacterium are correlated with subsequent identification from endometrial specimens at PID diagnosis, suggesting ascension from the lower to upper genital tract. Higher levels of vaginal BVAB2 and *Megasphaera*-like bacterium are associated with PID development, independent of NG and CT.

096-S

THE EFFECT OF THE USE OF DIFFERENT DEFINITIONS OF PERIODONTAL DISEASE ON ITS ASSOCIATION WITH SYSTEMIC DISEASES: AN EXAMPLE.

*H Xu, X Xiong, Z-C Luo, W D Fraser (University of Montreal, Quebec, H3T1E5 Canada)

Periodontal disease has been reported to be associated with variety of systemic diseases such as adverse pregnancy outcomes. However, the findings of the association between periodontitis and poor pregnancy outcomes are often inconsistent in the literature. One of major issues is that the different methods have been used to define the periodontal disease. Our objective was to evaluate if the observed association between periodontal disease and preeclampsia (PE) varies across the different definitions of periodontal disease based on a case-control study of women who gave births at four hospitals in Quebec, Canada, between January 2003 and March 2006. The status of periodontitis was defined by different threshold levels of probing depth (PD) and clinical attachment loss (CAL) as well as other definitions published in the literature. The percentage of periodontal disease varied significantly by different definitions. Although the estimates of the association with preeclampsia were not statistically significant, regardless of the case definition of periodontal disease, the magnitude of the odds ratios and their 95% confidence interval varied significantly depending on the criteria used to define periodontal disease. For instance, odd ratios were 1.15 (0.65–2.06) using criteria defined by Offenbacher and 1.93 (0.71–5.26) by Armitage's definition. The authors conclude that the variations in the definition of periodontal disease may explain the heterogeneity of findings on its relation to the risk of systemic diseases such as PE in previous studies. Further research is warranted to develop a more universally accepted research definition of periodontal disease.

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097-S

OXIDATIVE STRESS RELEVANT GENE POLYMORPHISMS AND THE RISK OF PREECLAMPSIA- A SYSTEMATIC REVIEW AND META ANALYSIS.

*H Xu, Z-C Luo, X Xiong, W Fraser (University of Montreal, Quebec, H3T1E5 Canada)

Oxidative stress is believed to play a central role in the etiology of pre-eclampsia (PE), a hypothesis-driven approach should be used to carefully assess various components of oxidative stress relevant genes in relation to the risk of PE. We therefore performed a systematic review and meta-analysis of clinical studies to quantify the magnitude of the association and to explore the basis for the heterogeneity in the previously reported observations. Studies that investigated the association between PE and polymorphisms of pre-selected candidate genes were identified and the quality of studies was evaluated using priori criteria. Pooled odds ratios (ORs) and their 95% confidence intervals (CI) were calculated using random effects model. A total of 34 studies were included in the present review. Meta-analyses revealed that the A/B polymorphism in intron4 (OR 4.03; 95% CI 1.48–10.99 in recessive model) and –786T/C polymorphism (OR 1.79, 95% CI 1.22–2.61 in recessive model; OR 1.31, 95% CI 1.06–1.61 in dominant model) in the endothelial nitric oxide synthase gene and His139Arg polymorphism of epoxide hydrolase gene (OR 2.60, 95% CI 1.11–6.08 in condominant model; OR 2.37, 95% CI 1.02–5.49 in recessive model) were significantly associated with the risk of PE. We were unable to find any significant associations between other pre-selected polymorphisms and the risk of PE. Six of seven studies that used haplotype analysis demonstrated that carriers of certain haplotypes significantly increased the risk of PE. Most findings from previous studies are inconsistent. Haplotype assessment of mutiple polymorphisms (maternal and fetal) may help to identify new key contributing variants.

098-S

SEMEN QUALITY IN FERTILE MEN IN RELATION TO PSYCHOSOCIAL STRESS.

*A Gollenberg, F Liu, C Brazil, E Z Drobnis, D S Guzick, J B Overstreet, J B Redmon, A Sparks, C Wang, S H Swan (University of Massachusetts, Amherst, MA 01003)

Psychological stress has been implicated as a factor in idiopathic infertility in both men and women, but most studies to date have investigated this association among infertile couples. We examined life events in the three months prior to sample collection in relation to semen quality in a population-based study of partners of pregnant women (N = 723) recruited at prenatal clinics in 4 US cities. We examined the total number of life events and 2 or more life events vs <2 in relation to semen parameters using ordinary least squares regression. We used multivariate logistic regression to model life events in relation to risk of having semen parameters below current WHO (4th Edition) reference values for sperm concentration (20 million/ml), motile sperm (50% or more motile), and morphology (>15% normal forms). After adjusting for confounders, men experiencing 2+ life events had lower sperm concentration and percent motile sperm, but not % normal morphology, compared to men reporting <2 life events, (log scale, beta = −0.24, p = 0.0017 and beta = −1.82, p = 0.06 for concentration and motility, respectively). Men experiencing 2+ life events had more than a 2-fold increased risk (OR = 2.49, 95% CI 1.39–4.43) of having sperm concentrations below 20 million/ml than men reporting <2 life events. These men had a 50% increased risk of having <50% motile sperm (OR = 1.52, 95% CI 1.01–2.30) compared to men with fewer life events. These results suggest that stressful life events may be associated with decreased sperm count and motility, and possibly an increased difficulty conceiving. The experience of psychosocial stress may be a modifiable factor in the pathway to idiopathic infertility.

099

THE ILLINOIS TRANS-GENERATIONAL BIRTH FILE: LIFE COURSE ANALYSIS OF BIRTH OUTCOMES USING VITAL RECORDS AND CENSUS DATA OVER TWO GENERATIONS.

R David, K Rankin, K Lee, N Prachand, *C Love, J Collins, Jr (John H Stroger Hospital, Chicago, IL 60622)

Objectives: The construction and evaluation of validity and limitations of a transgenerational birth file (TGBF) that includes social context data throughout childbearing women's life course. Methods: Births in Illinois from 1989 to 1991 were linked to the birth records of their mothers born in Illinois between 1956 and 1976 (N = 267,303), on the basis of the mother's complete name and exact date of birth. Outcome data (survival or death) was appended to each transgenerational record. Neighborhood median family income from census files was appended to records from the Chicago area. Results: An infant-mother match rate of 78% was achieved, and about half of these paired records could also be matched to fathers. For Chicago area births (N = 97,755), linkage to census data was also completed for nearly 100% of records, allowing us to characterize the economic situation of the mother both at the time of her birth as well as when she had her child. Analysis of the TGBF showed a slight bias toward more educated parents compared to the total Illinois population, especially within the subset with information for both parents. The infant mortality rate in the TGBF was essentially identical to the overall rate for Illinois. Conclusions: This project demonstrates the feasibility of creating a data set for analyzing birth outcomes of childbearing women within a lifetime social and economic context in a US population. This analysis clarifies the strengths and pitfalls found in the construction of a TGBF. In this TGBF, despite some bias in exclusion of less educated parents, mortality rates suggest that the TGBF population is fairly representative with regard to important infant health outcomes.

100-S

GENDER DIFFERENCES IN THE ASSOCIATION OF BIRTH WEIGHT WITH ACCUMULATION OF VISCERAL ABDOMINAL FAT IN CHILDREN.

*N A West and D Dabelea (University of Colorado School of Medicine, Denver, CO 80262)

Although numerous studies have linked higher birth weight with higher childhood body mass index (BMI), less is known about the relationship between birth weight and the accumulation of visceral abdominal fat (VAF) in children. High levels of VAF, independent of generalized obesity, have emerged as a key predictor of cardiometabolic abnormalities. Multiple linear regression was used to evaluate the association between birth weight and accumulation of VAF in 102 healthy children (non-Hispanic white, Hispanic, and African-American; 59% female) ages 7–12 years in the EPOCH Study (Exploring Perinatal Outcomes among Children). VAF accumulation was measured by multi-slice magnetic resonance imaging (MRI). Birth weight was ascertained from medical record abstraction (76%) or report of the biological mother (24%). Mean birth weight for females (3.25 kg) was slightly lower than for males (3.39 kg). Mean VAF for females was 394 cm2 and 366 cm2 for males. In females, the test for an interaction between birthweight and current BMI yielded p = 0.004. Birth weight was positively associated with VAF in female children with BMI greater than the median value, adjusted for gestational age, race/ethnicity, and age at MRI (beta = 422, p = 0.01). There was little association between birth weight and VAF accumulation in females with BMI less than the median (beta = 18, p = 0.75). In males, there was no evidence of an interaction between birth weight and BMI (p = 0.93) and little association between birth weight and VAF (adjusted beta = −12, p = 0.92). These preliminary results from the EPOCH study suggest gender differences concerning the fetal origins of cardiometabolic risk.

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EFFECTS OF INTER-PREGNANCY INTERVAL ON VASCULAR ADAPTATION IN CONSECUTIVE PREGNANCIES. R T Mikolajczyk, *J Grewal, J Ford, J Zhang (NICHD, NIH, Bethesda, MD 20892)

A lower risk of preeclampsia in parous women prompted a hypothesis that the vascular adaptation from the first pregnancy has ongoing benefits that contribute to the risk reduction during the second pregnancy. However, how the inter-pregnancy interval affects blood pressure in subsequent pregnancies has not been well studied. We examined the effect of the inter-pregnancy interval on vascular adaptation, as measured by mean arterial pressure (MAP), in consecutive pregnancies using data from the Collaborative Perinatal Project and a semi-parametric regression model with random effects. Prenatal MAP measurements (between 20th of gestation and delivery) as well as socio-economic, demographic, and behavioral data were available for 650 women with both first and second births recorded prospectively in the study. MAP exhibited a roughly parallel U-shaped trajectory in both pregnancies. MAP was lower in the second pregnancy (by about 2 mmHg) when the inter-pregnancy interval was less than a year. However, this difference began to diminish for intervals longer than one year and totally disappeared after two years. Although MAP is lower in the second pregnancy (compared to MAP in the first pregnancy), the effect persists for only a short time—substantially shorter than the observed risk reduction for preeclampsia in parous women (up to 6 or even 10 years). It is, therefore, unlikely that cardiovascular adaptation due to previous pregnancy contributes appreciably to the reduced risk of preeclampsia in subsequent pregnancies.

102-S

PHYSICAL ACTIVITY AND RISK OF HYPERTENSIVE DISORDERS OF PREGNANCY AMONG LATINA WOMEN. *R Turzanski Fortner, P Pekow, G Markenson, C Solomon, B Sternfeld, L Chasan-Taber (University of Massachusetts, Amherst, MA 01003)

A limited number of studies among predominantly non-Hispanic white women have suggested inverse associations between physical activity and hypertensive disorders of pregnancy. Since Latinas are at a 2-fold risk of preeclampsia compared to non-Hispanic white women, we examined this association in the Latina GDM Study, a prospective cohort of 1,231 predominantly Puerto Rican women conducted from 2000–2004. Bilingual interviewers utilized the Kaiser Physical Activity Questionnaire to quantify domain-specific physical activity (household/caregiving, sports/exercise, active living, and occupational activities). We identified women with hypertensive disorders following the National High Blood Pressure Education Program Working Group on High Blood Pressure in Pregnancy guidelines. Logistic regression models provided estimates of the risk of any hypertensive disorder and preeclampsia as a function of physical activity. Fifty (4.8%) women were diagnosed with a pregnancy-related hypertensive disorder, 30 (2.9%) of whom were diagnosed with preeclampsia. Adjusting for parity, women in the highest quartile of sports/exercise during early pregnancy had a 60% reduced risk of hypertensive disorders (OR = 0.37, 95% CI: 0.15–0.96, ptrend = 0.02) and preeclampsia (OR = 0.40, 95% CI: 0.02–1.37, ptrend = 0.07) compared to women in the lowest quartile. We did not observe significant associations between early pregnancy occupational, active living, or household/caregiving activity and hypertensive disorders or with pre-pregnancy physical activity in any domain. These findings suggest a protective effect of early pregnancy exercise on the risk of hypertensive disorders of pregnancy in this high risk population.

103-S

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

High levels of maternal psychosocial stress may increase risk of adverse pregnancy outcomes such as preterm delivery and small for gestational age infants. However, limited data exists on correlates of psychosocial stress during pregnancy, particularly in Hispanic women. We evaluated the association between sociodemographic, behavioral, and acculturation factors and levels of psychosocial stress among 528 participants of Proyecto Buena Salud, an ongoing cohort of pregnant Latina women of Puerto Rican and Dominican descent. Psychosocial stress was assessed in early pregnancy (<20 weeks gestation) by bilingual interviewers using Cohen's Perceived Stress Scale. Interviewers also collected information on sociodemographic, behavioral, and acculturation factors using standard scales. Logistic regression was used to measure associations between participant characteristics and the highest quartile of perceived stress. We corrected ORs for the non-rare outcome using the method of Zhang and Yu (JAMA. 1998; 280(19):1690). Scores on the PSS ranged from 5–47 (mean = 27.1, SD = 6.9) out of a possible range of 0 to 56. Smoking in early pregnancy (RR: 1.67, 95% CI: 1.10–2.29) and age in the higher age groups (RRs ranged from 1.46–1.75) were positively associated with high stress in early pregnancy as compared to nonsmokers and young women (ages 16–20), respectively. Factors inversely associated with high stress were high education (post-high school) (RR = 0.25, 95% CI: 0.05–0.92) and preference to be interviewed in Spanish (RR: 0.45, 95% CI: 0.25–0.79) as compared to no high school education and English language interview preference, respectively. This study provides important insights to correlates of stress among pregnant Latina women.

104-S

IMPACT OF MATERNAL ANEMIA ON PERINATAL MORTALITY: A PROSPECTIVE, POPULATION-BASED COHORT STUDY IN CHINA. *Q Zhang, C V Ananth, G G Rhoads, Z Li (University of Medicine and Dentistry of New Jersey, New Brunswick, NJ 08901)

Objective: Maternal anemia is a ubiquitous pregnancy complication in developing countries; however, its impact on perinatal mortality remains speculative. We evaluated if maternal anemia during gestation is associated with increased risk of stillbirth and neonatal death. Methods: A prospective cohort study, using data from a population-based pregnancy-monitoring system in 13 counties in East China (1993–96) was conducted. Singleton live births (n = 163,313) and stillbirths (n = 1,354) delivered at 20–44 weeks to women with at least 1 hemoglobin measure during pregnancy were included. Stillbirth and neonatal mortality rates by anemia status in each trimester were estimated. Multivariable Cox proportional hazards regression models were used to evaluate the association between mortality risk and hemoglobin levels both within and across trimester of exposure during pregnancy. Results: The stillbirth rates were 6.2 and 9.2 per 1,000 births in women with and without anemia, respectively (P<0.05). Anemia (hemoglobin <10 g/dL) in both the 1st and 2nd trimesters was associated with increased risk for stillbirth (adjusted hazard ratio (HR) 1.7, 95% confidence interval (CI) 1.1, 2.7). Hemoglobin of 9 g/dL in the 3rd trimesters was associated with reduced risk (HR 0.8, 95% CI 0.7, 0.97). Maternal anemia was not associated with neonatal mortality. Conclusion: Anemia in the first half of pregnancy is associated with increased risk of stillbirth, but not neonatal deaths. Early identification and appropriate intervention to manage maternal anemia might prove beneficial to improve adverse pregnancy outcomes.

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105-S

MATERNAL ANEMIA AND PRETERM BIRTH: A PROSPECTIVE COHORT STUDY. *Q Zhang, C V Ananth, Z Li, J C Smulian (University of Medicine and Dentistry of New Jersey, New Brunswick, NJ 08901)

Objective: We examined if anemia both within and across trimesters during gestation is associated with preterm birth. Methods: We conducted a secondary analysis of data from a population-based prospective cohort in 13 counties of East China (1993–96). Singleton live births delivered at 20–44 weeks to women with at least 1 hemoglobin measure during pregnancy were included (n = 160,700). Preterm birth (<37 weeks) was stratified as preterm premature rupture of membranes (PROM), spontaneous onset of labor and those resulting from medical interventions. Hemoglobin increase of ≥1 g/dL and hemoglobin decrease of >1 g/dL between the 1st and 3rd trimesters were used as proxies for hemo-dilution and hemo-concentration, respectively. Associations were expressed by hazard ratios (HR) derived from Cox proportional hazards regression models after adjusting for potential confounders. Results: Preterm birth rates were 4.1% for anemic and 5% non-anemic women ($P < 0.05$). In comparison to women with hemoglobin of 11 g/dL (reference), hemoglobin ≤5 g/dL was associated with the highest risk for preterm PROM (HR 3.3, 95% CI 1.4, 7.7) with progressively declining risk with increasing hemoglobin. In contrast, low hemoglobin in the 3rd trimester was associated with reduced risk for spontaneous preterm labor. Anemia was not associated with indicated preterm birth. Hemodilution, but not hemo-concentration, across gestation was associated with up to 23% reduced risk for preterm birth. Conclusion: Early pregnancy anemia is associated with increased risk for preterm PROM, while anemia in late pregnancy is associated with reduced risk for spontaneous preterm labor. Adequate physiological hemo-dilution may be associated with reduced risk for preterm birth.

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HUMAN IMMUNODEFICIENCY VIRUS (HIV) TESTING DURING PREGNANCY, 1997–2006. *J M Lawrence, I-LA Liu, W J Towner (Kaiser Permanente Southern CA, Pasadena CA 91101)

We assessed the prevalence and correlates of HIV testing among pregnant women who gave birth at ≥20 weeks gestation from 1/1/1997–12/31/2006 in all southern CA Kaiser Permanente hospitals who were insured for ≥31 days of pregnancy. Maternal age, gravidity, parity, month starting prenatal care (PNC), and education are from the birth certificate; medical center, year of delivery, and insurance duration are from administrative data; HIV testing is from laboratory data; and median household income was based on census block. Logistic regression analyses were used to generate adjusted odds ratios (OR) and 95% confidence intervals (CI) for each variable. Of the 307,221 pregnancies (51% Hispanic [HSP], 27% non-Hispanic White [NHW], 11% Asian/Pacific Islanders [A/PI], 11% Black [BLK]) to women without HIV pre-pregnancy, the proportion tested for HIV increased from 77.7% (CI: 77.2%, 78.1%) in 1997 to 91.0% (CI: 90.7%, 91.3%) in 2006. In the adjusted model, compared with HSP women, NHW (OR 0.58 CI 0.57, 0.60), A/PI (OR 0.76 CI 0.73, 0.79) and BLK (OR 0.82 CI 0.79, 0.86) women were less likely to be tested. Increasing maternal age was linearly associated with decreased testing. Women with > high school (HS) education were 13% less likely to be tested than HS grads; women living in the highest income tertile blocks were 9% less likely to be tested than those in the lowest tertile. Women enrolling in PNC after the 1st trimester, and women with insurance gaps were 15% and 43% less likely to be tested, respectively. In 2006, 91% of all women in this diverse population had HIV testing during their pregnancies. Older, more educated women living in higher income areas, and women who started PNC later, and had insurance gaps during pregnancy were least likely to be tested.

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RECURRENCE OF PRETERM PREMATURE RUPTURE OF MEMBRANES (PPROM) IN RELATION TO MATERNAL RACE. *D Getahun, D Strickland, C V Ananth, M J Fassett, R S Kirby, D A Sacks, S J Jacobsen (Research & Evaluation, Kaiser Permanente Southern California, Pasadena, CA 91101)

It is unknown how the increased risk of PPROM recurrence varies by maternal race and interpregnancy interval. We examined the recurrence risk of PPROM in 155,466 women who, following an index pregnancy complicated by PPROM had two, and 30,839 women who had three successive singleton pregnancies of ≥20 weeks' duration. This population-based retrospective cohort analysis utilized the Missouri 1989–97 longitudinally-linked database. Logistic regression analysis models estimated the odds ratio (OR), adjusting for potential confounders. The rate of PPROM in the 1st, 2nd, and 3rd pregnancies were 2.4%, 2.5%, and 2.7%, among African-Americans (AA), and 1.3%, 1.0%, and 1.0% among Caucasians ($p < 0.01$). The odds of recurrence of PPROM between the 1st and 2nd pregnancies were 4.6 (95% confidence interval [CI] 3.4–6.2) for AA women and 6.7 (95% CI 5.4–8.4) for Caucasian women. A 1.6-fold (95% CI 1.1–2.5) higher risk for a recurring PPROM in the 2nd pregnancy was noted in AA compared with Caucasian women. Compared to those with no history of PPROM, women with PPROM in both their first 2 pregnancies were at over 5.6-fold increased odds of recurrence in the 3rd pregnancy (95% CI 1.2–26.0). This recurrence was marginally lower when women had PPROM in the 2nd, but not in the 1st (OR 4.1, 95% CI 2.5–6.5) pregnancy. In both races, compared with a pregnancy ≥2 years following a prior pregnancy, a pregnancy within one year of delivery is associated with a 1.8 to 2-fold recurrence of PPROM. Race plays a role in recurrence risk of PPROM. The higher rate of PPROM observed in women with previous PPROM appears to be attributable to a shorter interpregnancy interval.

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ROTATING SHIFT WORK AND MENSTRUAL CYCLE CHARACTERISTICS OF NURSES. *C C Lawson, E A Whelan, E N Hibert, D Spiegelman, J W Rich-Edwards (National Institute for Occupational Safety and Health, Cincinnati, OH 45226)

Nonstandard work hours have been associated with hormonal differences, possibly disturbing physiological functions that are circadian in nature. We investigated the relationship between rotating shift work and usual menstrual cycle patterns in the Nurses' Health Study II. Data from 74,436 participants who reported being premenopausal, having menstrual periods, and not using oral contraceptives were analyzed. Of these 8,519 (11.4%) and 5,239 (7.0%) reported working rotating shifts for 1–19 months and 20+ months, respectively, between 1991 and 1993. In 1993, 871 (1.2%) reported short menstrual cycle length (<21 days), 3,477 (4.7%) reported long cycles (40+ days) and 7,469 (10.0%) reported irregular cycle patterns (>7 days variability). Logistic regression was used to estimate the odds ratios (ORs) for these three outcomes, adjusting for age, parity, smoking, alcohol use, and physical activity. Rotating shift work was associated with an increased odds of having an irregular cycle pattern: 1–19 months, OR = 1.2, 95% confidence interval (95% CI) = 1.1–1.3; 20+ months, OR = 1.4 (1.3–1.5). Rotating shift work was also associated with short cycles [ORs compared to normal cycles = 1.3 (1.1–1.6) for 1–19 months and 1.4 (1.1–1.8) for 20+ months]. Long cycles were also more common among rotating shift workers [ORs for long compared to normal cycles = 1.2 (1.1–1.4) for 1–19 months and 1.4 (1.2–1.5) for 20+ months]. When further adjusting for BMI, all ORs were slightly attenuated but still statistically significant. These data suggest that menstrual function is adversely affected by rotating shift work, possibly through circadian disruption.

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EFFECT OF PARITY ON OCCURRENCE OF ANEMIA-IN-PREGNANCY IN OMAN. *Y M Al-Farsi, D R Brooks, H C Wallenburg, M M Werler, M A Al-Shafaee, H J Cabral (Boston University, Boston, MA 02118)

Prior investigations of the controversial association between parity and anemia-in-pregnancy (AIP) were often hampered by failing to distinguish incident cases of anemia caused by pregnancy from prevalent cases of anemia complicated by pregnancy. To investigate the association, we conducted a retrospective cohort study in Oman on 1939 pregnancies among 479 parous women who participated in a community trial named ''AMAL Study: Delaying the Development of Diabetes Mellitus Type 2 in Oman''. Details of pregnancies were collected from participants, the AMAL Study, and Maternal Health Cards which were comprehensive records issued at time of pregnancy. Over the follow up time, we enumerated 684 AIP cases of which 289 (42.2%) were incident cases. We conducted two sets of regression analyses: restricted to incident cases only, and on all cases. In each set, we examined the relation with parity as a dichotomy (<5, ≥ 5) and as multiple categories. We fit the data to multi-level logistic regression (MLLR) models to address the dependency among pregnancies that belonged to the same mother. In the fully adjusted MLLR models that were restricted to incident cases, high parity (HP, ≥ 5) pregnancies had a higher risk of AIP compared to low parity (LP, <5) pregnancies (Risk Ratio, RR = 2.69; 95% CI 1.97, 4.59), and the AIP risk increased in a dose-response fashion over multiple categories of parity. In the fully adjusted MLLR models that included all cases, the association disappeared (RR = 1.01; 95% CI 0.71, 1.43) and the dose-response pattern flattened. This study shows the importance of specifying incident cases of AIP, and provides supportive evidence for a causal relation between increasing parity and occurrence of AIP.

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INUIT BIRTHING ATTENDANTS AND BIRTH OUTCOMES IN NUNAVIK, QUEBEC—A NATURAL ''EXPERIMENT'' IN HUDSON BAY VERSUS UNGAVA BAY COMMUNITIES. *F Simonet, R Wilkins, M Heaman, J Smylie, E Labranche, K Minich, P Martens, W D Fraser, Z C Luo (Department of Obstetrics and Gynecology, Sainte-Justine Hospital, University of Montreal, Canada)

Midwifery care may be a safe alternative in remote communities, but concern remains about its safety and effectiveness; evidence from linked vital data is scarce. We assessed birth outcomes by primary birthing attendant type in de facto ''experiment'' in 14 Nunavik Inuit communities in Quebec: Inuit midwives (accounted for ~73% births) in 7 Hudson bay communities versus Western physicians (accounted for ~95% births) in 7 Ungava bay communities. We conducted a geocoding linkage based study using Statistics Canada's linked vital data for the province of Quebec between 1991 and 2000. Through geocoding linkage of maternal residential place on birth registrations, a total of 2.338 births were identified to Inuit mother tongue women in Nunavik communities (accounted for 82% all births). Primary outcomes are stillbirth, neonatal death and postneonatal death. We also assessed the risks of preterm birth, small-for-gestational-age and low birth weight. Inuit maternal characteristics were similar in Hudson versus Ungava bay communities except for more frequent primiparous mothers in Hudson bay communities. There were no significant differences in crude rates of stillbirth, neonatal death and postneonatl death. Marginally significant less frequent low birth weight was observed in Hudson (5.2%) versus Ungava (6.4%) bay communities. Identical result patterns were observed after adjusting for maternal characteristics. We conclude that Inuit midwifery-led perinatal care in Hudson bay communities seems safe and has comparable risks of stillbirth, neonatal death and postneonatal death as those in physician-led perinatal care in Ungava communities. Moreover, there seems a marginal benefit of less frequent low birth weight in midwifery-led care Hudson bay communities.

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COMMUNITY REMOTENESS AND FIRST NATIONS BIRTH OUTCOMES - A STUDY IN QUEBEC, CANADA. *S Wassimi, R Wilkins, N Gros-Louis, M Heaman, J Smylie, P Martens, W D Fraser, F Simonet, Z C Luo (Department of Obstetrics and Gynecology, Sainte-Justine Hospital, University of Montreal, Canada)

Little is known about the extent of community remoteness in relation to aboriginal birth outcomes. The aim of this study was to assess community remoteness in relation to birth outcomes among First Nations in Quebec. We conducted a postcode geo-coding linkage based study using Statistics Canada's linked vital data files for Quebec 1991–2000. First Nations births were identified by maternal mother tongue on birth registrations. First Nations communities were identified by postcodes and census sub-division codes based on geo-coding linkage to each birth using maternal residential postcodes. We used Indian and Northern Affairs Canada (INAC) zone classification to group communities by remoteness into four zones (1, 2, 3, 4) based on road access and distance from the nearest service centre. Zone 1 is the least remote and Zone 4 the most remote. Preterm birth rates rose from the most remote Zone 4 (4.9%) to the least remote Zone 1 (7.5%) (test for trends, $P < 0.01$). Large for gestational age (LGA, >90th) and high birth weight (HBW, >4000 g) rates were high (> 20 %) in all zones, and the highest in Zones 2 and 3 (>30%). There were no significant differences in small-for-gestational-age (<10th), low birth weight, stillbirth, neonatal death, postneonatal death rates across INAC zones. The difference in preterm birth risks became only marginally significant after adjusting for maternal characteristics. We conclude that most observed difference in First Nations preterm birth rates across INAC zones can be explained by the difference in maternal characteristics, although Fist Nations living in less isolated (more ''urban'') communities might be at a marginally increased risk of preterm birth. Stillbirth and infant mortality rates are comparable and seem not affected by community remoteness.

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BIRTH OUTCOMES AMONG FIRST NATIONS, INUIT AND NON-INDIGENOUS MOTHER TONGUE WOMEN IN NORTHERN QUEBEC. *Z C Luo, R Wilkins, F Simonet, S Wassimi, N Gros-Louis, E Labranche, K Minich, M Heaman, J Smylie, P Martens, Y Q Wu, and W D Fraser (Department of Obstetrics and Gynecology, Sainte-Justine Hospital, University of Montreal, Montreal, Canada)

Significant numbers of indigenous peoples live in northern remote settings. It is unknown how birth outcomes may differ among aboriginal sub-groups and non-Indigenous women living in the same northern settings. We evaluated this question in Quebec in a birth cohort-based study of all births in Northern Quebec, 1991–2000, based on Statistics Canada's linked vital datasets. We used geo-coding linkage to identify births to Northern women by mother tongue (First Nations, 2,616; Inuit 2,388; non-Indigenous 5,006). Preterm birth rats were 10.6%, 6.0% and 7.7%, and Infant mortality 19.4, 10.0, and 8.8 per 1000 for Inuit, First Nations and non-Indigenous mother tongue babies, respectively ($P<0.001$). Postneonatal death rate was the highest among Inuit infants (12.3 per 1000). Rates of large-for-gestational-age or high birth weight were more than doubled among First Nations versus Inuit or non-Indigenous women. Similar patterns were observed after adjusting for maternal characteristics. We conclude that there are large differences in birth outcomes among Inuit, First Nations and non-Indigenous women living in the same Northern settings. First Nations babies are over twice likely to be large in size than Inuit or non-Indigenous infants but at no elevated risk of infant death. Inuit infants were most vulnerable to preterm birth and infant death especially postneonatal death.

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BIRTH OUTCOMES BY URBAN VERSUS RURAL AND THE EXTENT OF RURAL ISOLATION AMONG FIRST NATIONS AND NON-FIRST NATIONS –A STUDY IN MANITOBA, CANADA.

*Z C Luo, R Wilkins, M Heaman, P Martens, L Hart, J Smylie, F Simonet, S Wassimi, Y Q Wu, and W D Fraser (Department of Obstetrics and Gynecology, Sainte-Justine Hospital, University of Montreal, Montreal, Canada)

There is a concern that aboriginal birth outcomes may fare even worse in urban settings. Significant numbers of aboriginal women remain living in rural areas. It is unknown whether the extent of rural isolation may affect birth outcomes differentially among aboriginal versus non-aboriginal women. We assessed birth outcomes by urban versus rural and the extent of rural isolation among First Nations and non-First Nations in Manitoba in a geocoding linkage-based study using Statistics Canada's linked vital data for the province of Manitoba 1991–2000. Geocoding technique was applied to determine the residential locality based on maternal postal codes on birth registrations for all births (25,190 First Nations, 126,721 non-First Nations) in Manitoba, Canada 1991–2000. Extent of rural isolation is defined by metropolitan influence (strong/moderate, weak, no) zone based on the degree of workforce commuting flows to urban areas. Preterm birth rates were significantly higher but neonatal death rates lower in urban versus rural areas for both First Nations and non-First Nations. Within rural areas, there were no significant differences in neonatal death rates by metropolitan influence zone for both First Nations and non-First Nations. Postneonatal death rates were significantly lower in less isolated zones for non-First Nations but not for First Nations. Adjusting for maternal characteristics showed similar result patterns. We conclude that rural versus urban differences in birth outcomes are similar for First Nations and non-First Nations, and the effects of rural could be positive or negative dependent on the birth outcomes of interest. Greater rural isolation is associated with an increased risk of neonatal death among both First Nations and non-First Nations, but an increased risk of postneonatal death only among First Nations.

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A PROSPECTIVE STUDY OF PRE-PREGNANCY ABDOMINAL ADIPOSITY AND THE RISK OF GESTATIONAL DIABETES.

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Background: Gestational diabetes mellitus (GDM) is among the most common complications of pregnancy. Greater abdominal adiposity is significantly associated with insulin resistance and non-gestational diabetes. However, few studies have examined the association of abdominal adiposity and regional fat distribution with GDM risk. Methods and Results: We conducted a prospective cohort study including 4971 women enrolled in the Nurses' Health Study II who were free of cardiovascular disease, cancer, and type 2 diabetes and were not pregnant when anthropometric measures of abdominal adiposity were measured in 1993, and who reported at least 1 singleton pregnancy between 1994 and 1999. Among them, 232 developed GDM. After adjusting for pre-gravid body mass index (BMI) and other potential confounders, both pre-gravid waist circumference (WC) and waist to hip ratio (WHR) were strongly and positively associated with GDM risk. The relative risks (RR) and 95% confidence intervals (CI) across the lowest to the highest quintiles of WC were 1.00 (referent), 1.04, 1.23, 1.35, and 2.08 (1.15, 3.76) (P-value for trend = 0.005). Corresponding RR and 95% CI for WHR across the lowest to the highest quintiles were 1.00, 1.83, 1.92, 2.00, and 2.45 (1.43, 4.19) for GDM (P-value for trend <0.001). After adjustment for WC and BMI, hip circumference was significantly and inversely associated with GDM risk. Conclusion: Pre-gravid abdominal adiposity and regional fat distribution is strongly and positively associated with GDM risk, independent of pre-gravid BMI.

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INCREASES IN THE STATE-SPECIFIC RATES OF DIABETES THAT EXISTED BEFORE OR DEVELOPED DURING PREGNANCY, 2000 AND 2003.

*M M Adams, C Heath, N Gavin, T Austin (RTI International, Atlanta, GA 30341)

During the past decade in the United States, the rate of diabetes mellitus (DM) has increased in adults. Among women who received care from health maintenance organizations in California and Colorado, the rate of diabetes that is diagnosed first during pregnancy (gestational diabetes mellitus—GDM) also increased during these years. To determine if increases in DM and GDM occurred concurrently among the population of women who had deliveries, we analyzed the hospital discharge summaries of women who delivered in Florida, Massachusetts and Wisconsin during 2000 and 2003. To compare rates for 2000 and 2003 for each state, we directly adjusted the 2003 rates for maternal age (in 5 year age categories) and plurality (singleton vs. multiple gestation), using the women who delivered in 2000 as the standard population. In 2000, the crude birth prevalence rate of DM ranged from 5.41 per 1,000 women with deliveries in Wisconsin to 7.01 in Florida. In 2003, standardized rates of DM increased to 5.90 in Wisconsin and 7.49 in Florida. The DM rate among women delivering in Massachusetts decreased from 5.86 in 2000 to a standardized rate of 5.10 in 2003. For GDM, all three states had increases from 2000 to 2003. The increase was especially large in Florida, where the crude rate of GDM among women with deliveries was 3.63% in 2000, compared to a standardized rate of 4.35% in 2003. In summary, in two states, we observed concurrent increases in DM and GDM. This observation supports the likelihood that they share the same underlying pathology.

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THE ROLE OF DIET IN GLUCOSE DISTURBANCE DURING PREGNANCY IN LATINA WOMEN.

*A Tovar, L Chasan-Taber, O Bermudez, A Must (Tufts University, Boston, MA 02111)

Disturbances in glucose metabolism common to pregnancy have been associated with adverse maternal and fetal outcomes, highlighting the critical need to identify modifiable risk factors. High intakes of fat and energy dense snack foods, and low intakes of fiber, fruits, and vegetables have been associated with elevated insulin levels and obesity in adults. Little is known about these associations during pregnancy, especially among Latinas. We assessed the association between diet and abnormal glucose tolerance (AGT) in a prospective cohort of 1,231 Latina (predominantly Puerto Rican) patients. Height, weight, gestational age, and oral glucose tolerance results for 813 women with full-term pregnancies were abstracted from medical records. Diet was assessed with a semi-quantitative food frequency questionnaire in mid pregnancy. AGT (glucose ≥135 mg/dL) was present in 90 (11%) of women. Logistic regression was used to calculate odds ratios (OR) and 95% confidence intervals (95% CI). After adjusting for known confounding factors, % energy from total fat, polyunsaturated fat (PUFA), monounsaturated fat, and glycemic load were not associated with AGT. Percent of energy from saturated fat (SFA) (OR = 1.2, 95% CI 1.1–1.4), PUFA:SFA ratio (OR = 0.1, 95% CI 0.03–0.6), and fiber (OR = 0.9, 95% CI 0.9–0.99) were associated with risk of AGT. Compared to those with <4 fruit/vegetable servings/day, women with >7 did not have an elevated risk of AGT (OR = 1.3, 95% CI 0.5–3.2). However, women with high intakes of energy dense snack foods had almost 3 times the risk of AGT (OR = 2.9, 95% CI 1.2–7.25) vs. those consuming average amounts. Improved understanding of the link between diet and glucose disturbances during pregnancy will inform dietary interventions in this high risk population.

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INTERPRETING THE NARROWING GENDER GAP IN LIFE EXPECTANCY IN BRITISH COLUMBIA (BC) OF CANADA.

*R Fang, J Millar, H McMaster, L Drasic, R Armour (Provincial Health Services Authority, Vancouver, BC, V6Z 2H3 Canada)

Life expectancy is higher for females than for males in most countries. However, from the early 1980s, the gender gap has narrowed in most developed countries. This study was to identify and interpret the potential contributors to this phenomenon in BC. Life expectancy at birth (e0), death counts and the corresponding population denominators for BC for 1986 and 2004 were obtained from the BC Vital Statistics Agency. Arriaga's decomposition method was used to interpret life expectancy trend by attributions from individual causes of death across age groups. From 1986 to 2004, e0 in BC increased 4.4 and 2.3 years for men and women, respectively while the gap between the sexes dropped 2.1 years. The narrowed gap in e0 was mainly achieved through reductions of mortality rates for ischemic heart disease in population aged 45 to 84, injuries in most age groups particularly motor vehicle injuries in young adults aged 15 to 24, lung cancer in age group of 45 to 84 and respiratory system diseases. Narrowing gap in e0 is a reality of the relative progression in health for men over women. Men most benefited from reduced mortality from heart disease and injury due to innovative medicine and healthy behaviour. For example, in Canada male daily smokers reduced from 65% in 1970 to 24% in 2005 whereas their female counterparts only down from 38% to 20%. Women were also exposed to risk factors due to their increasing labour force participation and carried stress as they play dual roles from work and at home. Tobacco use is more likely to lead to the development of lung cancer in women than in men. Obesity is of greater risk to women in developing diabetes and dying from cardiovascular events than to men.

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RACIAL DISPARITIES RELATED TO CANCER PREVENTION AND ACCESS TO CARE AMONG WOMEN WITH CHRONIC JOINT PAIN: FINDINGS FROM THE NATIONAL HEALTH INTERVIEW SURVEY.

*E M Williams, C Purdy, L Tumiel-Berhalter (State University of New York, Buffalo, NY 14215)

Racial and ethnic health disparities are well documented in the literature. These disparities include a higher prevalence of chronic pain related disorders such as lupus and greater morbidity and mortality related to breast and cervical cancer among African American women compared to non-Hispanic White women. This study used secondary analysis of the 2005 data set of the National Health Interview Survey (NHIS) to assess racial/ethnic differences in access to health care, breast and cervical cancer screening, and patient education to reduce cancer lifestyle risk factors among adult women with chronic joint pain conditions (N = 4,626). Statistical analyses included chi-square analysis and independent samples t-tests. Among women with chronic joint pain, African American women were less likely to: be insured ($p < 0.01$), have a regular source of care ($p = 0.02$), receive a pap smear or mammogram within the last two years ($p < 0.01$), have access to specialists ($p < 0.01$), and receive patient education ($p < 0.01$). This study is unique in that it focuses on women with chronic joint pain. Women with chronic joint pain are complex patients that often see multiple providers to treat signs and symptoms of their disease. Due to competing demands, these women may not receive preventive services such as cancer screening or patient education encouraging a healthy lifestyle. The results of this study can be used to formulate interventions and evaluate approaches to reduce racial/ethnic disparities in outpatient service delivery in terms of continuity and scope of care and breast and cervical cancer screening.

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EXERCISE PATTERN AND PREVENTION OF WEIGHT GAIN.

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We investigated the association of physical activity with 8-year weight gain prevention in the Nurses' Health Study II. Included were 34,688 premenopausal women, 25–43years at 1989 baseline, who reported their weight every 2 years when non-pregnant or recently pregnant; their activity in 1989, 1991, and 1997; and who were free from conditions affecting their weight. The outcome was defined as gaining >5% of baseline weight at any point until 1997 (73.1% of the population). Compared with women who maintained <30 minutes/day (min/d) of activity for 8 years, those who sustained 30+ min/d (Odds Ratio OR = 0.66, 95% confidence interval [CI] 0.60–0.73) and those who increased to 30+ min/d in 1991 and 1997 (OR = 0.69, CI 0.63–0.77) or only in 1997 (OR = 0.77, CI 0.70–0.84) were less likely to gain weight. Conversely, the risk was elevated in women who decreased their activity levels. Risk was reduced among women whose only reported activity was walking and who sustained 30+ min/d over 8 years (OR = 0.47, CI 0.29–0.74). Moreover, walking pace was an independent predictor of weight gain prevention. For a 30 min/d increase between 1989 and 1997, jogging or running was associated with less weight gain ($\beta = -2.58$ kg, CI −2.87, −2.28) than brisk walk ($\beta = -1.33$, CI −1.46,−1.21) or other activities ($\beta = -1.08$, CI −1.18, −0.97). Non-brisk walking was only associated with less weight gain in obese women ($\beta = -0.83$, CI −1.56, −0.10). Overweight women benefited more than normal weight peers when they sustained or increased to a high exercise level. Sedentary behavior was associated with weight gain independent of activity level. Sustained physical activity, particularly if more intense, is associated with reduced weight gain over eight years.

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THE RELATION OF BODY MASS INDEX TO ASTHMA INCIDENCE IN THE BLACK WOMEN'S HEALTH STUDY.

*P F Coogan, J R Palmer, G T O'Connor, L Rosenberg (Slone Epidemiology Center, Boston, MA 02215)

Evidence from prospective studies among predominantly white populations links obesity to adult asthma onset. There are few data on this topic in black women, who fare worse than white women on most measures of asthma and among whom the prevalence of obesity is high. We assessed the relation of body mass index (BMI) to asthma incidence in the prospective Black Women's Health Study (BWHS), a cohort of African American women followed with mailed biennial surveys. Data on weight were collected at baseline in 1995 and on all subsequent surveys. Participants reported year of physician-diagnosed asthma in 1997 and on all subsequent surveys. Cox regression models were used to estimate incidence rate ratios (IRRs) and 95% confidence intervals (CIs), controlling for smoking status, exposure to second-hand smoke, parental history of asthma, menopausal and marital status, income, energy intake and expenditure, use of hormone therapy, and neighborhood socioeconomic status. During 402,674 person-years of follow-up from 1995–2005, 1068 participants reported physician diagnosed new-onset asthma and concurrent use of asthma medication. Compared to women with BMI 20–24, the IRRs for BMI of 25–29, 30–34, 35–39, and 40+ were 1.26 (95% CI 1.05–1.51); 1.62 (95% CI 1.32–1.98); 2.24 (95% CI 1.76–2.84); and 2.85 (95% CI 2.19–3.72), respectively (p for trend<0.0001). The association of BMI with asthma risk was consistent across strata of smoking, age, presence of sleep apnea, parental history of asthma, and energy expenditure and intake. Given the high prevalence of overweight and obesity among African-American women, the positive association between excess weight and asthma onset is of public health importance.

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MYCOPLASMA GENITALIUM HAS A LESS SEVERE CLINICAL PRESENTATION THAN *NEISSERIA GONORRHOEAE* AMONG WOMEN WITH CLINICALLY SUSPECTED PELVIC INFLAMMATORY DISEASE. *V Short, P Totten, S Astete, S Kelsey, R Ness, and C Haggerty (University of Pittsburgh, Pittsburgh, PA 15261)

Women with pelvic inflammatory disease (PID), infection and inflammation of the female upper genital tract, frequently present with pelvic pain. However, patients may present with a range of symptoms, and the characteristics of non-gonococcal/non-chlamydial PID are not well described. Our objective was to examine the characteristics of *Mycoplasma genitalium* infection among women with clinically suspected PID. We evaluated 722 women enrolled in the PID Evaluation and Clinical Health (PEACH) study. Women with *M. genitalium* only were compared to women with only *Neisseria gonorrhoeae* or *Chlamydia trachomatis*. Compared to women with gonococcal PID, women with *M. genitalium* were less likely to have elevated inflammatory markers, including temperatures ≥101 F (12.9% vs. 0.0%, p = 0.018), white blood cell counts >10,000 mm^3 (62.2% vs. 36.4%, p = 0.012), and erythrocyte sedimentation rates >15mm/hr (56.8% vs. 22.2% p < 0.001). Further, they were less likely to present with mucopurulent cervicitis (82.6% vs. 62.5%, p = 0.012), elevated vaginal pH (p = 0.049), and high pelvic pain scores (p = 0.015). Erythrocyte sedimentation rate was the only characteristic which differed between women with *M. genitalium* and women with *C. trachomatis* (22.2% vs. 42.3%, p = 0.024). Both chlamydial PID and *M. genitalium* PID were less symptomatic than gonococcal PID. As symptoms may be mild, women with *M. genitalium* may not seek PID treatment. Further studies are needed to assess the potential reproductive tract sequelae of *M. genitalium* upper genital tract infection.

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BONE DENSITY IN YOUNG ADULT WOMEN CAN BE PREDICTED USING ANTHROPOMETRIC MEASURES AND LIFESTYLE FACTORS. *S Zagarins, A Ronnenberg, S Gehlbach, E Bertone-Johnson (University of Massachusetts, Amherst, MA 01003)

Measurement of bone density has been established in clinical practice as an effective method for predicting osteoporotic fractures in older women. Younger women who are near their peak bone density are rarely screened for osteoporosis, although low bone density at this age is an important predictor of future fractures. We used data from our cross-sectional study of healthy young women (n = 135) aged 18–30 years to develop a prediction model for the estimation of bone mineral density (BMD). BMD, bone mineral content (BMC), and t-score were calculated by dual-energy x-ray absorptiometry (DEXA). Weight, height and waist circumference were measured using a calibrated scale, stadiometer, and a standard tape measure, respectively; body mass index (BMI) was calculated as weight (kg)/height (m2). Covariates including menstrual cycle characteristics and physical activity were measured by self-report. Mean age (standard deviation), BMI, and BMD were 21.1 (3.3) years, 23.2 (3.2) kg/m2, and 1.16 (0.08) g/cm2, respectively. In stepwise multivariate regression, weight, height, age at menarche, and waist circumference were each associated with BMC and together explained 70.0% of the variation in BMC. Models predicting BMD and t-score were similar and explained 45.4% and 54.8% of the variation in these measures, respectively. In models predicting BMD at specific body sites, weight and age at menarche alone explained 35–40% of the variation at all sites except for the legs; physical activity score was a more important predictor of leg BMD than other sites. These results suggest that easily measured anthropometric and lifestyle factors could provide a useful screening tool for low bone density in young women.

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OBESITY AND DEPRESSION: WHAT COMES FIRST? *L A DeRoo, J Johnson, and D P Sandler (Epidemiology Branch, National Institute of Environmental Health Sciences, Durham, NC 27709)

Cross-sectional studies have linked obesity and depression. We evaluated the direction of the association between depression and body mass index (BMI) using baseline data from the first 21,618 women enrolled in the Sister Study, a study of U.S. and Puerto Rican women with a sister with breast cancer. Current height and weight were measured during home visits. Doctor-diagnosed depression, age at first diagnosis, and average weight in the 30s were reported in telephone interviews. Logistic regression was used to calculate odds ratios (OR) and 95% confidence intervals (CI) for depression by BMI category (25.0–29.9 overweight, 30.0–34.9 obese 1, 35.0–39.9 obese 2, 40.0+ obese 3, with referent normal weight < 25.0), adjusting for confounders. A restricted analysis evaluated the association between body size in the 30s and later depression among women without depression before age 40 (n = 17,197). Another analysis evaluated whether depression diagnosed before age 40 was associated with later obesity among women who were normal weight during their 30s (n = 19,731). The association between current body size and depression increased with increasing BMI: overweight (OR = 1.3; 95% CI 1.2–1.4), obese 1 (OR = 1.8; 1.6–2.0), obese 2 (OR = 1.8; 1.5–2.1) and obese 3 (OR = 2.5; 2.1–2.9). Among women without depression before age 40, those who were obese in their 30s were more likely to be diagnosed with depression later in life (OR = 1.6; 1.3–1.9). Among women who were normal weight in their 30s, those diagnosed with depression prior to age 40 were more likely to be obese later in life (OR = 1.6; 1.4–1.9). These results suggest a bidirectional relationship between depression and obesity.

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URINARY CADMIUM AND OSTEOPOROSIS IN U.S. WOMEN AGE 50 AND OLDER, NHANES 1988–1994 AND 1999–2004. *C M Gallagher, J S Kovach, J R Meliker (Stony Brook University Medical Center, Stony Brook, NY 11794)

Urinary cadmium, a biomarker of long term exposure, has been associated with decreased peripheral bone mineral density (BMD) and osteoporosis. However, researchers have not reported an association using femoral BMD, the international standard-based measure used to diagnose osteoporosis worldwide. Moreover, studies have not shown a dose-response relationship at levels below 1.0 μg cadmium/g creatinine. Our goal was to investigate the dose-response relationship between urinary cadmium, at levels at or below 1 μg/g, and osteoporosis, as indicated by hip BMD and self-report in a population-based sample of US women age 50 years and older. Data were pulled from the National Health and Nutrition Examination Surveys 1988–1994 (N = 3207) and 1999–2004 (N = 1051). Osteoporosis was indicated by hip BMD cutoffs based upon the international standard and self-report of physician diagnosis. Urinary cadmium levels were analyzed for association with osteoporosis using multiple logistic regression. Women age 50 years and older with urinary cadmium levels between 0.50 and 1.00 μg/g creatinine were at 43% greater risk for hip BMD-defined-osteoporosis, relative to those with levels at or below 0.50 μg/g (odds ratio = 1.43; 95% CI = 1.02, 2.00; p = 0.03). Similar effect estimates were observed using self-report of physician-diagnosed osteoporosis. Smokers did not show a statistically significant risk for osteoporosis. Results suggest that U.S. women are at risk for osteoporosis at urinary cadmium levels below the US Occupational Safety & Health Administration's 3 μg/g safety standard. Given null findings among smokers, cadmium in food, as opposed to tobacco, is the likely source of cadmium-related osteoporosis risk for the U.S. female population age 50 and older.

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UROGENITAL INFECTIONS PRIOR TO ONSET OF VULVODYNIA.

*R Nguyen, D Swanson, B L Harlow (U of MN, Minneapolis, MN 55454)

Several studies report a 10–16% lifetime prevalence of vulvodynia, a debilitating condition characterized by unexplained vulvar pain and burning. We sought to determine whether antecedent urogenital infections and their frequency could lead to onset of vulvodynia, possibly through an altered immunoinflammatory response. We used data from a matched population-based case-control study of 242 case and 242 control women in the Boston area, 2000–2005. Controls were matched to cases on age and neighborhood. We examined self-reported urogenital infections occurring before age at first onset of vulvar pain in cases, and a matched reference age in controls. Conditional logistic regression was restricted to women (82%) who reported intercourse before first onset of vulvar pain (cases) and reference age (controls). After adjusting for race, age at first intercourse, coital frequency and number of sex partners before vulvar pain or reference age, self-reported history of genital warts (adjusted odds ratio [OR] = 3.3, 95% confidence interval: 1.0–10), trichomonas (OR = 12, 1.4–109), yeast (OR = 3.5, 1.9–6.7), or urinary tract infections (OR = 2.9, 1.7–5.1) increased the odds of vulvodynia. However, chlamydia (OR = 1.2, 0.4–3.3), gonorrhea (OR = 1.7, 0.4–8.0) and bacterial vaginosis (OR = 2.6, 0.8–9.0) did not exhibit compelling associations. The most notable finding, however, was a striking dose response with increasing number of antecedent infections resulting in highly significant ORs of 1.7, 5.2 and 12.0 for women with 1, 2, or 3+ antecedent infections, respectively. Our findings support the hypothesis that the presence of diverse urogenital infections may precede the onset of vulvodynia, with multiple assaults significantly compounding risk, possibly through a hyperimmune inflammatory response mechanism.

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WEIGHT GAIN AFTER PRE-MENOPAUSAL HYSTERECTOMY.

*P G Moorman, J M Schildkraut, E R Myers, E S Iversen, N Warren-White, F Wang (Duke University Medical Center, Durham, NC 27707)

Hysterectomy is the most common, non-obstetrical surgical procedure among US women, with >600,000 surgeries annually. Most women express satisfaction with surgical outcomes, however many have the perception they gained weight after hysterectomy that cannot be attributed to changes in diet or activity. In an on-going prospective study of hormonal changes after pre-menopausal hysterectomy, we compared weight changes among hysterectomized women (n = 236) in the first year after surgery to non-hysterectomized controls (n = 392). Weight (to the nearest kg) was measured at baseline and 1-year follow-up. Questionnaire data, including weight patterns during adulthood and perceived weight change over the previous year, also were obtained. Mean weight changes were assessed with ANCOVA, and unconditional logistic regression was used to calculate odds ratios (ORs) and 95% confidence intervals (CIs) for the outcome of weight gain >10 pounds (lbs), based on both measured and self-reported weight change. Mean weight change in the first year of follow-up was 1.36 kg for hysterectomized women and 0.61 kg for controls (p = 0.07). Weight gain >10 lbs occurred in 23% of hysterectomized women and 15% of controls (p = 0.012). In multivariable models adjusting for age, race, baseline weight, weight pattern during adulthood and other confounders, ORs for weight gain >10 lbs comparing hysterectomized women to controls were 1.63 (95% CI 1.03 – 2.59) based on measured weight change and 2.08 (95% CI 1.24 – 3.49) based on self-reported weight change. Our data show weight gain is very common among women in their 30s and 40s, with hysterectomized women being at higher risk for large weight gains. This suggests interventions targeting diet and physical activity may be valuable for women undergoing hysterectomy.

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RISK FACTORS ASSOCIATED WITH SUBTYPES OF UTERINE LEIOMYOMATA.

*A D Dragomir, J C Schroeder, A M Connolly, L L Kupper, A F Olshan, D D Baird (University of North Carolina, Chapel Hill, NC 27599)

We studied a cross section of 986 premenopausal health plan members aged 35–49 enrolled in the National Institute of Environmental Health Sciences Uterine Fibroid Study to compare risk factors among uterine leiomyomata (UL) subtypes (submucosal, intramural/subserosal, and diffuse only) in African-American (n = 581) and Caucasian women (n = 405). UL subtypes were identified using ultrasound examinations, and potential risk factors were self-reported. Polytomous logistic regression models were used to estimate adjusted prevalence odds ratios (aOR) and 95% confidence intervals (CI) within each ethnic group and overall. At least one UL was identified in 72% of African American and 50% of Caucasian women. Among women with UL, 20% had diffuse UL only, 60% had intramural/subserosal UL, and 20% had submucosal UL. Within each ethnic group, associations with age, age at menarche, body mass index, and current physical activity were similar across the three UL subtypes. Inverse associations with pregnancies after age 24 were stronger for submucosal UL than intramural/subserosal UL (aOR = 0.59 95% CI: 0.35, 1.01 in African-Americans, aOR = 0.25 95% CI: 0.10, 0.58 in Caucasians), while associations with diffuse UL were close to the null. Current smoking was associated with the diffuse UL subtype (aOR = 1.97 95% CI: 1.11, 3.51 in African-Americans, aOR = 3.00 95% CI: 1.07, 8.38 in Caucasians), but was not clearly associated with submucosal UL or intramural/subserosal UL. Overall, the two focal UL subtypes appeared to have similar risk factor profiles, while the diffuse subtype appeared to have a distinctive risk profile with regard to current smoking.

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SELF-REPORTED URINARY SYMPTOMS ASSOCIATED WITH UTERINE LEIOMYOMATA.

*A D Dragomir, J C Schroeder, A M Connolly, L L Kupper, A F Olshan, D S Cousins, D D Baird (University of North Carolina, Chapel Hill, NC 27599)

We studied 836 premenopausal health plan members aged 35–49 (474 African-American and 362 Caucasian) in the National Institute of Environmental Health Sciences Uterine Fibroid Study to investigate the association between uterine leiomyomata (UL) and self-reported stress urinary incontinence (SUI) in premenopausal women. UL were characterized at baseline and SUI was assessed at follow-up (4 years on average). Linear risk models were used to estimate adjusted prevalence differences (aPD) and 95% confidence intervals (CI), controlling for age, ethnicity, body mass index, and the number of deliveries. Almost half (49.5%) the women in the study population reported SUI during the follow-up period, and sixty-four percent had at least one UL identified at baseline. The estimated prevalence of SUI was 7.4% higher (CI: 0.4, 14.3) among women with UL compared with women without UL, with little difference when UL were subtyped according to location in the uterus, but slightly stronger associations with larger UL (aPD = 9.6 95% CI: 1.3, 17.9 and aPD = 9.3 95% CI: −0.4, 18.9 for UL 2–4cm or larger than 4cm compared with no UL, respectively). The estimated difference in the prevalence of this common condition in association with UL is clinically relevant. These findings suggest that treatment for UL might enhance SUI treatment in some women.

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CHILDHOOD AND ADOLESCENT VICTIMIZATION ON MENSTRUAL CYCLE LENGTH. *W He and B L Harlow (University of Minnesota, Minneapolis, MN 55454)

Violence has long been recognized to cause long-term psychological effects through neuroendocrine pathways, which may affect the hypothalamic-pituitary-ovarian axis. We examined the association between childhood (<12 yrs) and adolescent (12–18 yrs) abuse and menstrual cycle length during the late reproductive years (>35 yrs of age). Participants were 397 women enrolled in the Harvard Study of Moods and Cycles (HSMC), a three-year longitudinal study of women ages 36–44. General Linear Model(GLM) and General Linear Mixed Model(GLMM) were used to compare cycle length at baseline and across follow-up, respectively. Age, BMI, smoking, baseline depression, and age at menarche were adjusted in both models. Women reporting adult victimization were excluded to determine the independent effect of childhood and adolescent abuse. Women reporting abuse during adolescence had 0.4 days shorter cycles at baseline ($p = 0.003$), and 0.7 days shorter cycles across 36 months of follow-up ($p = 0.006$), compared to women with no history of victimization. Abuse during both childhood and adolescence did not result in additional shortening of cycles beyond that of adolescent abuse alone. However, among those victimized as either a child or adolescent, the most severe abuse was associated with 0.3 days shorter cycles at baseline ($p = 0.03$) and 0.6 days shorter cycles across follow-up ($p = 0.03$). Women with mild/moderate abuse did not have significant cycle length differences compared to non-abused women. We conclude that childhood and adolescent abuse may have a long term effect on ovarian function, independent of intervening depression, as evidenced by shorter cycle length during the late premenopausal years. Further research is needed to understand the reproductive endocrine mechanism behind this association.

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RISK FACTORS FOR MORTALITY IN THE NURSES' HEALTH STUDY. *H J Baer, R J Glynn, F B Hu, and B Rosner (Harvard University, Boston, MA 02115)

Few studies have examined multiple risk factors for mortality or formally compared associations for specific causes of death. We prospectively examined the associations of lifestyle and dietary factors with mortality, using competing risk survival analysis with age as the time scale to compare relative risk (RR) estimates across different causes of death. Participants were 53,856 women in the Nurses' Health Study who were free of cancer or cardiovascular disease (CVD) in 1986. During 18 years of follow-up, 5416 deaths occurred: 1109 from CVD, 998 from smoking-related cancers, 1536 from cancers unrelated to smoking, and 1773 from other causes. For continuous variables, RRs were computed for the difference between the 90th and 10th percentiles. Body mass index at age 18 (RR = 1.25 per 7 kg/m2), weight change since age 18 (RR = 1.13 per 24 kg), height (RR = 1.15 per 6 in), current smoking (RR = 1.44 vs. never), smoking amount/duration (RR = 1.89 per 39 pack-years), glycemic load (RR = 1.23 per 41 units), cholesterol intake (RR = 1.14 per 107 mg/kcal), time since menopause (RR = 1.13 per 13 yrs), hypertension (RR = 1.29 vs. no), diabetes (RR = 2.44 vs. no), and parental history of heart disease (RR = 1.14 vs. no) were positively associated with all-cause mortality. Greater physical activity (RR = 0.86 per 34 MET-hrs/wk), polyunsaturated fat (RR = 0.82 per 3% energy) and cereal fiber intake (RR = 0.83 per 4 g), and intermediate levels of alcohol intake (RR = 0.87 for 0.1–9.9 and 0.88 for 10–29.9 g/day vs. none) were associated with lower all-cause mortality. Estimates for several risk factors varied substantially across causes of death, and so an improved model was developed to allow for separate effects on specific causes. Models to predict all-cause mortality should incorporate these differences.

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MATERNAL OBESITY IS NEGATIVELY ASSOCIATED WITH BREASTFEEDING PRACTICES AMONG WHITE BUT NOT BLACK WOMEN. *J Liu, M Smith, M Dobre, J Ferguson (University of South Carolina, Columbia, SC 29208)

Objectives. We tested the hypothesis that women who are overweight (BMI = 25–29.9 kg/m2), obese (BMI = 30–34.9), and very obese (BMI≥35) before pregnancy are less likely to initiate and maintain breastfeeding than are their normal-weight counterparts among white and black women. *Methods*. Data from the 2000–2005 South Carolina Pregnancy Risk Assessment Monitoring System (PRAMS) were used. Multiple logistic regressions were performed to adjust for confounders. Response rate was 70.3%; there were 3517 white or black respondents. *Results*. Compared to normal-weight white women, very obese white women were less likely to initiate breastfeeding (Odds ratio [OR]: 0.64; 95% confidence interval [CI] = 0.43, 0.97) and less likely to still be breastfeeding at 10 weeks (OR = 0.36; 95% CI: 0.21, 0.59). Obese white women were not significantly less like to initiate or continue breastfeeding than normal-weight white women. Among black women, pre-pregnancy BMI was neither associated with breastfeeding initiation nor with breastfeeding continuation at 10 weeks. *Conclusions*. Very obese white women are less likely to initiate or continue breastfeeding than other white women. Health professionals should be aware that very obese white women need additional breastfeeding support.

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FIBROIDS DISAPPEAR AFTER PREGNANCY. *S Laughlin, K Hartmann, D Baird (NIH/NIEHS, Research Triangle Park, NC 27709)

Both parity and shorter interval since last pregnancy are associated with reduced risk of fibroids in epidemiologic studies. Infertility in women with fibroids does not explain these findings. Similar associations are seen in Eker rats, an animal model of fibroids. We hypothesize that the postpartum uterine remodeling process eliminates fibroids, thus reducing risk. We tested this hypothesis in collaboration with the Right from the Start study of pregnant women (University of North Carolina). Sonographers trained to screen for fibroids conducted early pregnancy ultrasounds (~gestational week 7). Participants with fibroids returned for a postpartum exam. Fibroid presence, size, and location were documented on both ultrasounds. This analysis is limited to participants with a single fibroid on their early pregnancy ultrasound who completed a postpartum ultrasound. Fibroid disappearance at the postpartum ultrasound among women with pregnancy greater than 20 weeks (n = 175) was 41% (95% confidence interval 34, 49), while disappearance after miscarriage (n = 30) was 17% (95% confidence interval 6, 35). The risks of fibroid disappearance were similar across all categories of initial fibroid size. For women who still had a fibroid postpartum, the fibroid diameter decreased for those experiencing a pregnancy greater than 20 weeks (2.7cm to 1.9cm), but increased slightly for women with a miscarriage (1.8cm to 2.0cm). Understanding the mechanisms behind remodeling and the factors that affect fibroid loss may help identify new approaches for developing fibroid treatments.

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SEXUAL VIOLENCE AND SUBSTANCE ABUSE AMONG U.S. WOMEN: IS THE TYPE OF SEXUAL VIOLENCE EXPERIENCE IMPORTANT? *J Stockman and J Campbell (Johns Hopkins University, Baltimore, MD 21205)

Sexual violence, often measured by forced sex, is a major public health problem with long-term negative outcomes on the health and social well-being of women. Notably, substance abuse functions as a coping mechanism for dealing with these events. Recent findings suggest that it is important to consider behaviorally-specific sexual violence measures rather than physically forced sex alone in assessing women's risk behaviors. The purpose of this study was to investigate the potential association between type of sexual violence experience and substance abuse using 2002 National Survey of Family Growth data. In this cross-sectional study of 6,386 women ages 18 to 44 years, type of sexual violence was assessed by the following: given alcohol or drugs, told relationship would end, pressured by words, threatened with physical injury, physically injured, and physically held down, all at the last forced vaginal intercourse by a male. Substance abuse was defined as use of crack, cocaine, non-prescription injection drugs, or 5 or more alcoholic drinks within a couple of hours (binge drinking), in the past year. Odds ratios (OR) and 95% confidence intervals (CI) were obtained from weighted logistic regression models. After adjusting for age, race/ethnicity, education, poverty, marital and insurance status, female substance abusers were significantly more likely to report being physically held down (OR = 1.47, 95% CI: 1.00–2.15) and given alcohol or drugs (OR = 1.50, 95% CI: 1.09–2.07) by the male perpetrator at last forced vaginal sex compared to non-substance abusers. This population-based study suggests that it is important to consider behaviorally-specific sexual violence measures when evaluating risk behaviors among women.

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IS STRESS A RISK FACTOR FOR UTERINE LEIOMYOMATA? *A I Vines, M Ta, and D D Baird (University of North Carolina at Chapel Hill, NC 27599)

The relation between psychosocial stress and uterine leiomyomata (fibroids) has not been widely studied, but stress has been shown to adversely affect health. To explore the racial disparity in fibroid risk, we examine perceived daily stress as a potential risk factor for this chronic gynecologic condition. Using cross-sectional data from the 1996–1999 National Institute of Environmental Health Sciences? Uterine Fibroid Study, 996 premenopausal black and white women, aged 35–49 years with a completed self-administered survey were included in the analysis. Fibroid status was based on ultrasound data. Daily stress was assessed using a self-administered questionnaire. Race-specific analyses were conducted since African American women tend to have a higher risk of fibroids in comparison to white women. Risk ratios (RR) and 95% confidence intervals (95% CI) were calculated using a modified Poisson regression model with a robust variance estimator. Overall, 69% of black women had fibroids as compared to 48% white women. The distribution of daily stress differed significantly by race with white women reporting more moderate stress (43%) than black women (29%)(p ? 0.0001). Perceived daily stress was also significantly associated with the presence of uterine fibroids. Adjusting for age, body mass index, parity, and other potential risk factors for fibroids, the risk of fibroids was 1.17 [95% CI: 1.02, 1.34] and 1.20 [95% CI: 0.92, 1.58] in black and white women with high stress, respectively. These findings suggest that stress may be an important factor in understanding the epidemiology of fibroids.

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EXAMINATION OF DISPARITIES IN HIV MORTALITY IN THE UNITED STATES (US) FROM A FUNDAMENTAL CAUSE PERSPECTIVE. *M Rubin, C Colen, J Phelan, B Link (Columbia U, New York, NY 10032)

This study employs a fundamental cause perspective to examine socioeconomic and racial disparities in HIV mortality in the US over a 25-year period. When health innovations make a specific disease more treatable, individuals with greater access to social, economic, and political resources will disproportionately benefit, thereby triggering disparities in health outcomes. We examine inequalities in HIV mortality in light of major advances in the capacity to delay death largely due to the introduction of highly active antiretroviral therapy (HAART). We combined death certificate data from the National Center for Health Statistics with yearly population estimates from the US Census Bureau to derive county-level all-cause and cause-specific mortality rates by sex, race, and age. An aggregate measure of socioeconomic status (SES) has been constructed using 11 county-level variables from the 1980–2000 Decennial Censuses. We use fixed and random effects negative binomial regression analyses to answer 3 questions. 1) How has the social patterning of HIV mortality changed during the study period? 2) To what extent are longitudinal shifts in HIV mortality associated with socioeconomic differentials? 3) Are emerging racial disparities in HIV mortality fully explained by differences in SES? Sensitivity analyses indicate the findings are robust to changes in model specifications. Preliminary results suggest recent transformations in the distribution of HIV mortality since the introduction of HAART in 1995 are driven largely by existing SES differentials. Moreover, Black/White disparities in HIV mortality cannot be solely attributable to differences in the availability of socioeconomic resources.

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NEIGHBORHOOD- AND INDIVIDUAL-LEVEL SOCIOECONOMIC VARIATION IN REPORTED RACIAL DISCRIMINATION. *A Dailey, S Kasl, T Holford, T Lewis, and B Jones (University of Florida, Gainesville, FL)

One approach to investigating discrimination and health has been to quantify interpersonal experiences of racial discrimination. Some studies have shown systematic differences in reporting of discrimination by socioeconomic status, which may have implications for the measurement of discrimination. We sought to establish the relationship between neighborhood- and individual-level socioeconomic status (SES) and reported racial discrimination in a cohort of 1,451 women age 40–79 who participated in a mammography study in Connecticut. This logistic regression analysis includes 1,249 women (492 African American [39%], 757 White [61%]) who completed telephone interviews at baseline and follow-up (average 29.4 months later). Neighborhood-level socioeconomic status (SES) was determined using census tract information. Individual-level income, education and occupation were also examined. Racial discrimination was measured as lifetime experience in seven possible situations. For African American women, living in the most disadvantaged neighborhoods was associated with fewer reported experiences of racial discrimination, independent of individual-level SES (odds ratio (OR) 0.51; 95% confidence interval (CI) 0.27, 0.96), with results attenuated after adjustment for neighborhood racial composition (OR 0.67, CI: 0.28, 1.61). For White women, low individual-level income was associated with higher perceived racial discrimination, independent of other measures of SES (OR 2.55, CI: 1.01, 6.43). The results suggest that individual-level and neighborhood-level SES may be important in understanding how racial discrimination is perceived, reported, processed, and how it influences health outcomes.

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ADDRESSING SEGREGATION IN HEALTH DISPARITIES RESEARCH. *R A Scribner, K P Theall, and K Mason (LSU School of Public Health, New Orleans, LA 70112)

Objectives: To use a recently developed multilevel design to compare mortality risk between whites and blacks living in the same neighborhood. It may be that black segregation contributes to overestimation of the risk among blacks attributable to individual level causes in previous research, using fixed effects models that do not partition risk in terms of its within- and between-neighborhood components. Methods: All-cause mortality data from Los Angeles County for the years 1989 through 1991 was modeled as the proportion of deaths in 29,936 cells (deaths and denominators cross-tabulated by age, gender, and race/ethnicity) at level 1 with 1,552 census tracts at level 2. Census tracts were characterized in terms of sociodemographic measures of poverty, household structure, education, and a contextual measure - liquor store outlet density. Results: In fixed effects models adjusted for age and sex, the odds of mortality was 29% greater for blacks, compared to their white counterparts (adjusted Odds Ratio, aOR = 1.29, 95% CI = 1.27–1.31). When the between-neighborhood risk of mortality was accounted for in random intercept models, the within-tract odds of mortality for blacks versus whites was reversed (aOR = 0.76, 95% CI = 0.74–0.78). Neighborhood characteristics explained some but not all of the risk of mortality attributed to between neighborhood differences. Conclusions: The inability to control for the between-neighborhood differences in mortality led to overestimation of the risk of mortality for blacks in fixed effects models. Black segregation, creating differential exposure to unmeasured contextual risk despite similar neighborhood sociodemographic risk (e.g., percent households in poverty), may account for this effect.

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SOCIO-STRUCTURAL AND CULTURAL MODEL OF HEALTH INEQUALITIES. *J Pearson (University of Michigan, Ann Arbor, MI 48109)

The literature upon which the assumed robust relationship between socioeconomic status and health is based focuses largely and uncritically on early research studying white men. The magnitude and, in some cases, direction of this relationship varies considerably for other demographic groups. Current descriptive evidence of such variation reveals a number of unanticipated findings often characterized as curious, paradoxical, or exceptional, for example the Latino Health Advantage. I hypothesize that these ''paradoxes'' actually fit a unified pattern which can be explained by a new dynamic and flexible conceptual model. I argue that the continued application of poorly conceptualized and un-theorized race and ethnicity variables are an impediment to integrating the range of findings on social characteristics and health. Additionally, frameworks based on the uncritical application of traditional socioeconomic measures may mask heterogeneity, overestimate the benefits of material resources, underestimate psychosocial and physical health costs of resource acquisition, and miss the value of alternative socio-cultural orientations. I have developed a dynamic and responsive theoretical framework that considers the health implications of racial categorization, ethnic identity, discrimination and alternative socio-cultural orientations along with traditional socioeconomic resources. This framework provides an alternative to existing static and culturally biased frameworks. Application of this framework to a racially and ethnically diverse sample and existing paradoxical findings suggests that it holds promise for contributing to understanding of the multi-dimensional and multi-level nature of social inequalities and resultant health disparities.

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EVALUATION OF TWO BIRTH CERTIFICATE SMOKING QUESTIONS. *M Kharrazi, M Pearl, J Yang, and G N DeLorenze (California Department of Public Health, Richmond, CA 94804)

The latest (2003) version of the national model live birth certificate, adopted by 19 states as of end of 2006, included a revised 4-part question on tobacco use that asked for average number of cigarettes smoked per day in the 3 months before pregnancy and in each trimester. This study compared the new smoking question with the previous version that asked about tobacco use during pregnancy (yes/no) and average number of cigarettes smoked per day. The study population included 2167 Black, White and Hispanic women who delivered March 2001-February 2003 in San Diego County, CA, and had 1 or more specimens collected during pregnancy as part of Project Baby's Breath. Before leaving the birthing facility, women answered 1 of the 2 smoking questions. Responses to smoking questions were compared to cotinine levels in urine (N = 1521) obtained for pregnancy confirmation (median, 7 weeks gestation), serum (N = 1950) collected for prenatal screening at 15–19 weeks gestation, and umbilical cord serum or plasma (N = 1557) collected routinely at delivery. Smoking was defined as 10+ ng cotinine/ml of serum or plasma and 100+ ng cotinine/ ml of urine. Based on reporting of more than 0 cigarettes per day in the 1st, 2nd or 3rd trimesters of pregnancy, the new smoking question identified 48.5% of all smokers. Based on reporting of more than 0 cigarettes per day in the 3 months before pregnancy or a trimester, 57.5% of the smokers were identified. The detection rate for the old smoking question was 39.0%. The difference in sensitivity between the two questions was largest among US-born Hispanics and Whites. While sensitivity is increased with the 4-part smoking question, underreporting of smoking during pregnancy is still common on the new birth certificate.

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ETHNIC TRENDS IN TOBACCO USE DURING PREGNANCY, NEW YORK CITY, 1995–2003. *C Stein, J Ellis, D Savitz, L Vichinsky, S Perl (Mount Sinai School of Medicine, New York, NY 10029)

The 1998 Master Settlement Agreement (MSA) between 46 states and major tobacco companies increased tobacco control funding and restricted tobacco marketing, among other requirements. In 2002, New York City (NYC) began a comprehensive tobacco control program (CTC) that raised the price of cigarettes, banned indoor workplace smoking, and increased access to cessation treatment. Using NYC birth records from 1995–2003, the authors examined trends in prenatal tobacco use over three time periods: pre-MSA (1995–1998), post-MSA/pre-CTC (1999–2002), and post-CTC (2003). Of the 898,679 included births, prenatal tobacco use was reported for 30,616 (3.4%). Prevalence varied markedly by maternal ethnicity: 3.4% for non-Hispanic white, 7.3% for Puerto Rican, and 8.4% for African American women. Less than 1% of pregnant women from Africa, Asia, Mexico, and Central/South America smoked. The prevalence of prenatal smoking dropped from 4.5% in 1995–1998, to 2.9% in 1999–2002, to 1.7% in 2003. Declines were seen across ethnic groups and subgroups defined by age, nativity, parity, prenatal care initiation, education, and borough. While tobacco use among all ethnic groups declined, the disparity across ethnic groups widened. Compared to non-Hispanic whites, African Americans had a 2.5-fold (95% confidence interval (CI) 2.4–2.5) increased odds of smoking during 1995–1998 and a 3.3-fold (95% CI 2.9–3.7) increased odds of smoking during 2003, despite an absolute reduction in smoking from 10.4% to 4.9%. These findings document a striking temporal decline in prenatal tobacco use in NYC associated with changing tobacco control policies. Results support an enhanced focus on reducing smoking among pregnant African American and Puerto Rican women.

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SPONTANEOUS SMOKING CESSATION AMONG PREGNANT HISPANIC WOMEN. *A Haskins, E Bertone-Johnson, P Pekow, E Carbone, L Chasan-Taber (University of Massachusetts, Amherst, MA 01003)

Few studies have examined smoking cessation at the onset of pregnancy in Hispanic women, one of the fastest growing populations in the U.S. The authors examined factors associated with quitting smoking at pregnancy onset among 1,231 predominantly Puerto Rican participants in the Latina GDM study, a cohort study conducted from 2000 to 2004. At enrollment (mean = 15 weeks gestation), interviewers collected self-reported information on cigarette smoking prior to and during pregnancy, as well as sociodemographic, behavioral, and acculturation factors. A total of 351 women reported smoking before pregnancy. The majority of these women were under age 25 (75%), did not graduate from high school (65%), and were born in the U.S. (61%). Slightly less than half (45%) quit smoking at pregnancy onset. In univariate analyses, higher education and nulliparity were positively associated with quitting, while television watching, marijuana use, and perceived stress were inversely associated with quitting. In multivariate analyses, parous women were 64% less likely to quit (odds ratio [OR] = 0.36, 95% confidence interval [CI] 0.21–0.64) as compared to nulliparous women. Pre pregnancy heavy smokers (20+ cigarettes/day) were 79% less likely to quit (OR = 0.21, 95% CI 0.12–0.38) as compared to light smokers (1–9 cigarettes/day), and daily marijuana users were 57% less likely to quit (OR = 0.43, 95% CI 0.22–0.84) compared to never users. Increasing hours of television was negatively associated with quitting (p-trend = 0.03). Age, income, BMI, language preference, birthplace, and pre pregnancy exercise level and alcohol use were not associated with quitting smoking. Study findings may be useful in informing cessation programs for pregnant Puerto Rican women.

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EARLY LIFE EXPOSURE TO TOBACCO SMOKING AND SUBSEQUENT REDUCED FERTILITY AMONG FEMALES. *X Ye, R Skjaerven, O Basso, D Baird, M Eggesbo, L A C Uicab, K Haug, M P Longnecker (Epidemiology Branch, NIEHS, Research Triangle Park, NC 27709)

Several epidemiological studies have evaluated the association between early life exposure to tobacco smoking and fertility, with inconsistent findings. We examined this association among women in The Norwegian Mother and Child Cohort Study (enrollment 1999 to date), which enrolled about 40% of all pregnant women in Norway. Around the 17th week of pregnancy, the women reported how long they took to conceive (time to pregnancy), whether her mother smoked while pregnant with her (the participant), and other factors. This analysis included 36,871 first planned pregnancies among women aged 18–39 years. A discrete-time Cox model was used to calculate adjusted fecundity odds ratios (FORs), controlling for age, education, smoking before pregnancy, use of other tobacco products before pregnancy, and history of sexually transmitted diseases. Time to pregnancy was censored at 13 months. The prevalence of infertility (time to pregnancy > 12 months or received treatment for infertility) was 11%. The adjusted FORs for early life exposure to smoking were 0.96 [95% confidence interval (CI): 0.94, 0.99] among women who never smoked, 0.96 (95% CI: 0.93, 0.99) among those who ever smoked, and 0.96 (95% CI: 0.94, 0.98) among all women. This large cohort study supports a modest association between early life exposure to tobacco smoking and reduced fertility.

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QUITTING SMOKING DURING EARLY AND LATE PREGNANCY AND RISK OF PREECLAMPSIA AND BIRTH OUTCOME. *X Xiong, J Zhang, W D Fraser and PIPE Study Group (Department of Epidemiology, Tulane University, New Orleans, LA 70112)

To examine the impact of maternal quitting smoking during early and late pregnancy on the risk of preeclampsia and birth outcomes, the authors analyzed data from a case-control study of pregnant women at three hospitals in Quebec, Canada, between January 2003 and March 2006. A total of 86 preeclamptic cases and 239 controls were included. Preeclampsia was defined as blood pressure ≥ 140/90 mm Hg and ≥ 1 + proteinuria after 20 weeks of gestation. Women were classified as never smokers, early quitters (quitting before 20 weeks of gestation), late quitters (quitting after 20 weeks of gestation), and persistent smokers (smoking before and during pregnancy). Compared to never smokers, after adjustment for confounders, the adjusted odds ratios (aOR) and 95% confidence interval (CI)of preeclampsia for persistent smokers, late quitters, and early quitters were 0.65 (0.17–2.47), 0.79 (0.12–5.09), and 1.06 (0.42–2.69), respectively. Both persistent and late quitting smoking were associated with a statistically nonsignificant reduced risk of preeclampsia. However, persistent and late quitting smoking were associated with an increased risk of other adverse pregnancy outcomes such as low birth weight and preterm birth. Compared to never smokers, the aORs and 95% CIs of low birth weight for persistent smokers, late quitters, and early quitters were 4.30 (1.36–13.6), 3.86 (0.75–19.8), and 2.04 (0.82–5.10), respectively. The authors conclude that, although persistent and late quitting smoking may be associated with a decreased risk of preeclampsia, the benefit effect of quitting smoking early in pregnancy on pregnancy outcome is evident.

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EFFECTS OF LIVING IN A POOR NEIGHBORHOOD ON DEPRESSION: A MULTILEVEL ANALYSIS OF THE SIRS COHORT DATA, THE PARIS METROPOLITAN AREA, FRANCE, 2005. C Roustit, E Cadot, E Renahy, *P Chauvin (INSERM, UMRS 707, Paris, France)

About 14% of the adult population of the Paris metropolitan area were suffering from depression in 2005, as estimated by the MINI-Diag questionnaire in the SIRS cohort study, a longitudinal health and social survey of a random sample of 3000 households initiated that year. As well, a significantly higher prevalence was observed in the poorest neighborhoods. In a previous analysis, we found that many individual factors were associated with a higher risk of depression: gender, family status and job status, but also certain adverse childhood events, such as sexual abuse and a bad relationship with one's parents. The objective of this study was to investigate if geographical differences in depression prevalence were due to composition and/or contextual effects. The neighborhoods of residence (NR) (about 2000 inhabitants) were classified into 4 categories according to a socioeconomic statistical typology (from the poorest to the wealthiest). We used a multilevel regression model to examine if the NR category was still associated with a higher risk of depression, after adjusting for the individual factors above. After the adjustment, a strong association persisted at level 2 between living in the poorest neighborhoods and depression (aOR = 2.17; 95% CI: 1.54–3.13). These results suggest that social contextual factors may play a role in the risk of depression, apart from individual socioeconomic and life-course factors. Among them, neighborhood characteristics other than the typology, which was used here, will be examined with the SIRS cohort study data and the same methodology, e.g., structural (population density, urban characteristics), economic (poverty, unemployment) and social (social interactions, social capital) characteristics.

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DEMOGRAPHIC PREDICTORS OF DIAGNOSTIC STABILITY FOR LIFETIME DIAGNOSIS OF DSM-III MAJOR DEPRESSION USING THE DIAGNOSTIC INTERVIEW SCHEDULE. *S Taubman (Harvard University, Boston, MA 02115)

Estimates of population prevalence of depression are often based on diagnoses made using structured diagnostic interviews. Although much is known about the psychometric properties of these instruments, how demographic factors impact these psychometric properties is less well understood. We consider the diagnosis of lifetime depression based on one such interview, the NIMH Diagnostic Interview Schedule (DIS), which was the instrument used in the Epidemiologic Catchment Area (ECA) survey. Using data from the ECA about lifetime history of depression gathered in two interviews spaced roughly a year apart, we examine the predictors of unstable diagnosis, defined as those who were given a diagnosis at one time but not the other, excluding incident cases. Although both interviews assess the same diagnosis (a lifetime diagnosis of depression), we find that the agreement between the two interviews is modest with kappa of 0.42 (95% confidence interval: 0.39, 0.45). Of the 1,048 subjects who were assigned a lifetime diagnosis of depression in one interview, only 292 (28%) were assigned that diagnosis in both interviews. After controlling for depression severity, several demographic factors were associated with unstable diagnosis. African-Americans were nearly twice as likely to have an unstable diagnosis, with an adjusted odds ratio of 1.95 (95% confidence interval: 1.24, 3.06); age over 45 was also associated with an increase in unstable diagnosis, with an adjusted odds ratio of 1.82 (95% confidence interval: 1.34, 2.49). These differences in diagnostic instability between demographic groups are troubling and suggest that simple comparisons of prevalence rates between groups may be lead to inaccurate conclusions.

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IS THERE A SUICIDE BELT IN THE UNITED STATES? *S Harper, S Yang, J Lynch (McGill University, Montreal, QC, H3A 1A2 Canada)

In 2004 all 8 states in the US mountain region were among the 10 states with the highest age-adjusted suicide mortality rates. We investigated whether this pattern has persisted over time using historical data along with regression analysis of contemporary US vital statistics from 1969 to 2003. Historical data showed that excess rates of suicide mortality were evident in the mountain region since at least the 1890s, and crude suicide rates have been at least 50% higher in the mountain than the non-mountain regions since at least the 1940s. Negative binomial regression analysis showed that over the period from 1969 to 2003 rates of suicide were 64% higher in the mountain region compared to the rest of the country (rate ratio [RR] = 1.64, 95% confidence interval [CI] = 1.58,1.70), a pattern which generated more than 27000 excess deaths. Adjustment for age, sex, race, secular trends, and suicide mechanism (firearm, hanging, poisoning) could not explain the excess risk (adjusted RR = 1.43, 95% CI = 1.41,1.46). Additional adjustment using time-series on two population-level factors associated with increased suicide—divorce rates and per capita alcohol consumption—reduced, but did not eliminate, the excess risk (adjusted RR = 1.16, 95% CI = 1.13,1.19). Further analyses showed the excess risk in the mountain region was evident in both urban and rural counties. There is a large, persistent excess rate of suicide mortality in the mountain region that has been evident for at least 70 years and that cannot be explained by differences in demographic composition, urban-rural status, or mechanism of suicide. This long term pattern suggests that relatively stable risk factors more prevalent in the mountain area may be associated with increased risk of suicide mortality.

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PATTERNS AND PREDICTORS OF TRAJECTORIES OF DEPRESSION IN A REPRESENTATIVE GENERAL POPULATION SAMPLE. *A Nandi, M Tracy, J R Beard, D Vlahov, and S Galea (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205)

Clinical evidence has long suggested there may be heterogeneity in the trajectories of depressive symptoms over time; however, there has been sparse epidemiologic work aimed at understanding the patterns and predictors of depressive trajectories in the general population. In this study, we used data from a prospective, representative sample of adult residents of the New York City metropolitan area (n = 2282) to document trajectories of depression between 2001 and 2004, and to identify the time-fixed and time-varying predictors of distinct depressive trajectories. Using semi-parametric group-based modeling, we identified six trajectories of depressive symptoms across four survey waves. The most prevalent trajectories were the resistance (i.e., no symptoms at all time points, 22% of sample), chronic moderate levels of symptoms (22% of sample), gradual decline (21% of sample), and chronic dysfunction (19% of sample) groups. Those who reported a history of depression ($p < 0.001$) or a peri-event emotional reaction ($p = 0.014$) were more likely to be assigned to the chronic dysfunction group relative to the resistance group. Among members of distinct trajectories, lower household income, exposure to ongoing stressors, and exposure to traumatic events were commonly associated with an increased number of depressive symptoms. Ongoing socioeconomic adversity appears to be associated with worse course of depression over time. Exposure to some of these adversities may be preventable and may be a fruitful focus of public health interventions that aim to promote better mental health in the general population.

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RISK FACTORS FOR INCIDENT DEMENTIA IN OLDER PEOPLE WITH HIGH LEVELS OF ABSOLUTE POVERTY BUT LOW LEVELS OF CARDIOVASCULAR DISEASE AND DEPRESSION. *R Chen, L Wei, Z Hu, H Hemingway (Anhui Medical University, China)

Objective: To determine the risk factors for dementia in people with high levels of absolute poverty but low levels of cardiovascular disease risk factors and depression. Design: Prospective cohort study. Setting: Anhui province, urban China, with annual personal income of about US$ 1280. Participants: 1254 non-demented men and women aged≥65 years. Main outcome measures: Dementia was diagnosed by the Geriatric Mental State and Automated Geriatric Examination for Computer Assisted Taxonomy. Baseline risk factors, collected from the standard questionnaire and physical measurements were examined in a Cox regression model. Results: In one year follow up, 75 patients were diagnosed for new dementia. Multivariate analysis showed the risk of dementia was significantly associated with older age, female gender, lower body mass index, lower educational level, very satisfactory income (adjusted hazard ratio 2.19, 95% CI 1.20–3.99, compared to satisfactory income), not watching television/reading newspaper (1.93, 1.06–3.49) and smoking (2.17, 1.10–4.30), but was reduced in living with children (0.21, 0.07–0.69). The highest risk was for those who were illiterate (and at primary school education) but had a highest income (6.67, 2.09–21.3 and 6.38, 2.25–18.1) and had a lowest income (4.75, 1.67–13.5 and 4.79, 1.56–14.7). Conclusions: Within such a deprived population which had recently had rapid economic improvements, combinations of low educational level with highest and lowest family incomes showed strong effects on development for dementia. Appropriately remaining body weight, watching television and living with children may be additional protective factors.

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LIFE COURSE SOCIOECONOMIC POSITION AND CORONARY HEART DISEASE RISK STATUS AMONG ADULTS WITH DIABETES: THE TRIAD STUDY. *S V Ross, G L A Beckles, S Lu, J C Crosson, N Lasser, A Karter, S H Schneider, T Gary, B Waitzfelder, N Steers, W Herman, A Brown (TRIAD Study, University of Medicine and Dentistry of NJ, New Brunswick, NJ 08903)

We investigated the association between lifecourse socioeconomic position (SEP) and coronary heart disease (CHD) risk status among 4558 patients with diabetes participating in the Translating Research Into Action for Diabetes (TRIAD) study. Data were collected from 2000 to 2003 using surveys and medical records. The 10-year risk of a coronary event (CHD-10) was estimated for each participant using the United Kingdom Prospective Diabetes Study (UKPDS) risk calculator. SEP in childhood was measured by education attained. SEP in adulthood was measured by the participant's own education level. Linear regression analysis was used to assess the relationship between CHD-10 and childhood SEP and adult SEP. Compared to participants whose parents completed college, the CHD-10 score was 39% higher among those whose parents did not complete high school ($p < 0.001$) and 30% higher among those whose parents had only a high school education ($p < 0.001$). After adjustment for nativity, age, income, employment, marital status, diabetes treatment regimen and mental and physical health, the CHD-10 score remained significantly higher (12%; $p < 0.05$) for participants whose parents had only completed high school. The CHD-10 score for participants who had not completed high school was 21% ($p < 0.001$) higher than the score for participants who had completed college. After adjustment, those participants who had graduated from high school ($p = .49$) and those with some college ($p = .38$) had a non significant 3% higher CHD-10 score than those with a college education. Childhood SEP and Adult SEP are each inversely associated with 10-year CHD risk among adults with diabetes.

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SOCIAL ENGAGEMENT AND COGNITIVE FUNCTION: THE BALTIMORE MEMORY STUDY. *B D James, T A Glass, B K Lee, B S Schwartz (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205)

Social engagement may help to preserve cognitive function as we age, although methodologic challenges have impeded the field. We used baseline data from the Baltimore Memory Study, a diverse population-based cohort of 1,140 urban dwelling 50–70 year olds, to examine this relationship. We add to previous studies through improved measurement and a broad range of cognitive test scores. Rather than a using a simple index of activities assumed to be social, we used confirmatory factor analysis to test our measurement theory and to estimate social engagement as a latent variable based on items from the Enacted Function Profile. Seven separate cognitive domain outcomes (language, processing speed, eye-hand coordination, executive functioning, verbal memory and learning, visual memory, and visuoconstruction) were derived from a battery of 20 standard neurobehavioral tests. Linear regression models were adjusted for age, sex, race/ethnicity, education, wealth, disability, and chronic health conditions. Social engagement was strongly associated ($p < 0.05$) with six of seven cognitive domains after adjustment for these confounders. Processing speed, language, and eye-hand coordination showed the strongest associations with social engagement. The magnitudes of association appear clinically relevant: an increase in social engagement from the 25th to 75th percentile was equivalent to a decrease of 2.1 to 5.7 years of age. Social engagement was strongly and consistently associated with performance across multiple domains of cognitive function in this diverse and relatively young cohort of older adults. We do not interpret these results in causal terms, however the potential importance of social engagement warrants further study.

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GENDER DIFFERENCES IN DISABILITY AND PERSONAL CARE ASSISTANCE AMONG OLDER ADULTS WITH AND WITHOUT DIABETES IN MEXICO. *F Andrade (University of Illinois at Urbana-Champaign, Champaign, IL 61820)

This paper examines the gender differences in disability among older adults with and without diabetes and to explore the effects of gender on personal care assistance in Mexico. This study is based on data from the Mexican Health and Aging Study (MHAS), a prospective two-wave panel study of a nationally representative cohort of Mexicans born prior to 1951. It also uses the Interpolation of Markov Chains method to investigate the differences in total life expectancy, disability-free life expectancy, and disabled life expectancy. Disability was measured using three measures: Activities of Daily Living (ADL), Instrumental Activities of Daily Living (IADL) and Nagi functional limitations. The results show that diabetes reduces total and disability-free life expectancy for older men and women by a similar amount. Results show that Mexican men with diabetes at age 50 are expected to live 19.7 years, on average, without any ADL and 2.9 years, on average, with at least one ADL. Their male counterparts without diabetes are expected to live 28.4 years, on average, without any ADL and the same number of years with at least one ADL. For women aged 50, those with diabetes are expected to live, on average, 21 years without any ADL limitation and 5.2 years with at least one ADL. Women without diabetes are expected to live, on average, 29.2 years in good health after they had reached age 50 and other 5.1 years with at least one ADL. Therefore, differences in total life expectancy are largely due to differences in disability-free life expectancy. This contrasts with findings from Canada and the United States where effects of diabetes on total life expectancy and disability-free are more remarkable among women. The study confirms that women face higher disability burden than men regardless of their diabetic status and they require personal care assistance for a greater number of years. Finally, the paper analyzes the extent these gender differences in can be explained by the differential social and economic characteristics of older women and men.

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THE EFFECT OF LIFECOURSE SOCIOECONOMIC POSITION AND MOBILITY ON COGNITIVE FUNCTION AND CHANGE AMONG OLDER ADULTS. *J Faul, D Weir, and M Haan (University of Michigan, Ann Arbor, MI 48104)

Education and early-life conditions are related to cognitive function in adulthood. However, few studies examining the effect of early socioeconomic factors on cognition have benefited from the use of longitudinal data. This study examines the relationship between measures of childhood socioeconomic position (SEP) and trajectories of cognitive function in later life within a nationally representative sample of adults over age 50, whether these effects are mediated by later life SEP, and the effect of social mobility on cognitive performance and change. Using longitudinal data from the Health and Retirement Study from 1992 to 2004 ($N = 12{,}972$, $D = 57{,}399$) we examined the association between measures of SEP and cognitive change using growth curve models. We found a large linear age-based decline in cognitive performance with a positive retest effect. After controlling for practice effects, demographics, and death/proxy effects, lower parental education and father's occupation were significant predictors of poorer cognitive performance at age 65 while higher father's education was associated with faster decline. The effect of early life SEP on cognitive performance was attenuated by up to 75% while the effect of father's education on cognitive change was attenuated by 46% after adjusting for education. Downward socioeconomic mobility had negative consequences for cognitive performance suggesting that the benefits of higher SEP in childhood can be diluted by lack of educational attainment and subsequent downward mobility over the lifecourse. Moreover, consistently high SEP across the lifecourse and upward mobility were not protective against cognitive decline. These findings emphasize the lasting impact of childhood SEP on cognitive trajectories among older adults.

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SERUM VITAMIN D AND RISK OF PANCREATIC CANCER. *R Z Stolzenberg-Solomon, R Horst, R B Hayes, D T Silverman (NEB, DCEG, NCI, Rockville, MD 20854)

Experimental evidence suggests vitamin D has anticarcinogenic properties, however, a recent nested-case control study conducted in a population of male smokers showed that higher 25(OH) vitamin D–the major circulating vitamin D metabolite and is also considered the best indicator of vitamin D status as determined by the sun and diet–was associated with a significant 3-fold increased risk for pancreatic cancer. We conducted a nested case-control study in the PLCO cohort of men and women 55–74 years of age at baseline, to test whether pre-diagnostic serum 25(OH) vitamin D concentrations were associated with pancreatic cancer risk. One hundred eighty four incident cases of adenocarcinoma of the pancreas that occurred between 1994 and 2006 (follow-up to 11.7 years, median 5.4 years) were matched by age, race, sex, and date of blood draw to 368 controls who were alive at the time the case was diagnosed. Smoking and body mass index adjusted odds ratios (ORs) and 95% confidence intervals (CI) were calculated using conditional logistic regression. Higher vitamin D concentrations were not significantly associated with pancreatic cancer (highest vs. lowest quintile, >82.3 vs. < 45.9 nmol/L: OR = 1.45, 95% CI 0.66–3.15, p-trend = 0.49). Our results do not support the hypothesis that higher vitamin D status plays a protective role in pancreatic cancer carcinogenesis.

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HISTORY OF PEPTIC ULCER DISEASE AND PANCREATIC CANCER RISK IN MEN. *Y Bao, D Spiegelman, E Giovannucci, C Fuchs, D Michaud (Harvard School of Public Health, Boston, MA 02115)

Helicobacter pylori infection has been hypothesized to increase pancreatic cancer risk through inflammation, changes in gastric acidity, and/or N-nitrosamine formation. Gastric ulcer is primarily associated with N-nitrosamines formation, whereas duodenal ulcer is accompanied by hyperacidity. To investigate whether gastric or duodenal ulcer is associated with pancreatic cancer risk and therefore provide clues into different potential mechanisms mentioned, we prospectively examined 51,529 men in the Health Professional Follow-Up Study. Peptic ulcer history was obtained from baseline questionnaires. Relative risks (RRs) and 95% confidence intervals (CIs) were estimated using Cox proportional hazards models adjusting for smoking, height, body mass index (BMI), diabetes, physical activity, and NSAID use. During 18 years of follow-up, we observed 254 incident pancreatic cancer cases. Compared with no peptic ulcers, men who reported a gastric ulcer before 1986 had an elevated risk of pancreatic cancer (RR = 1.80, 95% CI = 1.05–3.10). The association was stronger among never smokers (RR = 2.81, 95% CI = 1.17–6.72). Although risk was highest for those with an ulcer diagnosis close in time to the cancer diagnosis (RR = 6.46, 95% CI = 1.49–28.03), risk remained significantly elevated 10–25 years after ulcer diagnosis (RR = 2.95, 95% CI = 1.36–6.41). In contrast, duodenal ulcer was not associated with pancreatic cancer risk (RR = 1.15, 95% CI = 0.75–1.77). The results did not change after excluding the first 2 years of follow-up. These results support the nitrosamine hypothesis but not the hyperacidity hypothesis for the development of pancreatic cancer.

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SUBJECTIVE GLOBAL ASSESSMENT: A PREDICTOR OF SURVIVAL IN PANCREATIC CANCER. *C G Lis, C A Lammersfeld, S Dahlk, P G Vashi, J King, J F Grutsch, D Gupta (Cancer Treatment Centers of America, Zion, IL 60099)

The Subjective Global Assessment (SGA), a well-validated tool for screening of malnutrition, assesses nutritional status based on the features of history and physical examination. Malnutrition is a frequent manifestation in patients with pancreatic cancer. This study investigated the prognostic role of SGA in pancreatic cancer. We evaluated a case series of 91 histologically confirmed pancreatic cancer patients treated at Cancer Treatment Centers of America. Using SGA, patients were classified as well nourished (SGA A), moderately malnourished (SGA B) or severely malnourished (SGA C). Kaplan Meier method was used to calculate survival. Long rank test was used to evaluate the equality of survival distributions across the SGA strata. Of 91 patients, 57 were males and 34 females. 52 were newly diagnosed at our hospital while 39 had received prior treatment elsewhere. 3 patients had stage I disease at diagnosis, 13 stage II, 12 stage III and 63 stage IV. The median age at diagnosis was 55 years (range 30–73 years). 26 patients were well-nourished (SGA A) while 65 were malnourished (SGA B/C). Well nourished patients had a median survival of 10.1 months (95% CI: 8.1–12.4), while malnourished patients had 7 months (95% CI: 5.5–7.6); (p = 0.04). No other variable was found to be statistically significantly associated with survival upon univariate analysis. In this cohort, we found that low SGA scores (well-nourished status) versus high SGA scores (malnourished status) identified patients with better survival outcomes. At our center, we continue to investigate the role of nutritional intervention in improving patient prognosis in pancreatic cancer.

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INDEPENDENT PREDICTORS OF BASELINE FASTING SERUM INSULIN AND GLUCOSE AND THE RISK OF PANCREATIC CANCER IN MALE SMOKERS. *C L Meinhold, A B de Gonzaléz, D Albanes, S J Weinstein, P R Taylor, J Virtamo, and R Z Stolzenberg-Solomon (National Cancer Institute, Division of Cancer Epidemiology and Genetics, Nutrition Branch, Rockville, MD 20892)

Diabetes mellitus and higher glucose concentrations are consistent risk factors for pancreatic cancer with most prospective studies reporting associations independent of body mass index (BMI). Using linear and logistic regression models, the authors identified potentially modifiable factors that were independently associated with baseline fasting insulin, glucose, and/or diabetes among 383 Finnish male smokers who had fasting serologic measurements in the Alpha-Tocopherol, Beta-Carotene Cancer Prevention Study (ATBC). Cox proportional hazards models were subsequently used to calculate adjusted hazard ratios (HRs) for incident pancreatic cancer among the full ATBC Study cohort with relevant baseline information (n = 27,035). Between 1985 and 2004, 305 participants developed pancreatic cancer. Of the 20 factors associated with baseline fasting insulin, glucose, and/or diabetes, self-reported diabetes (HR = 2.12) and intakes of sucrose, total fat, and saturated fat were significantly related to pancreatic cancer risk (highest versus lowest quintiles: $HR_{sucrose} = 0.68$; 95% confidence interval (CI): 0.47, 0.98; $HR_{saturated\ fat} = 1.40$; 95% CI: 0.98, 2.01; p-trend = 0.02). BMI strongly predicted baseline insulin, glucose, and diabetes but was not associated with cancer risk (highest versus lowest quintile: HR = 0.96; 95% CI: 0.68, 1.37). In conclusion, dietary influences on insulin and glucose concentrations independent of BMI and other cardiovascular risk factors may play a role in pancreatic carcinogenesis.

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PREDICTION RULE FOR PREEMPTIVE ISOLATION AND RESCREENING OF PATIENTS AT HIGH RISK FOR MRSA NASAL CARRIAGE IN A VETERANS AFFAIRS (VA) MEDICAL CENTER. *S Chang, A K Sethi, PhD, C J Donskey, MD, K Pintchuk, U Stiefel, MD (Case Western Reserve University, Cleveland, OH, 44106)

VA Medical Centers implemented mandatory screening for methicillin-resistant Staphylococcus aureus (MRSA) nasal carriage upon admission and during intrahospital transfers with subsequent contact isolation of colonized patients. There is often a delay between admission and discovery of MRSA carriage, suggesting a role for a prediction rule used for presumptive initial isolation. A rule for targeted rescreening during hospital stay can reduce costs. To develop a clinical prediction rule to identify patients for preemptive isolation and targeted rescreening. A cross-sectional study of all inpatients for anterior nares carriage of MRSA was performed. Logistic regression was used to identify factors associated with carriage. Prediction rules were developed using factors available upon or after admission. Overall, 22/158 (14%) patients were nasal carriers. Factors independently associated with carriage included being single or divorced, having a low Braden score, and at least 2 weeks hospitalization in previous year. An algorithm requiring 8 factors available upon admission would identify a small number for preemptive isolation upon admission (64% sens, 89% spec, 48% PPV, 94% NPV). A second algorithm requiring 7 factors available after admission can be used to target high-risk patients for re-screening (91% sens, 79% spec, 42% PPV, 98% NPV). A prediction rule can be used to identify 18% of admitted patients for preemptive isolation. The rule would capture two-thirds of colonized patients and half of isolated patients would be colonized with MRSA. A second rule can be used to reduce number needed to be rescreened by 70%.

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ESTIMATING THE VALUE OF OCCUPATIONAL HEALTH SERVICES: BUSINESS METRICS FOR PERFORMANCE MANAGEMENT. *J Bender, A Johnson, and T Schenk (General Motors Corp, Detroit, MI 48265)

Businesses develop metrics and use benchmarking techniques to optimize performance across their enterprise by quantifying and ranking the success of internal competitors. General Motors Health Services developed a method to estimate the value of professional services provided at their work site occupational health clinics. The value-based metric was unique because it quantified both the clinical and non-clinical aspects of occupational health services. Clinical procedures were assigned Common Procedural Terminology (CPT) codes using an electronic algorithm and evaluated with a resource-based relative value scale. Clinics were also surveyed and observed to quantify regular duties that were not directly related to patient care. An algorithm was developed to estimate the value of these occupational health activities. About 23% (95% confidence interval: 18% – 28%) of the value provided by occupational health staff was attributed to active surveillance and other activities unrelated to patient care. For each clinic, the average value of occupational health services produced per full-time equivalent was assessed and each site was ranked accordingly. Performance varied across clinics by as much as 64%. Performance leaders were examined to identify best practices and operating characteristics. Value-based benchmarking is readily understood and facilitates the optimal delivery of occupational health services in today's highly competitive economy.

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VARIABILITY IN SURGICAL OUTCOMES FOR SPINAL FUSION SURGERY IN U.S. CHILDREN'S HOSPITALS. *E H Morrato, M Erickson, B Beaty, K Benton, E Benefield, A Kempe (Children Outcomes Research Program, The Children's Hospital, Denver, CO 80045)

To investigate inter-hospital variability in length of stay (LOS), in-hospital infection and surgical complications in children who underwent spinal fusion surgery, we conducted a retrospective cohort study of 5,641 surgical cases occurring in 2004–2006 at 27 children's hospitals participating in the Pediatric Health Information System (PHIS), the largest and most advanced children's hospitals in the U.S. Outcomes were stratified by whether children had underlying neurological impairment (NI) determined by ICD-9 diagnosis. Among children undergoing spinal fusion, 1,173 (21%) children had NI. Median number of spinal fusions per hospital was 181 (intra-hospital range: 76–654). Among NI children: median LOS ranged from 5 to 12 days; mean infection rates ranged from 0 to 29%; and mean surgical complication rates ranged from 0 to 90%. Among non-NI children: median LOS ranged between 4 to 7 days; mean infection rates ranged from 1–16%; and median surgical complication rate ranged from 3 to 71%. Using chi-squared tests, the following factors were associated with a LOS: diagnosis of a surgical infection ($p < .0001$), diagnosis of a surgical complication ($p < .0001$), and anterior vs. posterior surgical technique ($p < .0001$). Hospital spinal fusion case volume was not associated with LOS >10 days ($p = 0.5$). Substantial variation between children's hospitals was observed in surgical outcomes for children undergoing spinal fusion surgery. The variation and high rate of morbidity seen in children with NI undergoing spinal fusion surgery suggest the need for increased monitoring of surgical outcomes to direct future quality improvement efforts for these children at higher surgical risk.

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THE HEALTH SERVICE UTILIZATION PATTERNS OF SPANISH AND ENGLISH-SPEAKING CHILDREN AS A MANIFESTATION OF DIFFERENTIAL TRANSACTION COSTS. *E B Mancha (University of Texas, San Antonio, TX 78249)

This report examines the differential transaction [non-financial] costs that impact the utilization of health services by children who come from English and Spanish-speaking households, as these are manifested in their subsequent utilization of health services. A basic assumption of this research is that disparities in the utilization of services can be expected to the degree that there exist disparities in the true (total) costs of these services for different populations. Using 2004 data from the Medical Expenditure Panel Survey, and controlling for insurance coverage, subsamples of 10,192 and 10,178 children are used to ascertain a measure of the transaction costs associated with a language barrier, as they impact initial access to health services, ability to get needed medical care, and overall service utilization patterns across different types of health services. Methods include analyses of variance, logistic regression, and subsequent post-hoc analyses via exploratory methods. Findings include a disproportionate inability by children from Spanish-speaking households to get needed medical care and a disparate, but parallel, pattern of service utilization by English and Spanish-speaking children across different service types. While Spanish-speaking children appear to face differential transaction costs in regards to the *number* of services they use, they appear to face similar transaction costs in regard to the relative *distribution* of service types. Findings point to unexamined factors contributing to health service utilization patterns by children from Spanish-speaking households, as well as the adequacy of the Transaction Cost model as a conceptual framework for such analyses.

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THE IMPACT OF RETURNING TO SCHOOL ON CHILDHOOD HOSPITAL ADMISSIONS FOR ASTHMA IN NEW YORK STATE. *S Lin, X Liu, R Jones, and S A Hwang (New York State Department of Health, Troy, NY 12180)

Asthma is normally believed to increase beginning in autumn, but seasonal variation by age group has rarely been examined. The impact of returning to school on childhood asthma admissions has also not been well explored. The objectives of this study are to determine how the return to school affects asthma hospital admissions and to assess the timing and magnitude of admissions following school vacations among different age groups. This time-series study compared admissions on the first day of school to those on subsequent days in the school session following four school breaks (summer, Christmas, winter, spring). Data included hospital admissions for asthma from 1991–2001 in New York State. A generalized additive model assessed the risk associated with school return among different age groups (2–4, 5–11, and 12–17 years old) while adjusting for long term trends, day-of-the-week, holidays, daily ozone level, temperature, and humidity. Adults (18–65 years) and elders (> 65 years) were the comparison groups. Overall, there was a significant increase in asthma admissions (6% - 254%) associated with the return to school after each break for all children. Peak admissions occurred from 17–30 days after the first day of school. Stronger associations were found following summer vacation and for children aged 5–11 years. Smaller or no increases were observed in adults and elders. Returning to school after vacations substantially increases the risk of asthma admissions in children, especially among elementary school children. Intervention focused on the period of return to school may reduce the asthma burden in children.

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UNEQUAL RACIAL/ETHNIC DISTRIBUTION OF BREAST CANCER SUBTYPES: IDENTIFYING MECHANISMS BY WHICH ADVERSE SOCIAL ENVIRONMENTS MAY MODULATE GENETIC VULNERABILITIES. *R A Hiatt and *D Braithwaite (University of California, San Francisco, CA)

Despite being a major part of the cancer burden worldwide, much is still unknown about the etiology of breast cancer. Several breast cancer subtypes have been identified in recent years, including basal-like, human epidermal growth factor receptor-2 positive/estrogen receptor negative (HER2+/ER-), luminal A, and luminal B. A particular form lacking receptors for estrogen, progesterone, and HER2, the 'triple-negative' breast cancer, has been shown to have a disproportionately increased incidence in African American and Hispanic women. Data from the large scale studies such as the Nurses Health Study and the Women's Health Initiative, have shown that risk factors may vary by breast cancer subtype. Human observational studies and experimental animal models underscore the important role that social environments play in carcinogenesis. The aims of the proposed symposium are twofold: (1) to shed light on the markers of multiple adverse environments that point to windows of increased susceptibility to breast carcinogenesis and (2) identify potential pathways that could explain mechanisms by which adverse social environments may modulate genetic vulnerabilities. We anticipate that the symposium will inform future research directions aimed at improving our understanding of the racial/ethnic and social determinants of breast cancer.

Symposium Chairs:
Robert A. Hiatt, MD, PhD and Dejana Braithwaite, PhD (University of California, San Francisco, CA).

Speakers:
Funmi Olopade, MD, University of Chicago, "*Racial/ethnic disparities in breast cancer.*"
Monica Brown, PhD, California Cancer Registry, "*Triple Negative Breast Cancer: a Cancer Registry's Perspective.*"
Sarah Gehlert, PhD, University of Chicago, "*Breast Cancer and Social Interactions: Identifying Multiple Environments That Regulate Gene Expression.*"

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RACIAL/ETHNIC DISPARITIES IN BREAST CANCER. *F Olopade, MD (University of Chicago, Chicago, IL)

Breast cancer is a genetically and clinically heterogeneous disease. Whether different target cells contribute to this heterogeneity in different populations, and which cell types are most susceptible to oncogenesis is still not well understood. In addition, recent DNA and tissue microarray analyses have identified basal-like breast tumor subtype and shown that these tumors portend a poor prognosis. Although geographically separated, there are strong similarities in the clinico-pathological features of early onset breast cancer in African American women as well as women in countries with low breast cancer incidence. Globally, early onset breast cancer is frequently associated with high nuclear atypia, high S-phase fractions, poor histological differentiation, and predominantly estrogen and progesterone receptor negative tumors. The clinical outcome of early onset breast cancer in women of African ancestry has been uniformly poor partly because they are non-screen detected and/or the inadequate treatment of basal-like or triple negative breast cancer. Nonetheless, the aggressive biologic behavior of breast cancer in young women may be due to previously unrecognized genetic risk factors. In ongoing work, we are examining the frequency and mutational spectrum of BRCA1 and BRCA2 germline mutations in a large cohort of women in the US as well as in Africa and also exploring BRCA1 pathways as a mechanism to examine disparities in breast cancer outcomes. Translating this research into clinical practice and prevention can be challenging as will be discussed during this session.

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TRIPLE NEGATIVE BREAST CANCER: A CANCER REGISTRY'S PERSPECTIVE. *M Brown, K Bauer, C Parise, V Caggiano (California Cancer Registry, Sacramento, CA)

DNA microarray technology led to molecular classification of breast cancers: basal-like, HER2-overexpressed, luminal A, B and C. Gene expression profiling is currently uncommon for breast cancer diagnosis; however, tumor marker phenotyping, a surrogate technique, is common. Triple negative breast cancer (TNBC) is a subgroup of the basal-like subtype (85%). TNBC is described as having aggressive histology; patients have a poor prognosis, are unresponsiveness to endocrine therapies and shorter survival. The California Cancer Registry (CCR) provides a robust source of epidemiologic data for a populous and demographically diverse geographic area. We used the CCR for a series of studies on TNBC. In this presentation, we will discuss the use of registry data for those studies, the results of those studies and the intriguing role patient SES seems to play.

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BREAST CANCER AND SOCIAL INTERACTIONS: IDENTIFYING MULTIPLE ENVIRONMENTS THAT REGULATE GENE EXPRESSION. *S Gehlert, PhD (University of Chicago, Chicago, IL)

The University of Chicago's Center for Interdisciplinary Health Disparities Research (CIHDR) is one of the eight centers funded through NIH's Population Health and Health Disparities initiative. CIHDR's trandisciplinary team of social, behavioral, and biological/genetic investigators is united by related questions: Why, despite the fact that white women are more likely to develop breast cancer, are African-American women more likely to die from it, and how does this contribute to African-American and white disparities in breast cancer mortality? Based on the knowledge that breast cancer develops only after a series of complex genetic interactions, CIHDR investigators launched four interdependent research projects (two using animal models and two following the same group of newly-diagnosed African-American women) to better understand gene and environment interactions in breast cancer. CIHDR's goal is to move beyond correlations to elucidate causal steps: beginning with neighborhood and community features, moving to individuals' psychosocial reactions to these features, then to how psychosocial reactions are linked to the physiological stress system (i.e., inflammatory process and cortisol dynamics), and ultimately to factors that regulate apoptosis and tumorigenesis. This presentation focuses on the range of environments that create daily stressors (e.g., high-crime neighborhoods and lack of safe and affordable housing) or help to ameliorate them (e.g., collective efficacy), as well as the lack or presence of desired social support in the face of these stressors. Based on work with animal models that suggests that natural variation in the glucocorticoid response to a stressor predicts the timing of mammary tumorigenesis, we began to collect salivary cortisol and investigate the relationship between diurnal cortisol rhythms and subjective and objective measures of participants' social environments. As part of the study, we measure features of the built environments around women's homes that might impede or enhance social interactions (e.g., vacant buildings and lots) and collect data on violent crime, collective efficacy, socioeconomic indicators, etc. We have identified statistically significant links between neighborhood/community-level factors (e.g., violent crime), psychosocial responses (felt loneliness, acquired vigilance, and depression), and cortisol response. We have identified a two factor "psychosocial suite" that demonstrates how the social environment gets "under the skin" to alter the body's ability to repair cells. CIHDR's research to date suggests interventions targeted at multiple levels of influence, for e.g., that understanding the suite of psychosocial factors that contribute to a woman's vulnerability to stress and development of breast cancers can help treatment providers identify high-risk individuals and thus allow resources to be maximized.

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EPIDEMIOLOGY RESPONDS TO ITS MEDIA CRITICS. *N Weiss (University of Washington, Seattle, WA)

This Symposium was stimulated by the criticism of epidemiologic research leveled by Gary Taubes last year in the New York Times Magazine. The speakers will address: errors of fact and interpretation in Taubes' article; strategies to reduce the likelihood and degree of misinterpretation of the results of epidemiologic studies; and the means by which the epidemiologic profession can promote its interests and educate the public.

Speakers:
Meir Stampfer, Harvard School of Public Health—"*Is observational epidemiology bad science: Setting the record straight.*"
Noel S. Weiss, University of Washington School of Public Health and Community Medicine—"*What can epidemiologists do to minimize overinterpretation and misinterpretation of the results of our studies?*"
Roberta Ness, University of Pittsburgh Graduate School of Public Health—"*Taubes as a call to action: Epidemiology and advocacy.*"

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SOCIAL EPIDEMIOLOGY AND BEHAVIORAL HEALTH: METHODOLOGIC APPROACHES, PROBLEMS, AND PROMISE. *Y Thomas and C Sterk (Emory University, Rollins School of Public Health, Atlanta, GA)

There has been a tremendous increase in epidemiologic interest in the social determinants of health over the past two decades. Most of the literature in this area thus far however has concerned itself with traditional chronic diseases, particularly cardiovascular disease. More recently, papers in the peer-reviewed literature have been considering how the social environment influences aspects of behavioral health, including psychiatric disease and substance abuse and dependence. This work brings novel epidemiologic approaches to early and classic work in psychiatric epidemiology that recognizes that psychiatric illness is inextricably linked to features of an individual's context. However, studies concerned with the social environment and behavioral health face particular challenges, some of which are unique to this substantive area of research. Issues of endogeneity, measurement issues, definitions of counterfactual effects, social selection, and social causation are particularly important analytic and conceptual concerns, among others. This symposium will discuss the methodologic challenges faced in the study of social determinants of behavioral health, offer some potential solutions, and suggest directions for the field.

Session Chairs:
Yonette Thomas and Claire Sterk (Emory University).

Discussant:
Wilson Compton (DESPR).

Speakers:
Sandro Galea—"*Applying complex system analytic approaches to behavioral health questions.*"
Jay S. Kaufman—"*Counterfactual contrasts in the absence of manipulability.*"
Shruti Mehta—"*Assessing causal ecologic effects in drug dependence epidemiology.*"
Thomas Glass—"*Etiologic Inertia: Using latent variable models to address risk clustering.*"

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APPLYING COMPLEX SYSTEM ANALYTIC APPROACHES TO BEHAVIORAL HEALTH QUESTIONS. *S Galea (University of Michigan, Ann Arbor, MI)

As social epidemiologic inquiry matures, and as behavioral health research focuses increasingly on challenging questions of multilevel causation, it is becoming increasingly well recognized that the dominant epidemiologic analytic paradigm, which generally assesses the relation between "independent" variables and "outcome" variables of interest is flawed. Conceptually, it is unlikely that social risk factors act independently and unidirectionally to produce behavioral health outcomes. Rather, it is much more plausible that personal circumstances and behaviors that have traditionally been considered "risk factors", are interdependent, shape one another, and are in turn shaped by health itself. Methodologic challenges to the dominant epidemiologic regression approach arise quickly upon recognition of these conceptual entanglements. Commonly used regression models rest on several central assumptions that limit their use in studying complex phenomena. Unfortunately, these assumptions are false in most analyses that are of interest to population heath scientists and policy makers. For example, individuals are shaped by shared common experiences and individual behaviors likely influence those of others in a neighborhood. If we accept that dynamic and interrelated forces influence the health of populations, it becomes relatively easy to recognize that methods that can account for the dynamic characteristics of population systems may expand our capacity to understand and predict population health. One promising avenue that can help contribute to behavioral health analysis is the application of complex systems computational models. In this presentation we will use one particular behavioral health example—the acquisition of drug dependence—to illustrate the promise and challenges inherent in these approaches.

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COUNTERFACTUAL CONTRASTS IN THE ABSENCE OF MANIPULABILITY. *J S Kaufman (University of North Carolina, Chapel Hill, NC)

Modern causal inference in epidemiology is premised on counterfactual quantities, such as the risk in the exposed had they been unexposed. This inferential model has led many authors to suggest that only manipulable exposures can be considered causes, excluding factors such as race and sex. This proposed restriction has led to some counterexamples, such as Glymour's statement that, had he been born a girl, his parents would have named him Olga (1986). I discuss such counterexamples for the case of racial/ethnic categories in epidemiologic research. Some proposed racial contrasts seem more reasonable than others, and so I discuss what subject matter knowledge is being used to sort out more plausible from less plausible comparisons. Examples show how different assumptions and/or background knowledge, encoded in directed acyclic graphs (DAGs), make situations distinct with respect to this question. Subject matter examples include discrimination in medical care, melanoma, cystic fibrosis and hypertension. Such examples demonstrate that it is not manipulability that is the key criterion for causal comparisons, but rather a credible assertion of ignorability of the treatment assignment. In some cases, we might accept this condition as reasonable, even if we know of no existing means of manipulating the exposure. This distinction helps clarify when contrasts between racial/ethnic categories might be fruitfully pursued in epidemiologic research, and when their use would be more problematic.

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ASSESSING CAUSAL ECOLOGIC EFFECTS IN DRUG DEPENDENCE EPIDEMIOLOGY. *S Mehta (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD)

Interventions aimed at reducing the harms associated with injection drug use have historically taken a reductionist approach, targeting individual-level risk factors that have been identified in a number of seminal analyses. With growing recognition of the inherent limitations of these interventions in terms of their ability to bring about sustained behavior change, questions related to drug dependence have moved to consideration of individuals in terms of their broader environmental context. However, assessment of causal ecologic effects is not without its methodologic challenges. In order to estimate the causal effect of a neighborhood-level exposure on a drug-related outcome, we need to assure that 1) we have appropriately measured the neighborhood-level exposure of interest; 2) the observed associations are not confounded, particularly by selection of individuals who are more likely to have the outcome of interest into particular types of neighborhoods; and 3) we have appropriately accounted for the relationships between neighborhoods in space. We will present these challenges and potential solutions in the context of a conceptual framework designed to address multiple questions related to neighborhood-level exposures and drug-related outcomes in an ongoing longitudinal cohort of active and former injection in drug users in Baltimore, MD that has contributed nearly 20 years of follow-up data. Our methods will build upon and refine the standard techniques which are now routinely used for contextual analyses. For example, we will explore the use of measurement models to deal with the inherent difficulties of measuring neighborhood-level latent constructs. We will characterize potential approaches for addressing selection into neighborhoods including propensity scores and marginal structural models. Finally, we will discuss the use of using spatial mixed modeling techniques to account for the non-independence of neighborhoods within space.

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ETIOLOGIC INERTIA: USING LATENT VARIABLE MODELS TO ADDRESS RISK CLUSTERING. *T A Glass (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205)

The social machinery that generates risk factors for disease does so in a patterned and maldistributed fashion. Yet, our traditional approaches involve studying risk factor-disease relationships in isolation. This presents substantial methodological challenges given that risk factors co-occur in space, time and within individuals as a function of the underlying risk production machinery. This talk will describe the phenomenon of etiologic inertia, when cumulative exposure to some strata of the risk production machinery (a particular risk regime) leads to the chaining together of risk factors. The author proposes that when risk clustering is not taken into account, the influence of "uphill" social factors, temporally and spatially distal from disease outcome, tend to be null biased. Latent variable measurement models have been used sparingly in epidemiology. The author will show an example of how these models can be used to address measurement error and risk clustering. The example involves modeling global physiologic vulnerability using a latent variable approach and a range of observed indicators of risk taken from a cohort study of randomly selected adults aged 50–70. Several extensions of this measurement model will be shown to illustrate how associations with aspects of social context can be sharpened using this approach.

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SOCIAL AND ENVIRONMENTAL DETERMINANTS OF DIABETES: WHAT WE CAN LEARN FROM NATIONAL TO COMMUNITY LEVEL DATA. *S Saydah, K A Lochner (National Center for Health Statistics, Hyattsville, MD 20782)

The prevalence of obesity and diabetes has increased dramatically over the past twenty years. While many factors may contribute to this increase, social and environmental determinants likely play a large role. Yet, how social and environmental factors are characterized and what we can learn about how they affect health depends upon the lens that a particular data source provides. At the national level, we can examine broad socio-economic characteristics and trends over time. As the geographic reference becomes more granular, the indicators of social and environmental determinants can become more context specific. This session will present research on the social determinants of obesity and diabetes that utilize data from varying geographic levels. Speakers will discuss available measures of social and environmental factors from the national, to the state, to the community level as well as discuss challenges encountered in collecting, analyzing and interpreting the results as they relate to obesity and diabetes. The session will allow time for interaction with the panel of speakers to help identify some of the key lessons learned about the social and environmental determinants of obesity and diabetes and discuss future directions for epidemiologic research in this area.

Speakers:
Susan Babey, PhD—"*Using the California Health Interview Survey to Examine the Association of Local Food Environments with Obesity and Diabetes.*"
Manuel Franco, MD, PhD—"*Availability of Healthy Foods and its Associations with Diet Quality: The MESA Study in Baltimore.*"
Lorna Thorpe, PhD—"*Diabetes and Impaired Fasting Glucose in an Urban Population: Prevalence and Control Findings from an Examination Survey among New York City Adults, 2004.*"
Kimberly A Lochner, ScD—"*Socioeconomic status and risk of diabetes mortality in the U.S.: 1990–2000.*"

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USING THE CALIFORNIA HEALTH INTERVIEW SURVEY TO EXAMINE THE ASSOCIATION OF LOCAL FOOD ENVIRONMENTS WITH OBESITY AND DIABETES. *S H Babey, T A Hastert, A L Diamant, H Goldstein, R Banthia, R Flournoy, V Rubin (UCLA Center for Health Policy Research, Los Angeles, CA 90024)

Increasingly, researchers are examining environmental influences on obesity and diabetes. Using data from the 2005 California Health Interview Survey (CHIS), a random-digit dial (RDD) telephone survey of California households and an InfoUSA business database, we examined the association of the food environment with obesity and diabetes among adults. The food environment was characterized in terms of the availability of fast food restaurants and convenience stores relative to grocery stores and produce markets. Specifically, we used a ratio of fast food outlets and convenience stores to grocery stores and produce markets within buffers around individual CHIS respondents' home addresses. A higher ratio represents greater availability of fast food and convenience stores relative to grocery stores and produce markets, arguably a worse food environment. Adults with lower ratios (<3) had a lower prevalence of obesity (20%) than adults with ratios of 5 and above (24%; $p < 0.05$). Similarly, adults with lower ratios (<3) had a lower prevalence of diabetes (6.6%) than adults with ratios of 5 and above (8.1%; $p < 0.05$). Regression analyses indicated that, after adjusting for individual income, race/ethnicity, age and neighborhood income, the association between the food environment and obesity remained significant (Odds Ratio = 1.18; 95% Confidence Interval = 1.06–1.31) as did the association between the food environment and diabetes (OR = 1.25; 95% CI = 1.06–1.46). Improving the retail food environment could help improve weight status of California adults. The challenges in linking a state-level population-based survey with local data on retail food outlets will be discussed.

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AVAILABILITY OF HEALTHY FOODS AND ITS ASSOCIATIONS WITH DIET QUALITY: THE MESA STUDY. *M Franco, A V Diez-Roux, J A Nettleton, F Brancati, B Caballero, T Glass, M Lazo, L V Moore (Johns Hopkins School of Public Health, Baltimore, MD 20852)

We investigated the association between the availability of healthy foods and diet quality. A cross-sectional study of 759 participants from the Baltimore site of the Multi-Ethnic Study of Atherosclerosis was conducted. We calculated a Healthy Food Availability Index (HFAI) for each participant based on the availability of healthy foods in all food stores within the participant's neighborhood of residence. To assess diet quality we used two empirically-derived dietary patterns; the Fats & Processed Meats pattern, reflecting a diet of low quality, and the Whole Grains & Fruit pattern, reflecting a diet of high quality. After adjustment for age, sex, income and education, adults living in neighborhoods with low availability of healthy foods scored higher on the low-quality dietary pattern ($P = 0.04$) compared to adults in neighborhoods with high healthy food availability. Large race/ethnicity disparities were observed: 24% of Black participants lived in neighborhoods with low healthy food availability compared to 5% of White participants ($P < 0.0001$). Compared to White participants, Black participants scored lower on the high-quality dietary pattern ($P < 0.0001$) and higher on the low-quality dietary pattern ($P < 0.0001$). Availability of healthy foods was associated with diet quality. Healthy foods were significantly less available for Black than White participants. Whether improvements in the availability of healthy foods would result in higher quality diets deserves further investigation.

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DIABETES AND IMPAIRED FASTING GLUCOSE IN AN URBAN POPULATION: PREVALENCE AND CONTROL FINDINGS FROM AN EXAMINATION SURVEY AMONG NEW YORK CITY ADULTS, 2004. *L E Thorpe UD Upadhyay, R Garg, J Mandel-Ricci, S Kellerman, D K Berger, S Chamany, C Gwynn (NYC Dept of Health and Mental Hygiene, New York, NY 10013)

National surveillance has documented a sharp rise in diabetes. In local settings, monitoring of the diabetes epidemic has been limited to mortality, hospitalizations and, in some settings, self-reported diabetes status. In 2004, NYC implemented the first community-level Health and Nutrition Examination Survey (NYC HANES), modeled after the national NHANES. We used an interview to determine previously-diagnosed diabetes, and measured fasting plasma glucose to determine undiagnosed diabetes and IFG in a probability sample of 1,336 NYC adults. We assessed diabetes medication, glycemic control, and other cardiovascular risk factors (smoking, blood pressure, cholesterol, obesity). The prevalence of diabetes among NYC adults was 12.5% (95% confidence interval: 10.3–15.1%)—8.7% diagnosed and 3.8% undiagnosed. Nearly one-fourth (23.5%) of adults had IFG. Asians had the highest prevalence of diabetes (16.1%) and IFG (32.4%) but were significantly less likely than other adults to be obese. Less than half (45%) of adults with diagnosed diabetes had A1C levels below 7; only 10% had their glucose, blood pressure, and cholesterol at or below recommended levels. Most (83%) adults with diagnosed diabetes were on medication, but only 12% were receiving insulin. In 2004, more than one-third of NYC residents had diabetes or IFG. Policies and structural interventions to promote physical activity and healthy eating should be prioritized, coupled with aggressive disease management for persons with diabetes.

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SOCIOECONOMIC STATUS AND RISK OF DIABETES MORTALITY IN THE U.S.: 1990–2000. *K A Lochner, S Saydah (NCHS, CDC, DHHS, Hyattsville, MD 20782)

Diabetes presents a significant public health burden in the U.S. Much attention has been paid to the large racial disparities in diabetes mortality, with less attention to other social determinants. We examined the association of socioeconomic status (SES) and risk of diabetes related mortality using the 1990–2000 National Health Interview Survey cohorts, with mortality follow-up through 2002. We constructed proportional hazards models with age as the time scale and adjusted for sex, race/ethnicity, marital status and BMI. Results show the inverse gradient between SES and diabetes mortality, with both lower education and lower family income associated with increased risk. Compared to adults with a college degree or more, the relative hazard (RH) was 2.05 (95% confidence interval (CI) 1.78, 2.35) for those with less than a high school education, 1.57 (95% CI 1.37, 1.80) for those with a high school education or GED and 1.46 (95% CI 1.25, 1.71) for those with some college. Compared to adults with family income at 400% of the poverty level or more, the RH was 2.41 (95% CI 2.05, 2.84) for those with family income at less than 100% of poverty, 1.98 (95% CI 1.71, 2.28) for those with family income at 100% to 199% percent of poverty, 1.70 (95% CI 1.47, 1.97) for those with family income at 200% to 299% of poverty and 1.20 (95% CI 1.02, 1.42) for those with family income at 300% to 399% of poverty. Including both education and income in the model attenuated the results, but the overall pattern of relationships remained. These findings, based upon nationally representative U.S. samples, highlight the importance of SES in assessing the social determinants of diabetes mortality.

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MAKING LEMONADE FROM LEMONS: IMPLICATIONS OF MARGINAL STRUCTURAL MODEL ANALYSIS FOR PUBLIC HEALTH PLANNING AND POLICY. *S Magzamen, J Scott, A E Hubbard (University of Wisconsin, Madison, WI 53726)

Risk estimates derived through epidemiologic research have served the policy development process by providing an indication of the magnitude of health risks; however, these findings do not readily translate into indicators of population health impact, for two primary reasons. First, many studies are based on observational data, limiting any causal inference and further, studies often estimate conditional parameters related to specific subsets of the population, which are somewhat less relevant for policy formulation and intervention. Marginal structural models (MSM) address both these issues by providing researchers with a method for estimation of the marginal (as opposed to conditional) effects of an exposure on a population; moreover the resulting estimates have causal interpretations under certain conditions. Although marginal structural models have been limited largely to address time-dependent confounding in longitudinal data studies, this symposium will illustrate the rationale for the application of these models to point-treatment data. Further, we will present examples of the application of MSM to derive causal estimates of effect with observational data for three distinct epidemiologic research questions. Results of these analyses rare highly relevant to health policy and public health planning, particularly in understanding the utility of interventions.

Speakers:
Alan Hubbard, PhD, "*Causal inference and the curse of dimensionality.*"
Jim Scott, PhD, MPH, "*Estimating causal effects using observational data: An alternative to randomized controlled trials.*"
Sheryl Magzamen, PhD, MPH "*Causal inference at the community level: A marginal structural models approach.*"

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CAUSAL INFERENCE AND THE CURSE OF DIMENSIONALITY. *A E Hubbard (University of California, Berkeley, CA 94720)

A typical study design for investigating potential causes of disease can involve collecting a large number of potential risk factors and disease outcomes in a random sample of individuals. Some (e.g., Ioannidis, 2005) with good reason have suggested that these types of studies (exploratory observational epidemiology) have very high rates of false positive findings. Although there are several reasons, one is the so-called curse of dimensionality and how this issue is handled in the analysis or design of a study. We will discuss certain varieties of the curse of dimensionality in observational epidemiological studies and methods used to address it (typically by assuming an arbitrary regression model). We also mention post-hoc matching, which can be done in a clever way using the propensity score (Rosenbaum and Rubin, 1983). In this talk, we will focus on how the estimating equation approach to estimating marginal structural models (Robins, 2002) has a very natural way of handling the curse of dimensionality. Part of the virtue of the technique is not only does it provide estimates for an interesting causal parameter if assumptions are met, but it also conveniently separates out the estimation of a potential simple (low dimensional) parameter of interest regarding aspects of the marginal counterfactual distribution from the so-called high dimensional nuisance parameters. We discuss the general methodology for constructing estimators as well as a specific example for parameters that compare outcome distribution after eliminating an exposure of interest to the current distribution of the disease outcome (Hubbard and van der Lann, 2008).

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ESTIMATING CAUSAL EFFECTS USING OBSERVATIONAL DATA: AN ALTERNATIVE TO RANDOMIZED CONTROLLED TRIALS. *J Scott, J Bartram, L Haller, J Eisenberg (St. Olaf College, Northfield, MN 55057)

A common way investigators estimate causal effects is though the use of randomized controlled trials (RCTs). Under ideal conditions RCTs are conducted using double blind procedures and, through randomization, ensure that all groups are comparable to one another (i.e. they exhibit exchangeability) with regard to exposure. However, in the realm of environmental epidemiology, ethical concerns, the inability to adequately blind participants and investigators, and challenges in employing randomization procedures may make it very difficult to conduct internally valid RCTs, potentially leading to biased estimates. In such instances, marginal structural models (MSMs) should be considered as an alternative to RCTs. Under certain assumptions, these models can be used to estimate the causal effects associated with an exposure using observational data. In this talk, I will introduce a MSM methodology known as g-computation. Applying this methodology to country-wide, cross-sectional data from 27 African countries obtained from 1995 to 2003, I will demonstrate how to estimate the causal effects that improved water supply and sanitation facilities have on diarrheal disease in children under five years old. Differences in results between the two methodologies (MSMs and RCTs) will be discussed.

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CAUSAL INFERENCE AT THE COMMUNITY LEVEL: A MARGINAL STRUCTURAL MODELS APPROACH. *S Magzamen, A E Hubbard, I B Tager (University of Wisconsin, Madison, WI 53726)

The concept of place has many implications for the development of disease and illness. Pediatric asthma is a disease in which the various aspects of place contribute to the incidence, prevalence and severity of disease. Contextual analysis, also known as hierarchical analysis or multilevel modeling, is currently the most frequently used tool to investigate effects of place on health. Many studies have explored the effect of neighborhood-level covariates, particularly sociodemographic factors (i.e. contextual variables) on individual level health outcomes. However, there have been several criticisms of contextual analysis in neighborhood studies. Specifically, these studies have conceptual limitations that preclude the estimate of a causal parameter of interest. To address these limitations, this seminar will present the application of a class of statistical models, marginal structural models (MSM), to broad-based community health issues; specifically, residential exposure to traffic-generated air pollution. Although MSM are more commonly used to address issues in longitudinal data analysis at the individual level, these models may have application for community-level studies of place and health. Marginal structural models provide population-level (i.e. marginal) causal effect estimates compared to traditional hierarchical modeling approaches that always provide conditional (stratum-specific) estimates of neighborhood effects that may or may not have a causal interpretation. Population-level estimates derived from MSM may be more appropriate for policy, intervention and planning compared to stratified or conditional estimates derived from traditional models.

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LIMITATIONS OF NEIGHBORHOODS RESEARCH FOR UNDERSTANDING RACIAL HEALTH DISPARITIES.

*T L Osypuk, D Acevedo-Garcia, T D Cook, S F Reardon, L Quillian (Northeastern University, Boston MA 02115)

Racial disparities for a range of health outcomes are strikingly large and persistent. Racial inequality in multiple domains of life contributes to these inequalities, and housing-market-related racial disparities may be one powerful generator. Rapidly growing evidence on neighborhood effects finds that after taking into account individual-level factors, disadvantaged neighborhood environments are associated with worse health outcomes. However, there are several challenges to conducting neighborhoods research in relation to racial health disparities. While limitations of existing neighborhood research have been debated in the epidemiology literature and elsewhere, we aim to highlight methodological and theoretical issues that are specific for quantitative racial health disparities research on neighborhoods and place-based inequality, based on different disciplinary perspectives (i.e. sociology, demography, education, and epidemiology). The interdisciplinary speakers in this symposium will discuss issues that may contribute to misestimation of the contribution of neighborhoods/place to racial health disparities.

Speakers:
Thomas D. Cook—"*Large-scale experiments involving neighborhood change: Health data from Moving to Opportunity.*"
Sean Reardon—"*Approaches to Estimating the Causal Effects of Residential Segregation and Neighborhood Conditions on Health Disparities.*"
Lincoln Quillian—"*Neighborhood Racial Composition and Distortion in Neighborhood Perceptions.*"
Theresa L. Osypuk—"*Residential Segregation, Neighborhood Inequality, and Racial Health Disparities: Methodological Considerations.*"

Discussant:
Dolores Acevedo-Garcia, PhD, MPA-URP.

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LARGE-SCALE EXPERIMENTS INVOLVING NEIGHBORHOOD CHANGE: HEALTH DATA FROM MOVING TO OPPORTUNITY.

*T D Cook (Northwestern University, Evanston, IL 60208)

This paper analyzes the health effects obtained in the Moving to Opportunity randomized experiment carried out in five cities. The main emphasis is to explicate how large-scale randomized experiments involving changes in neighborhood might be more productively designed and analyzed.

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APPROACHES TO ESTIMATING THE CAUSAL EFFECTS OF RESIDENTIAL SEGREGATION AND NEIGHBORHOOD CONDITIONS ON HEALTH DISPARITIES.

*S F Reardon (Stanford University, Stanford, CA 94305)

In this paper, I distinguish between estimating the effects of residential segregation and estimating the effects of neighborhood conditions on racial health disparities. I then discuss alternative study designs for estimating each, focusing on the data requirements, assumptions, and limitations for each.

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NEIGHBORHOOD RACIAL COMPOSITION AND DISTORTION IN NEIGHBORHOOD PERCEPTIONS.

*L Quillian (Northwestern University, Evanston, IL 60208)

This presentation examines evidence for the role of neighborhood racial composition in creating distorted perceptions of neighborhood-linked risks, focusing on perceived crime risks. The presentation will present detailed results comparing subjective probability estimates of crime victimization to actual victimization experiences among respondents from the 1994 to 2002 waves of the Survey of Economic Expectations. Using zip code identifiers, we then match these survey data to local area characteristics from the census. The results show that: (1) the risk of criminal victimization is significantly overestimated relative to actual rates of victimization or other negative events; and (2) neighborhood percentage black is strongly associated with perceived risk of victimization among white respondents, although actual victimization risk is driven by non-racial neighborhood characteristics. The results are consistent with a model of racial stereotypes distorting estimates of risk. We compare these results to other studies of factors driving neighborhood perceptions. We conclude that respondents' perceptions of neighborhoods are often distorted by stereotypes linked to racial composition and cannot be used reliably as measures of actual neighborhood attributes.

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RESIDENTIAL SEGREGATION, NEIGHBORHOOD INEQUALITY, AND RACIAL HEALTH DISPARITIES: METHODOLOGICAL CONSIDERATIONS. *T L Osypuk, D Acevedo-Garcia (Northeastern University, Boston MA 02115)

This presentation will discuss methodological challenges in the current neighborhood-health literature and directions for future studies, to understand the contribution of neighborhood environment to racial/ethnic health disparities.

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EXTENDED INSTRUMENTAL VARIABLES ESTIMATION FOR OVERALL EFFECTS. *M Joffe, D Small, S Brunelli, T T Have, H Feldman (University of Pennsylvania, Philadelphia, PA 19104)

We consider the use of instrumental variables-like methods for estimating the overall effect of a variable in settings in which the instrument influences both the treatment or exposure of interest and a secondary treatment also influenced by the primary treatment. We demonstrate that, while instrumental variables methods may be used to estimate the joint effects of the primary and secondary treatments, they cannot by themselves be used to estimate the overall effect of the primary treatment. However, instrumental variables methods may be used in conjunction with approaches for estimating the effect of the primary on secondary treatment to estimate the overall effect of the primary treatment. We consider extending the proposed methods to deal with confounding of the effect of the instrument, mediation of the effect of the instrument by other variables, failure-time outcomes, and time-varying secondary treatments. We motivate our discussion by considering estimation of the overall effect of type of vascular access among hemodialysis patients.

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ESTIMATING THE EFFECTS OF HYPOTHETICAL INTERVENTIONS IN LONGITUDINAL DATA: INVERSE PROBABILITY WEIGHTING OF MARGINAL STRUCTURAL MODELS VERSUS THE PARAMETRIC G-FORMULA. *S Taubman, J Robins, M Mittleman, and M Hernán (Harvard University, Boston, MA 02115)

Epidemiologists often seek estimates of the effect of hypothetical interventions, such as the population risk of coronary heart disease were everyone to quit smoking or exercise 30 minutes a day. We estimate the effects of various lifestyle interventions on the risk of coronary heart disease using data from the Nurses' Health Study. We contrast estimates based on inverse probability weighting of marginal structural models with estimates based on the parametric g-formula, both of which can appropriately adjust for time-dependent confounding by factors affected by earlier intervention. The contrast highlights, in particular, the implications of subtle differences in the interpretation of the intervention. Our analysis also explores the potential for bias in the IPW estimates resulting from violations in the positivity assumption. This work represents the first contrast of these two methods in a large-scale epidemiologic study and illustrates some of the relative advantages and disadvantages of the methods.

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COGNITIVE TEST SCORES AND RISK OF FIRST STROKE. T DeFries, M Avendaño, *M M Glymour (Columbia University, New York, NY 10032)

Background: Prior studies suggest low cognitive test scores may predict stroke risk, but results have been inconsistent and it is unknown whether associations are modified by conventional vascular risk factors. Methods: Stroke-free participants in the Health and Retirement Study age 50+ (n = 19,699) were followed on average 7.6 years for self or proxy report of first stroke (1,483 events). We examined relationships between performance on a 10-word list recall test (immediate and delayed) and a modified version of the Telephone Interview for Cognitive Status mental status screen. Cox proportional hazards models were used to estimate hazard ratios (HRs), stratified by the following vascular risk factors: prior diagnosis of hypertension, diabetes, or heart disease, and baseline obesity and smoking status (current vs not current). Models were adjusted for age, race, Hispanic ethnicity, Southern birth, childhood and adult socioeconomic status. Supplementary models adjusted for any alcohol use and vascular risk factors. Results: Hazard of incident stroke was predicted by performance on both the Word Recall test (hazard ratio for 1 standard deviation change in Word Recall = 0.92 (95% CI: 0.86, 0.97)) and the Mental Status screen (HR = 0.89; 0.84, 0.95). Adjustment for vascular risk factors did not substantially attenuate the association between cognitive scores and stroke risk. Although Mental Status scores predicted stroke risk both among those with and those without 1+ vascular risk factors, higher scores conferred greater protection among those without any vascular risk factors (HR = 0.81 vs 0.92, $p < 0.01$ for test of interaction). Conclusions: Impaired cognitive test scores indicate substantial excess risk of stroke, regardless of the presence of other vascular risk factors.

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LARGE AND VARIABLE INVERSE PROBABILITY WEIGHTS IN A MARGINAL STRUCTURAL MODEL ANALYSIS OF WARFARIN USE AND THE RISK OF BLEEDING.

*J A C Delaney, R W Platt, S Suissa (McGill University, Montreal, Quebec, Canada)

There is evidence that patients at high risk of gastro-intestinal bleeding (GIB) are unlikely to be prescribed warfarin. One analytic option to estimate the marginal effect of warfarin use on GIB at the population level, despite this drug channeling, is to use a marginal structural logistic model (MSLM). To explore this option, we implemented a MSLM on 4028 cases of GIB and 788766 controls (matched only on index date using incidence density sampling) in the United Kingdom's General Practice Research Database. We defined warfarin use as a prescription issued in the 90 days before the index date. All inverse probability weights were estimated using logistic regression. The estimated association between warfarin use and GIB was higher with a MSLM (Odds Ratio (OR):17.2;95% Confidence Interval (CI):6.5–37.7) than with an adjusted logistic regression model (OR:2.1; 95% CI:1.7–2.5). We noted the presence of large and variable inverse probability weights (range: 0.01–748 and standard deviation: 2.7 for the stabilized weights). Given this extreme distribution, we used restriction on age to patients over 60 years of age to remove subjects extremely unlikely to be treated. After restriction, the MSLM estimate (OR:4.2;95% CI:1.7–9.3) still differed from the logistic regression estimate (OR:1.9;95% CI:1.5–2.3). Previous work by Kurth et al. and Robins et al. has suggested caution in the presence of large and variable inverse probability weights. Comparison of our MSLM estimates with the estimate from a meta-analysis of randomized controlled trials (OR:2.2 from Lip et al.) provides further evidence for this cautious approach to interpretation.

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DIFFERENT PROFILES OF BIOLOGICAL RISK ACROSS SELF-RATED HEALTH CATEGORIES BY SOCIOECONOMIC POSITION.

*J B Dowd, A Zajacova (University of Michigan, Ann Arbor, MI 48106)

Self-rated health (SRH) is a commonly used summary measure of health in epidemiology and social science. Differences in self-rated health across socioeconomic strata may reflect differences in "true" health or in reporting standards. This paper tests whether a given self-rated health category corresponds to similar biological risks across different categories of socioeconomic position (SEP). We use data from the National Health and Nutrition Examination Survey (NHANES) III collected from adults 17–90 years old. Biological risk indicators include systolic and diastolic blood pressure, body mass index, waist-to-hip ratio, HDL and LDL cholesterol, glycated hemoglobin, and fibrinogen. SEP is measured by education and income. Gender-stratified regression models are employed to test whether the values of each biological risk indicator differ by level of education or income within a given category of SRH. We find that among adults who reported fair or poor health, there were few differences in biological risk factor levels across SEP. For individuals who reported good, very good, or excellent health, there were larger differences by SEP. For instance, age-adjusted means for glycated hemoglobin among men in good to excellent health are 5.60% [95% CI: 5.56,5.64] for those with less than high school education and 5.41% [5.37,5.44] for men with more than high school. The comparable values for women are 5.53% [5.49,5.57] at less than high school and 5.35% [5.31,5.38] at more than high school. The findings suggest that the meaning of self-rated health may differ for men and women across socioeconomic position.

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DISENTANGLING RACIAL AND ECONOMIC SEGREGATION: THE LIMITS TO CAUSAL INTERPRETATION POSED BY STRUCTURAL CONFOUNDING.

*L C Messer, J M Oakes, S Mason (US EPA/NHEERL, Research Triangle Park, NC 27711)

The use of multilevel models to explore neighborhood effects on health has increased, but model utility is limited by the lack of attention paid to nonrandom neighborhood selection. Structural confounding, which results from differential neighborhood selection processes, ensures that people residing in different neighborhoods are neither comparable nor exchangeable, even after traditional covariate matching. Using geocoded birth records, we explore the joint influence of racial (defined as %black) and economic segregation (defined using a neighborhood deprivation index) on preterm birth ([PTB] birth $<$ 37 weeks gestation) among non-Hispanic white and black women living in Wake (n = 105) and Durham (n = 53) County census tracts (NC) in 1999–2001 (n = 31715). Tabular analyses show the count of tracts, women and outcomes for each combination of the quartiles of deprivation and racial segregation (4 X 4 = 16). County-stratified maternal-education adjusted models find increased PTB odds for living in the highest deprivation quartile (Odds Ratio [OR] = 1.4; 95% Confidence Interval [95% CI] 1.1, 1.8) and highest %black quartile (OR = 1.3; 95% CI: 1.0, 1.7) tracts in Wake County, compared with residence in the lowest quartiles, respectively. Increased PTB odds for highest %black tract residence was also noted for Durham County (OR = 1.9; 95% CI: 1.3, 2.8). The tabular analysis demonstrates an absence of data to support these model results. Because multilevel modeling assumes exchangeability across contexts, in the presence of structural confounding, causal interpretations of multilevel model results will not be supported by data. Implications for public health policy will be discussed. This abstract does not necessarily reflect EPA policy.

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RESIDENTIAL CONTEXT AND DISABILITY AMONG BLACK AMERICANS.

*T Osypuk, S Galea, D Acevedo-Garcia (Northeastern University, Boston, MA 02115)

Although emerging studies suggest that residential segregation and area-level disadvantage may be important social determinants of health disparities, studies with representative data at metropolitan, neighborhood, and individual levels are uncommon. In this study we assessed whether black residents in highly segregated metropolitan areas (MAs) were more likely to have disabilities, compared to black residents in less segregated MAs, and whether neighborhood poverty or violent crime rates mediated this association. We applied Census 2000 counts of disability status for black Americans by sex & age for all tracts within the 100 largest MAs, merged with Census measures of MA residential segregation (black isolation) and tract poverty. Disability was defined in the long-form questionnaire as self-report of sensory, physical, mental, self-care, difficulty going outside home, or employment disability. We derived MA violent crime rates from FBI data. We used 3-level hierarchical logistic models of individuals within census tracts within MAs predicting odds of disability. Blacks living in MAs with high segregation were more likely to have disability (OR = 1.23, 95% CI:1.12,1.36) compared with blacks living in low segregation areas. Blacks living in higher poverty tracts had greater likelihood of disability (OR = 1.43 for 10-point higher tract %poverty, 1.34,1.52) compared with blacks in less poor areas. Both MA segregation and tract poverty were significant determinants of disability in models when both variables were included together with age and sex. There were no associations with violent crime. Disability is a primary source of morbidity. Multiple features of residential context likely shape disability among minority groups, which should be explored in future studies.

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AN AGENT-BASED MODEL TO STUDY THE RELATIONSHIP BETWEEN SPATIAL ACCESS TO HEALTHY FOOD STORES AND DIET.

*A H Auchincloss (University of Michigan, Ann Arbor, MI 48109)

Recent years have witnessed an explosion of interest in how neighborhood built environments affects health. One topic of interest has been whether access to healthy foods affects dietary choices of residents and contributes to social patterning of obesity. Most work in this area has relied on statistical models to isolate the independent effects of features of built environments on individual health behaviors or morbidity after statistical adjustment for individual-level confounders. A major limitation with current statistical models is that they do not allow understanding of the dynamic processes between individuals and their environments. In particular, regression models do not account for the reciprocal relationships and feedback loops that may be fundamental to understanding spatial patterning of health behaviors. This study uses a dynamic modeling approach—agent-based simulation models—to examine how household income and proximity to stores that sell healthy foods contribute to spatial patterning in diets and income differentials in diets. Model results suggest the contribution of various segregation/clustering patterns (household income segregation and the spatial clustering of food stores that sell healthy foods) to the social patterning of poor diets. The benefits, limitations, and challenges of this modeling approach will be discussed.

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NEIGHBORHOOD PSYCHOSOCIAL HAZARDS, APOE GENOTYPE, AND COGNITIVE FUNCTION IN OLDER ADULTS.

*B K Lee, T A Glass, B D James, B S Schwartz (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205)

Neighborhood psychosocial hazards may contribute to elevated cortisol, a risk factor for cognitive aging. The ε4 allele of apolipoprotein E gene (APOE), a risk factor for Alzheimer's disease, may influence susceptibility to neurological insults. We conducted a cross-sectional analysis of data from the Baltimore Memory Study, a population-based cohort of 50–70 year old men and women. Performance on 20 standard cognitive tests was measured in 1100 subjects and combined to form summary measures in 7 domains. We used theory and factor analysis to create the Neighborhood Psychosocial Hazards (NPH) scale to assess neighborhood conditions that give rise to a persistent state of vigilance, alarm and worry. In analyses stratified by race/ethnicity (African-Americans (AA) /AA-mixed: $n = 504$; whites/others: $n = 596$), we evaluated interactions of the NPH scale (quartiles) with APOE ε4 (yes/no) using GEE to account for clustering by neighborhood, and adjusting for age, sex, education, wealth, and technician. In AA/AA-mixed, 20 of 21 NPHxAPOE ε4 cross-product coefficients were negative, with interactions at or near statistical significance ($p < 0.10$) observed in processing speed, executive functioning, and visual memory. In whites/other, only 10 of 21 NPHxAPOE ε4 cross-products were negative. However, interactions at or near significance ($p < 0.10$) were observed in executive functioning, visual memory, and visuoconstruction. In an example of gene-environment interaction, these data indicate that APOE genotype may modify relations of neighborhood conditions with cognitive function. Moreover, living in psychosocially hazardous neighborhoods may be especially bad for blacks with the ε4 allele.

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RELATIVE DEPRIVATION AND PERCEIVED HEALTH AMONG JAPANESE WORKING-AGE POPULATION: EXPLORING PSYCHOLOGICAL PATHWAYS IN INCOME INEQUALITY AND HEALTH.

*N Kondo, I Kawachi, and Z Yamagata (Harvard School of Public Health, Boston, MA 02115)

Although a number of epidemiologic studies have suggested the adverse impact of income inequality on health, empirical evidence on its pathways is limited. Relative deprivation has been hypothesized as one of the pathways. That is, when people are relatively deprived they have psychological stress regardless of their absolute income, resulting in poor physical and mental health consequences. We tested this hypothesis by using a Japanese national sample obtained in 2001. Our survey included a random sample of 22,871 men and 24,243 women aged 25–64. The response rate was 80%. Our measure of relative deprivation was the Yitzhaki Index, which calculates the deprivation suffered by each individual as a function of the aggregate income shortfall for each person relative to everyone else with higher incomes in that person's reference group. We modeled several alternative reference groups, including others with the same occupation, others of the same birth cohort, and others living in the same prefecture, as well as combinations of these. Generalized estimating equation demonstrated that higher relative deprivation was significantly associated with worse self-rated health. Even after controlling for absolute income as well as other sociodemographic factors, the odds ratio for poor health ranged from 1.16 to 1.49 for men and from 1.35 to 1.47 for women comparing the highest to lowest quintiles of the Yitzhaki Index. Relative income deprivation is associated with worse self-rated health independently of absolute income. Relative deprivation may be a mechanism underlying the link between income inequality and population health.

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MODE OF INHERITANCE OF PRETERM DELIVERY.

*H A Boyd, G Poulsen, J Wohlfahrt, B Feenstra, J C Murray and M Melbye (Department of Epidemiology Research, Statens Serum Institut, Copenhagen, Denmark)

Background: Preterm delivery (PTD) is thought to have a significant familial component, but no mode of inheritance has been established. We examined the contribution of PTDs in both a woman's family and her male partner's family to her risk of PTD. Methods: We linked birth information from Danish national registers with pedigree information from the Danish Family Relations Database for 1,107,124 live singleton deliveries occurring in the period 1978–2004. For each delivery, we assessed whether the mother had previous PTDs, a history of PTD among members of her family or her partner's family, and/or step-children born preterm. Using log-linear binomial models, we estimated risk ratios comparing the risks of PTD in women with various PTD histories to those of women with no such histories. Results: Women with previous PTDs were at greatly increased risk of recurrent PTD (risk ratio [RR], 5.6; 95% confidence interval [CI], 5.5 to 5.8); however, their risk of PTD was unaffected by a partner's history of preterm children by other women. PTDs to a woman's mother, full sisters or maternal half-sisters also increased her risk of PTD (RR, 1.6; 95% CI, 1.5 to 1.6), whereas PTDs in her paternal half-sisters, the female partners of her male relatives or any member of her partner's family did not affect her risk of PTD. Conclusions: A substantial portion of PTD risk is explained by effects passed through the female line compatible with either imprinting or mitochondrial inheritance.

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IS FETAL LIFE RISKIER THAN NEONATAL LIFE? *J Teji, W Meadow (Pediatrics, University of Chicago and Mercy Hospital, Chicago, IL)

BACKGROUND: Perinatal statistics are reported as a gestational-age based mortality, either as stillbirth or neonatal mortality rate. There are no data on the outcome of pregnancies comparing the mortality risk whether intra- or extra-uterine for each gestational age. OBJECTIVE: The aim of this study is to compare risk for fetal death, greater than or equal to 20 weeks gestation, and neonatal death, less than 28 days, after each gestational age for the prevailing pregnancies. DESIGN/METHODS: We used the NCHS linked birth and death files for 1999 and 2000. Variables used in the analysis were clinical gestational age, live births, Neonatal death at less than 27days age of death (ND), and stillbirth (SB) more than and equal to 20 wks. SB risk (SBR) was calculated as SB for each gestational age per 1000 total births (TB) (total live births and total stillbirths) at risk. The neonatal mortality risk (NMR) was calculated as ND per 1000 TB at risk. Chi squared tests of significance was used for significance of $P<0.05$, and odds ratio with confidence limits at 5% and 95%. RESULTS: In 1999 and 2000, total pregnancies at risk were 8,076,923 comprising 8,025,028 live births and 51,895 stillbirths for GA 20–46wks. SBR was significantly higher than NMR for every GA except for 23 thru 25 wks where it was significantly lower, $P<0.05$. There was no significant difference for mortality in GA from 41 thru 43; however, at 44 wks SBR becomes significantly higher, $P<0.05$. Analysis for GA $>$ 44 wks was not possible due to very small numbers. CONCLUSIONS: 1) Stillbirth rate is higher than neonatal mortality rate for every gestational age between 20–44 wks, with the exception of 23–25 wks. 2) Perinatal statistics should be presented as mortality, both intrauterine and extrauterine, for pregnancies at risk at each gestational age. The impact of stillbirth on potential life lost would be emphasized by this strategy.

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RECURRENCE OF CHORIOAMNIONITIS IN SUBSEQUENT PREGNANCIES: RELATIONSHIP OF INTERPREGNANCY INTERVAL. *D Getahun, D Strickland, M J Fassett, R S Zeiger, and S J Jacobsen (Research & Evaluation, Kaiser Permanente Southern California, Pasadena, CA 91101)

Chorioamnionitis is known to recur. Unclear is whether there is a dose-response relationship between the number of episodes and risk in successive pregnancies and the effect of interpregnancy intervals. We conducted a retrospective cohort study of 1st two (n = 62,067) and 1st three (n = 10,860) consecutive singleton pregnancies using the 1991–2006 KPSC longitudinally-linked Perinatal Services System and Hospital Inpatient Dataset. ICD-9 codes "762.7 and 658.4x" identified chorioamnionitis. Adjusted relative risks (RR) quantified the risks. Overall rate of chorioamnionitis was 3.2%. A second pregnancy following a first pregnancy complicated by chorioamnionitis was at 3.9-fold increased risk of chorioamnionitis (95% confidence interval [CI] 3.2–4.8). Compared with women whose 1st two successive pregnancies were not complicated by chorioamnionitis, the recurrence risk in the 3rd pregnancy for women whose 1st but not 2nd and 2nd but not 1st pregnancy complicated by chorioamnionitis were 2-fold (95% CI 0.9–4.7) and 5.3-fold (95% CI 2.1–13.6), respectively. Two pregnancies with chorioamnionitis were associated with 6-fold increased risk of recurrence in the 3rd pregnancy although the association failed to achieve statistical significance. A 2nd pregnancy within a year (RR 6.4, 95% CI 4.4–9.1) and two years (RR 2.4, 95% CI 1.1–5.1) were associated with increased risk of recurrence. Our results suggest that prior chorioamnionitis predicts an increased risk for a subsequent chorioamnionitis only in the next pregnancy and the association of shorter interpregnancy interval with a high risk of recurrence reflects an extension of existing endometrial inflammation.

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TIME WINDOW DEPENDANT FETAL GROWTH AND IQ AT AGE FIVE. *O S von Ehrenstein, R T Mikolajczyk, J Zhang, U Grewal, J Troendle (National Institute of Child Health and Human Development, NIH, Bethesda, MD)

Associations between birth weight and postnatal development have been studied extensively. However, the relation between fetal growth during distinct time windows and cognitive function later in childhood remains unclear. To examine sensitive time windows for fetal neurodevelopment, we used serial ultrasound measurements at 4 time points during gestation. Intelligence Quotient (IQ) scores were assessed with the Wechsler Preschool and Primary Scale of Intelligence-Revised test at the age of 5 in a cohort of 397 children whose mothers participated in the National Institute of Child Health and Human Development Study of Successive Small for Gestational Age Births in Scandinavia and with 4 ultrasounds available. Fetal weight percentiles in different gestational weeks were estimated by non-parametric quantile regression based on a subsample of low risk mothers. Fetal growth velocity reflected the change in weight between subsequent measurements, accounting for the duration of this interval. Positive associations with IQ score were found for fetal weight at 25, 33 and 37 weeks, and growth velocity in the 17–25 week and 25–33 week intervals in univariate models, with the strongest effect for weight at 33 weeks. In the final model, the effect of fetal weight at the 33rd week measurement remained significant, with a 0.9 (95% confidence interval: 0.38–1.41) increase in IQ score for each 10 percentile increment in weight, adjusting for maternal smoking, age, education, pre-pregnancy body mass index, and gender. The findings support the notion that the effect of fetal growth on cognitive function in childhood is time sensitive, with the developmental time window around the 25th to 33rd week of gestation being a critical period.

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POLYMORPHISMS IN MNSOD AND NOS3 AND COLORECTAL CANCER RISK FOCUSING ON PRO-OXIDANT ENVIRONMENTAL MODIFIERS. *S Funke, M Hoffmeister, H Brenner, J Chang-Claude (Division of Cancer Epidemiology, German Cancer Research Center, Heidelberg, Germany)

Oxidative stress may play an important role in colorectal carcinogenesis. Crucial genes in the oxidative stress pathway are the manganese superoxide dismutase gene (*MnSOD*), and the endothelial nitric oxide synthase gene (*NOS3*) involved in either neutralizing or generating reactive oxygen species, respectively. The association between colorectal cancer (CRC) risk and polymorphisms in *MnSOD* and *NOS3* taking into account potential pro-oxidant environmental modifiers such as smoking and alcohol, has not been elucidated so far. In a population-based case-control study including 507 cases and 606 age and sex-matched controls we assessed the association of two functional polymorphisms in *MnSOD*(Ala9Val) and *NOS3* (Glu298Asp) with CRC risk and potential effect modification by smoking history or alcohol consumption. Multivariate logistic regression adjusting for potential confounders was used to calculate odds ratios (OR). No main effects were observed for either Ala9Val or Glu298Asp. ORs (95% confidence interval) were 1.00 (0.75–1.27) for Ala9Val and 0.98 (0.76–1.26) for Glu298Asp when comparing variant allele carriers with non-carriers. The association was not modified by packyears of smoking ($p_{interaction} = 0.15$ and 0.85 for Ala9Val and Glu298Asp, respectively) or grams/day alcohol consumption ($p_{interaction} = 0.72$ and 0.48, respectively). Although effect modification between the two analyzed polymorphisms and pro-oxidants such as smoking and alcohol have been observed with regard to breast cancer risk, we could not confirm these observations for colorectal cancer.

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TRENDS IN PUBLISHED META-ANALYSIS OF GENETIC ASSOCIATIONS, 2001–2007. *A Yesupriya, W Yu, M Clyne, M Gwinn, and M J Khoury (National Office of Public Health Genomics, Centers for Disease Control and Prevention, Atlanta, GA 30329)

The increasing availability of high throughput genotyping has produced an upsurge in published genetic associations. Evidence for many of these associations is inconsistent in replication studies. Meta-analysis is one method for summarizing and evaluating the evidence for association in both candidate gene and genome-wide association studies. The recently deployed HuGE Navigator, which provides access to a continuously updated knowledge base in human genome epidemiology, was used to examine trends in meta-analysis of genetic associations during the last 6 years. From 2001 to 2007, meta-analyses increased threefold as a proportion of all published articles on genetic associations; however, they still represent only a tiny fraction (3%) of this literature. For the ten most frequently studied diseases in the HuGE Navigator, genetic associations described in twenty-five or more articles were far more likely to have been reviewed by meta-analysis (range: 47%–100%) than were those described in ten to twenty-four articles (range: 9%–69%) or in five to nine articles (range: 0%–32%). Although research on genetic associations is booming, not enough attention is being devoted to efforts to synthesize and interpret research findings. Investigators and journals should be encouraged to perform and publish meta-analyses of genetic associations, which are an important step in the ongoing translation of gene discoveries into clinical medicine and public health.

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ALDH2 AND HEAD AND NECK CANCER: A META-ANALYSIS USING MENDELIAN RANDOMIZATION APPROACH. *S Boccia, M Hashibe, P GallÌ, E De Feo, T Asakage, T Hashimoto, A Hiraki, T Katoh, T Nomura, A Yokoyama, C M van Duijn, G Ricciardi and P Boffetta (Institute of Hygiene and Preventive Medicine, Università Cattolica del Sacro Cuore, Rome, Italy)

In conventional epidemiology confounding and reverse causation may invalidate a causal interpretation of observed associations. Conversely, according to the principle of 'Mendelian randomization', 1) the distribution of alleles in a population is unrelated to confounders because of the random assortment of parental chromosomes at conception, and 2) disease onset cannot influence genotype. Therefore, using a gene that influences alcohol drinking propensity as a proxy of the alcohol exposure in assessing the association between alcohol and head and neck cancer (HNC) should provide an estimate unconfounded by smoking. Alcohol drinking is a risk factor for HNC, especially at high doses; exposure to acetaldehyde, the principle metabolite of alcohol, may account for the increased risk. The ability to metabolize acetaldehyde is determined by the *ALDH2* gene, whose *2 variant allele is unable to metabolize acetaldehyde. 2*2 homozygotes show facial flushing and nausea after alcohol consumption that inhibits drinking, while heterozygotes have 5-times higher blood acetaldehyde concentrations post alcohol consumption respect to 1*1 homozygotes. We carried out a meta-analysis of studies looking at the relationship between *ALDH2* genotypes and HNC and found that the risk was reduced among 2*2 homozygotes [OR of 0.64 (95% CI: 0.39–1.03)] and increased among heterozygotes [OR of 1.83 (95% CI: 1.21–2.77)] relative to 1*1. Additionally, the expected OR for HNC due to alcohol intake compared with never drinkers based on the largest available pooled-analysis on never smokers was 1.40 (95% CI: 0.89–2.21) in 1*1 individuals. Hence our meta-OR for HNC of 1.56 (95% CI: 0.97–2.56) among 1*1 homozygotes compared to 2*2 (virtually all never drinkers) is what we would expect given their drinking behaviour and findings from studies among never smokers. These data support the theory that alcohol raises HNC risk through the carcinogenic action of acetaldehyde.

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DAIRY INTAKE, G-6A ANGIOTENSINOGEN POLYMORPHISM, AND BLOOD PRESSURE CHANGE OVER TIME: THE ARIC STUDY. *A Alonso, L M Steffen, A R Folsom (University of Minnesota, Minneapolis, MN 55454)

Observational studies and experimental evidence suggest that a high intake of dairy products could decrease the risk of hypertension. Questions remain, however, about the specific causal effect of dairy intake, particularly low-fat dairy products, on blood pressure (BP) independently of other dietary components. Our objectives were to assess (i) whether dairy intake was associated with changes in BP over time, and (ii) whether polymorphisms in the renin-angiotensin-aldosterone system modified this association. We used data from the Atherosclerosis Risk in Communities (ARIC) Study. The ARIC study includes 15,792 individuals aged 45–64, recruited between 1987 and 1989 in four communities in the US. Dairy intake was assessed at baseline using a validated food frequency questionnaire. BP measurements were obtained at baseline and at three follow-up visits, each about three years apart. After adjustment for potential dietary and non-dietary confounding factors, systolic BP in individuals in the highest quintile of low-fat milk intake was estimated to raise 1.0 mmHg less than among those in the lowest quintile after 9 years ($p = 0.007$ for trend across quintiles). No association was found for whole-fat milk. Low-fat milk intake interacted with the G-6A polymorphism in the angiotensinogen gene among Caucasians ($p = 0.03$ for systolic BP, $p = 0.04$ for diastolic BP): higher low-fat milk intake was associated with lower increase in systolic and diastolic BP over time in those with the AA genotype, but not in those with GG and AG genotypes. Our results provide new evidence that low-fat milk intake may slow BP rise over time and suggest an interaction between dairy intake and angiotensinogen, worthy of replication in other settings.

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NEGATIVE EFFECTS OF SERUM DDT AND ITS METABOLITES ON SPERM PARAMETERS AND MODIFICATION BY GENETIC POLYMORPHISMS. *B M Protas, M G Rossano, G Liu, M Diamond, K Friderici, K Jernigan, E Puscheck, N Paneth and J J Wirth (Michigan State University, East Lansing, MI 48824)

To investigate the possible effects of DDT and its metabolites (DDT/DDE) on sperm parameters and the role of genetic polymorphisms in modifying the association, the first 336 male partners of couples presenting for infertility work up were analyzed. The men are part of an on-going study of environmental contaminants and male infertility. Demographic and medical history was obtained by questionnaire and each subject provided a blood and a semen sample. Serum was analyzed for organochlorines (OCs) and DNA was analyzed for polymorphisms in genes involved in sex steroid and contaminant metabolism (GSTM1, GSTT1, GSTP1 and CYP1A1). Men with each sperm parameter considered low by WHO criteria (concentration <20 million/mL, motility <50%, morphology <4%) were compared to men with all normal sperm parameters in logistic regression models. After controlling for potential confounders, the highest quartile of DDT/DDE was significantly associated with low concentration (odds ratio (OR) = 2.49, 95% confidence interval (CI) 1.0–6.66), low motility (OR = 2.86, CI 1.24–6.59) and low morphology (OR = 3.19, CI 1.49–6.81). The absence of GSTT1 gene (mutation versus gene present) was significantly associated with low motility (OR = 2.28, CI = 1.04–5.02). Heterozygous and homozygous mutation of two CYP1A1 alleles on exon 7 showed a non-significant dose-response inverse association with low morphology (OR = 0.76, CI 0.43–1.35 and OR = 0.29, CI 0.06–1.49, respectively). Thus, DDT/DDE exposure adversely affected all three sperm parameters and its effects were exacerbated in men with absence of GSTT1 gene and with the CYP1A1 variant alleles.

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A CASE-CONTROL STUDY OF METABOLIC POLYMORPHISMS AND LUNG CANCER AMONG NEVER SMOKERS: EXAMINING GENE-ENVIRONMENT INTERACTIONS. *D Brenner, J McLaughlin, M Tsao, R Tyndale, F Shepherd, M Johnston, S Narod and W Rubenstein (Samuel Lunenfeld Research Institute & The University Health Network, Toronto, ON, Canada)

Genotypic differences from Single Nucleotide Polymorphisms (SNP) in the genes coding for Phase I & II metabolism enzymes (cytochrome P450 (CYP1A1) and glutathione s-transferase (GST)) have been implicated in differential susceptibility to lung cancer among never smokers. Incident cases of cancers of the trachea, bronchus and lung diagnosed among residents of metropolitan Toronto, were frequency matched with both hospital and population controls. Polymorphisms in the exon 7 and Msp1 regions the CYP1A1 (activation) gene, and in the GST-M1, GST-T1 & GST-Pi regions of the GST (detoxification) gene were detected using restriction fragment length polymorphism techniques among 797 Caucasian subjects. Logistic regression models were adjusted for age at diagnosis, gender and smoking status. ETS exposure (spousal) was significantly related to case status (OR, 95% CI, 1.46, (1.09–1.97)) independent of smoking status. Those individuals with a variant in the CYP1A1 exon 7 region (OR, 95% CI, 2.53, (1.01–6.34)), or at Msp1 (OR, 95% CI 2.05 (1.03–4.06)), and the GST-M1 variant (OR, 95% CI 1.75, (1.02–3.02)) were at a greater risk of a lung cancer diagnosis among those individuals exposed to ETS. Among never smokers, CYP1A1 exon 7 was associated with a greater risk of lung cancer. This appears to be indicative of a significant, however modest departure for the expected OR values for multiplicative as well as additive synergistic interaction. These results provide further evidence for increased susceptibility associated with these metabolic polymorphisms among low-exposure populations.

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SERUM BONE ALKALINE PHOSPHATASE AND URINE N-TELOPEPTIDE LEVELS IN THE U.S., NHANES 1999–2004. *D Lacher, J Hughes, M Carroll and A Looker (National Center for Health Statistics, Centers for Disease Control and Prevention, Hyattsville, MD 20782)

Serum bone alkaline phosphatase (BAP) is a biomarker for bone formation and urine N-Telopeptide (NTx) for bone resorption. BAP and NTx have been used in the management of bone diseases. Serum BAP (1999–2004) and urine NTx (1999–2002) were measured in the National Health and Nutrition Examination Survey (NHANES). NHANES is a cross-sectional, nationally representative, area probability survey conducted by the National Center for Health Statistics. Serum BAP was measured in 18834 persons and urine NTx in 11580 persons 8 years and older. The urine NTx/creatinine (NTx/Cr) ratio was calculated in 11578 persons to standardize NTx. Geometric means (GM) for BAP and NTx/Cr were examined by age, gender and race/ethnicity. The BAP (ug/L) GM peaked in females (90.8) and males (88.4) at 8–11 years, decreased to stable levels in both genders at 30–39 years, and increased in females 50 years and older. Mexican Americans and non-Hispanic blacks had higher age-adjusted BAP GM than non-Hispanic whites in both sexes. Overall, the age-adjusted BAP GM was higher in males (24.5) than females (19.4). The NTx/Cr (nM BCE/mg/dL creatinine) GM peaked at 31.8 for females and 33.3 for males at 8–11 years, decreased in both genders to stable levels at 30–39 years, and increased in females 50 years and older. In women, Mexican-Americans had higher age-adjusted NTx/Cr GM than non-Hispanic whites. Overall, the age-adjusted NTx/Cr GM was higher in males (7.0) than females (5.8).

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ASSOCIATION OF ADIPONECTIN CONCENTRATIONS AND METABOLIC SYNDROME AMONG THAI ADULTS. *V Lohsoonthorn, O Hanvivatvong, and M A Williams (Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand)

Adiponectin, an adipocytokine with insulin-sensitizing effects, may be involved in the pathogenesis of cardio-metabolic disorders. The investigators examined relationships between serum adiponectin and risk of metabolic syndrome (MetS) in 241 MetS cases (108 men and 133 women) and 241 controls randomly selected from a Thai occupational cohort that participated in annual health exams during 12/2006—2/2007. MetS was defined using modified ATP III criteria. Serum adiponectin was determined using enzyme-linked immunoassays. Logistic regression procedures were used to estimate odds ratios (OR) and 95% confidence intervals (95% CI) of MetS risk according to tertiles of adiponectin concentrations with the highest tertile as the referent group. Adiponectin concentrations were lower in men and women with MetS as compared with controls (median: 3.1 vs. 4.1 μg/ml in men; and 4.4 vs.7.9 μg/ml in women). Adiponectin concentrations were positively correlated with HDL-C and were inversely correlated with triglyceride, and insulin resistance ($p < 0.05$). After adjusting for confounding, men with adiponectin concentrations in the lowest tertiles (<3.1 μg/ml) had a 2.18-fold increased risk of MetS (95% CI: 0.90–5.27), as compared with men in the highest tertile (>4.9 μg/ml). Among women, the risk of MetS increased across successive tertiles of adiponectin concentrations (1.00, 2.08, and 7.66, with the highest tertile as the referent group). Hypoadiponectinemia was associated with MetS and with several of its components, particularly, insulin resistance and dyslipidemia. The adipocytokine may help identify individuals at increased risk of cardio-metabolic disorders.

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PLASMA 25-HYDROXYVITAMIN D IS ASSOCIATED WITH A DECREASED RISK OF PREMENOPAUSAL BREAST CANCER IN A GERMAN CASE-CONTROL STUDY. *S Abbas, J Chang-Claude, J Linseisen (Division of Cancer Epidemiology, German Cancer Research Center, Heidelberg, Germany)

Laboratory and epidemiological data have linked vitamin D to breast cancer prevention. In humans, the vitamin D status is predominantly determined by endogenous production and secondarily by diet. Most studies have assessed the effects of dietary intake only, however, studies examining the association between breast cancer risk and plasma 25-hydroxyvitamin D [25(OH)D], as indicator of the overall vitamin D status, are still scarce. We assessed the association of premenopausal breast cancer in a population-based case-control study comprising 289 cases and 595 matched controls. Information on sociodemographic and breast cancer risk factors was collected by questionnaire, and plasma 25(OH)D was measured by enzyme immunoassay. Conditional logistic regression was used to calculate odds ratios (ORs) and 95% confidence intervals (CIs). We observed a significantly inverse association between premenopausal breast cancer risk and plasma 25(OH)D concentrations. Compared with the lowest category (<30 nmol/L), the ORs (95% CI) for the upper categories of 25(OH)D (30–45, 45–60, $\geq$ 60 nmol/L) were 0.68 (0.43–1.07), 0.59 (0.37–0.94) and 0.45 (0.29–0.70) respectively ($p_{trend} = 0.0007$). The inverse association was stronger in progesterone receptor negative tumors with borderline significant heterogeneity ($p_{interaction} = 0.05$). By means of fractional polynomial analysis ($p_{non\text{-}linearity} = 0.07$) it was shown that the highest benefit in terms of risk reduction could be achieved in women with low plasma 25(OH)D concentrations (< 50 nmol/L). Our findings support a protective effect of vitamin D in premenopausal breast cancer.

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EPIDEMIOLOGY OF CYTOKINES: THE WOMEN ON THE MOVE THROUGH ACTIVITY AND NUTRITION (WOMAN) STUDY. *E Wong, M Freiberg, R Tracy, L Kuller (University of Pittsburgh, Pittsburgh, PA 15213)

We evaluated a panel of cytokines including interleukin-1a (IL-1a), IL-1ra, IL-4, IL-8, IL-10, interferon-inducible protein-10 (IP-10), tumor necrosis factor-α (TNF-α) and monocyte chemotactic protein-1 (MCP-1) using multiplex cytokine 8-plex panel assay in 290 postmenopausal women (mean age 57) participating in the WOMAN clinical trial. We evaluated laboratory coefficient of variation (CVa), within-individual coefficient of variability (CVw) and between-individual coefficient of variability (CVb) over 18 months. Laboratory variability (CVa) was smaller than the CVw or CVb. A ratio of CVw to CVb <0.6 is suggestive of the ability to discriminate between-individuals in epidemiological studies and was present for IL-1a, IL-4, IL-8, IL-10 and TNF-α. The levels were below the sensitivity of the assays for 29% of IL-1a, 27% of IL-4 and 35% of IL-10 at both baseline and the 18 month follow up visit. We evaluated changes in these cytokines over 18 months in relationship to hormone therapy (HT). There were small changes in the median and interquartile range of the cytokines over 18 months but minimal evidence of an association with HT at baseline or over 18 months. There were strong correlations among some of these cytokines (e.g, 0.88 for IL-4, 0.76 IL-8, and 0.15 IL-10 and IL-1a). Similarly, TNF-α, CRP, IP-10, IL-6 and IL-1ra were significantly associated with HOMA insulin resistance and IL-1ra, IP-10, TNF-α and CRP with log-fasting triglyceride levels. The weight loss intervention was significantly associated with decreases in IL-1ra, IL-6 and CRP over the 18 month time period. This study is the first to evaluate the laboratory, between- and within-individual variability of cytokines over time using this new technology. Large between-individual variations in several cytokine levels remain unexplained and are likely related to unmeasured environmental and genetic factors. Given the high correlations between these cytokines, the era of measuring single cytokines, chemokines and acute phase proteins in relationship to risk of disease may be over. Measuring multiple cytokine simultaneously to evaluate an inflammatory response will substantially increase our understanding of the risk of disease and gene, environmental interactions.

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BLOOD TRIHALOMETHANE DATA AND WATER USE ACTIVITIES IN PREGNANT WOMEN. *Jones E, Wright J M, Blount B, Savitz D A, Chan R, Silva L (US EPA, Cincinnati, OH 45268)

We examined water use activities and trihalomethane (THM) biomarker data in 147 pregnant women recruited for a prospective cohort study. Subjects from 3 sites completed a 24-hr water activity diary 30 days postpartum, with 32 subjects sampled in summer and winter. Mean indirect water consumption was 2.0L (range = 0.2–5.9). 104 women consumed tap water only, 7 consumed bottled water only, and 36 consumed a combination. Of the exclusive tap drinkers, 27% drank filtered water only, 55% drank unfiltered water only, and 18% drank both filtered and unfiltered water. Forty-one percent of the population drank at least some water outside their home. The average time spent bathing/showering was 17 min and bathing children was 16 min. Two subjects reported swimming during this time period, and 78% reported hand-washing dishes or clothes. Among the 180 samples, a weak correlation (r = 0.33) was detected between total THM (TTHM) tap water (range: 0–197 μg/L) and blood samples (range: 0–133 ng/L). Despite large differences in tap water concentrations (Site 1 = 43.5 μg/L, sd = 17.9 μg/L; Site 2 = 5.7 μg/L, sd = 3.8 μg/L; Site 3 = 62.2 μg/L, sd = 53 μg/L), mean blood TTHMs were fairly comparable by site (Site 1 = 23.8 ng/L, sd = 18 ng/L; Site 2 = 19.5 ng/L, sd = 24.0 ng/L; Site 3 = 28.3 ng/L, sd = 21.6 ng/L). Blood THMs increased with higher daily non-ingestion exposures (i.e., total swimming, bathing/showering time). Mean blood TTHMs were 21.5 ng/L for the low exposure group (<20 min), 21.7 ng/L for the intermediate group (20–30 min), and 28.8 ng/L for the high group (>30 min). Similar to the relative proportion detected for residential tap water concentrations, seasonal differences were noted for Site 1 with mean winter blood TTHMs 70% of the summer levels.

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THE ASSOCIATION OF SERUM ADIPONECTIN LEVEL WITH BRACHIAL-ANKLE PULSE WAVE VELOCITY: HALLYM AGING STUDY. J Y Jeong, K S Hong, H A Kim, and *D H Kim (Hallym University College of Medicine, Chuncheon, Gangwon, 200–702, Korea)

Objectives: Adiponectin, an anti-inflammatory adipocytokine, is reported to be associated with the risk of coronary artery disease. The automatic computer-assisted measurement of brachial-ankle pulse wave velocity (baPWV) is a valid and reproducible method by which to assess arterial stiffness, a potential surrogate marker of early atherosclerosis. We have investigated whether low serum adiponectin is associated with high baPWV in a sex-specific manner. Methods and Materials : The survey was conducted among persons enrolled in Hallym Aging Study, population-based cohort of 647 men and women aged 45 and over, which was established in 2004 in Chunchon, Korea. They were invited to the hospital and evaluated for clinical measures in 2007. Results : Out of 647, 448(206 men, 242 women) completed blood test, questionnaire and clinical examination. After adjusting for potential covariates, the highest tertile of serum adiponectin were less likely to be high baPWV (men: adjusted odds ratio[aOR] = 0.29, 95% Confidence interval[CI] = 0.11–0.75, women: aOR = 0.37, 95% CI = 0.16–0.88), compared with the lowest. And the subjects with hypertension were more likely to be high baPWV than the normotensives(men: aOR = 7.95, 95% CI = 3.04–20.83, women: aOR = 3.03, 95% CI = 1.40–6.55). Conclusion : These results showed low serum adponectin as well as hypertension was independent risk factors for early arterial alterations in men and women.

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ENVIRONMENTAL RISK FACTORS IN THE ETIOLOGY OF ANORECTAL MALFORMATIONS. *I van Rooij, P Rieu, H Hendriks, M Brouwers, N Knoers, N Roeleveld (Department of Epidemiology, Biostatistics and HTA, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands)

Anorectal malformations (ARM) are common major congenital malformations that are assumed to have a multifactorial etiology with both genetic and environmental factors playing a role. In this case-control study, we investigated the role of environmental risk factors just before and during pregnancy in the etiology of ARM. Parents of 75 ARM cases and 650 controls filled in a questionnaire. Controls were children treated with ventilation tubes. The questionnaire contained questions about time to pregnancy (TTP), medical history, lifestyle factors, such as smoking, alcohol use, and vitamin intake, and occupation in the three months before and during pregnancy. On average, the questionnaires were filled in 6 years after birth for both cases and controls. TTP for parents of ARM cases was larger than that for controls (median 4 (P5-P95: 0–36) versus 2 (0–24) months, respectively, p = 0.02). A higher maternal occurrence of fever during the first trimester of pregnancy was found for case mothers compared to control mothers, resulting in a seven-fold increased risk (Odds Ratio (OR) = 6.9; 95%Confidence Interval (CI) = 1.5–31.3) and maternal exposure to industrial cleaning agents doubled the risk of ARM (OR = 2.1; 95% CI = 0.9–4.8). Paternal smoking in the three months before conception was also associated with ARM (OR = 1.9; 95% CI = 1.2–3.1), as was exposure to exhaust fumes and industrial cleaning agents (both: OR = 1.9; 95% CI = 1.1–3.4). This is the first study investigating a large range of environmental risk factors in the etiology of ARM. Potential risk factors can be found in infections during pregnancy, paternal smoking and occupational exposures.

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MATERNAL PREPREGNANCY BODY MASS INDEX AND CONGENITAL HEART DEFECTS: RESULTS FROM THE NATIONAL BIRTH DEFECTS PREVENTION STUDY (NBDPS), 1997–2003.

A Correa, *S M Gilboa, L M Besser, L D Botto, S A Rasmussen, D K Waller, M Cleves, C A Hobbs, T Riehle-Colarusso, and the NBDPS (CDC, Atlanta, GA)

Prepregnancy obesity is associated with several types of birth defects. Increased risk of congenital heart defects (CHD) as a whole has been documented in relation to maternal body mass index (BMI) but studies that have examined specific CHD phenotypes report inconsistent results. Data from the National Birth Defects Prevention Study were used to explore the relation between obesity (BMI: >30.0 kg/m2), overweight (BMI: 25.0–29.9 kg/m2), and underweight (BMI: <18.5 kg/m2) status and CHD. Mothers reporting pregestational diabetes and those with missing BMI data were excluded. The final analysis included 4884 cases and 4774 controls. Several potential confounders were included in the multivariable model. Effect measure modification by gestational diabetes was investigated. Among mothers of control infants, 6% were underweight, 22% were overweight, and 15% were obese. The odds of having a baby born with any simple, isolated heart defect were increased for overweight (Odds Ratio (OR) = 1.20; 95% Confidence Interval (CI) = 1.07–1.35) and obese (OR = 1.22; 95% CI = 1.07–1.40) mothers compared with mothers of average BMI (18.5–24.9 kg/m2). Several CHD phenotypes were associated with either overweight status or obesity or both. For some phenotypes, obesity was a stronger risk factor among women diagnosed with gestational diabetes (5.5% of cases; 3.5% of controls). Overweight status and obesity appear to be associated with the occurrence of selected CHD. However, exposure misclassification due to self-reported height and weight data is possible and differential patterns of missing data may be sources of bias.

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DOES PERICONCEPTIONAL USE OF VITAMIN SUPPLEMENTS CONTAINING FOLIC ACID ATTENUATE THE RISK FOR DIABETES-ASSOCIATED BIRTH DEFECTS?

A Correa, *S M Gilboa, L D Botto, C A Moore, C A Hobbs, M Cleves, T Colarusso, D K Waller, E A Reece, and the NBDPS (CDC, Atlanta, GA)

Pregestational diabetes mellitus (PGDM) is a known human teratogen. We used data from the National Birth Defects Prevention Study (1997 - 2003) to examine whether periconceptional use of vitamin supplements containing folic acid attenuated the risk for birth defects associated with PGDM. All data were self-reported during maternal interviews. PGDM was defined as types 1 or 2 diabetes diagnosed before the index pregnancy. Periconceptional use was defined as any use of a multivitamin, prenatal vitamin, or single vitamin supplement containing folic acid during the month before conception or daily use during the first month of pregnancy. The analysis included 10,292 cases and 3,874 controls. Multivariable logistic regression was used to estimate adjusted odds ratios (OR) and 95% confidence intervals (CI). PGDM was associated with an elevated risk for 16 out of 30 non-cardiac defects, and 24 out of 31 cardiac defects. For 11 out of 16 non-cardiac defects and for 13 out of 24 cardiac defects the elevated risk was limited to offspring of mothers with PGDM who did not use vitamin supplements. Among non-users of supplements, PGDM was associated with an elevated risk for all noncardiac defects combined (OR = 5.05, CI 2.65–9.61) and all cardiac defects combined (OR = 7.03, CI 3.72–13.29). Among users of vitamin supplements, the PGDM-associated risks were attenuated by 51% for noncardiac defects combined (OR = 2.45, CI 1.03–5.79) and by 33% for cardiac defects combined (OR = 4.81, CI 2.31–10.90). Periconceptional use of vitamin supplements containing folic acid may attenuate, but not eliminate, the risk for PGDM-related birth defects.

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HYPOSPADIAS: RISK FACTOR PATTERNS FOR DIFFERENT PHENOTYPES.

*M M Brouwers, L F M van der Zanden, R P E de Gier, G A Zielhuis, W F J Feitz, N Roeleveld (Radboud University Nijmegen Medical Centre, The Netherlands)

Hypospadias is one of the most common birth defects in boys. Causal explanations are limited to only some patients, stressing the need for etiologic research. With this case-referent study, the authors aimed to obtain more insight in the origin of hypospadias by distinguishing between different phenotypes. Cases and referents were recruited at 4 hospitals and included 305 boys with hypospadias and 629 boys with middle ear infection. Both parents of cases and referents filled out postal questionnaires. Information on hypospadias phenotype was collected from medical files and was classified as anterior (n = 195), middle (n = 67), and posterior (n = 43). Adjusted odds ratios (OR) with 95 percent confidence intervals (CI) were estimated using multinomial logistic regression. For familial occurrence of hypospadias, high risk estimates were found for the anterior and middle phenotypes: OR 10.4 (95% CI 4.5–24.1) and OR 9.0 (95% CI 3.1–26.0), but not for the posterior type: OR 1.8 (95% CI 0.2–14.9). In contrast, the association with low birth weight (proxy for early placental dysfunction) seemed much stronger for posterior hypospadias: OR 9.1 (95% CI 3.4-24.2) compared to anterior and middle hypospadias: OR 2.6 (95% CI 1.4–5.0) and OR 2.3 (95% CI 0.8–6.5), respectively. Similar estimates were found for preeclampsia. Other factors with smaller differences in risk estimates between phenotypes included being a twin or triplet, mother being a DES-daughter, fertility treatments, and paternal subfertility, obesity, and prescriptive drug use. The findings strongly point towards etiologic heterogeneity of hypospadias and provide leads for the mechanisms through which specific risk factors may interfere with penile development.

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ENDOCRINE DISRUPTORS: RISK FACTORS FOR CRYPTORCHIDISM?

*M M Brouwers, W F J Feitz, R P E de Gier, G A Zielhuis, N Roeleveld (Radboud University Nijmegen Medical Centre, The Netherlands)

Cryptorchidism is the most common birth defect in boys with a largely unknown etiology. The authors conducted a case-referent study on risk factors for cryptorchidism, focusing on maternal and paternal exposures to endocrine disruptors, in particular. Cases and referents were 203 boys with surgically corrected cryptorchidism and 629 boys with middle ear infection, who were recruited at 5 hospitals in the Eastern part of the Netherlands. Referents were frequency matched with the cases on regional postal codes to obtain similar geographical distributions. Both parents of cases and referents filled out postal questionnaires. Confounder adjusted odds ratios (OR) with 95 percent confidence intervals (CI) were estimated using unconditional logistic regression. Corresponding with the literature, cryptorchidism was associated with low birth weight: OR 2.2 (95% CI 1.1–4.2), multiple gestation: OR 2.2 (95% CI 0.9–5.3), and familial occurrence of the disorder: OR 3.2 (95% CI 2.0–5.1). Use of oral contraceptives after conception also seemed to increase the risk of cryptorchidism: OR 3.6 (95% CI 1.0–12.5). Indications were found for associations with gestational preeclampsia, prescriptive drug use, and personal or occupational use of cosmetics immediately prior to or during the index pregnancy for both parents. Additionally, mothers of cases more often reported occupational exposure to dust of divers origins: OR 5.1 (1.6–16.4). The findings reflect a number of risk factors for cryptorchidism in general, but provide only some support for a role of endocrine disruptors in its etiology. However, the associations with occupational exposures need a re-evaluation using more valid exposure assessment methods, which is currently being done.

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ARE THERE DIFFERENCES IN THE PREVALENCE OF CONGENITAL HEART DEFECTS IN NH-BLACK, NH-WHITE AND HISPANIC INFANTS? *W N Nembhard, T Wang, M L Loscalzo, J L Salemi and K Hauser (University of South Florida, Tampa, FL 33612)

Birth defects are the leading cause of infant morbidity and mortality in the U.S. and congenital heart defects (CHD) are the most common of all birth defects. Few studies provide race-specific prevalence estimates for types of CHD and results are largely inconsistent. It is unclear if there are racial/ethnic differences in rates of CHD overall or for specific types of CHD. Our purpose was to determine the prevalence of specific types of CHD among NH-Black, NH-White and Hispanic infants. We conducted a retrospective cohort study with 16,788 singleton infants diagnosed with conotruncal, right or left obstructive or septal CHDs from the Florida Birth Defects Registry, born 1998–2003 to resident NH-White, NH-Black and Hispanic women aged 15–49. Cases were sub-classified into isolated CHD, multiple heart defects and CHD plus non-cardiac defects. Defect-specific prevalence rates (PR) and 95% simultaneous confidence intervals (CI) adjusted for multiple comparisons, were calculated for each type of CHD and by number of defects for each racial/ethnic group. There was little racial/ethnic difference in overall CHD rates. However compared to NH-Whites, NH-Blacks had higher rates of pulmonary valve atresia/stenosis (PR = 1.68; 95% CI: 1.40, 2.06) but lower rates of aortic valve atresia/stenosis (PR = 0.45; 95% CI: 0.23, 0.91) and ventricular septal defect (PR = 0.86; 0.77, 0.96). Hispanics had lower rates of endocardial cushion defect (PR = 0.65; 95% CI: 0.44, 0.96) than NH-Whites. We found few racial/ethnic differences in prevalence among infants with CHD and by number of defects. The variations observed in prevalence may reflect racial/ethnic differences in environmental and genetic factors.

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MATERNAL SERUM HOMOCYSTEINE LEVELS AND RISK FOR NEURAL TUBE DEFECTS IN A TEXAS-MEXICO BORDER POPULATION. M. Felkner, *L Suarez, J Brender, M Canfield (Texas Department of State Health Services, Austin, TX 78756)

Background: Despite the effectiveness of folate supplementation and fortification of cereal grain products in reducing risk of neural tube defects (NTD), researchers have not elucidated the exact role of folate in neural tube closure. It is unclear if lack of folate, dysfunctional enzymes, or excess by-products disrupts closure of the neural tube. In this study we examined the independent and joint association of excess by-product serum homocysteine with NTD-affected pregnancies in the context of more frequently studied biomarkers. Methods: Using tandem mass spectroscopy, we measured serum homocysteine in participants in a population-based case-control study on the Texas-Mexico border. Case-women had pregnancies affected by NTDs and resided and delivered in 14 Texas-Mexico border counties from 1995–2000. Control women were study area residents delivering normal live births during the same period. Sera were available for homocysteine testing from 103 cases and 139 controls. Results: Serum homocysteine levels were significantly higher in case than control women. Odds ratios (OR) were elevated for women in the upper homocysteine quintiles when compared to the lowest(OR = 1.7, 1.3, 2.8, 2.4); 95% confidence intervals for ORs in the two highest quintiles excluded the null. In stratified analyses, women with high homocysteine levels had elevated ORs regardless of their serum B12, serum folate, or red blood cell (RBC) folate levels. Discussion: The evidence linking high homocysteine levels to fetal injury continues to grow. This study is the first to assess risk effects for homocysteine levels independent of other folate metabolic pathway components. Our findings suggest that homocysteine is a more sensitive indicator of NTD risk than B12, or RBC and serum folate.

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ARE LESS ACCULTURATED HISPANIC PARENTS AT HIGHER RISK FOR HAVING OFFSPRING WITH NEURAL TUBE DEFECTS? *M A Canfield, T Ramadhani, G M Shaw, D K Waller, S L Carmichael, B Mosley, R S Olney, and the National Birth Defects Prevention Study (NBDPS) (Texas Department of State Health Services, Austin, TX 78756)

The prevalence of neural tube defects (spina bifida and anencephaly) is higher in Hispanics, relative to non-Hispanic whites. Among Hispanics, the prevalence has been shown to vary by "acculturation" factors, such as parents' country of birth, duration of residence in the U.S., and predominant language. We used data from the NBDPS to examine these factors further. We analyzed data from Hispanic and non-Hispanic white mothers who completed an interview and had expected delivery dates from 10/1997–12/2003. Our dataset included 206 anencephaly cases, 473 spina bifida cases, and 4,133 non-malformed controls. Crude and adjusted odds ratios (aORs) and 95% confidence intervals (CIs) were calculated for each acculturation factor/combination of one or both parents, using whites as the referent group. Final models included parent age, education, maternal body mass index, parity, and/or study site. For spina bifida, there was no significant risk effect for US-born and English-speaking Hispanic parents, relative to whites (aORs = 0.9 to 1.2). For anencephaly, however, corresponding odds ratios ranged from 1.4 to 1.8, and most estimates were significant. The highest aORs were observed for recent Hispanic immigrants from Mexico or Central America (e.g. for spina bifida, aOR = 2.84, 95% CI = 1.25–6.45, if both parents were in the US <5years). In summary, relative to whites, Hispanic mothers and fathers with less acculturation to the U.S. seemed to be at highest risk. For anencephaly, but not spina bifida, U.S.-born and English-speaking Hispanic parents (who some might consider "more acculturated") were also at increased risk.

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SPINA BIFIDA PREVALENCE AMONG CHILDREN IN TEN REGIONS OF THE UNITED STATES. *M Shin, J E Kucik, C Siffel, C Lu, A Correa and the Congenital Anomaly Multistate Prevalence and Survival (CAMPS) Collaborative (Centers for Disease Control and Prevention, Atlanta, GA 30333)

Little is known about the prevalence of spina bifida (SB) among children of different age groups due to the lack of population-based registries of affected children beyond infancy. Using 10 population-based birth defects monitoring programs and U.S. Census population estimates, the authors examined trends of prevalence among children with SB by age group (0–3, 4–7, 8–11, and 12–15 year olds) and estimated point prevalence among children with SB as of July 2002 using Poisson regression. Point prevalence ratios (PR) and 95% confidence intervals (CI) were estimated by age group, region, race/ethnicity, sex, and lesion site of SB (cervicothoracic, lumbosacral). The overall SB prevalence among children showed a slight decreasing trend among all age groups over time. One exception was that among children 0–3 years old, the yearly SB prevalence remained stable in Iowa from 1998 to 2002. In July 2002, the SB point prevalence (per 10,000 population) across the 10 regions ranged from 1.8–4.6 among <4 year olds, 2.1–4.6 among 4–7 year olds, 1.8–3.5 among 8–11 year olds, and 2.9–3.8 among 12–15 year olds. The prevalence of SB was higher among females than among males (PR = 1.12, CI = 1.05–1.20). Compared with 0–19 year old non-Hispanic Whites, 0–19 year old non-Hispanic Blacks had a lower point prevalence (PR = 0.62, CI = 0.54–0.70) while 0–19 year old Hispanics had a higher point prevalence (PR = 1.13, CI = 1.05–1.22). The prevalence of children with lumbosacral SB was higher than the prevalence of children with cervicothoracic SB (PR = 6.36, CI = 5.60–7.22). Information on age-group specific prevalence estimates could be useful in assessing the resources needed to treat each age group more effectively in defined communities.

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SURVIVAL IN INFANTS WITH SPINA BIFIDA IN TEN REGIONS OF THE UNITED STATES. C Lu, M Shin, C Siffel, J E Kucik, *A Correa, and the Congenital Anomaly Multistate Prevalence and Survival (CAMPS) Collaborative (Centers for Disease Control and Prevention, Atlanta, GA 30333)

Evaluation of survival of children with spina bifida (SB) has been limited mainly to short-term follow-up and certain regions of the United States. This study examines survival trend and prognostic factors based on studies with long-term follow-up in 10 regions in the U.S., namely Arkansas (AR), metropolitan Atlanta (AT), California (CA), Colorado, Iowa (IA), New York (NY), North Carolina, Oklahoma (OK), Texas (TX), and Utah. The authors used Kaplan-Meier method to estimate the one-year survival probability, and calculated relative survival probabilities (ratios) of infants with SB comparing with infants with any birth defect in AT. Adjusted hazard ratios (aHR) and 95% confidence intervals were estimated in relation to birth weight and presence of major heart defects. For regions available for long-term follow-up (AT, CA, IA, NY), the trend of survival probability to one year of age by time period (83–89, 90–96, 97–02) was examined. The one-year survival probability for SB ranged from 84% to 92%, while the 20-year survival probability was 80% in AT, and 85% in CA, IA, and NY. Among regions with long-term follow-up, the one-year survival probability improved in AT (87% to 90%) ($p < 0.1$), NY (89% to 91%) ($p < 0.1$), CA (89% to 94%) ($p = 0.01$) and IA (92% to 96%) ($p = 0.005$). The relative survival probability to one year of age ranged from 0.91 to 0.99. For all regions, low birth weight was associated with an increased risk of mortality (aHR ranged 2.7–8.5 for <2500g vs. ≥2500g). In AR, CA, NY, OK and TX, infants with SB born with major heart defects had an increased risk of mortality (aHR ranged 1.8–4.6). Further studies are warranted to elucidate possible influences of access to health services and treatment on survival of children with SB.

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EXPOSURE TO CARCINOGENS IN THE WORKPLACE IN NORTHWESTERN CAMEROON. *D S Nsagha MSc, PhD and A J Sasco MD, Dr PH (Department of Public Health and Hygiene, Faculty of Health Sciences, University of Buea, Box 63, Buea, Cameroon)

Objective: To survey exposure to carcinogens, assess risky behaviours involved and their preventive methods among different professions. Study design: Descriptive exploratory study. Methods: We used a structured questionnaire containing information on working history, types of carcinogens or environmental risk factors they are exposed to, names of carcinogens they were exposed to, assessment of risky behaviours involved, preventive and protective measures employed. Results: Forty-two participants had been exposed to more than one cancer-causing agent over a minimum period of 8 years. Officially recognized carcinogens the subjects were exposed to include metals, wood dust, fibres, chemicals, fumes, x-rays, ultraviolet sunrays, tar, microorganisms, smoke and drugs including other environmental hazards such as soil dust, bad odour, loud noise and vibrations. Thirty five (83.3%) participants knew the names of the carcinogens they were exposed to. Assessment of risky behaviours was based on whether the individual allow carcinogenic material to fall on the skin or cloth, whether one eats and smokes at the workplace and whether work clothes are washed at home or at the workplace. Common hygienic practices such as taking a bath and washing work dresses at the workplace, use of detergents to wash hands after work and no smoking or eating at the workplace were poor among the study population. Twenty-nine (69.0%) participants (CI 0.47–0.75) could smell the carcinogenic chemicals they work with. Thirty (71.4%) participants (CI 0.65–0.77) had been instructed in the use of protective equipment against exposure to carcinogens. The subjects used hand gloves, laboratory coats, boots, face caps, face masks, goggles, ear plugs, respirators, and other protective garments to protect themselves. Conclusion: Participants were exposed to many carcinogens and correct knowledge about carcinogens and the use of protective methods were poor, whereby contrast risky behaviours were quite common. Key words: carcinogen exposure, cancer, workplace, environment, assessment, prevention.

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BODY MASS INDEX AND WAIST CIRCUMFERENCE IN RELATION TO LUNG CANCER RISK IN THE WOMEN'S HEALTH INITIATIVE. *G C Kabat, M Kim, J R Hunt, R T Chlebowski, T E Rohan (Albert Einstein College of Medicine, Bronx, NY 10461)

A number of studies have suggested that body mass index (BMI) is inversely associated with risk of lung cancer, but their results have been inconsistent, particularly by smoking status. Few studies have reported results for measures of central adiposity or for weight at multiple time points in adulthood. We used data from the Women's Health Initiative to assess the association of baseline BMI and waist circumference, as well as other anthropometric variables, with risk of lung cancer. Over 8 years of follow-up 1,365 incident lung cancer cases were ascertained among 161,809 women. Cox proportional hazards models were used to obtain hazard ratio estimates adjusted for covariates. After adjustment for smoking, baseline BMI and BMI-to-waist-circumference ratio were inversely associated with lung cancer risk in current smokers (hazard ratio [HR] for highest vs. lowest quintile 0.62, 95% CI 0.42–0.92, p-value for the test for trend 0.002 and 0.39, 95% CI 0.24–0.65, p trend < 0.0001, respectively). In former smokers, only BMI-to-waist-circumference ratio showed an inverse association with lung cancer, although the association was weaker than in current smokers (HR 0.72, 95% CI 0.55–0.95, p trend 0.004). In never smokers, only height showed a borderline positive association with lung cancer. Our findings suggest that in smokers, and particularly current smokers, the combination of BMI and waist circumference is a stronger predictor of lung cancer risk than either variable alone. Greater abdominal adiposity relative to BMI may influence lung cancer risk in smokers due to higher levels of tobacco smoke carcinogens or other factors in centrally deposited fat tissue.

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ALCOHOL TYPES AND SOCIOECONOMIC FACTORS AS RISK FACTORS FOR BARRETT'S ESOPHAGUS. *A Kubo, T R Levin, G Block, G J Rumore, C P Quesenberry, Jr, Patricia Buffler, Douglas A Corley (Kaiser Permanente Division of Research, Oakland, CA 94612)

Little is known regarding the associations between alcohol use, socioeconomic factors and the risk of Barrett's esophagus (BE), a precursor to esophageal adenocarcinoma. We thus evaluated these relationships, and explored how choice of alcoholic beverages was associated with other life-style or sociodemographic factors. A case-control study within the Kaiser Permanente Northern California population utilized patients with a new diagnosis of BE ($n = 320$) who were matched to persons with gastroesophageal reflux disease ($n = 316$) and to population controls ($n = 317$). Information was collected using validated questionnaires from direct in-person interviews and electronic databases. There was a significant inverse association between wine drinking and the risk of BE [odds ratio (OR) = 0.39, 95% confidence interval (CI) (0.19–0.88)] controlling for age, sex, race, education, income, smoking, vitamin supplement use, and fruits and vegetables intake. Liquor drinking increased the risk after adjustment of the model with wine drinking [OR = 4.79 95% CI(1.23–18.7)]. Among population controls, wine drinkers were substantially more likely to have college degrees, have normal BMI, watch fewer hours of TV, consume more fruits and vegetables, and regularly take vitamin supplements than their counterparts. In addition, having a college degree or higher income was associated with half the risk of BE. In conclusion, socioeconomic status and types of alcoholic beverages were significantly associated with the risk of BE, though the associations seen for alcohol types and BE may be explained by unmeasured confounding due to incomplete control for sociodemographic factors.

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IMPACT OF PROSTATE CANCER TREATMENT ON COMORBID CONDITIONS. *N Sadetsky, P R Carroll (University of California, San Francisco, CA 94115)

Introduction and objectives: The effects of comorbidities influence the diagnosis, treatment, disease progression, and survival of patients with prostate cancer. We sought to evaluate the effect of treatment on total burden of illness. Methods: From the Cancer of the Prostate Strategic Urologic Research Endeavor (CaPSURE), we identified 2585 men who completed baseline comorbidity and the Total Illness Burden Index for Prostate Cancer (TIBI-CaP). The TIBI-CaP consists of 11 sub-dimensions that creates global score (range 0 to 23) based on severity. Patients who were treated with Radical Prostatectomy (RP), External Beam Radiation (EBRT), Hormonal Treatment (HT), Brachytherapy (BT), and Watchful Waiting (WW) were analyzed. The odds ratios (OR) of the likelihood of being in each level of TIBI-CaP compared to the least severe level for each treatment were derived using multinomial logistic regression, adjusted for several clinical and sociodemographic variables. Results: Adjusted odds ratio demonstrated a strong association of the type of treatment received with TIBI-CaP severity score. Compared to patients treated with RP, patients treated with BT, EBRT, HT, and WW demonstrated an increased likelihood to be in the severe TIBI-CaP category with odd ratios ranging from 1.5 (95% CI 1.01–2.27) for BT, to 2.6 (95% CI 1.6–4.1) and 2.85 (95% CI 1.5–5.4) for EBRT and WW respectively. Likelihood for being in the most severe category was even more pronounced. Conclusions: Effects of specific treatments on comorbidities differ by the type of treatment received even after adjusting for the factors that influence both diagnosis and treatment. Evaluation of the impact of treatment on comorbidities can help determine specific changes that affect survival and quality of life.

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META-ANALYSIS OF THE RELATIONSHIP BETWEEN EUROPEAN AND NORTH AMERICAN SMOKELESS TOBACCO AND PANCREATIC CANCER. *Z Sponsiello-Wang, R Weitkunat, P N Lee (Philip Morris International, Research & Development, Quai Jeanrenaud 56, 2000 Neuchatel, Switzerland)

The present work reviews the available epidemiological data on the relationship of pancreatic cancer and smokeless tobacco used in North America and Europe. Meta-analytic methods were used to estimate the overall relative risk. Four cohort and seven case-control studies were identified. Two sets of estimates were selected for meta-analysis. The first meta-analysis was based on study-specific estimates for the overall population of smokers and nonsmokers combined, where they were available, otherwise on estimates for never smokers. The overall random-effects risk estimate was found to be 1.10 (95% confidence interval 0.73–1.65). Sub-group analyses by continent, study type, or type of smokeless tobacco also showed no increased risk. The second meta-analysis was based on study-specific estimates for never smokers, where they were available, otherwise on combined smokers/nonsmokers estimates. The overall random-effects risk estimate was found to be 1.15 (95% confidence interval 0.67–1.98). There were, however, some indications of increased risk in cohort studies, in studies conducted in Sweden or Norway, and in studies of snuff. As there are a number of weaknesses in the currently available studies, no definite conclusion can be drawn. Our results are less indicative of a causal relationship than other reviewers have suggested; additional studies will have to be conducted to clarify the situation.

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HIGH DIETARY GLYCEMIC LOAD IS ASSOCIATED WITH INCREASED RISK OF COLON CANCER. *S Zelenskiy, C L Thompson, T C Tucker, and L Li (Case Western Reserve University, Cleveland, OH 44106)

High dietary glycemic load (GL) has been inconsistently associated with the risk of colon cancer in epidemiologic studies. We seek to further clarify this relationship in a population-based incident case-control study. The study sample consisted of 360 incident colon cancer cases and 420 population controls. Cases were recruited through the Kentucky Cancer Registry, and controls were recruited via random digit dialing. Glycemic load was assessed based on a self-administered food frequency questionnaire. On average, the cases had a significantly higher GL (mean = 149.0g, SD = 102.5g) than the controls (mean = 132.3g, SD = 79.1g) (p = 0.0119). In multivariate unconditional logistic regression model adjusted for age, gender, race, body mass index (BMI), family history of colorectal cancer, and total caloric intake, the odds ratio (OR) for the 2nd through the upper quintiles of GL were: 1.23 (95% CI: 0.78, 1.97), 1.01 (95% CI: 0.63, 1.63), 1.21 (95% CI: 0.75, 1.95), 1.74 (95% CI: 1.06, 2.85), respectively (p for trend = 0.0618), as compared to those at the bottom quintile of GL intake. Our results support the hypothesis that a diet with a high glycemic load increases the risk of colon cancer.

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INCREASING BIRTH WEIGHT AND CHILDHOOD CANCER. *S E Puumala, S E Carozza, E J Chow, E E Fox, S Horel, K J Johnson, C C McLaughlin, B A Mueller, P Reynolds, J Von Behren, L G Spector (University of Minnesota, Minneapolis, MN 55455)

Many studies have examined high birth weight (HBW: ≥4000 grams (g)) as a risk factor for childhood cancer, with only acute lymphoblastic leukemia (ALL) and Wilms tumor (WT) showing consistent associations. Using pooled data from five linked state cancer-birth registry datasets (California, Minnesota, New York, Texas, and Washington) we examined birth weight as a categorical (<2500g, 2500–3999g, >4000g) and linear variable. A total of 17,672 cases diagnosed 1980–2004 at ages 28 days-14 years and 57,966 controls born 1970–2004 were identified. Subjects who died before 28 days or who had Down syndrome were excluded. Logistic regression controlling for sex, gestational age, plurality, birth order, maternal age, maternal race, state, and birth year was used to examine associations with increasing birth weight. A significant association with HBW compared to 2500–3999g was observed for WT (Odds ratio (OR): 1.4; 95% Confidence interval (CI): 1.2–1.7), ALL (OR: 1.2; 95% CI: 1.1–1.3), chronic myeloproliferative disease (OR: 1.7; 95% CI: 1.0–2.8), and astrocytoma (OR: 1.2; 95% CI: 1.0–1.4). A linear trend was observed for WT (OR: 1.2; 95% CI: 1.1–1.3 per 500g), ALL (OR: 1.1; 95% CI: 1.1–1.2 per 500 g), rhabdomyosarcoma (OR: 1.2; 95% CI: 1.1–1.3 per 500 g), astrocytomas (OR: 1.05; 95% CI: 1.0–1.1), and extracranial germ cell tumors (OR: 1.4; 95% CI: 1.2–1.7 per 500 g). No significant associations were found in other cancers. By assembling a large sample this study was better able to examine associations in rare cancers. Overall, increasing birth weight was found to increase risk for a number of childhood cancers, including several not previously associated firmly with birth weight.

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MATERNAL VITAMIN AND IRON SUPPLEMENTATION DURING PREGNANCY AND ACUTE LEUKEMIA IN CHILDREN WITH DOWN SYNDROME. *M L Perez-Saldivar, L Ortega, M Ortega, J Flores, R Bernaldez, M Del Campo, A Medina, M Palomo, R Paredes, A Martinez, L Romero, P Perez, J De Diego, M Alvarado, V Bolea, A Fajardo-Gutierrez and J M Mejia-Arangure (Instituto Mexicano del Seguro Social, Mexico City, Mexico 06720)

A few studies have found a reduced risk of childhood acute leukaemia (AL) when maternal vitamin supplementation has been used during pregnancy; this relationship has been found in only one study of children with Down syndrome (DS). The aim was to assess whether maternal vitamin and iron supplement use during pregnancy was associated with the risk of developing AL in children with DS. We carried out a case-control study that included 57 children with both AL and DS, and 218 healthy children with DS as controls. Of the total number of children less than 16 years of age was included in this study. Mothers of cases and controls were interviewed about vitamin and iron supplement use during pregnancy. The odds ratio (OR) obtained by the logistic regression was 0.84; 95% confidence intervals (95% CI) 0.45–1.58 with vitamin supplementation during pregnancy, but with iron supplementation, a moderate risk was found 1.52; (95% CI) 0.79–2.83. When stratified by AL type, the OR to vitamin and iron supplementation were 0.63 (95% CI) 0.29–1.36 and 1.05 (95% CI) 0.48–2.31 respectively in acute lymphoblastic leukemia (ALL). In children with acute myeloid leukemia (AML) the OR was 1.83 95% CI 0.40–8.39 and to iron supplementation the risk was very high 11.23; (95% CI) 1.04–121. The sample size was small, but the risk trend suggests that vitamin use during pregnancy may be protective against the development of ALL in children, but not against AML. This study was financed by CONACYT's SALUD–2003–C01–102 grant.

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NUMBER OF SOURCES USED BY CANCER PATIENTS TO INFORM TREATMENT DECISIONS ACCORDING TO SOCIOECONOMIC STATUS. *M C Walsh and A Trentham-Dietz for the Assessment of Cancer Care and Satisfaction (ACCESS) Study Collaborators (University of Wisconsin, Madison, WI)

The ability to obtain, process, and understand basic health information is important for cancer patients to participate in the decision making process surrounding their cancer care. To evaluate the information use patterns among cancer patients, 1,839 (68% of eligible) breast, colorectal, lung and prostate cancer patients were enrolled in a study. Patients were identified by the state cancer registry, aged 30–80 years, and diagnosed in 2004. A self-administered survey elicited cancer treatments and demographics. Patients were asked to indicate the information sources (e.g. the internet, the treatment staff, support groups) they used to make cancer treatment decisions. Patients reported using on average 2.5 sources to inform treatment decisions. Colorectal and lung cancer patients reported using fewer sources (1.8 and 1.9 respectively) than prostate and breast cancer patients (2.7 and 3.1). Patients with less than a high school degree reported using fewer sources to inform treatment decisions (1.8) than patients with a high school degree (2.1), some college (2.8), and a college degree (3.5, p-trend <0.0001 from linear model). In addition, patients earning less than $15,000 annually reported using fewer sources (1.8) than patients earning between $15,000 and $30,000 (2.1), between $30,000 and $50,000 (2.5), between $50,000 and $100,000 (3.0), and over $100,000 (3.8, p-trend <0.0001). This study indicates disparities between socioeconomic groups and the number of sources used to inform cancer treatment decisions. These results suggest that some cancer patients may face barriers to adequate treatment information and, possibly, quality cancer care.

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SURVIVAL VARIABILITY AMONG ASIANS WITH CHILDHOOD CENTRAL NERVOUS SYSTEM TUMOR IN THE UNITED STATES. *L-M Yang, N Sakamoto, and J Fujimoto (National Research Institute for Child Health and Development, Tokyo, 157-8535, Japan)

Objective: To evaluate the 5 year survival rate for central nervous system (CNS) tumor among Asian and White children in the United States. Methods: Survival data for children diagnosed with CNS tumor (1973–2004) from 2006 limited-use data from the Surveillance, Epidemiology, and End Results (SEER) program were analyzed. Survival probabilities between Asian and White children were estimated and compared using the Kaplan-Meier method and the log-rank test. Multivariate Cox regression analysis was used to calculate proportional hazard ratios (HRs) for relative comparisons of survival. Results: For all CNS tumors combined, White children had the highest 5-year survival probability at 67.9%, followed by Chinese (59.9%), Filipinos (54.0%), and Japanese (45.7%). Compared with white children, after adjusting for age at diagnosis, sex, and diagnosis period, Asian children had particularly poor result for CNS tumors combined (HRs = 1.48; 95% Confidence Intervals (CI) 1.25 to 1.76), for astrocytoma (HRs = 1.54; 95% CI 1.12 to 2.12), for the other gliomas (HRs = 1.55; 95% CI 1.20 to 2.13). For all CNS tumors combined, Chinese, Japanese and Filipinos had hazard ratios of 1.38 (95% CI, 0.96–2.02; P = 0.08), 1.76 (95% CI, 1.15–2.67; P = 0.009) and 1.57 (95% CI, 1.12–2.19; P = 0.008). Conclusion: Asian children with CNS tumor have worse survival than White children. More research is needed to provide social and biological explanations for such disparities.

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LONG-TERM OVERALL AND CARDIOVASCULAR MORTALITY FOLLOWING CHILDHOOD CANCER: THE ROLE OF CANCER TREATMENT. *C Guibout, O Oberlin, F Doyon, A Moussannif, N Haddy, S Guérin, H Pacquement, A Aouba, M Hawkins, D Winter, J Bourhis, D Lefkopoulos, I Diallo, F de Vathaire (Inserm, Villejuif, France)

We investigated long-term mortality in a cohort of 4,122 5-year survivors of a childhood cancer treated between 1942 and 1986 in France and UK and followed up over an average 26 years. Information about chemotherapy was collected, and the radiation dose received in all except for 159 of the 2,870 patients, who had received radiotherapy was estimated. Radiation doses were estimated using DOS_EG software at 188 anatomical sites, including heart (7 sites), lungs and brain (10 sites). We obtained the death causes of 95% of dead patients. Overall and cause-specific mortality standardized ratios (SMR), absolute excess risk (AER) of death were studied using Poisson regression. 603 patients died during the follow-up, i.e. 8.5-fold (95% CI: 7.7–9.1) more than that expected in the general population. A total of 32 patients died of cardiovascular diseases, i.e. 4.8-fold (95% CI, 3.3 to 6.7) more than expected, 21 of which were cardiac diseases, i.e. 6.0-fold more (95% CI, 3.8 to 9.0). Overall, patients who had received radiotherapy had a 5.4-fold (95% CI, 1.5 to 32.1) higher risk of mortality due to cardiovascular disease than those who had not. Mortality due to cardiac disease was related to the administration of alkylating agents and / or vinca alkaloids, and to that of anthracyclines. Each additional 100 mg of anthracyclines per m^2 of body surface area increased the mortality rate due to heart diseases by 92% (95% CI, 16% to 318%). Patients who had received between 5 to 14.9 Gy to the heart during radiotherapy had a 14.5-fold (95% CI, 2.0 to 291) higher risk of mortality from cardiac diseases than patients who had not received radiotherapy. Our results show that heart disease is likely to be among the iatrogenic effects in the long term the most important in children treated for cancer first.

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INTERACTION BETWEEN PLASMA ORGANOCHLORINES AND THE AHR GENE AND RISK OF NON-HODGKIN LYMPHOMA. *C Ng, R Janoo-Gilani, A R Brooks-Wilson, J P Weber, J M Connors, R D Gascoyne, A S Lai, N D Le, R P Gallagher, S Leach, and J J Spinelli (British Columbia Cancer Agency, Vancouver, British Columbia, T3C 0X6 Canada)

We previously found an association between plasma organochlorines (OCs) and increased risk of non-Hodgkin lymphoma (NHL). Gene-environment interactions may modify NHL risk, but have not previously been explored. The aryl hydrocarbon receptor (AHR) gene is a candidate for studying gene-environment interactions due to its role in the detoxification of OCs. All HIV-negative NHL cases aged 20–79 were diagnosed between 2000 and 2004, and resided in the Greater Vancouver or Greater Victoria regions. Controls frequency matched by age, sex and region were identified from the Client Registry of the British Columbia Ministry of Health. Pre-chemotherapy blood samples from 422 cases and 459 controls were utilized for OC measurement and DNA analysis. Levels of 14 polychlorinated biphenyl (PCB) congeners and 11 OC pesticide analytes were determined. Seven single nucleotide polymorphisms (SNPs) in the AHR gene were genotyped. The IVS1+4640G/A SNP was significantly associated with NHL risk, with an odds ratio (OR) of 1.32 (95% CI = 1.05–1.65) comparing the G/A or A/A genotypes to the G/G genotype. This SNP had statistically significant interactions with PCB 118, a known inducer of AHR, and oxychlordane and trans-nonachlor. The OR comparing the highest to lowest exposure quartiles for oxychlordane, which had the strongest effect, was 3.19 (95% CI = 1.85–5.51) for the G/G genotype compared to 1.32 (95% CI = 0.52–3.36) for the G/A or A/A genotypes. Gene-environment interactions are important for understanding the etiology of complex diseases such as NHL. The AHR gene may play a role in the carcinogenicity of OCs.

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ANTHROPOMETRIC FACTORS IN THE RISK OF DIFFERENTIATED THYROID CANCER IN FRENCH POLYNESIA: A POPULATION BASED CASE-CONTROL STUDY. *P Brindel, F Doyon, F Rachedi, J L Boissin, J Sebbag, L Shan, L Yen Kai Sun, F de Vathaire (Inserm U605, Institut Gustave Roussy, Univ. Paris XI, Villejuif, 94800, France)

French Polynesia has one of the world's highest incidence rates of thyroid cancer. A case-control study among native residents of French Polynesia included 219 cases of differentiated thyroid cancers diagnosed between 1981 and 2004 (195 women / 24 men) matched to 359 population controls (315 women / 44 men) on date of birth. Anthropometric factors, categorized into quartiles among women and according to the median among men were analyzed by conditional logistic regression. Odds ratios (OR) were adjusted for ethnicity, education level, interviewer, height, number of births, and menopausal status. Risk of thyroid cancer for women in the highest quartile of body mass index (BMI) at age 18 was 2.3-fold higher compared to the lowest quartile. Women in the highest quartile of BMI before diagnosis had a 2.3-fold higher risk compared to the lowest quartile. These results did not depend on ethnicity. Among men, thyroid cancer risks were 4.5 and 7.4-fold higher when BMI at age 18, respectively before diagnosis, were elevated. Individuals who were overweight (BMI = 25–29.9 kg/m^2) or obese (BMI$\geq$30 kg/m^2) at age 18 and before diagnosis had a higher risk compared with those who had a normal BMI both at age 18 and before diagnosis (OR = 5.0 95% CI:2.3, 11.2 for women and OR = 6.6 95% CI :0.8, 53 for men). An elevated height, and elevated weight and BMI at all ages were associated to an increased risk of thyroid cancer among men and women in our study. This confirms the role of anthropometric factors in the risk of thyroid cancer in Pacific island populations.

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GLYCEMIC INDEX, SWEETS, AND BREAST CANCER RISK IN THE BLACK WOMEN'S HEALTH STUDY. *J R Palmer, D A Boggs, L L Adams-Campbell, L Rosenberg (Slone Epidemiology Center, Boston, MA 02215)

Studies of diet and breast cancer have yielded mixed results on whether breast cancer risk is related to the glycemic index (GI) of a diet or the consumption of sweet foods. These factors are of interest because of their link to insulin resistance and insulin-related growth factors, which may be promoters of breast carcinogenesis. We assessed the relation of breast cancer incidence to dietary GI and consumption of sweets (pies, cakes, cookies, candies, and chocolate) in data from the Black Women's Health Study, a prospective follow-up study of 59,000 U.S. black women. Participants completed a baseline questionnaire in 1995, including the Block-NCI short-form food frequency questionnaire (FFQ), and have completed biennial mail questionnaires since then. Analyses included 1091 incident breast cancer cases that occurred during the first 10 years of follow-up. FFQ data were used to create variable for quintiles of GI and servings per week of sweets. Cox proportional hazard models were used to compute incident rate ratios (IRR) and 95% confidence intervals (CI), with control for age, body mass index, energy intake, reproductive factors, and established breast cancer risk factors. GI was not associated with breast cancer incidence, either overall or within strata of body mass index, waist circumference, or menopausal status. Women who ate at least one sweet per week had an increased risk of breast cancer relative to those who ate less than one per week, IRR = 1.27, CI 1.08–1.48, but there was not a trend with increasing consumption. The association was consistent across strata of factors mentioned above. These results provide limited support for the hypothesis that intake of foods high in sugar increase risk of breast cancer.

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MATERNAL AGE AND CHILDHOOD CANCER. *K J Johnson, S E Puumala, S E Carozza, E J Chow, E E Fox, S Horel, C C McLaughlin, B A Mueller, P Reynolds, J Von Behren, L G Spector (University of Minnesota, Minneapolis, MN 55455)

Childhood cancer affects ~10,400 children <15 years annually in the United States. Recent surveillance data indicates that incidence increased from 1992–2004. Over the same period the mean reproductive age has also increased. Prior studies have reported inconsistent associations between maternal age and offspring cancer, possibly due to insufficient power to detect weak effects. We examined this association with a pooled dataset, created by linking the cancer and birth registries from five states (New York, Washington, Minnesota, Texas, and California). Subjects included 17,762 cases ages 0–14 years at diagnosis and 57,966 controls born during 1970–2004. Odds ratios (ORs) and 95% confidence intervals (CIs) controlling for sex, birth weight, gestational age, birth order, birth year, plurality, maternal race, and state were calculated by logistic regression. Subjects known to have Down syndrome were excluded. Significant positive linear trends ($p < 0.05$) per 5 year increase in maternal age were detected for 7 of the 10 most common cancers, which included >400 cases each in the dataset: acute lymphoblastic leukemia (OR = 1.08, 95% CI 1.05–1.11, $p < 0.0001$), acute myeloid leukemia (OR = 1.08, 95% CI 1.01–1.16, $p = 0.02$), non-Hodgkin's lymphoma (OR = 1.11, 95% CI 1.02–1.20, $p = 0.02$), astrocytoma (OR = 1.08, 95% CI 1.03–1.14, $p = 0.002$), neuroblastoma (OR = 1.09; 95% CI 1.04–1.15, $p = 0.0007$), Wilms tumor (OR = 1.15; 95% CI 1.09–1.22 $p < 0.0001$), and rhabdomyosarcoma (OR = 1.16; 95% CI 1.07–1.25 $p = 0.0005$). No significant linear trends were found for intracranial embryonal tumors, other glioma, or retinoblastoma. Maternal age may thus partially explain the rising rate of childhood cancer.

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CANCER RISK IN A COHORT OF PATIENTS WITH SCLERODERMA IN CALIFORNIA.

*A Parikh-Patel, R H White, M Allen and R D Cress (California Cancer Registry, Sacramento, CA 95815)

Previous cohort studies have reported increased risks of several cancer types among scleroderma patients, although many of these have suffered from limited power and generalizability. We conducted a retrospective cohort study to examine cancer risk in a hospitalized cohort of scleroderma patients in California via electronic linkage of cancer registry and patient discharge data over the period 1991–2002. Patients with a diagnosis of scleroderma in the patient discharge database were followed up for cancer using registry data. Person-years of follow up were calculated for each individual. Time from the first hospitalization with a diagnosis of scleroderma to one of the following three events was calculated: date of cancer diagnosis, date of death, or December, 31, 2002. Site-specific standardized incidence ratios (SIRs) and 95% confidence intervals (95% CI) were calculated to compare observed to expected numbers of cancers based on age, race and sex specific incidence rates in the California population. The 6,014 scleroderma patients were observed for 27,432 person-years. A total of 299 cancers occurred within the observation period. Risk of all cancers combined was not significantly elevated in the cohort (SIR: 0.94, 95% CI: 0.83, 1.06). Cohort members had increased risks of lung, (SIR: 1.64, 95% CI: 1.27, 2.09), and esophageal cancers (SIR: 4.74, 95% CI: 2.13, 8.84) and leukemia (SIR: 2.07, 95% CI: 1.12, 3.52). Significantly lower risks of endometrial cancer (SIR: 0.20. 95% CI: 0.10, 0.73), and melanoma (SIR: 0.30. 95% CI: 0.08, 0.76) were observed in the cohort. To our knowledge, this is the largest cohort study of cancer in scleroderma patients.

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OVERALL OBESITY AND COLORECTAL CANCER: A QUANTITATIVE REVIEW.

*Y Ning, L Wang and E Giovannucci (Harvard School of Public Health and Harvard Medical School, Boston, MA 02115)

Background: Although overall obesity has been associated with the risk of colorectal cancer (CRC), the magnitude of the association has varied widely across observational investigations. Methods: We identified English-language publications in which CRC incidence or mortality was an end point, overall obesity was measured by Body Mass Index (BMI), and the relative risk (RR) and information necessary to calculate the variance were reported. Data on first author, participants, events, cancer subsites, RR and 95% confidence interval (95% CI) were extracted. Results: The 54 studies were conducted among 7,117,486 individuals including 93,371 CRC cases. Using random effect models, we calculated pooled RRs and 95% CI for highest vs. lowest BMI categories, across five BMI categories, and for 5kg/m2 BMI. Compared with individuals with BMI less than 23.0 kg/m2, those with BMI of 23.0–24.9, 25.0–27.4, 27.5–29.9 and $\geq$ 30.0 kg/m2 had 16%, 17%, 24%, and 41% increased risk, respectively. The association was stronger in men than in women (RR 1.25 vs. 1.11 for each 5kg/m2 BMI, $p < 0.01$), and for colon cancer than rectal cancer in both men (RR, 1.29 vs. 1.14, $P < 0.01$) and women (RR, 1. 20 vs. 1.06, $p = 0.08$). Premenopausal women have greater risk than postmenopausal women (1.22 vs. 1.11, $p = 0.29$). The association was stronger in North American than European (RR 1.23 vs. 1.13, $p = 0.02$). Asian had a steeper increased risk at the lower end of BMI (RR, 1.25, 95% CI, 1.11, 1.41 for 23 to 25 kg/m2). Conclusion: BMI was significantly associated with increased risk of CRC, colon cancer and rectal cancer. The magnitude of the associations differed significantly by sex, cancer subsite, geographic region, and women's menopausal status.

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FRUIT, VEGETABLES, AND RISK OF LUNG CANCER BY SMOKING INTENSITY.

*M Shareck, M-C Rousseau, J Siemiatycki, and M-E Parent (Université de Montréal, Montreal, QC, H2V 4P3 Canada)

Whether a high consumption of fruit and vegetables lowers the risk of lung cancer among smokers remains debated. Data from a population-based case-control study conducted in Montreal, Canada (1996–1999) were used to assess the association between seven fruit and vegetable groupings, and risk of lung cancer, according to sex and smoking intensity. In-person interviews elicited dietary data from 1103 incident lung cancer cases and 1447 population controls. A food frequency questionnaire listing 42 food items, including 22 fruit and vegetables, elicited intakes 2 years prior to interview. Adjusted odds ratios (OR) and 95% confidence intervals (CI) between intake variables and lung cancer were estimated using logistic regression. As compared to men in the lowest tertile of intake, and after a detailed adjustment for smoking, those in the highest tertile of intake of fruit, cruciferous vegetables, and carrots had a reduced risk of lung cancer. When restricting analyses to heavy smokers, the protective effect persisted for cruciferous vegetables (OR = 0.58, 95% CI:0.37–0.90) and carrots (OR = 0.53, 95% CI:0.35–0.81). Analyses based on all women or restricted to heavy smokers showed a strong protective effect for the groupings of fruit, vegetables, cruciferous and leafy vegetables, tomatoes, carrots, and citrus fruit. In heavy smokers, risk estimates ranged from 0.23 (95% CI:0.13–0.39) for fruit to 0.56 (95% CI:0.34–0.95) for tomatoes, when comparing women in the highest to those in the lowest tertiles of intake. These findings suggest a protective role of selected fruit and vegetable groupings against lung cancer, even among heavy smokers.

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URINARY PHYTOESTROGEN EXCRETION AND PROSTATE CANCER RISK IN A NESTED CASE-CONTROL STUDY: THE MULTIETHNIC COHORT STUDY.

*S-Y Park, S P Murphy, A A Franke, L R Wilknes, B E Henderson, L N Kolonel (University of Hawaii, Honolulu, HI 96813)

Phytoestrogens are of special interest because populations in Asia with a high consumption of phytoestrognes have lower incidence rate of prostate cancer than in Western countries. To investigate associations between phytoestrogens and prostate cancer risk, we analyzed data from a nested case-control study within a large cohort of African Americans, Native Hawaiians, Japanese Americans, Latinos, and Whites. Analyses included 249 incidence prostate cancer cases and 404 matched controls for urinary daidzein, genistein (two main isoflavones in soy products), equol (metabolite of daidzein), and enterolactone (lignan). Conditional logistic regression was used to estimate odds ratios (ORs) and 95% confidence intervals (95% CIs) with adjustment for the matching criteria of ethnicity, age and date of blood draw, and fasting status, as well as family history of prostate cancer, BMI, and education. The median excretion of daidzein was 1.73 nmol/mg creatinine in cases and 2.91 in controls ($p = 0.01$), and the median excretion of genistein was 0.48 in cases and 0.78 in controls ($p = 0.05$). Excretion of daidzein and genistein was inversely associated with prostate cancer risk (OR of the highest vs. the lowest quintile = 0.55, 95% CI = 0.31–0.98, p for trend = 0.03 for daidzein; OR = 0.72, 95% CI = 0.72, p for trend = 0.09 for genistein). Equol and enterolactone were not significantly related to prostate cancer risk. Our findings suggest that high intake of phytoestrogens may reduce prostate cancer risk. Grant sponsor: National Cancer Institute, Grant No. R37 CA54281)

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EFFECTS OF ALCOHOL-RELATED METABOLIZING GENES COUPLED WITH ALCOHOL ABUSE ON THE AGE AT DIAGNOSIS OF ESOPHAGEAL CANCER. *C-H Lee, W-T Tseng, J-S Liu, I-C Wu, S-H Chou, D-C Wu, J-M Lee, Y-G Goan, H-L Huang, Y-H Hung, M-T Wu (Kaohsiung Medical University, No. 100 Shih-Chuan 1st Road, Kaohsiung 807, Taiwan)

Because of the high case fatality, an earlier age at esophageal squamous cell carcinoma (ESCC) diagnosis has been linked to a shorter life expectancy, and thereby leads to a substantial economic loss. The risk of ESCC was closely connected to polymorphisms of the ADH1B and ALDH2 gene. To investigate the possible genotoxic effect of the two genes with regard to alcohol intake on the age of ESCC diagnosis, as well as the dissemination of this neoplasm, we conducted a large-scale case-series investigation in Taiwan. Here, 406 consecutively registered patients with pathology-proved ESCC were recruited. The Kaplan-Meier curves and the Cox proportional regression model were utilized to asses the relationship between age at cancer diagnosis and alcohol-related metabolizing genotypes with regard to alcohol consumption. The median age of carcinoma diagnosis for dinking carriers of ADH1B Arg/Arg genotype (55 years) and of ALDH2 inactive Lys allele (51 years) appeared to be 14 and 18-years earlier than that for the non-drinkers (69-years), with a 2.8 and a 2.9-fold increased hazard ratio, respectively. The cumulative risks for drinkers with these genotypes were observed to be significantly departure from those for the non-drinkers at aged 49 and 43 years. No substantial association between the ADH1B/ALDH2 genetic frequencies and tumor invasion were detected. In conclusion, alcohol abuse coupled with genetic vulnerability that determines alcohol removal by the ADH1B and ALDH2 genotypes modulate the risk of an earlier age of ESCC diagnosis.

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ROLE OF TUMOUR STAGE AND CO-MORBIDITY ON SOCIOECONOMIC INEQUALITIES IN SURVIVAL AMONG COLORECTAL CANCER PATIENTS. *L Shack, B Rachet, E M I Williams, M P Coleman (LSHTM, London WC1E 7HT, England)

Poorer survival of cancer patients has been associated with lower socioeconomic status. To investigate the controversial role played on these socioeconomic inequalities by late tumour stage at diagnosis and the co-morbidities, we analysed 29,566 colorectal cancer patients diagnosed in the North West of England during 1997–2004, and followed up to the end of 2006. Diagnostic details for any hospital admissions were obtained. Generalized linear models were used to model the relative survival and assess the effect of the main prognostic factors on the socioeconomic differences in survival. Patients from lower socioeconomic groups were more likely to have late stage at diagnosis and co-morbidities, and were less likely to be treated. Compared to the most affluent group excess mortality was 17% higher for patients from the lowest socioeconomic group after adjusting for age. Adjustment for stage at diagnosis and comorbidity had little impact on the in the inequalities in excess mortality. Our findings partially explain the disparities in survival by socioeconomic status but also highlight the complex influence and interaction of these and other factors on inequalities in cancer patients.

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FAMILY CANCER HISTORY, ADOLESCENT EXPOSURES, AND RISK OF COLORECTAL CANCER IN A PROSPECTIVE COHORT OF CHINESE WOMEN. *G Murphy, X O Shu, Y-T Gao, B-T Ji, M Cook, G Yang, H-L Li, N Rothman, W Zheng, W-H Chow (Division of Cancer Epidemiology and Genetics, National Cancer Institute, NIH, Rockville, MD 20852)

Sporadic colorectal cancer (CRC) in first degree relatives has been associated with a risk approximately twofold that of individuals without a family history. Familial clustering may also be a result of shared environment. We aimed to examine CRC risk in relation to a family history of cancer, and to evaluate whether family history-related risk may be explained by early life exposures. We followed 73,366 women in the Shanghai Women's Health Study for cancer incidence until December 2005. After an average of 7 years of follow-up, 391 women were diagnosed with colorectal cancer. We calculated hazard ratios (HR) and 95% confidence intervals (CI) using Cox proportional hazards models adjusted for age, smoking, family income, education and body mass index (BMI). We observed a significant association between CRC risk and family history of a parent being diagnosed with CRC (HR: 3.34; 95% CI: 1.58, 7.06). Daily or weekly red meat intake during adolescence was also significantly associated with risk of developing CRC as an adult (HR: 2.18; 95% CI: 1.23, 3.87). In contrast, we observed no association with adolescent BMI or physical exercise habits. Our results support the hypothesis that family history of CRC is associated with an increased risk of CRC. Possible links between diet, BMI and/or physical activity as an adolescent may warrant further investigation.

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SELF REPORTED VS. REGISTRY RECORDED CANCERS IN A LONGITUDINAL POPULATION-BASED STUDY. *B E K Klein, K E Lee, A Trantham-Dietz, R Klein (University of Wisconsin-Madison, Madison, WI 53726)

Cancer is a commonly reported condition in aging populations; incidence is 2177.8 per 100,000 in persons 65+ years of age. In a well-defined cohort in Wisconsin (n = 4926) that has been followed since 1988 there were 1771 persons with cancer either by self-report or listed in the Wisconsin Cancer Registry. There were 959 whose reported cancer type (skin cancer) or date would not be expected to be reported from both sources. There were 812 persons with cancer that could have been reported from both sources; 540 (66.5%) of these were in both, 144 (17.7%) were only in the registry, and 116 (14.3%) were only self-reported. There were 12 persons for whom information was missing. In preliminary analyses, rates of cancer calculated by source of data differed by cancer type. For example, 79% of self-reported prostate cancers also appeared in the cancer registry but only 61% of the prostate cancers in the registry also self-reported prostate cancer. Compared to persons with information from both sources, persons with cancer only in the registry or only as self-report did not differ significantly in age, gender, education or income level. Further analyses of these data will explore situations when self-report and registry will not match, such as self-reported cancers outside Wisconsin or specific cancer types, such as lung cancer, that are less likely to be self reported. Additional comparisons of accuracy of self-reported cancers will be examined. These analyses suggest that information about the occurrence of cancer in a general population is likely to under estimate incidence if only one source of information is used. The under estimation is unlikely to be random and this could lead to errors in risk factor attribution.

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RACE AND GENDER DISPARITIES IN TRANSITIONAL CELL CARCINOMA OF THE BLADDER: SURVIVAL, AND STAGE/GRADE MIGRATION– ANALYSIS OF THE NATIONAL CANCER DATA BASE. *K Mallin, D M Nanus, P R Carroll (American College of Surgeons, Chicago, IL 60611)

The National Cancer Data Base (NCDB) collects data on more than 70% of cancer cases in the U.S. The NCDB was used to analyze bladder five year relative survival (1993–2000) and trends in stage (1993–2005) (0a,0is,I,II,III,IV) and tumor grade percent distribution in white males (WM) (n = 275,982), white females (WF)(n = 90,697), black males(BM) (n = 11,444) and black females (BF)(n = 6,494). Stage data were forward converted using American Joint Committee on Cancer 6th edition staging rules. Relative survival utilized 95% confidence intervals (CI). Trends were analyzed using the Mantel-Haenszel test for trend. Cox proportional hazards models were used to assess hazard ratios (HR). Between 1993–2005, the percentage of high-grade tumors (poorly or un-differentiated) significantly increased from 38% to 49% in WM, 38% to 47% in WF, 48% to 54% in BM, and remained unchanged, but significantly higher in BF (63%) compared to the other groups. Stage 0a tumors significantly increased, and Stage I tumors significantly decreased in each group ($p < .01$). The percentage of late stage (II,III,IV) and high grade tumors combined was highest in BF (39%) compared to WM (21%), WF (24%) and BM (30%). Stage and grade specific survival was lowest in BF, and highest in WM. Overall five year survival was 84.2% (CI:83.8–84.5) in WM, 78.7% (CI:78.2–79.3) in WF, 70.4% (CI:68.6–72.2) in BM, and 55.7% (CI:53.5–57.9) in BF. In a multivariate Cox regression model, female gender (HR = 1.12) and black race (HR = 1.30) were significantly associated ($p < .05$) with increased mortality. The increase in high grade tumors and the high percentage of high grade tumors in black females requires additional research.

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TRENDS IN THYROID CANCER INCIDENCE BY RACE AND ETHNICITY IN THE UNITED STATES. *L Enewold, K Zhu, A Stojadinovic, G E Peoples, S Devesa (United States Military Cancer Institute, Walter Reed Army Medical Center, 6900 Georgia Ave, NW, Washington, DC 20307)

Thyroid carcinoma incidence, especially small (<1 cm) subclinical papillary tumors, has been increasing in the United States. However, it is not clear whether this trend differs among racial/ethnic groups by histology and size. Data collected through the National Cancer Institute's Surveillance, Epidemiology, and End Results program were analyzed to assess racial/ethnic differences in thyroid cancer incidence according to histology and tumor size over time. Between 1978 and 2004 age-adjusted incidence rates of papillary thyroid cancer (PTC) were significantly lower among Blacks [RR = 0.49, 95% CI = 0.46–0.51] when compared to Whites. Race specific percent changes during this time period were similar for Whites and Blacks. Between 1992 and 2004, the incidence of PTC was significantly lower among Hispanic Whites (RR = 0.89, 95% CI = 0.85–0.92) and higher among Asians (RR = 1.06, 95% CI = 1.02–1.10) in comparison to Non-Hispanic Whites. The percent change in incidence during this time period was greatest among Non-Hispanic Whites. A greater increase in small subclinical papillary tumors was observed among Blacks compared to Whites and among Non-Hispanic Whites compared to Hispanic Whites. To varying degrees, the incidence of larger tumors also increased while tumors of unknown size decreased. Although papillary thyroid cancer is increasing among all racial/ethnic groups the magnitude of change differs. The observed increases are likely due to the implementation of more sensitive diagnostic techniques, changes to the diagnostic criteria for papillary carcinomas, and more complete information on tumor size in recent years. Further analyses are being conducted.

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BIRTHWEIGHT, OBESITY DURING CHILDHOOD, ADOLESCENCE AND ADULTHOOD, AND PROSTATE CANCER—PRELIMINARY DATA FROM THE PROTEUS STUDY. *M-É Parent, J Siemiatycki, M Goldberg, and M Désy (INRS-Institut Armand-Frappier, Laval, QC, H7V 1B7 Canada)

There is mixed evidence about the role of obesity in prostate cancer (PC). We report here on lifelong body size characteristics, elicited as part of PROTEuS (Prostate Cancer Environmental Study), a population-based case-control study on-going in Montreal, Canada. To date, 727 men aged ≤75 years with incident PC and 485 population controls have been interviewed. Odds ratio (OR) and 95% confidence interval (CI) between anthropometric variables and PC were assessed, adjusting for age, family history of PC and ethnicity. As compared to men reporting medium birthweight (5.5–9 lbs), men with low birthweight (under 5.5 lbs) had an OR for PC of 1.60 (95% CI: 0.99, 2.59), while those with high birthweight (over 9 lbs) had an OR of 0.88 (95% CI: 0.59, 1.29). The OR for men reporting being heavier than others during childhood and adolescence were 0.54 (95% CI: 0.32, 0.91) and 0.66 (95% CI: 0.39, 1.11), respectively. These associations persisted after adjusting for body mass index (BMI) 2 years prior to interview. Men with BMI in the upper tertile at the ages of 20, 40, 50, 60 years and 2 years prior to interview had lower risks of PC (OR varying between 0.55 and 0.68, with CI excluding one) than men in the lower tertile. Our preliminary observations are consistent with an inverse association between obesity and PC at all stages of life. An inverse association between adult obesity and PC could relate to an inherent bias in the ability to detect PC in obese men. However, the inverse association noted for childhood and adolescent obesity, independently of adult BMI, raises the possibility that mechanisms other than detection bias might also be implicated.

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FACTORS RELATED TO MATURATION AND REPRODUCTION AND RISK OF DIFFERENT HISTOLOGIC TYPES OF INVASIVE BREAST CARCINOMA AMONG WOMEN 55–74 YEARS OF AGE. *E F Beaber, V L Holt, K E Malone, L F Voigt, P L Porter, J R Daling, and CI Li (Fred Hutchinson Cancer Research Center, Seattle, WA)

Numerous studies have evaluated the association between factors related to maturation and reproduction and breast cancer risk, but few have assessed how these factors are related to different histologic types of breast cancer. We used polytomous logistic regression to assess the effect of maturation and reproductive factors on risk of invasive breast cancer by histologic type in three case groups (524 ductal, 324 lobular, 196 mixed ductal-lobular) and 469 controls enrolled in a population-based case-control study of women aged 55–74 years residing in the Seattle-Puget Sound region of Washington State (2000–2004). Histologic type was determined by a centralized tissue review for 83% of cases. Age at menarche and age at maximum height were inversely associated with risk of mixed ductal-lobular carcinoma (p-value for trend = 0.04 for both exposures), but not ductal or lobular carcinoma. Relative to women without a prior live birth, women who had 2, 3, or ≥4 live births had a 50–60% reduced risk of all histologic types of breast cancer. There were similar increases in risk across histologic types associated with having a first live birth at ≥30 years of age compared to ≤19 years of age. Compared to parous women who never breastfed, those who ever breastfed had a reduced risk of ductal (odds ratio = 0.7, 95% confidence interval: 0.5–0.9), but not lobular or mixed ductal-lobular carcinoma. Further exploration of the association between maturation and reproductive factors and breast cancer risk by histologic type is merited in order to better understand differences in the etiology of ductal, lobular, and mixed ductal-lobular carcinoma.

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NO DECLINE IN BREAST CANCER INCIDENCE TRENDS FOLLOWING REDUCED USE OF HORMONE REPLACEMENT THERAPY IN SWEDEN. *M Lambe, M Holmqvist, J Ahlgren, J Adolfsson, P Karlsson, L Bergqvist (Karolinska Institutet, Stockholm Sweden)

Background: Studies from several Western countries have found evidence of a recent decline in breast cancer incidence in postmenopausal women, particularly among those with estrogen receptor positive tumors. These findings have been hypothesized to reflect a reduced use of hormone replacement therapy (HRT) following a report from the Women's Health Initiative hormone trial in 2002. We examined incidence trends between 1997 and 2006 in Sweden, a country with a high incidence of breast cancer, but with a low prevalence of HRT use compared to other regions. Setting: Three administrative health care regions covering 70 % of the Swedish population. Material: National pharmacy dispensation data. Information retrieved from three Regional Quality Registers on Breast Cancer, including more than 95 % of all incident cases. Results: The prevalence of HRT use - based on the dispensation of defined daily doses per 1000 - decreased from about 16 % in 1999 to 9 % in 2003 and further to 5 % in 2006. The incidence of breast cancer increased slightly from 1997 to 2002. Between 2003 and 2006 the incidence of estrogen- receptor-positive tumors remained stable both overall and in women 50 years of age or older. Conclusion: Breast cancer incidence trends in Sweden have remained stable in recent years with no evidence of a clear decline overall or by estrogen receptor status. If HRT exposure plays an important role in driving breast cancer incidence trends by promoting tumor growth, the absence of an effect may reflect that the drop in HRT use in Sweden - while steep - occurred from substantially lower levels than in the US. Taken together, our findings show that a reduced use of HRT has not been paralleled by clear changes in the incidence of breast cancer.

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CUMULATIVE RISK OF COLON CANCER TO AGE 70 IN WOMEN ACCORDING TO RISK FACTOR STATUS. *E K Wei, G A Colditz, E L Giovannucci, C S Fuchs, B A Rosner (Channing Laboratory, Boston, MA 02115)

Previous literature on colon cancer incidence has focused on individual risk factors and assumed proportional hazards. These approaches do not account for the temporal nature and interdependence of risk factors. We developed a comprehensive nonlinear Poisson regression model to describe colon cancer risk to age 70. Among the participants of the Nurses Health Study who provided dietary data in 1980 and who met exclusion criteria, we observed 701 cases of colon cancer between 1980 and June 1, 2004. All risks reported are from multivariate models and reflect comparisons in risk from age 30–70. A positive family history of colon cancer increased risk by 55%, smoking 10 or more pack-years before the age of 30 increased risk by 16%, and tall women (67 inches) had a 19% increased risk compared to a shorter woman (61 inches). Reduced risk was observed for current PMH use (−23%); being physically active (21 versus 2 MET hrs/week: −49%), taking aspirin 7 tablets of per week (−29%), and being screened (−24%). Similar to models developed for breast and ovarian cancer, we have developed a comprehensive model of the cumulative incidence of colon cancer to age 70 that incorporates important risk factors and may be useful for developing prevention messages.

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SUN BEHAVIOUR IN CANADIAN CHILDREN. *L Marrett, E Pichora, B Waller, M Spinks, C Rosen, D Northrup, M Rhainds (Cancer Care Ontario, Toronto, ON, Canada)

Knowledge of sun behaviours in a population is essential to planning and evaluating sun safety strategies for skin cancer prevention. Sun exposure during childhood is a particularly important determinant of melanoma risk, yet little data are available for children. As part of a recent telephone survey about sun behaviours of adult Canadians, participants were asked about their children aged 1–12. Questions referred to the summer and included time in the sun on a typical day, sun protective behaviours and sunburn. Standard complex survey weighting methods are used. 1,437 of 7,121 adult respondents reported on the sun behaviour of one randomly selected child aged 1–12 in his/her household. Over 1/2 spent 2+ hours in the sun during peak hours (11am - 4pm) on a typical summer day (compared to 28% for all adults aged 16+). Only 38% sought shade or otherwise tried to avoid the direct sun in peak hours when out for 30+ minutes; 65% wore a hat; 41% wore protective clothing; 16% wore sunglasses; and 3/4 used sunscreen. Of the 16% of children who had a sunburn during the summer, most were participating in or watching recreational activities when got their most serious burn. There was a very strong positive correlation between reported time in the sun of the parents and their children. It is important to minimize the harmful effects of ultraviolet radiation (UVR) among children, partly to reduce subsequent melanoma risk. Two or more hours in the sun daily, with sunscreen as the major mode of protection, results in a high UVR exposure over each summer, contributing to significant lifetime exposure. Policies, such as scheduling of recreational activities outside of peak hours and enhancement of shade where children play, may be the most effective ways of reducing exposure.

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AN ASSOCIATION BETWEEN *TRANS* FATTY ACID CONSUMPTION AND COLORECTAL ADENOMAS. *L C Vinikoor, J C Schroeder, R C Millikan, J A Satia, C F Martin, J Ibrahim, J A Galanko, R S Sandler (University of North Carolina, Chapel Hill, NC 27599)

Trans fatty acid consumption is known to have detrimental effects on cardiovascular health but little is known about its potential role in gastrointestinal neoplasia. We investigated the relationship between *trans* fatty acid consumption and colorectal adenomas using data from a cross-sectional study (Diet and Health Study IV) at the University of North Carolina Hospitals from 2001 to 2002, in which 622 individuals underwent a complete screening colonoscopy. After colonoscopy, trained interviewers collected information about demographic and lifestyle factors. Dietary information was collected using the National Cancer Institute's Diet History Questionnaire. Energy intake-adjusted *trans* fatty acid consumption was categorized into quartiles based on its distribution in adenoma-free individuals. We modeled the association between *trans* fatty acids and colorectal adenomas using logistic regression and evaluated potential covariates for effect measure modification and confounding. Compared to participants in the lowest quartile, those in the highest quartile of *trans* fatty acid consumption had an increased prevalence of colorectal adenomas, with an adjusted prevalence odds ratio of 1.86 (95% confidence interval: 1.04, 3.33). No increase in prevalence was observed with lower consumption. The adjusted prevalence odds ratios showed little or no difference by adenoma location, size, or number. These results suggest that consumption of high amounts of *trans* fatty acid is associated with presence of colorectal neoplasia and provide additional support for recommendations to limit *trans* fatty acid consumption.

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RACE-SPECIFIC MODELING OF PROSTATE-SPECIFIC ANTIGEN AND PREVALENT BONE METASTASIS AMONG NEWLY DIAGNOSED, UNTREATED PROSTATE ADENOCARCINOMA PATIENTS. *R P Ojha, L A Fischbach, E L Evans, R Thertulien (UNT Health Science Center, Fort Worth, TX 76107)

Previous studies have reported an association between prostate-specific antigen (PSA) values from 10–20ng/ml and bone metastasis in prostate cancer. We evaluated whether the association between PSA values and bone metastasis at time of diagnosis of prostate cancer is modified by race. We used data from Surveillance, Epidemiology, and End Results 17, a population-based cancer registry in the United States, to establish a cross-sectional sample of Black and White men (n = 43,390) with newly diagnosed, untreated prostate adenocarcinoma in 2004, without previous diagnosis of other cancers, and for whom laboratory-determined PSA values and pathologic confirmation of bone metastases were available. Race-specific spline logistic regression models were used to examine the relationship between PSA and bone metastasis before treatment initiation. Both races demonstrated J-shaped curves for the association between PSA and bone metastasis at diagnosis of prostate adenocarcinoma after controlling for age and grade. PSA values of 1.50–20.0ng/ml for Blacks and 1.50–15.5ng/ml for Whites were protective for the prevalence of bone metastasis at diagnosis compared to <1.50ng/ml reference, whereas the prevalence of bone metastasis increased as PSA values surpassed 20.0ng/ml for Blacks and 15.5ng/ml for Whites. Our study reveals J-shaped curves for the association between PSA and prevalent bone metastasis among newly diagnosed Black and White prostate adenocarcinoma patients. Our results suggest that race-specific models may provide useful clinical information regarding bone metastasis in prostate adenocarcinoma.

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EXERCISE PHYSICAL ACTIVITY AND BREAST CANCER SURVIVAL. *X Chen, W Lu, Y Zheng, K Gu, Z Chen, W Zheng, X O Shu (Vanderbilt University Medical Center, Nashville, TN 37203)

It has been suggested that physical activity improves breast cancer prognosis. Direct epidemiologic evidence linking physical activity after cancer diagnosis and breast cancer survival is limited. We evaluated the associations of exercise physical activity (EPA) after cancer diagnosis with overall and disease-free survival in a population-based cohort study of 5046 breast cancer survivors aged 20–75 years at study recruitment (6 months after cancer diagnosis). In-person interviews were conducted at 6-, 18- and 36-months after cancer diagnosis to collect information on cancer diagnosis, treatment, and prognosis and on EPA, diet, and other lifestyle factors. Each EPA was assigned a metabolic equivalent (MET) score. The Kaplan-Meier method and Cox models were used to evaluate the association of EPA with survival after adjustment for potential confounders. During the median follow-up of 25.3 months, 242 deaths and 378 relapses or breast cancer specific deaths were documented. EPA was positively associated with overall and disease-free survival. The multivariate adjusted hazard ratios (HR) for total mortality and relapse or breast cancer specific mortality were 0.87 (95% confidence interval (95% CI): 0.82–0.92) and 0.86 (95% CI: 0.81–0.92) for EPA during the 6 months, 0.89 (95% CI: 0.81–0.97) and 0.89 (95% CI: 0.82–0.98) for EPA throughout 18 months after cancer diagnosis, respectively. Both overall and disease-free survival increased with increasing EPA MET. Our study provided a strong piece of evidence suggesting EPA improves breast cancer prognosis.

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INFLAMMATION GENE POLYMORPHISMS ASSOCIATED WITH GLIOMA RISK. *E Amirian, M E Scheurer, R El-Zein, M L Bondy (MD Anderson Cancer Center, Houston, TX 77030)

Glioblastoma is a rapidly fatal, complex disease with few known etiologic factors. Single nucleotide polymorphisms (SNPs) in inflammatory genes are of special interest with regard to glioma etiology because atopic disorders (such as asthma) have been associated with lower risk. SNPs modulating the over- or under-expression of pro-inflammatory or anti-inflammatory factors can contribute to individual susceptibility to atopic disorders and in turn, play a role in glioma etiology. We used 527 incident Caucasian adult glioma cases identified between 2001 and 2006 in Harris County, Texas and 577 community-based controls to examine the relationship between glioma risk and SNPs in the IL10, IL4R, and TNF genes. Main effects of each SNP were examined using logistic regression; case-only analyses were conducted to identify gene-gene interactions. The IL10 rs1800896 (GA/AA vs. GG), previously linked to asthma severity and increased IL-10 production (G allele), was significantly protective against glioma risk (OR:0.61; 95% CI:0.43–0.86). Furthermore, among cases, we identified four interactions, two between functional pro-inflammatory gene SNPs, TNF rs1800629*TNF rs361525 (OR:0.13; 95% CI:0.01–0.52) and IL10 rs1800896*TNF rs1800630 (OR:0.61; 95% CI:0.36–1.01), and two between functional pro- and anti-inflammatory gene SNPs, IL10 rs1800896*IL4R rs1805016 (OR:2.98; 95% CI:1.20–8.85) and TNF rs361525* IL4R rs1805016 (OR:2.33; 95% CI:0.90–5.51). IL10 rs1800896 was important in both the main effects and the interaction analyses. These findings suggest that polymorphisms in inflammation pathway genes may play an important role in glioma etiology, both individually and through their joint effects. Further research on the effects of these SNPs in glioma etiology is warranted.

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SURFACE-ADJUSTED COLORECTAL CANCER INCIDENCES. AN ANALYSIS OF THE U.S. SEER DATA 2000–2004. *A Stang, A Kluttig (University of Halle-Wittenberg, Halle, Germany)

Background: The subsite-specific comparison of the incidence of cancer within the colorectum is complicated because the mucosa surface and therefore the amount of epithelial cells at risk varies considerably among the subsites. The aim of this study was to provide subsite-specific estimates of the colon mucosa surface and to provide mucosa-surface adjusted cancer incidence estimates of colon subsites that allow a more valid comparison of the subsite-specific incidences. Methods: We extracted subsite-specific incidence rates of colorectal cancer from the Surveillance, Epidemiology, and End Results (SEER) Program (SEER 9 regions) of the years 2000–2004. Rates were age-standardized to the U.S. standard population in the year 2000. We estimated the mucosa surface of each segment of the colorectum using elementary geometry and calculated surface-adjusted incidence rates by dividing the observed age-standardized incidence rates by the estimated surface areas. Results: After adjustment for surface area, the incidence relations among the colorectal subsites changed. Within the colon the highest surface-adjusted rates are observed in the cecum and vermiform appendix. Rates of the ascending, transverse, descending and sigmoid colon are considerably lower. The surfaced-adjusted incidence of rectal cancers is about 14–24-fold higher than the rate of cancers of the transverse colon. Conclusions: Our analyses illustrate that the subsite-specific distribution of the incidence of cancers is markedly influenced by the adjustment of surface area of the colorectum. The surface adjustment shows that colorectal cancer is most common in the dependent parts of the large bowel (vermiform appendix, cecum, and rectum) where fecal stasis occurs.

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SHORT SLEEP DURATION AT NIGHT: GENDER SPECIFICITY MAINLY DUE TO INEFFECTIVELY TREATED HYPERTENSION?

*A Stang, N Dragano, S Moebus, S Möhlenkamp, A Schmermund, J Siegrist, R Erbel, K H Jöckel (University of Essen, Essen, Germany)

Background: Only few population-based studies investigated the association between sleep duration and arterial hypertension (NHANES-I, Sleep Heart Health Study, Whitehall II study). According to Whitehall II, sleep 5h per night) appears to be associated with hypertension among≤deprivation (women only. This report examines this association within a German population-based study. Methods: Analyses were based on cross-sectional data of the Heinz Nixdorf Recall Study including 2381 men and 2403 women aged 45–75 years. We calculated age-standardized prevalences with the age distribution of the overall group as the standard. Results: Self-reported sleep duration of 5 hours or less was associated with an increased prevalence of hypertensive blood 9h:≥ 5h: 38%, 6h: 28%, 7h: 31%, 8h: 30%, ≤pressure values among women only (32%). This gender-specificity was mainly due to a considerably higher prevalence 5h:≤of ineffectively treated hypertension among women with sleep deprivation (9h: 13%).≥22%, 6h: 13%, 7h: 12%, 8h: 13%, Conclusions: We were able to corroborate the gender specificity of the association between sleep deprivation and prevalence of hypertension. The gender-specific effect may be mainly due to a higher proportion of ineffective treatment for hypertension among women with short sleep durations.

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SUBCLINICAL MARKERS OF CARDIOVASCULAR DISEASE IN URBAN POLICE OFFICERS AND A GENERAL POPULATION SAMPLE.

*P N Joseph, J M Violanti, R Donahue, M Andrew, C Burchfiel, J Dorn (State University of New York at Buffalo, Buffalo, NY 14214)

The Buffalo Cardio-Metabolic Occupational Police Stress (BCOPS) study is designed to assess the impact of police work on subclinical cardiovascular disease (CVD). Our objective was to compare subclinical CVD markers between police officers (n = 312, mean age 42.9 years) and a population sample (n = 318, mean age 55.1 years) of men and women free of clinical CVD. We used B-mode ultrasound to measure carotid artery intima-media thickness (CIMT) and brachial artery flow-mediated dilation (FMD). Adequate overlap in age distributions between groups allowed for age-adjustment in subsequent analyses. Compared to controls, officers had elevated age-adjusted CVD risk factor levels (blood pressure, total cholesterol, smoking prevalence). In multiple linear regression models, officers exhibited more adverse subclinical CVD compared to controls; mean common CIMT (police = 0.66mm, controls = 0.64mm, p = 0.03), mean maximum CIMT (police = 0.85mm, controls = 0.81mm, p = 0.03), and FMD (police = 5.60%, controls = 6.27%, p = 0.15), after adjustment for age, gender, and CVD risk factors (body mass index, education, hypercholesterolemia, hypertension, diabetes, smoking, alcohol, physical inactivity, and depression). Restricting controls to employed participants only, to reduce healthy worker bias, led to similar results. In this study, officers showed increased subclinical CVD compared to a population sample. These differences could not be fully explained by traditional CVD risk factors, and implicate other pathways whereby stressful law enforcement work may increase CVD risk.

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DAILY SPIRITUAL EXPERIENCES AND BLOOD PRESSURE.

*G Fitchett and L Powell (Rush University Medical Center, Chicago, IL 60612)

There is some evidence that religious involvement is protective for blood pressure (BP) and hypertension (HTN). Daily spiritual experiences may be protective via strengthening host resistance to stress. We examined the relationship between the Daily Spiritual Experiences Scale (DSES) and BP and HTN among 1,060 White and 598 Black women (mean age 50 yr, SD 2.7) participating in the Study of Women's Health Across the Nation (SWAN). The 8 DSES items (e.g. ''I feel God's presence'') assessed the frequency of spiritual experiences. Four groups were created based on average DSES score: some days or less, most days, daily, or many times a day. Using multiple regression, mixed effects regression, and logistic regression equations, we examined the effects of DSES group on the cross-sectional association with SBP and hypertensive status, and their effects on 3-year change in SBP and incident HTN. All models were stratified by race. We found little difference in adjusted mean SBP for either the White or Black women in the highest DSES group compared to those in the lowest (adjusted mean SBP for highest vs lowest DSES group: Whites 114.9 vs 114.3, Blacks 126.9 vs 127.5, p > 0.90). Higher DSES did not protect against 3-year increases in SBP. There was no association between DSES group and hypertensive status or incident HTN. Daily spiritual experiences, as measured by the DSES, do not appear protective for SBP or HTN in midlife women. SWAN has grant support from the National Institutes of Health, DHHS, through the National Institute on Aging, the National Institute of Nursing Research and the NIH Office of Research on Women's Health (Grants NR004061; AG012505, AG012535, AG012531, AG012539, AG012546, AG012553, AG012554, AG012495). This research was also supported by AG020145 (G Fitchett).

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SELF-REPORT VERSUS MEDICAL RECORDS FOR MONITORING CARDIOVASCULAR CONDITIONS IN PATIENTS WITH HYPERCHOLESTEROLEMIA.

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Objective: To determine the accuracy of patients' self-reporting of specific cardiovascular diseases as judged by information from medical records and to identify sociodemographic patient characteristics influencing the accuracy. Methods: The study was conducted using the resources of ORBITAL, a double blind, multicentre, randomised, controlled study in Germany from 2002–2005. Self reported questionnaire data of 7571 patients with hypercholesterolemia were compared with information from general practitioners on cardiovascular diseases, using the kappa statistics and binomial logit models. Results: Kappa values ranged from 0.89 for diabetes to 0.04 for angina pectoris. The number of overreporting varied from 1% for diabetes to 17% for angina pectoris, while the number of underreporting varied from less than 0.3% for cardiac arrhythmia to 10% for hypertension. Gender, age, frequency of consultation and the choice of the individual general practitioner were correlated with overreporting for almost all conditions whereas educational status had a relatively low impact on accuracy. Conclusions: High agreement e.g. for diabetes supports the conclusion, that certain diagnoses have excellent validity. However, low agreement observed for other cardiac conditions suggests that patient self-reports are relatively inaccurate. Therefore, additional data validation is recommended for more specific and diagnostically complex conditions.

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BLOOD PRESSURE CONTROL AND RISK OF INCIDENT ATRIAL FIBRILLATION. *M C Thomas, MS, MPH, S Dublin MD, PhD, R C Kaplan, PhD, N L Glazer, PhD, T Lumley, PhD, W T Longstreth, Jr, MD, MPH, N L Smith, PhD, B M Psaty, MD, PhD, D S Siscovick, MD, MPH, S R Heckbert, MD, PhD (Departments of Epidemiology, Group Health Center for Health Studies, University of Washington, Seattle, WA)

Objectives: We sought to determine whether the risk of incident atrial fibrillation (AF) among patients treated for hypertension differs by the degree of blood pressure control. Methods: A population based, case-control study of 434 patients with incident AF and 899 controls was conducted to investigate the relationship between average achieved systolic (SBP) and diastolic blood pressure (DBP) and risk of AF. Medical records were reviewed to confirm the diagnosis of AF and to collect information on medical conditions, health behaviors, and measured blood pressures. Average achieved SBP and DBP were calculated from the three most recent outpatient blood pressure measurements. Results: Compared with the reference level of 120–129 mm Hg, for categories of average achieved SBP of ≤120, 130–139, 140–149, 150–159, 160–169 and ≥170 mm Hg, the odds ratios (95% confidence interval [CI]) for incident AF were 1.99 (1.10, 3.62), 1.20 (0.79, 1.83), 1.40 (0.93, 2.09), 2.02 (1.30, 3.15), 2.27 (1.31, 3.93) and 1.84 (0.89, 3.79), respectively. We estimated that, among patients with treated hypertension, 16.9% (95% CI 4.0%, 28.1%) of incident AF was attributable to an average achieved SBP ≥140 mmHg. Conclusion: Compared with controlled SBP, uncontrolled SBP is associated with an increased risk of incident AF, among patients treated for hypertension.

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PHYSICAL ACTIVITY AND METABOLIC SYNDROME IN POLICE OFFICERS. *E C McCanlies, T A Hartley, J E Slaven, C M Burchfiel, M E Andrew, L E Charles, J M Violanti (National Institute for Occupational Safety and Health, Morgantown, WV 26505)

The aim of this study was to evaluate if physical activity in police officers was associated with the mean number of metabolic syndrome (MS) components. In 1999, 115 officers from Buffalo, NY were randomly selected to participate in a cross-sectional study. Complete data were available for 102 officers (41 women, 61 men). MS components included elevated waist circumference, elevated triglycerides, low HDL cholesterol, elevated glucose or treatment for diabetes, and elevated blood pressure or treatment for hypertension. Data on duration, intensity, and type (work, sport, home) of physical activity for the past seven days were collected. A physical activity score was calculated by multiplying the intensity score (1 = low, 2 = hard, 3 = very hard) by duration. Comparisons of the mean number of MS components across physical activity score tertile (Low = 0–3; Medium = 3.1–11.9; High = 12+) were performed using analysis of covariance. In unadjusted models, as physical activity increased, the mean number of MS components decreased (1.49, 1.24, and 0.88 respectively; p for trend = 0.057). Adjustment for age, education, smoking, and alcohol attenuated this trend slightly (1.47, 1.07, 1.02; p for trend = 0.163), with level of education principally responsible for this attenuation. These trends were similar in men and women. In sum, physical activity was inversely associated with the number of MS components; this association was partially explained by education. Although this study was limited by sample size and its cross sectional design, further examination of this association in a large prospective study would be of interest.

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CARDIOVASCULAR DISEASE IN HISPANIC POPULATIONS: COUNTRY OF ORIGIN AND ACCULTURATION. *M Franco, M Lazo, R Durazo-Arvizu and R Cooper (Johns Hopkins University, Department of Epidemiology, Baltimore, MD 21205)

To describe the patterns of cardiovascular disease (CVD) mortality in the three major Hispanic populations in the US (Mexicans, Puerto Ricans and Cubans) as compared to CVD mortality in their country of origin. We studied the degree of acculturation of these populations in the US as a potential determinant of CVD mortality. We used vital statistics from the US, Mexico, Cuba and Puerto Rico during 2000 to estimate CVD age-adjusted mortality. We used census data to measure the degree of acculturation defined as: % born in the US, and % speaking English at home. US-Mexicans have 6% higher CVD mortality than in Mexico. Puerto Ricans in the mainland have 17% higher CVD mortality than in the island. Cubans in the US have 29% lower CVD mortality than in the island. Degree of acculturation is high for US-Mexicans, with 62% being born in the US and 23% speaking English at home. Puerto Ricans in the mainland have an even higher degree of acculturation, with half of the population living in the US and 24% speaking English at home. Cubans in the US present a low degree of acculturation with only 38% being born in the US and just 8% speaking English at home. Each of the studied Hispanic populations presents a unique degree of acculturation and a CVD mortality pattern. High degrees of acculturation were found in Mexican and Puerto Rican immigrants along with higher CVD burden than in their country of origin. On the contrary, Cubans in the US present a low degree of acculturation and lower CVD burden than in Cuba. The degree of acculturation may be one of several dimensions determining CVD mortality in immigrant populations.

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RISK OF STROKE AND MYOCARDIAL INFARCTION FOLLOWING REDUCTION OR CESSATION OF CIGARETTE SMOKING: A COHORT STUDY IN KOREAN MEN. *Y-M Song, *H-J Cho (SungKyunKwan University School of Medicine, Seoul, Korea, 135-710)

The effect of smoking reduction on cardiovascular disease outcomes has not been studied in Asian populations. A total of 475,734 Korean men aged 30 to 58 years, stratified into nine groups based on smoking status at two different time points (1990 and 1992), were followed from 1992 to 2001 for the occurrence of stroke or myocardial infarction (MI) events. Compared with non-reducing heavy smokers (≥20 cigarettes/day), those who quit smoking showed significantly lower risks of ischemic stroke, subarachnoid hemorrhage, and MI with hazard ratios (95% confidence intervals (CI)) of 0.66 (0.55–0.79), 0.58(0.38–0.90), and 0.43(0.34–0.53), respectively. For hemorrhagic stroke, quitters showed lower risk compared with heavy smokers, but the difference was not statistically significant (hazard ratio 0.82, 95% CI: 0.64–1.06). Compared with non-reducing heavy smokers, the risks of all stroke combined and MI among reducers tended to decrease, although the reductions were not statistically significant. The risks of subarachnoid hemorrhage and MI in those who reduced from moderate to light smoking tended to be lower than in non-reducing moderate (10–19 cigarettes/day) smokers. The association between the reduction of smoking level and the risk of stroke and MI did not change significantly when the analysis was limited to those whose smoking status in 1992 was maintained up to 1994. Smoking cessation was associated with a decrease in the risks of ischemic stroke, subarachnoid hemorrhage, and MI. More studies are needed to verify the likely health benefits of reducing smoking.

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CLINICAL PREDICTORS OF LATE MORTALITY IN SURVIVORS OF ACUTE MYOCARDIAL INFARCTION.

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Background: Survivors of acute myocardial infarct (AMI) have higher mortality than the general population. This study looked at the value of multiple clinical characteristics to predict the late mortality in patients presenting with AMI. Methods: Electronic medical records of all patients with AMI treated at the University of Pittsburgh Medical Center from 1992 to 2000 were reviewed. The clinical, laboratory, EKG, echocardiogram and treatment characteristics were abstracted. Multivariate Cox proportional hazard model was used, following identification of relevant variables using univariate analyses and literature review, to find predictive variables. Kaplan Meier plots were constructed using a composite risk score. Results: Of the 144 patients (79.2% males; 97.2% Caucasians; mean $\pm$ SD age = 63 $\pm$ 14.2 years) included in this analysis, 63 (43.8%) patients died during a follow-up period of 5.6 $\pm$ 2.8 years. Higher age (Hazard ratio $\pm$ SD = 1.83 $\pm$ 0.31 for every 10 years increase), elevated serum creatinine (HR $\pm$ SD = 2.87 $\pm$ 0.76), and lower ejection fraction (HR $\pm$ SD = 0.74 $\pm$ 0.21 every 5% increase) at baseline were found to be predictors of late mortality after adjustment for previous history of coronary artery disease, white blood count (WBC), QRS duration, revascularization and defibrillator implantation. Elevated WBC count predicted early but not late mortality. Patients with none of the above risk factor had 100% five-year survival, as compared to 22.7% in those with three or more risk factors. Conclusion: In this study, we identify clinical predictors of long term survival after AMI. These predictors can help in prognostication, patient education, and may guide interventions to influence modifiable risk factors.

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DIABETES MELLITUS LEADING RISK FACTOR FOR EARLY CARDIOVASCULAR MORTALITY. DRECE FOLLOW UP PROJECT.

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PURPOSE: Mediterranean diet countries held the paradox of very low cardiovascular mortality and high levels of cardiovascular risk factors. The aim is to describe evolution and relationship of main cardiovascular risk factors, diet and mortality during 1991–2004 in Spain. METHODS: The Diet and Cardiovascular Risk in Spain project is a general population based follow up cohort study started in 1991. It is composed of 4783 individuals from 15 to 60 ages in the inception, and it is a representative sample of the Spanish nationwide general population. Vital status and cause of death was provided by the National Institute of Statistics. Mortality rates and risk factors were estimated by Poisson and Cox regression, hazard ratio (HR), procedures respectively. RESULTS: There were 125 deaths (70930 person-years). Causes of death were: 53 (42,4%) cancer; 31 (24,8%) circulatory system, 24 (19%) cardiovascular. Mean age for all causes death was 56,6 years old, for cancer 58,32 and for cardiovascular 59,04. Risk factors for all causes mortality were: Creatinine >1,5 mgr/dl, HR 3.78 (IC 95%:1.52–9,40); Diabetes Mellitus HR 2.80 (IC 95%:1.74–4.46); Male Sex HR 2.39 (IC 95%:1.61–3.55); Age HR 1.08 (IC 95%:1.07–1.10); and Gammaglutamyl transpeptidase HR 1.001 (1.000–1.003). For cancer deaths: Age HR 1.12 (IC 95%: 1.09–1.16); and Tobacco HR 1.33 (IC 95%: 1.14–1.54). For cardiovascular diseases: Creatinine >1,5 mg/dl, HR 19.40 (IC 95%: 5,45–69.12); Diabetes Mellitus HR 9.82 (IC 95%:4.19–23.04); and Age HR 1.10 (IC 95%:1.05–1.15). CONCLUSION: We found a mortality profile where cancer is the most frequent cause of death following recent trends in western countries but we emphasize the role of Diabetes Mellitus and Creatinine (probably as diabetes kidney damage surrogate variable) as early and strong risk factors for cardiovascular mortality and therefore for all causes death. No diet pattern or other cardiovascular risk factors were associated. Diabetes emerges as a prioritary target for action in Mediterranean diet countries.

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THE ASSOCIATION OF BIOMARKERS OF IRON STATUS WITH PERIPHERAL ARTERIAL DISEASE IN US ADULTS.

*A Menke, J M Fernández-Real, P Muntner, E Guallar (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205)

Ferritin levels, below the levels found in genetic hemochromatosis, have been associated with diabetes and with metabolic abnormalities in previous studies. The association of ferritin and other biomarkers of iron metabolism with cardiovascular outcomes, however, remains controversial. We examined the association of serum ferritin and transferrin saturation with peripheral arterial disease (PAD) among 1,983 men and 1,418 postmenopausal women participating in the 1999–2002 National Health and Nutrition Examination Survey (NHANES). The prevalence of PAD, defined as having an ankle-brachial blood pressure index <0.9, was 4% and 7% in men and women, respectively. The geometric mean levels of ferritin and transferrin saturation were 140 ng/mL and 25%, respectively, in men and 79 ng/mL and 22%, respectively, in women. The multivariable adjusted odds ratios (95% confidence interval) for PAD comparing the highest versus the lowest tertiles of serum ferritin and transferrin saturation were 0.89 (0.51 – 1.55) and 1.07 (0.56 – 2.03), respectively, for men and 0.73 (0.44 - 1.22) and 1.22 (0.81 – 1.83), respectively, for women. Ferritin and transferrin saturation levels were not associated with PAD in this large nationally representative sample of US men and postmenopausal women.

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VENOUS THROMBOEMBOLISM (VTE) RISK FACTORS.

*P L Lutsey, B A Virnig, L M Steffen, D R Jacobs, Jr, A R Folsom (University of Minnesota, Minneapolis, MN 55108)

Background: VTE is a major cause of morbidity and mortality among the elderly. However, few studies have prospectively evaluated risk factors for VTE. Objective: To explore the prospective relation of demographics, behavioral characteristics and anthropometrics to VTE incidence. Methods: In 1986 Iowa women aged 55–69 (n = 39,458) completed a survey and provided anthropometric measurements. Hospitalized VTE cases were ascertained through linkage to Medicare records for the period from 1986–2004. Cox regression was used; with adjustments for age, education, smoking status, physical activity, and body mass index (BMI) considered in a single model. Results: Over 19 years of follow-up 2,215 women developed VTE, yielding an incidence rate of 4.36/1,000 person-years. Women who had completed high school were at lower risk than those who had not (HR: 0.83; 95% CI: 0.75, 0.93). Risk was modestly elevated among smokers: current (HR: 1.20; 95% CI: 1.05, 1.37) and former (HR: 1.21; 95% CI: 1.09, 1.35). There was a linear association between BMI and VTE risk. Compared to women with a BMI <25, the HRs for those overweight and obese were 1.48 (95% CI: 1.33, 1.64) and 2.08 (95% CI: 1.86, 2.33), respectively. Abdominal obesity was associated with VTE risk independent of BMI; women in the highest tertile of waist circumference were at 1.53 (HR: 1.31, 1.78) greater risk than those in the lowest tertile. Prevalent diabetes was also associated with increased risk (HR: 1.21; 95% CI: 1.03, 1.43), as was greater height. Usual physical activity level, HRT use, and parity were not related to risk of VTE. Conclusions: In this large prospective cohort, risk of VTE was elevated among women who were smokers, overweight, taller, diabetic, and those with less education, indicating that lifestyle contributes to VTE risk.

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INTAKE OF FATTY FISH AND INCIDENCE OF CONGESTIVE HEART FAILURE. *E B Levitan, A Wolk, and M A Mittleman (Harvard University, Boston, MA 02131)

Background: Intake of fish rich in omega-3 fatty acids has been associated with lower rates of cardiovascular diseases. Hypothesis: Consumption of fatty fish (salmon, herring, or mackerel) is associated with lower incidence of congestive heart failure (CHF). Methods: We measured diet using food-frequency questionnaires in 36,259 women 48–83 years old and 39,367 men 45–79 years old without a history of myocardial infarction or diabetes. Participants were followed for CHF through the Swedish inpatient and cause-of-death registers from January 1, 1998 to December 31, 2004. To estimate rate ratios (RR), we used proportional hazards models that allowed the baseline rate to vary by age and adjusted for other dietary factors, physical activity, body mass index, education, family history of myocardial infarction at <60 years, cigarette smoking, postmenopausal hormone use (women), living alone (women), and marital status (men). We used fractional polynomials to explore the shape of the association. Results: During follow-up, 455 women and 597 men developed incident CHF. Compared to 1 fatty fish meal/week, the RR for no fatty fish was 1.24 (95% confidence interval (CI) 0.94–1.64) in women and 1.17 (95% CI 0.91–1.50) in men, and the RR for >1 fatty fish meal/week was 0.95 (95% CI 0.73–1.23) in women and 1.13 (95% CI 0.93–1.42) in men. In both women and men, the best-fitting polynomial model showed a U-shaped relationship with a minimum rate >1 meal/week in women and <1 meal/week in men. Conclusions: In this population, rates of CHF appeared to be elevated in women and men who did not consume fatty fish. The higher rates among individuals who consumed a large amount of fish may be due to confounding by health status or to contaminants in the fish.

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RENAL FUNCTION PREDICTS SURVIVAL IN PATIENTS WITH ACUTE ISCHEMIC STROKE. *E Mostofsky, G A Wellenius, E B Levitan, A Noheria, M R Burger, G Schlaug, M A Mittleman (Harvard University, Boston, MA 02215)

Background: Among patients with acute ischemic stroke, impaired kidney function may increase mortality risk, but this hypothesis has not been evaluated in detail. *Methods*: We studied 1,163 patients $\geq$ 21 years of age residing in the greater Boston area and hospitalized with a confirmed acute ischemic stroke at Beth Israel Deaconess Medical Center between April 1, 1999 and December 31, 2004. We estimated glomerular filtration rate (eGFR) at the time of hospitalization using the abbreviated Modified Diet and Renal Disease equation and examined the association between eGFR and all-cause mortality using Cox models. *Results*: There were 505 deaths during a median follow-up of 39.8 months. After adjusting for age, sex, and race, chronic kidney disease (eGFR <60 ml/min/1.73 m^2) was positively associated with all-cause mortality (hazard ratio [HR]: 1.46; 95% confidence interval [CI]: 1.17, 1.82; $p < 0.001$). Mildly impaired kidney function (eGFR 60.0C74.9 ml/min/1.73 m^2) was not significantly associated with increased risk (HR: 1.07; 95% CI: 0.84, 1.36; $p = 0.58$). Further adjustment for stroke etiology, smoking status and past medical history of stroke, coronary artery disease, myocardial infarction, atrial fibrillation, heart failure, valvular disease, diabetes, dyslipidemia and hypertension did not materially alter the results. The strength of this association did not vary by sex, age or 30-day survival. *Conclusions*: Among patients with acute ischemic stroke, chronic kidney disease at hospital admission is associated with a higher mortality rate compared to patients with normal kidney function, and this association remains significant after adjustment for clinically relevant characteristics.

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DIABETES WILL BECOME THE LEADING CAUSE OF MORTALITY FROM VASCULAR DISEASE IN PUERTO RICO BY 2012. *R A Durazo-Arvizu, D Shoham, A L Davila, A Garcia, A Palloni, R S Cooper (Loyola University Medical School, Maywood, IL 60153)

The trends in mortality from diabetes and cardiovascular disease (CVD) in Puerto Rico (PR) from 1985 to 2002 are compared. Age-adjusted rates were calculated using data from the PR Department of Public Health and the Census Bureau. Diabetes mortality for men almost double between 1985 and 2002, whereas for women increased by about 25%. Death from all CVD decreased at similar rates for men and women (about 2.5% per year) since 1985. Stroke mortality decreased more rapidly at 2.9% and 2.6% per year for men and women respectively. Heart disease mortality decay has been more modest (1.3% per year). Linear projection leads to the following estimates in 2012 (per 100,000): Diabetes = 100; CHD = 64, Stroke = 20. These data should inform public health policy and create a clear imperative to intervene using strategy different from those applied to curb CHD and stroke.

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COMPARISON OF OBSERVED COMMUNITY CORONARY HEART DISEASE RATES AND TRENDS WITH COHORT-BASED EXPECTED RATES AND TRENDS. *N P Paynter, A R Sharrett, T A Louis, W Rosamond, A R Folsom, J Coresh (Johns Hopkins University, Baltimore, MD 21205)

The relationship of coronary heart disease (CHD) risk to major CHD risk factors is well established. The extent to which individuals' risk factor levels and trends explain community CHD rates has been difficult to determine. The Atherosclerosis Risk in Communities Study provides two sources of data from each of four US communities: 1) a sampled cohort; and 2) surveillance of hospitalized myocardial infarction and CHD deaths in each community. Cohort members' information from each visit and follow-up was combined to generate the predicted probability of a CHD event. The probability was then summarized across the individual risk factor distributions for each geographic, chronologic and demographic group and compared to the observed rate obtained from the surveillance and census data. The analysis was limited to ages 53 to 64 to ensure availability of risk information from the cohort throughout the time period of concurrent visit and surveillance information (1987–1998). Observed CHD rates declined by 1–3% per year in all communities except one, while CHD mortality declined 3–6% per year in all communities. Risk factor trends predicted a 2–3% per year decline in both morbidity and mortality. Overall, trends in CHD rates parallel the trends in expected rates based on cohort risk factors, but declines in mortality are steeper than expected, particularly among the Black populations. Tracking risk factors provided a useful indicator of changes in a community event rates, but its utility in prediction of absolute risk of CHD varied across communities.

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DIABETES, METABOLIC SYNDROME AND CARDIOVASCULAR DISEASE MORTALITY AMONG MEN IN THE AEROBICS CENTER LONGITUDINAL STUDY.

*A Thompson, T Church, P Katzmarzyk, and S Blair (Pennington Biomedical Research Center, Baton Rouge, LA)

Individuals with diabetes are at increased risk of cardiovascular disesase (CVD), however it has been reported that this increased risk is primarily due to the presence of metabolic syndrome (MetS). There is a need to better understand the relative contribution of diabetes (DM) and MetS to CVD risk. We examined the associated risk of MetS, DM and the combination of these two to CVD mortality within the Aerobics Center Longitudinal Study (ACLS). We identified 34 889 men (mean age [SD]: 45.1 [±10.2] y) who were examined between January 1, 1977 and December 31, 2003, who had complete measures for all of the MetS criteria. Among this cohort, 706 men had only DM, 7650 men had MetS alone as defined by the NCEP, 957 men had both DM and MetS, and 25 576 men had neither condition. The mean follow-up time was14.2 y and CVD was the cause of death for 1131 men. Crude CVD mortality rate was highest among men with the presence of both DM and MetS (Rate: 9.9), lower in men with DM (Rate: 8.7) and MetS only (Rate: 3.0) and lowest in men with neither condition (Rate: 1.8). In a model adjusted for age and smoking history, compared to men without DM or MetS, risk of CVD mortality was significantly higher in men with MetS only (Hazard Ratio [HR]: 1.5, CI: 1.3–1.7), DM only (HR: 2.6, 95% Confidence Intervals [CI]: 2.0–3.5), and both (HR: 3.1, CI: 2.5–3.8). In this large prospective cohort of men, we found that DM with or without MetS was a strong risk factor for CVD mortality and that the presence of MetS only added slightly to the risk associated with DM. The combined presence of diabetes and MetS conferred the highest risk of CVD mortality.

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DIET, BMI, AND FITNESS AND THE DEVELOPMENT OF LOW HIGH-DENSITY LIPOPROTEIN CHOLESTEROL (HDL-C) LEVELS: CARDIA.

*N S Evans, D M Lloyd-Jones, P J Schreiner, S S Gidding, K Liu, M R Carnethon (Northwestern University, Chicago, IL 60611)

We set out to determine the association of dietary components, aerobic fitness, and body mass index (BMI) on incident low HDL-C (INCHDL) over 20 years. Coronary Artery Risk Development in Young Adults (CARDIA) is a multicenter cohort study of 5115 black and white men and women ages 18–30 years. HDL-C was measured at baseline (1985–86) and 2, 5, 7, 10, 15, and 20 years after baseline; low HDL-C was categorized at each exam as <40 mg/dl(men) or <50 mg/dl(women), BMI was measured. Diet components (% energy intake) were assessed using averaged values from the CARDIA Dietary History at baseline and 7-years. Fitness was measured at baseline using treadmill testing. In 2942 participants (50% black, 50% female) with normal HDL-C at baseline, we used Cox proportional hazard ratios (HR) to describe the association between baseline covariates and INCHDL at 2+ exams. Over 20-years, 20% of black men, 32% of white men, 30% of black women, and 23% of white women developed INCHDL. Baseline BMI (per 5 kg/m2) was associated with INCHDL in women and men (HR = 1.3; 95% confidence interval [CI] 1.2–1.4 in both). After adjusting for BMI, race, and age, high %carbohydrate was associated with INCHDL in women (HR = 1.4; CI 1.0–1.9 Q5 vs. Q1) but not men (HR = 0.9, CI 0.7–1.3 Q5 vs. Q1). High %fat was significantly associated with INCHDL only in men (HR = 1.5; CI 1.1–2.1 Q5 vs. Q1). The association of fitness with INCHDL only remained significant in men (HR = 0.87, CI 0.77, 0.98 per 2 min.) following adjustment. The incidence of low HDL-C was high in middle-aged adults. Dietary factors and fitness were associated with the development of low HDL beyond BMI, but further research should explore the association of fatty acids, sugars and fiber on low HDL.

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ATHEROSCLEROSIS AND THE 5-YEAR INCIDENCE OF HEARING LOSS.

*C R Schubert, K J Cruickshanks, D M Nondahl, C W Acher, B E K Klein, R Klein, T L Wiley, T S Tweed (University of Wisconsin, Madison, WI 53726)

The etiology of age-related hearing loss is unknown but previous studies suggest atherosclerosis may affect blood flow to the cochlea and therefore, could be a contributor to presbyacusis. As part of the population-based Epidemiology of Hearing Loss Study, hearing thresholds were measured by pure-tone audiometry at the baseline, 5- and 10-year exams. Carotid artery ultrasound was performed at the 5-year exam and the intima media thickness (IMT) of the carotid artery walls was measured. The maximum IMT was used in these analyses. There were 921 participants aged 53–79 years at the 5-year exam at risk for incident hearing loss at the 10-year exam. Among participants aged 53–59 years (n = 335), carotid IMT (3rd versus 1st tertile) was associated with increased risk for the 5-year incidence of hearing loss (age and gender adjusted Odds Ratio (OR) = 2.92; 95% Confidence Interval (CI) = 1.10, 7.74). This association remained after including noise exposure (at work and during leisure activities) and education in the model (OR = 3.26, 95% CI = 1.20, 8.87). Excluding those with a history of cardiovascular disease strengthened this association (OR = 3.92, 95% CI = 1.40, 10.94). The presence of plaque was non-significantly associated with the 5-year incidence of hearing loss in this age group (OR = 3.01, 95% CI = 0.73, 12.43; plaque at 4–6 versus 0 sites). There was no association between IMT and hearing loss in participants aged 60–69 or 70–79 years (age- and gender-adjusted, 3rd versus 1st tertile; 60–69 years: OR = 0.81, 95% CI = 0.41, 1.57; 70–79 years: OR = 1.05, 95% CI = 0.45, 2.54). Subclinical atherosclerosis at a young age was a risk factor for hearing loss suggesting it may contribute to the development of presbyacusis.

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HYPERTENSION IN THE BEAVER DAM OFFSPRING STUDY.

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The prevalence of hypertension was analyzed using preliminary data from the first 2666 participants in the Beaver Dam Offspring Study, a study of familial and birth cohort effects on aging senses. Eligible participants in this on-going study are children of participants in an earlier population-based study of older adults. History of physician-diagnosed hypertension with medication use was ascertained by interview and blood pressure was measured using the Dinamap Procare 120; the average of the second and third measures was used. Hypertension was defined as systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥90 mmHg at the examination or a history of hypertension with medication use. The prevalence of hypertension in this young cohort (mean age = 49 yrs) was 36%, higher among males than females (41% vs. 29%, $p < .0001$), and older subjects (15% for ages <40, and 65% for ages >60 yrs, $p < .0001$). Among those with a history of hypertension, 34% had uncontrolled blood pressure at the exam. Controlling for gender, income, education and health insurance, age was associated with uncontrolled blood pressure (OR = 1.27, 95% CI: 1.04–1.56 per 10 yrs). Among those with elevated blood pressure, 50% did not have a history of hypertension. Younger people were more likely to be undiagnosed (OR = 1.43 per 10 yrs, 95% CI: 1.22–1.75). These preliminary results indicate that a third of participants treated for hypertension had high blood pressure at the exam, and older subjects were more likely to have uncontrolled hypertension. Younger people with elevated blood pressure were more likely to be undiagnosed. These results suggest that many people remain at risk for adverse health effects from high blood pressure.

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ALCOHOL CONSUMPTION AND RECURRENT CARDIOVASCULAR DISEASE (CVD) EVENTS IN MI SURVIVORS: THE WESTERN NEW YORK ACUTE MI STUDY (1996–2004). *M Trevisan, J Dorn, K Hovey, R Donahue, M Russell (University at Buffalo, Buffalo, NY 14214)

This prospective study examined gender differences in the association between drinking pattern and recurrent CVD in a population based sample of incident MI survivors. Cases (1064 men, 432 women) 35–69 yrs old were recruited from 12 of 15 WNY hospitals and completed an interviewer-administered survey and clinic exam (mean 4 months post MI) (59.2% participation). Alcohol drinking pattern was assessed in detail for the 30 days prior to the interview. Recurrent events (RE) included non-fatal and fatal CVD (ICD9 390–450) and revascularizations (ICD9 36–39). 204 men and 110 women had an RE during the follow up period (mean 2.4 yrs). Survival analysis was conducted adjusting for age, smoking and diabetes status. Compared with lifetime abstainers, Hazard Ratios (95% CI) for women non-current and current drinkers were 1.23(0.64–2.38) and 1.34 (0.68–2.64) respectively, whereas in men, risks for similar patterns were 1.10(0.56–2.18) and 0.77 (0.39–1.49) (gender interaction $p < .001$). Among current drinkers, women who drank weekly had a more than a two-fold increased risk of RE [2.64(1.34–5.20)] compared to less frequent drinkers. Drinking intensity [drinks/drinking day(dpdd)] was associated with increased RE risk (ref <1dpdd, 1-<2dpdd 2.44(1.06–5.61) 2 plus dpdd 1.53 (0.61–3.82), ptrend 0.097. In men, frequency and intensity of drinking were not associated with RE. In this study of MI survivors, alcohol appeared to have differential effects in men and women in regards to recurrent CVD events. Women who drink after their incident MI are at greater risk for a recurrent event than men, particularly if they drink on a weekly basis.

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NEIGHBORHOOD SOCIOECONOMIC STATUS (SES) AND ONE-YEAR CASE FATALITY AFTER INCIDENT MYOCARDIAL INFARCTION (MI); THE ATHEROSCLEROSIS RISK IN COMMUNITIES (ARIC) COMMUNITY SURVEILLANCE. *K M Rose, M D Patel, E A Whitsel, C Suchindran, G Heiss, H Ni (U of North Carolina, Chapel Hill, NC 27510)

In the US, variations in MI case fatality (CF) by SES are not well studied, largely due to the lack of SES data in medical records. We examined the association of neighborhood census tract household income (nINC)[low (L-), medium (M-), high (H-)] with one-year CF in 8489 hospitalized MI patients ages 35–74 years under surveillance by ARIC (1992–2001). We used weighted generalized estimating equations to estimate CF rate ratios (RR) and 95% confidence intervals (CI). Age-adjusted CF was 17% in L-nINC, 10% in M-nINC, and 7% in H-nINC areas. Given effect modification by race, CF was estimated within race-SES strata in the two bi-ethnic study communities, with H-nINC whites as the referent. In models adjusting for gender, age, center, and year of MI, living in a L-nINC area was associated with higher CF in Blacks [RR = 2.4 (1.8–3.4)] but not Whites [RR = 1.4 (0.8–2.3)]. Similar patterns were found when M-nINC patients were compared to whites from H-nINC areas [Blacks:RR = 2.2 (1.5–3.2); Whites:RR = 1.2 [0.9–1.6]). CF in H-nINC blacks did not differ from that of H-nINC Whites. We further examined the contribution of hospital type, insurance, medical history, MI characteristics and MI treatment to these associations. Excess CF in L-nINC and M-nINC in Blacks was modestly attenuated after inclusion of most covariate sets, except for use of evidence-based treatments, which strongly attenuated associations [RR, L INC = 1.4 (0.8, 2.2); RR, M nINC = 1.5 (0.8, 2.7)]. In the ARIC study communities, neighborhood disparities in one-year CF were limited to Blacks and largely explained by differences in the use of evidence-based treatments for MI.

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THE CONSISTENT EFFECT OF LOW DENSITY LIPOPROTEIN-RECEPTOR MUTATIONS ON INCIDENT CORONARY HEART DISEASE ACROSS STRATA OF APOE ALLELES: THE ARIC STUDY. *D Canos, C Avery, N Franceschini, N Maeda, H Muallem, G Heiss, M Grove, E Boerwinkle, K North (University of North Carolina, Chapel Hill, NC 27514)

Low-density lipoprotein receptors (LDLR) are instrumental in regulating plasma LDL cholesterol; they bind and uptake apolipoprotein B and apolipoprotein E (ApoE) containing lipoproteins. LDLR polymorphisms, associated with familial hypercholesterolemia, increase LDL cholesterol. APOE mutations are associated with higher (E4) and lower (E2) LDL. Using data from the Atherosclerosis Risk in Communities (ARIC) cohort, we measured how APOE variants modify the association between LDLR SNPs and incident coronary heart disease (CHD). Of the 15,792 ARIC participants, 9,757 Caucasians and 3,469 African Americans were genotyped for two SNPs in exon 3 of APOE and two SNPs in the 3' regulatory region of LDLR (rs1433099 and rs2738466). We grouped APOE genotypes as E2 (E2/E2, E2/E3, E2/E4); E3 (E3/E3); E4 (E3/E4, E4/E4). One tagSNP (rs2738466) represented the LDLR SNP variation. A dominant model was assumed with APOE E3 and LDLR CC as referent. Log-log survival plots provided evidence against proportionality of hazards over time in study. The time-varying effects of the SNPs over 16 year follow-up were estimated using a Cox piecewise quadratic basis-spline regression model stratified by race. African Americans with LDLR CT/TT had a higher hazard, and the time-varying effects of LDLR were consistent across levels of the APOE genotypes. At approximately 10 years follow-up, hazard ratios ranged 2.1–2.4, 95% confidence limit ratios 4.5–5.0. No effect was observed for LDLR in any APOE strata among Caucasians. This suggests that the effect of the LDLR variant is independent of the APOE isoform.

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FRUIT AND VEGETABLE INTAKE AND STROKE MORTALITY: RESULTS FROM THE ADVENTIST HEALTH STUDY-1. *T Zamansani, L Beeson, S Knutsen (Loma Linda University, Loma Linda, CA 92350)

The association between dietary factors and risk of cerebrovascular disease is unclear. Intake of vegetables and fruit has been reported as protective for stroke. We studied the association between fruit and vegetable intake and stroke mortality during 12-year follow-up of 34,198 non-smoking subjects, aged 25–100, enrolled in The Adventist Health Study-1 (AHS–1). Subjects completed a comprehensive lifestyle and diet questionnaire at enrollment. This is a health conscious population where about 50% are lacto-ovo vegetarian. A total of 434 fatal strokes (ICD9 431–434 and 436–437) were identified by record linkage with the California Death Certificate Files and the National Death Index. The independent effect of a priori dietary factors was assessed using the Cox proportional-hazards model. Compared to very low fresh fruit intake (citrus fruit, winter fruit and other fresh fruit) (i.e. < 2x per week), consumption of fresh fruits 2 or more times per day showed a weak inverse association with stroke mortality (HR = 0.89, 95% CI = 0.66 to 1.19) adjusting for age, sex, hypertension, diabetes, previous coronary events, body mass index, prior smoking history, educational level, total exercise and meat consumption. When limiting our analyses to those without hypertension, diabetes and coronary heart disease at baseline, there was no longer an association with fresh fruit intake (HR = 0.99, 95% CI = 0.65 to 1.51). The addition of other variables such as cooked vegetables, green salads, tomatoes, nuts, and water did not change the hazard ratio appreciatively. We conclude that fresh fruit consumption is not associated with fatal stroke in this population.

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ASSOCIATION BETWEEN CARDIAC REHABILITATION AND HEALTH-BEHAVIORS POST MYOCARDIAL INFARCTION. *M D Zullo, M Dolanksy, L Jackson (Case Western Reserve University, Cleveland, OH 44106)

Research on behaviors post cardiac rehabilitation (CR) has focused on exercise maintenance while failing to address other behavior changes. The authors examined the association of health-behaviors and body mass index (BMI) with prior CR attendance and time since CR. A cross-sectional study was carried out among individuals reporting having a myocardial infarction (MI) in the 2003 Behavioral Risk Factor Surveillance System (n = 1,374). CR was self reported and time since CR was based upon age at MI and age at survey. Outcomes including fruit/vegetable consumption and exercise were dichotomized: meeting/not meeting national recommendations; BMI was categorized: normal, overweight, obese. Logistic (polytomous) regression was used to identify predictors of behaviors. In adjusted analysis CR participants were 50% more likely to meet fruit/vegetable (p = 0.02) and exercise guidelines (p = 0.05) than non-participants. CR had a protective, non-significant effect on BMI for overweight and obese participants (odds ratio (OR) 0.73, 95% confidence interval (CI) 0.46–1.2 and OR 0.70, CI 0.45–1.1, respectively) compared to non-participants. Meeting fruit/vegetable consumption guidelines was associated with CR participation in the past year (OR 3.6, CI 1.3–9.9) and 1–2 years post CR (OR 2.9, CI 1.2–7.3). Those attending CR were less likely to be obese 1–2 years post CR (OR 0.28, CI 0.09–0.84) compared to those who did not attend CR. CR was not associated with meeting exercise guidelines. CR was associated with healthy behaviors post CR though maintenance diminished over time. Understanding factors associated with healthy behaviors and the time at which behavior maintenance decreases will assist with program planning and may increase behavior sustainability.

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THE ASSOCIATION BETWEEN OBESITY AND TNF-α CONCENTRATION IN THE GINGIVAL CREVICULAR FLUID IN CHILDREN AT RISK OF OBESITY. *B Nicolau, R Khosravi, S Tran, J O'Loughlin, M Lambert (INRS—Institut Armand Frappier, Laval, Quebec, H7V 1B7 Canada)

Increasing evidence suggest an association between periodontal disease and other diseases with inflammatory components, such as cardiovascular disease (CHD) and type 2 diabetes mellitus (DMII). The potential underlying biological mechanisms remain to be established; however, the adipose tissue actively secretes a variety of cytokines and hormones that are involved in inflammatory processes, pointing toward similar pathways involved in the pathophysiology of obesity, periodontal disease, and related inflammatory diseases. Aim: To investigate the relationship between body mass index (BMI) and TNF-α concentration in the gingival crevicular fluid (GCF) in the first 300 children recruited in the baseline wave of the Quebec Adipose and Lifestyle InvesTigation in Youth (Quality cohort). Methods: The QUALITY Cohort is an ongoing longitudinal studying the natural history of obesity in Quebec children. Study participants comprise children age 8–10 yrs at risk of obesity and their families, living in the Montreal and Quebec City areas. The GCF was collected from six sites per subject using periopaper, and the volume was determined using Peritron 8000. TNF-α concentration was determined using ELISA kits. Anthropometric measures including height and weight were taken using standardized procedures. Multiple linear regression examined the association between BMI and TNF-α concentration in the GCF. Results: BMI was positively associated with TNF-α concentration in the GCF only in boys (beta = 0.21 [0.06, 1.65] for 2nd tertile and beta = 0.24 [0.2, 1.82], 3rd tertile). However, when accounting for insulin resistance this association disappeared and the model's goodness of fit improved. This results suggest that the association between BMI and TNF-α in the CGF may be mediated by insulin levels. It provides support for the inflammatory pathway liking periodontal diseases and obesity, CHD, DMII.

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ABDOMINAL OBESITY AND THE RISK OF STROKE IN WOMEN: 18 YEARS OF FOLLOW-UP. *C Zhang, T Y Li, K M Rexrode (NICHD/NIH, Bethesda, MD 20852)

Background: While obesity has been associated with increased risk of stroke, whether abdominal obesity is a particular risk factor is not clear, particularly in women. Methods and Results: In a prospective cohort study of 44,059 women in the Nurses Health Study who were aged 40–65 years and free of coronary heart disease (CHD), stroke, and cancer at baseline, the associations of abdominal adiposity (waist circumference [WC] and waist/hip ratio [WHR]) with total and specific types of stroke were examined. During 18 years of follow up, 1120 incident stroke cases were identified. After adjustment for body mass index (BMI) and potential confounders including age, physical activity, smoking, alcohol, menopause, hormone therapy and family history of CHD, WC and WHR were strongly associated with risk of total and particularly ischemic stroke, but not hemorrhagic stroke. The relative risks (RR) (95% confidence intervals [CI]) comparing highest with lowest quintiles of WC were 1.48 (95% CI, 1.16–1.88) for total stroke and 1.56 (95% CI: 1.12–2.16) for ischemic stroke (P-trend <0.001 for both). RRs were similar for comparison of extreme WHR quintiles. Among lean women (BMI <25 kg/m2), abdominal obesity as defined by American Heart Association was associated with significantly increased risk of total stroke : multivariate adjusted RR (95% CI) for WC ≥ 88 cm was 1.64 (1.07–2.49) and for WHR > 0.88 was 1.56 (1.14–2.14). Conclusion: Anthropometric measures of abdominal adiposity are significantly and positively associated with total and ischemic stroke independent of BMI. Abdominal obesity is associated with significantly increased risk of total stroke even among lean women.

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PROJECT HEART: (HEALTH EDUCATION AWARENESS RESEARCH TEAM): DEMOGRAPHIC CHARACTERISTICS, ACCULTURATION AND CLINICAL OUTCOMES OF A STUDY POPULATION AT RISK FOR CARDIOVASCULAR DISEASE IN EL PASO, TEXAS. *H deHeer, V M Cardenas, F A Puentes, H G Balcazar, L O Schulz (University of Texas, El Paso, TX 79968)

Introduction: The purpose of this paper is to describe the demographic characteristics, acculturation and clinical indicators of a sample of Mexican American (n = 328) residents of El Paso, Texas, who had at least one risk factor for development of cardiovascular disease (CVD) and agreed to participate in a randomized intervention trial aimed at CVD risk reduction. Method: Risk factors used for screening include: overweight, diabetes, high cholesterol, high blood pressure, and smoking. Results: The mean age was 53 ± 13 years; 53% was Mexican born; 97% spoke Spanish (60% bilingual). Participants were low to moderately acculturated Acculturation score = 2.32 ± .9 on a 1–5 scale; 68% were unemployed; 75% completed high school or less; 80% reported less than $20,000 annual income; 46% had family history of CVD; 64% had family history of diabetes; 38% took BP medication; 23% cholesterol medication. Pre BMI was 31 ± 7 (35% BMI 25–30; 53% BMI>30). Females (n = 232) that were more acculturated, showed significantly higher diastolic blood pressure (p = .035) and higher triglycerides (p = .038). Males (n = 96) who were more acculturated, were heavier (p = .033), had higher Body Mass Index (p = .021) as well as larger waist circumference (p = .017), but also lower systolic blood pressure (p = .045). Discussion: Participants of a randomized trial intervention in El Paso, Texas, are at high risk for development of CVD; socioeconomic characteristics contribute to risk for CVD development. Culturally sensitive interventions are recommended and gender specific interventions may be worth exploring.

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INTRACRANIAL HEMORRHAGE AS COMPLICATION OF THROMBOLYSIS AND ITS IMPACT ON OUTCOMES OF STROKE PATIENTS IN A STATE-WIDE REGISTRY.

*Y Deng, W J Kostis, Y-H Shao, A C Wilson, N M Cosgrove, A E Moreyra, J B Kostis (Robert Wood Johnson Medical School, New Brunswick, NJ 08903)

Intracranial hemorrhage (ICH) is a serious complication of thrombolytic treatment(TT) for stroke. However, the likelihood of occurrence and outcomes of ICH in clinical practice need further study. METHOD: The rate of ICH among TT treated strokes, the in-hospital and 1 –year mortality were investigated in the Myocardial Infarction Data Acquisition System (MIDAS), a statewide database of cardiovascular disease hospitalizations in New Jersey. Logistic regression and Cox proportional models were used to assess the likelihood of ICH and its impact on the outcomes. Odds ratio or hazard ratio and their 95% confidence interval were reported. RESULTS: From 1998 to 2006, 1687 acute strokes received TT. ICH occurred among 8.0% of the patients that received TT, compared to 0.5% of those not ($p < 0.0001$). There were no differences on their age (68.9 vs 69.8), gender (61.6% vs 52.8% male), hypertension(68.4% vs 67.9%) and diabetes (21.8% vs 20.0%) for patients with ICH compared to those without(all $p>0.05$). Atrial fibrillation increased the risk of ICH by 2.4 times (1.4~4.0). Average length of stay (LOS) for TT patients without ICH was 8.9 days, their LOS were extended to 14.7 for those with ICH ($p < 0.0001$). In-hospital death was 36.8% for patients with ICH compared to 12.8% for those without (HR: 1.9,1.03–3.8).In contrast to the serious impact of ICH on in-hospital death, patients discharged alive had no significant difference on their 1 year mortality (HR: 1.4,0.6–3.6).CONCLUSION:ICH is a severe complication of TT for strokes. Successful management of ICH could further help improve the survival of these patients.

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HOW DO THOSE WHO COMPLETE FOLLOW-UP AND ADHERE TO A CARDIOVASCULAR HEALTH EDUCATION INTERVENTION DIFFER FROM THOSE WHO DO NOT?

FA Puentes, *V M Cardenas, H De Heer, H Balcazar, L Rosenthal, and L Schulz (University of Texas School of Public Health, El Paso Regional Campus, El Paso, TX)

A randomized cardiovascular health education intervention trial (National Heart, Lung and Blood Institute or NHLBI-sponsored Health Education Awareness Research Team) conducted in El Paso, Texas, enrolled 328 participants 30–75 year-olds who reportedly had at least one major Framingham risk factor for cardiovascular disease. To assess the extent of potential selection bias in this trial we: 1) Among those assigned to the experimental group, we compared the baseline characteristics of those who completed the intervention consisting of 4+ out of 8 classes provided by community health workers ('promotoras') with those did not show-up to at least 4 classes. 2) We also compared the experimental (i.e., promotora group) and the comparison group, receiving NHLBI self-taught printed materials, according to baseline characteristics. We found that among those assigned to the experimental group ($n = 176$), those not completing at least 4 sessions ($n = 68$) were younger (-8.9 years), more likely to be overweight (Body Mass Index difference $= 2.7$), had lower average systolic blood pressure (-8 mm of mercury), were regular drinkers [prevalence ratio (PR) $= 1.6$), and ever smokers (PR $= 1.6$), born in the US and English speakers. Those not completing the four months of follow-up were younger (6 years), but did not differ significantly otherwise. These results indicate that interventions targeting high risk individuals often fail to engage the most vulnerable populations. However, the study results might not be affected by a follow-up bias.

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CROSS-SECTIONAL ANALYSIS OF HELICOBACTER PYLORI INFECTION AND GROWTH IN A COHORT OF CHILDREN IN THE US/MEXICO BORDER.

*F A Puentes, V M Cardenas, K Mena, C Aragaki, C Broussard, S Rivas (University of Texas School of Public Health, El Paso, TX 79902)

It has been hypothesized that H. pylori infection retards growth in children, but the relevant literature reveals inconsistent findings. This analysis compares the prevalence of underweight, short stature, and overweight by H. pylori status in the Pasitos Cohort Study, which drew its population from the border communities of Socorro and San Elizario, Texas, and Ciudad Juarez, Chihuahua, Mexico. Between 1998 and 2005, 472 children were followed to identify determinants of H. pylori infection. H. pylori status ascertained by urea breath test and height and weight measurements were obtained at follow-up exams targeted at 6-month intervals. The proportion of children who were classified as of short stature using the 2000 CDC reference was under 5%, while those considered underweight were less than 10% at selected six-months of age intervals. Using the subset of children who were 66 months of age we found that the risk of underweight was higher among those who ever tested positive for H. pylori infection using the urea breath test; however, due to small numbers of children with 'wasting' this difference was not statistically significant. The prevalence of underweight was 4.8% compared to 1.6% of children who were stunted and ever tested positive. Only 3.1% who tested positive were also stunted (RR $=$ 0.8). Similar results were seen in children who tested positive and were also overweight with only a 4.6% indicating no statistical significance (RR $=$ 0.4). Future research using a longitudinal approach might help to better describe the relation between H. pylori status and growth in this cohort.

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ATTITUDE DIFFERENCE BETWEEN PRIMARY PHYSICIANS WHO REPORT AND NEVER REPORT COMMUNICABLE DISEASES IN TAIWAN.

*H F Tseng, H F Tan (National Sun Yat-sen University, Kaohsiung, Taiwan, 804)

Epidemiological surveillance of infectious diseases through the mandatory-reporting system is crucial in the planning and evaluation of disease prevention and control programs. A total of 1250 clinics were randomly sampled nationwide in Taiwan. Among them, 1093 doctors (87.4%) returned the completed questionnaires regarding the attitude toward disease reporting. Of those who have experiences of diagnosing reporting communicable diseases ($n = 406$), comparison of attitude was made between those who have ever reported ($n = 340$) and those who have never reported ($n = 66$). The 3 most common reasons for not reporting among the never reporters were "do not want to violate the patient's privacy" (32.8%), "reporting procedure is troublesome" (31.1%), and "not sure whether the diagnosed disease is reportable" (29.5%). Ever reporters and never reporters were different in many aspects of attitude toward disease reporting. Of the 14 questions about attitude toward reporting, significant differences were found in 10 of them between reporters and never reporters. The perceived barrier significantly associated with physician's reporting behavior. About 44% of the physicians who never reported felt that the reporting system has been inconvenient or felt that they were not familiar with the reporting system. This proportion was twice as much as that of those with reporting experiences. In addition, higher proportion of the never reporters had misconception about disease reporting. For example, they chose not to report if the disease was less severe or if disease diagnosis was difficult to be confirmed. The results of this study revealed that physicians' attitude toward disease reporting was significantly different between reporters and never reporters. The most effective way to improve reporting rate may be to modify physician's attitude. In addition, development of a convenient and widely-accepted reporting system is also essential.

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ACUTE PYELONEPHRITIS IN THE UNITED STATES—FACTORS ASSOCIATED WITH HOSPITAL ADMISSION FROM THE EMERGENCY DEPARTMENT. RT Lee, MS2, *A Krishnadasan, PhD, G J Moran, MD, D A Talan, MD (Olive View-UCLA Medical Center, Sylmar, CA 91342)

BACKGROUND: While outpatient management of acute uncomplicated pyelonephritis can be safely achieved in most patients, there are no clearly established criteria to identify those who may require inpatient care. Therefore, we conducted this study to determine which factors are associated with the decision of emergency department (ED) physicians to admit patients with pyelonephritis. METHODS: A prospective, multicenter survey of adult patients with pyelonephritis presenting to 11 urban U.S. ED's was conducted. Demographic characteristics, historical information, clinical presentation, and disposition information were collected. Associations between clinical and epidemiologic characteristics of patients who were and were not admitted to the hospital were examined. Variables found to be associated with hospital admission were further analyzed using multivariate logistic regression. RESULTS: Of 697 patients for whom disposition information was available, 219 were hospitalized and 478 were discharged. The following factors were associated with hospitalization: having > 1 UTI in the past year (odds ratio [OR], 2.00 [95% CI], 1.08–3.70]), history of immunocompromising disease (OR, 3.01 [CI, 1.78–5.08]), and having a current confirmed complicating feature (e.g., pregnancy)(OR, 8.79 [CI, 4.93–15.7]). Hospitalization was also associated with symptoms of nausea/vomiting (OR, 1.60 [CI, 1.03–2.48]) and general toxicity (OR, 3.81 [CI, 2.44–5.96]). CONCLUSION: Our study suggests that specific patient factors are associated with hospital admission for pyelonephritis. This data may be used in the future to establish criteria that indicate inpatient management.

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DO SEXUAL PARTNER CHARACTERISTICS EXPLAIN THE RACIAL DISPARITY IN SEXUALLY TRANSMITTED INFECTIONS? *S Staras, R Cook, D Clark (Univ. of Florida, Gainesville, FL)

Within the United States, Blacks are 2–24 times as likely as Whites with similar sexual profiles to have had a sexually transmitted infection (STI). This unexplained disparity may be influenced by characteristics of the sexual partners. Previous studies of partner characteristics considered self-reported STIs and provided conflicting evidence. We assessed the influence of partner characteristics on the association between race and diagnosed STI (chlamydia, gonorrhea, trichinosis, genial herpes, or genital warts) with data from a previously conducted cross-sectional study of 15–24 year old men and women who attended an urban STI clinic between 1999–2002 (n = 412). To analyze partner characteristics we created a propensity score, the proportion of markers with a response of increased risk, from the patient's report of partner characteristics (age difference between partners, previously in jail, STI in past year, other partners in past year, alcohol abuse, and marijuana abuse). STIs were diagnosed in 38% (93/245) of Blacks and 12% (20/167) of Whites [Odds Ratio (OR) = 4.5, 95% Confidence interval (CI) (2.6, 8.1)]. While partner characteristics predicted STI (P-value <0.01), the racial disparity persisted when adjusting for partner characteristics alone and in models with potential confounders: sex, marital status, medical insurance, age, and individual sexual risk [OR = 4.1, 95% CI (2.3, 7.5)]. The measured partner characteristics did not explain the observed racial disparity in STI prevalence suggesting that prevention efforts should not be limited to high risk individuals. Future research should consider additional explanations such as partner race, partner-report of partner characteristics, and differences in vagina flora among women.

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HOST GENETICS RELATIONSHIPS TO STEATOSIS AND INSULIN RESISTANCE (IR) IN HEPATITIS C VIRUS (HCV) INFECTION. *A D Iuliano, E Feingold, A S Wahed, S H Belle, L J Yee (University of Pittsburgh, Pittsburgh, PA 15213)

Steatosis is the accumulation of fat in the liver and occurs in 30–84% of HCV patients. IR is a condition in which normal levels of insulin do not produce a standard response from cells, especially fat, muscle and liver cells. Both are common in HCV infection and thought to be biologically related. Few genetic association studies have examined these outcomes in HCV and even fewer in African-Americans (AA). This study tested gene associations with steatosis and IR among 167 AA and 184 Caucasian Americans infected with HCV genotype-1. Steatosis was defined as having ≥5% fat in cells rated by a central pathologist. IR was quantified using scores from the Homeostasis Model Assessment (HOMA2) and IR was defined as HOMA2 ≥2. Logistic regression models within race tested the associations of variants in 10 genes with steatosis and IR. Statistically significant ($p < .05$) associations were observed for variants in *Interleukin-10 (IL10), Leptin Receptor, Interleukin-6* and *Transforming Growth Factor Beta 1* for both outcomes. Some significant interactions were observed between *IL10* variants and HOMA2 scores when examining steatosis. Among AA with higher HOMA2 scores, the odds of steatosis were significantly higher for those with the CT (12.8: 2.0–81.7) or TT genotype (8.4: 1.3–56.1) of *rs3024496* than for those with the CC genotype. AA with the *IL10 rs3024496* CT genotype had significantly lower odds of IR (0.1: 0.1–0.7) compared to AA with the CC genotype. No significant interactions were observed between gene variants and the presence of steatosis when examining IR. Assuming that IR is along the causal pathway for steatosis, these results imply that some *IL10* variants could affect steatosis and IR in HCV infection.

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PROGNOSTIC FACTORS OF CHRONIC HEPATITIS C PATIENTS TREATED BY PEGYLATED INTERFERON-ALFA PLUS RIBAVIRIN IN TAIWAN. *C-K Chang, K-C Tseng, N-S Lai, A-L Chou (University of Ulster, Coleraine, North Ireland, UK)

For the outcome of chronic hepatitis C (CHC) treatment, of greater interest is the hypothesis on the effects of baseline related clinical features of patients and human leukocyte antigen (HLA) alleles class I and II to the response of combined pegylated interferon-alfa (PegIFN-alfa) and ribavirin regimen for 24 weeks. From June, 2005 to January, 2007, a total of 81 CHC patients who accomplished the above combined treatments were traced for prognostic outcomes in clinics of a regional hospital in Southern Taiwan. Fifty-eight of them made a success in obtaining responses to the treatment (namely, sustained virologic response - SVR), and, meanwhile, 23 of them did not after the same treatments. Besides measurements of demographics and baseline clinical features of their CHC, sequence-based genotyping was used to determine the class I and II allelic variability of HLA-A, -B, -C, -DR and -DQ loci. The odds ratio (OR) for favoring SVR outcomes after complete treatment was estimated by logistic regressions for assessing the factors. In univariate analyses, HCV genotype of 1b and lower level of HCV RNA revealed significant effects on SVR achievement. After controlling confounders, HCV genotype of 1b (OR = 6.67; 95% CI: 1.39, 33.33), lower level of HCV RNA (OR = 3.70; 95% CI: 1.47, 9.09), and BMI (OR = 1.33; 95% CI: 1.03, 1.69) were shown to be significant determinants for prognosis. Unfortunately, no HLA locus was found significant in analyses of current study. The prognosis of chronic HCV infection to Peg-IFN-alfa plus ribavirin is more associated to the clinical features of viral factors, rather than the hosts' HLA genotypes among Taiwanese.

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GENETIC SUSCEPTIBILITY TO SEVERE INFECTION IN FAMILIES WITH INVASIVE PNEUMOCOCCAL DISEASE.

T Hjuler, G Poulsen, *J Wohlfahrt, M Kaltoft, R J Biggar, and M Melbye (Department of Epidemiology Research, Statens Serum Institut, Copenhagen, Denmark)

Severe infections may be influenced by genetic constitution. The authors examined familial aggregation of invasive infections, using invasive pneumococcal disease (IPD) as the index condition to ascertain families at risk. From Danish national registers, they identified relatives of persons with IPD from 1977 through 2005. Risks of IPD, bacterial meningitis, septicemia, and any invasive infection were analyzed for relatives of IPD cases in a prospective cohort study (23 million person-years). In total, 43,134 persons were found to have an IPD case in the family. The authors observed an increased risk of invasive infections in relatives of IPD cases most likely sharing the same household (parents, offspring, siblings, half-siblings), but only regarding those events within 1 year of the index IPD diagnosis (rate ratio = 7.4, 95% confidence interval: 2.4, 23.0). After 1 year, there were no increased risks of severe infections, including IPD, in close relatives. For other relatives, no increased risks of severe infections were observed at any time. No aggregation of invasive infections in IPD relatives was found, other than for close events among relatives who most likely shared the same household. Thus, at the population level, genetic constitution appears of little importance in the development of IPD and other severe infections.

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CLUSTERING OF ACUTE RESPIRATORY INFECTION HOSPITALIZATIONS IN CHILDCARE FACILITIES.

M Kamper-Jørgensen, C S Benn, J Simonsen, N Thrane, *J Wohlfahrt (Department of Epidemiology Research, Statens Serum Institut, Copenhagen, Denmark)

Clustering of acute respiratory infection (ARI) childcare facilities can be characterized by the transient change in hospitalization rate of ARI in children attending a facility with a recent hospitalization for ARI. We investigated how risk of ARI hospitalization in children attending a childcare facility with a recently (within 1 month) hospitalized child is modified by sex, age and other characteristics. The analyses were based on a population-based prospective cohort study of Danish 0–5-year-old children attending a childcare facility from 1989 to 2004. Information was collected from the Danish Childcare Database and the Danish National Patient Registry. Incidence rate ratios of inpatient hospitalization for ARI were estimated by quasi log-linear Poisson regression. During 1,777,999 years of follow-up 42,681 hospitalizations for ARI occurred, of which 362 (1%) occurred within 1 month after another child was hospitalized for ARI in the facility. Attendance to a facility with a recent ARI hospitalization was associated with an increased risk of 42% (95% CI 27%;60%) compared with facilities without a recent ARI hospitalization. The increased risk was similar in boys and girls, but was significantly higher if the latest hospitalized child was a boy rather than a girl (52% vs. 13%). The increased risk was significantly higher in 0–2-year-old children rather than 3–5-year-old children (55% vs. 17%) and if the latest hospitalized child was 0–2 years rather than 3–5 years (52% vs. 19%). In conclusion, clustering of ARI hospitalizations in childcare facilities is relatively more often involving toddlers and a boy as first hospitalized child.

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IMPACT OF ELIMINATING H. PYLORI INFECTION ON GROWTH IN SCHOOL AGE CHILDREN.

*R Mera, K J Goodman, P Correa, M C Yepes, C Ceron, C Campo, N Guerrero, L E Bravo (Vanderbilt University, Nashville, TN)

Little is known about consequences of *H. pylori* infection on child health. We aimed to examine the effect of *H. pylori* infection over time on growth among children in a high-prevalence region in the Colombian Andes, by comparing growth velocity in the presence and absence of *H. pylori* infection. We followed 160 children in two towns where children were treated to eliminate *H. pylori*, and 158 in two non-intervention towns, for a mean 2.5 years. *H. pylori* positivity in intervention and non-intervention towns was 74% (95% CI: 67–81%) and 83% (95% CI: 76–89%), respectively, at baseline in 2004, and 46% (95% CI: 38–54%) and 89% (95% CI: 83–93%) at study end. Follow-up intervals were 3 months for anthropometry measurements and 6 months for *H. pylori* status, ascertained by urea breath test. Treatment occurred at 6 months post-baseline. To estimate the effect of *H. pylori* elimination on growth, the main exposure variable was *H. pylori* status rather than intervention status. Growth curves for person-time with and without infection were compared using mixed models for repeated measures. Mean age at baseline was 6.3 + 1.3 (range: 4–8) yrs old; growth velocity in the pre-treatment interval was 0.44 + 0.13 cm/month. Growth curve analysis adjusting for age, sex and intervention status showed that *H. pylori*-positive children grew 0.012 cm/month (95% CI 0.003 – 0.019) slower than *H. pylori*-negative children. Continuously positive children were 0.36 cm (95% CI 0.11 – 0.57) shorter on average at study end than continuously negative children. This longitudinal study suggests that chronic *H. pylori* infection is accompanied by slowed growth in school-age children.

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ILLICIT DRUG USE AND COMMUNITY-ASSOCIATED MRSA BACTEREMIA.

*K Kreisel, J Johnson, M Shardell, E Perencevich, O Stine, M Roghmann (University of Maryland, Baltimore, MD)

Background: Methicillin-resistant Staphylococcus aureus (MRSA) has become a cause of community-associated (CA) infections. Most are due to a new clone, USA300. Illicit drug users may acquire USA300 via drug-using networks and transmit it to other populations when hospitalized. Objective: To determine the association of illicit drug use and USA300 MRSA in adults with S. aureus bacteremia (SAB). Methods: We conducted a retrospective cohort study of veterans at the VAMHCS with SAB from 2000–2007. Isolates were tested for the arginine catabolic mobile element (ACME) gene; positive isolates were defined as USA300 MRSA. Clinical data were extracted via electronic medical record review. Associations were evaluated using Pearson's ÷2 or Student's t test. Results: Of 162 patients with SAB, 34 (21%) were USA300 MRSA, 54 (33%) non-USA300 MRSA and 74 (46%) methicillin-sensitive S. aureus. Illicit drug users were more likely than those not using illicit drugs to have USA300 MRSA bacteremia compared to all other S. aureus (Relative Risk [RR] = 2.8; 95% Confidence Interval [CI]: 1.3,6.1). Another risk factor associated with USA300 MRSA bacteremia was having a CA infection (RR = 1.7; 95% CI: 0.9,3.0). Having a CA infection was also associated with illicit drug use (RR = 5.6; 95% CI: 2.0,15.9). Adjusting for CA infection, the adjusted RR of illicit drug use on USA300 MRSA bacteremia was 2.0 (1.1,3.7). Conclusion: Illicit drug users are more likely to have USA300 MRSA bacteremia. When hospitalized, illicit drug users may serve as a source of transmission of USA300 MRSA to others. The molecular epidemiology of USA300 MRSA can help in understanding transmission pathways of this bacteria.

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DIABETES MELLITUS INCREASES THE RISK OF ACTIVE TUBERCULOSIS: A SYSTEMATIC REVIEW OF 13 OBSERVATIONAL STUDIES. *C Y Jeon, M B Murray (Harvard School of Public Health, Boston, MA)

The rising prevalence of diabetes in tuberculosis-endemic areas may adversely affect tuberculosis control as diabetes may increase the risk of tuberculosis. We conducted a systematic review and a meta-analysis of studies assessing the association of diabetes and tuberculosis. We performed literature search in PubMed and EMBASE databases, hand-searched reference lists, and contacted experts in the field. We included observational studies that had reported an age-adjusted quantitative estimate of the association between diabetes mellitus and tuberculosis disease, and excluded studies that studied the effect of diabetes on tuberculosis treatment outcomes, and studies that investigated the impact of tuberculosis on the occurrence of diabetes. Two investigators independently extracted information on study population and setting, statistical methods, effect estimates, adjustment factors, and key quality-associated variables. We computed summary relative risks by the random-effects analysis, and performed sensitivity analyses by several population characteristics and quality-associated variables. The search yielded 13 observational studies (N = 1,786,212 participants) with 17,698 tuberculosis cases. Diabetes was associated with an increased risk of tuberculosis: cohort RR = 3.11, 95% CI: 2.27–4.26; case-control RR = 1.78, 95% CI: 1.50–2.10. Associations were stronger in studies with greater background tuberculosis incidence, and in non-North-American studies. Studies of higher quality with regard to exposure and outcome ascertainment, and control sampling, showed stronger effects. In conclusion, diabetes was found to be associated with an increased risk of tuberculosis regardless of study design and population.

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METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA) COLONIZATION IS ASSOCIATED WITH WORSE OUTCOMES. *M Schweizer, A Harris, J Furuno, A Moore, J McGregor, K Thom, M Shardell, E Perencevich (University of Maryland, Baltimore, MD 21201)

Little is known about the associations between MRSA colonization and adverse outcomes such as infection, length of hospital stay and mortality in the non intensive-care setting. The objective of this study was to explore the associations between preexisting colonization and these outcomes. From 2/1/2007 to 1/11/2008, patients were surveyed upon admission to an acute-care hospital to assess their risk of MRSA colonization. Patients admitted directly to psychiatric wards, intensive care units, the correctional health unit and emergency departments were excluded. Statistical analyses were done using the chi-square test, the Wilcoxon rank sum test and logistic regression. Of 4,895 patients surveyed, 2,815 were categorized as high risk for MRSA colonization (self-reported previous admission to a healthcare facility in the past year and/or current skin infection). 198 of the high-risk patients were colonized with MRSA. MRSA colonized patients were more likely to have an MRSA positive clinical culture (Relative risk (RR) = 18, 95% Confidence Interval (CI) = 11, 30) compared to high-risk, uncolonized patients. This association remained after controlling for aggregate comorbidity using the Charlson Comorbidity Index. Colonized patients had a longer length of stay compared to high-risk, uncolonized patients (median = 7 vs. 5 days, $p < 0.01$). Colonization was not associated with mortality (RR = 1, 95% CI = 0.6, 2). Among high-risk patients, MRSA colonization was associated with subsequent infection and longer lengths of stay. Early identification of colonization may be useful in preventing these outcomes.

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PREVALENCE OF ASTHMA, ALLERGIC RHINITIS AND ECZEMA AMONG LEBANESE ADOLESCENTS. *H Tamim, B Al-Sahab, F Zeitoun, F Ramadan, U Musharrafieh (American University of Beirut, Beirut, Lebanon)

Despite having one of the world's highest prevalence rates of severe asthma, studies on allergic diseases remain scarce in Lebanon. The aim of the present study was to determine prevalence of asthma, allergic rhinitis and eczema among Lebanese school children. The study was cross-sectional in design performed on a convenient sample of school students from five provinces in Lebanon. A sample of 3,115 students aged 13–14 years was selected from 13 schools. Students were asked to complete the Arabic version of the International Study of Asthma and Allergies in Childhood questionnaire. The prevalence of asthma, rhinitis and eczema was determined by sex group and separately for each of the five provinces. Associations between the differences in sex and region were assessed by chi square tests. The overall prevalence of ever having asthma, allergic rhinitis and eczema was 8.3%, 45.0% and 12.8% respectively. While males significantly reported ever having eczema more than females (9.3% vs. 7.4%), females reported higher eczema rates (14.0% vs. 11.4%). No sex differences were evident for ever having rhinitis; however, females (22.2%) significantly experienced more rhinitis associated with itchy eyes and tears in the past year than males (18.3%). Students from the South province had the highest prevalence rates for current and ever having allergic rhinitis (51.5% & 59.2% respectively), wheeze (37.9% & 44.7% respectively) and chronic rash (29.5% & 32.2% respectively). Allergic diseases are on the rise in Lebanon. The results of this study fits with the international pattern of worldwide rise of allergic diseases, whereby developing countries like Lebanon are catching up with the rates of the developed countries.

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CALCULATION OF *R* IN OUTBREAK INVESTIGATIONS: INFLUENZA IN THAILAND. *J Lessler, P Chartpituck, S Iamsirithaworn, D Burke, D Cummings (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205)

The effective reproductive rate, *R*, is used to characterize the transmissibility of an infectious disease, dictating the number of people likely to be infected by an epidemic and the strength of control measures necessary to halt it. The calculation of dynamic disease properties in outbreak investigations is uncommon, and presents challenges in methodology and ease of use. We are working to incorporate calculation of *R* into investigations conducted by the Field Epidemiology Training Program of Thailand, and to find ways in which this calculation may aid the investigation and control of outbreaks. We calculated *R* for four institutional outbreaks of influenza in Thailand between 2003 and 2007. Initial calculations where made using published techniques, which we extended using Markov-Chain Monte-Carlo methods to better quantify the uncertainty in *R*. These techniques are based on the serial interval, a result of both biological and social processes. We developed techniques based on strictly biological processes, the incubation and the infectious periods for the disease, which better meet the needs of the field epidemiologist. These techniques are less dependent on social processes and provide more accurate estimates of the time at which *R* falls below one (at which point the epidemic will begin to recede). Point estimates for *R* at the beginning of these epidemics ranged from 3 to 6. These estimates are higher than general population estimates of *R* for interpandemic influenza (1.5–3). As contact between individuals is both more frequent and more intimate in institutional settings, this result is not unexpected. The uncertainty in *R* at the beginning of each epidemic is high, with 95% credence intervals from half to twice the point estimate for the epidemic, but uncertainty rapidly decreases as the epidemic progresses. In all cases *R* fell to below one by the end of the first week of transmission.

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ACHIEVING AND MAINTAINING HIGH COVERAGE OF MEASLES IMMUNIZATION IN ZAMBIA. *J Lessler, S Lowther, W Moss, D Cummings (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205)

Measles elimination campaigns in southern Africa have combined routine immunization activities with supplemental immunization activities (SIAs) to reduce measles morbidity and mortality. The increase in population immunity due to SIAs is unclear, yet is critical to designing effective elimination campaigns. A household survey of 1,069 children 9 months to 5 years of age in Lusaka Zambia was conducted in 2006, 3 years after the last SIA. This survey collected data on measles immune status, vaccination history and history of measles. We estimated the age-specific hazard of vaccination and the effect of the 2003 SIA on vaccination coverage. Using our estimates of the hazard of vaccination, published age-specific probabilities of vaccine failure and information on the decay of maternal antibodies, we estimated age-specific immunity and compared these estimates with 2006 serological data. The models of vaccine hazard and immunity distribution were used to evaluate multiple theoretical vaccination programs. We evaluated lowering the recommended age of vaccination from 9 to 6 months, and SIAs at intervals of one, three and five years with varying coverage. We compared predicted levels of population immunity with those necessary to confer herd immunity to measles. The vaccination data was best fit by a semi-parametric model where the hazard of vaccination was strongly peaked at 10 months. The use of the reported rate of coverage in the 2003 SIA to supplement the hazard of routine vaccination yield predictions that agree well with our data. We found that the current routine immunization program is inadequate to achieve or maintain herd immunity. SIAs targeting children 6 months to 12 years of age must be conducted every year in order maintain herd immunity. Yearly SIAs are required whether coverage is 85% or 95%.

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SHIFTING SPATIAL-TEMPORAL DISTRIBUTION OF CHICAGO AREA *ACANTHAMOEBA* KERATITIS CASES. *C E Joslin, E Y Tu, R J Anderson, F G Davis (University of Illinois at Chicago, Chicago, IL 60612)

Acanthamoeba keratitis (AK) is a serious eye infection that can lead to visual loss and ocular morbidity. *Acanthamoeba* are ubiquitous and free-living, and believed to infect the cornea through contaminated water exposure. Estimated incidence rates are 1.6–2.0 cases per million contact lens users; however in Chicago, a seven-fold increase has occurred since 2003. A similar national increase began in 2004 that led to a CDC investigation and contact lens solution recall, yet nearly 40% of cases did not use the affected solution in either the Chicago or national study. We investigated the spatial-temporal distribution of case residence using geographic information systems (GIS) to evaluate time trends and determine annual cumulative incidence rate (CIR) maps. The CIR per zip code was calculated from a cohort of all 72 AK cases diagnosed at UIC between 6/1/03 – 6/1/07 and 2003 Census data. CIR categories were chosen to reflect EPA exposure classes used in risk analysis, and plotted to overlay 2003 population density plotted by quartile. The 6/03–6/05 CIR map demonstrates observed cases are distributed to the west, south and southwest and further from Lake Michigan compared to expected cases based on population density, while the 6/03–6/07 CIR map shows cases continue presenting from the far west, south and southwest, but also present closer to Lake Michigan and the city center. This exploratory analysis demonstrates a shifting AK case distribution that is inconsistent with previously known risk factors. Moreover, it suggests further exploration of the hypothesis that the domestic water supply is contributing to AK, especially since lens solution base disinfectants are unchanged over the past dozen years.

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EFFECT OF STRESS ON INTERVENTION COMPLIANCE AND INFLUENZA-LIKE ILLNESS RATES. *V Perez, A S Monto, A E Aiello (Epidemiology Dept., University of Michigan, Ann Arbor, MI 48109)

Increased psychological stress and negative health behaviors have been implicated as factors leading to increased susceptibility to respiratory infections. Data also suggest that stress may influence compliance with study interventions. Using data from a randomized intervention trial of facemask use for reducing transmission of influenza among students living in university residence halls, we examined whether higher levels of perceived stress 1) negatively impacted facemask compliance and 2) modified the effect of facemask use on rates of reported influenza-like illness (ILI). Analyses included generalized estimating equations (GEE) with logistic regression and GEE Poisson regression, adjusted for correlations within residence halls, follow-up time, and potential covariates. Perceived stress was measured using a validated scale and ILI symptoms were defined by the Centers for Disease Control and Prevention. Students with greater perceived stress showed slightly lower compliance with the facemask intervention (Odds Ratio = 0.98, 95% confidence interval [CI] 0.97, 1.00). Higher levels of stress were moderately associated with increased ILI rates (Rate Ratio [RR] = 1.03, 95% CI 1.01, 1.04) and remained significant (RR = 1.02, 95% CI 1.01, 1.04) after adjustment for behaviors, gender, and number of roommates. We found no evidence of interaction between perceived stress and use of facemasks on ILI in covariate-adjusted models. These results suggest that perceived stress impacts ILI rates but does not modify intervention compliance. Further studies examining the biological mechanisms by which stress influences ILI rates among university students are needed.

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MEASLES VACCINATION COVERAGE AND BARRIERS IN PRESCHOOL CHILDREN. *H Park, K Kong, B Park, J Lee, Y Jung, K Kim, Y Han, U Go, W Choi (Department of Preventive Medicine, School of Medicine, Ewha Womans University, Seoul, Korea)

Aims: High MCV vaccination coverage rate are important to prevent measles occurrece and transmission. During 2002–2006, South Korea satisfied all interim criteria for measles elimination. But in April 2007, measles outbreak has reported in Seoul and Kyung-gi province. Therefore, we aim to estimate the MCV vaccination coverage and barriers in outbreak regions. Method: We conducted a survey of around 800 randomly selected children aged 12~23 months and 4~6 years in outbreak areas. Detailed questionnaire was obtained from their care giver for immunization. Vaccination status was determined by review of the immunization report card. Results: In this study, coverage for MCV1 was 87.8% in 15~23 months children. The rate of timely immunization for MCV1 was 70.1%. For the second dose of MCV, coverage was approximately 60% in 4~6 years children. Second and third born child and child whose mother had low education level were significant negative factor of measles immunization. Parental lack of awareness of child's immunization schedule and knowledge for measles were important barrier to MCV1/MCV2 vaccination status. Conclusion: These findings suggest that measles vaccination relates family's SES and knowledge. Therefore, it is an important to find the potential risk group for measles vaccination. In addition, continuing education is necessary for the maintenance of sufficient immunity in population. "This research was supported by Korea centers for disease control and prevention Grant."

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A POPULATION BASED STUDY OF EXTRA-PULMONARY TUBERCULOSIS (RTB) IN BRITISH COLUMBIA, CANADA OVER A PERIOD OF 17 YEARS. *A Moniruzzaman, R K Elwood, and J M FitzGerald (Department of Health Care and Epidemiology, University of BC, Vancouver, BC, Canada)

Introduction: The epidemiology related to extra-pulmonary tuberculosis (EPTB) is not well characterized in a population setting. We investigated the characteristics of EPTB in a population-based cohort in British Columbia (BC), Canada over a period of 17 years. Methods: We reviewed all TB cases that were registered with provincial (BC) tuberculosis services from 1990 to 2006. Based on diagnosis, all TB cases were categorized into two groups: pulmonary TB (PTB) and extra-pulmonary TB. Bi-variate analysis was conducted to examine the differences between groups. Multivariable logistic regression analysis was used to identify the risk factors for EPTB. Results: During the study period, 5430 TB patients were registered with the TB control division of BC. Among them, 1811 TB (33.4 %, 95% CI: 32.1%, 34.6%) cases were classified as EPTB. The mean age of the study cohort was 48.7 (SD: 21.8) years. Over time, a significant variation of EPTB cases was observed ($p = 0.006$). EPTB cases were significantly younger (mean age, 46.3 vs. 49.9 years, $p < 0.001$) compared to PTB cases. The multivariable logistic regression analysis demonstrated that the risk of having EPTB was higher among younger people, female [Adjusted Odds Ratio (AOR): 1.95, 95% CI: 1.72, 2.21] and individuals with foreign-born origin (AOR: 1.79, 95% CI: 1.39, 2.31). In terms of ethnicity, Filipino (AOR: 1.78, 95% CI: 1.30, 2.44) and Vietnamese (AOR: 1.68, 95% CI: 1.20, 2.36) were more likely to have EPTB compared to Caucasian. Conclusion: This study identified several important socio-demographic risk factors of EPTB. Reasons for these significant differences need to be explored further. Acknowledgement: Canadian Institute of Health Research (CIHR), Canada.

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THE ROLE OF THE CONTAMINATED ENVIRONMENT IN THE OCCURRENCE OF SPORADIC NON-TYPHOIDAL SALMONELLA INFECTIONS IN MICHIGAN CHILDREN: FINDINGS FROM A POPULATION-BASED CASE-CONTROL STUDY. *M Younus, M Wilkins, C Nguyen, H D Davies, H Rahbar, J Funk, A Siddiqi, A M Saeed (Department of Epidemiology, Michigan State University, East Lansing, MI 48824)

Few epidemiologic studies have addressed the role of the contaminated environment as a risk factor for Salmonella infections in children. We conducted a population-based case-control study to identify potential risk factors for salmonellosis in Michigan children. Questionnaires were administered between December 2006 and October 2007 to laboratory-confirmed cases of Salmonella infections in children aged $\leq$ 10 years on exposures during the week before the onset of their illness and to control children who had not experienced symptoms of gastrointestinal illness during the month before the interview. A total of 123 cases and 139 controls were enrolled. The final multivariate model showed that contact with cats (adjusted odds ratio (AOR) = 1.95, 95% CI:1.01–3.94) and reptiles (AOR = 3.72, 95% CI:1.24–1.13) was significantly associated with salmonellosis. Additionally, contact with a person having symptoms of gastrointestinal infection during the 3 days prior to the onset of the child's illness was associated with Salmonella infections (AOR = 2.21, 95% CI:1.09–4.92). Salmonellosis was not associated with exposure to other measured household and food-related sources. Our data suggest that the contaminated environment plays an important role in the acquisition of Salmonella infections by Michigan children, in contrast to the adult population where a larger proportion of infections are acquired through consumption of contaminated foods.

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A PREDICTION MODEL FOR TYPE 2 DIABETES RISK IN CHINESE. *K-L Chien, T Cai, H-C Hsu, T-C Su, W-C Chan, M-F Chen, Y-T Lee, F B Hu (Department of Internal Medicine, National Taiwan University Hospital, Taipei, Taiwan)

A range of prediction rules for the onset of type 2 diabetes have been proposed. However, most studies were conducted in Caucasians and it is not clear whether these models apply to Asian populations. The purpose of this study was to construct a simplified model for predicting incident diabetes among Chinese. We estimated the 10-year risk of diabetes in a cohort study of middle-aged and elderly participants who were free from diabetes at baseline. Cox regression coefficients were used to construct the simplified model and the discriminatory ability of the resulting prediction rule was determined using the area under the receive operating characteristic curve (AUC). 5-fold random splitting was used to test the internal validity and obtain bootstrap estimates of the AUC. Of the 2960 participants without diabetes at the baseline examination, 548 developed type 2 diabetes during a median of 10-year follow-up period. Age (4 points), elevated fasting glucose (11 points), body mass index (8 points), triglyceride (5 points), white blood cell (4 points), and a higher HDL cholesterol (−4 points) were found to strongly predict diabetes incidence in a multivariate model. The estimated AUCs for the simplified model was 0.702 (95% CI, 0.676 −0.727). This simplified model performed better than existing prediction models developed in other populations, including the PROCAM, Cambridge, San Antonia, and Framingham models for diabetes risk. We have constructed a simplified model for predicting 10-year incident diabetes in Chinese, and this model could be useful in identifying high risk populations for diabetes in Chinese populations.

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UNDIAGNOSED DIABETES: ESTIMATING THE 'REAL' BURDEN OF DIABETES IN LATIN AMERICA AND THE CARIBBEAN. *F Andrade (University of Illinois at Urbana-Champaign, Champaign, IL 61820)

Most studies in developing countries rely on self-reported measures as a way to assess the prevalence and incidence of chronic conditions. Self-reported measures are less expensive to be collected, but their validity is usually questioned. This paper proposes an innovative approach to estimate adjusted diabetes prevalence rates in Latin America and the Caribbean. This approach combines data on demographic, social and clinical diagnosis to predict new prevalence rates. The results indicate that diabetes prevalence estimated by self-reports is underestimated for most part. For example, the self-reported diabetes prevalence among older adults in Buenos Aires is 12.4% (95% confidence interval [CI], 12.1–15.6), while the predicted prevalence can reach 30.2% (95% CI, 28.6–31.8). As a consequence, the average number of years expected to be lived with diabetes are considerably higher than one would expect using self-reported measures. Finally, this paper shows that estimates of total life expectancy and disability-free life expectancy of diabetics in Mexico based on self-reports may be biased downwards. In any case, it is important to understand that diabetes reduces total life expectancy and the bulk of this reduction comes in the form of reductions in the number of years expected to be lived without disability. The new estimate shows that total life expectancy of diabetics at age 50 is about 4 years lower than among non-diabetics. This estimate contrasts with the estimate obtained with self-reported measures, in which reduction in total life expectancy was about 8 years.

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SHORT STATURE AND THE RISK OF TYPE II DIABETES: A CROSS-SECTIONAL ANALYSIS OF THE CANADIAN COMMUNITY HEALTH SURVEY CYCLE 2.2.

*M Stegne and J Liu (Brock University, St. Catharines, Ontario, L2S 3A1 Canada)

To assess the association between stature and prevalence of type II diabetes among Canadian adults we examined a total of 10,781 Canadian adults aged 25 years and greater from the cross-sectional Canadian Community Health Survey Cycle 2.2 (2004–2005). Sex-specific quartiles of height were created to compare if being in the lowest quartile of height increases the odds of type II diabetes. Multiple logistic regression results showed that being in the lowest quartile of height significantly increases the odds of having type II diabetes by 1.82 times (95% CI 1.34–2.47) in comparison to being in the highest quartile of height after adjustment for age, sex, race, weight, physical activity level, smoking status, alcohol use and socioeconomic status. This suggests that adulthood stature may be associated with the development of Type II diabetes in the general adult Canadian population.

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EFFECTS OF EXERCISE TRAINING ON CIRCULATING ADIPONECTIN OLIGOMER COMPOSITION: A RANDOMIZED CONTROLLED TRIAL.

*D Ando, Y Hosaka, K Suzuki, and Z Yamagata (University of Yamanashi, Chuo, Japan)

Exercise training improves glucose and lipid metabolism that is mediated by alterations in the adiponectin oligomer composition. The purpose of this study was to determine the effects of a twice-weekly combined aerobic and resistance training program on the amounts of high molecular weight (HMW) adiponectin and the adiponectin oligomer composition. A randomized parallel-design study (n = 53; 40 women and 13 men; age range, 32–65 years) was conducted at a fitness club between March 2006 and September 2007. This study protocol was registered in UMIN-CTR (www.umin.ac.jp/ctr/; identifier: UMIN000000654). The participants were randomly assigned to the exercise (n = 26) or control (n = 27) group. The exercise group received exercise training for 70 min twice a week for 12 weeks, and the control group received exercise advice at baseline. The primary outcomes were changes in the levels of total adiponectin and HMW adiponectin and those in the percentage of HMW adiponectin. We assessed the outcome measures at the baseline and after 12 weeks. Of the 53 participants, 49 underwent follow-up evaluations. All 53 participants were included in an intention-to-treat analysis. No significant between-group differences were observed in the baseline characteristics. Body weight and body mass index (BMI) remained unchanged by exercise training. After 12 weeks, there were no differences between the groups for the total adiponectin levels, HMW adiponectin levels, or percentage of HMW adiponectin. These data suggested that in the absence of accompanying weight loss, exercise training does not change the HMW adiponectin levels or the adiponectin oligomer composition.

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DO GOOD RESOURCES FOR BEING PHYSICALLY ACTIVE AND EATING HEALTHY FOODS LESSEN THE RISK OF TYPE 2 DIABETES (THE MULTI-ETHNIC STUDY OF ATHEROSCLEROSIS)?

*A H Auchincloss, A V D Roux, M Shen, A G Bertoni, M R Carnethon, M S Mujahid (University of Michigan, Ann Arbor, MI 48109)

Recent cross sectional studies have found neighborhood resources associated with precursors to type 2 diabetes (T2D), however, still undetermined is whether neighborhood resources are associated with incident T2D. We hypothesized that neighborhood resources for physical activity and healthy foods reduce the risk of T2D. Person-level data came from 3 sites of The Multi-Ethnic Study of Atherosclerosis, a cohort study of adults aged 45–84 years at baseline. Area-level data were derived from a population-based residential survey. T2D was measured as fasting glucose $\geq$ 7 mmol/L ($\geq$126 mg/dL) or taking insulin or oral hypoglycemic agents. We used a Weibull-based accelerated failure time model (appropriate for interval-censoring) to estimate the hazard of T2D associated with neighborhood (census tract) resources for physical activity and healthy foods. 232 new T2D cases occurred among 2285 participants over a median of 5 follow-up years (approximately 9800 person years). Better neighborhood resources for physical activity and healthy foods were associated with lower risk of T2D: risk of T2D was 38% lower (95% confidence interval: −57%, −12%) for an increase from the 10th to 90th percentiles of the resource distribution (adjusted for age, gender, family history of diabetes, income, assets, education, race/ethnicity, alcohol use, and cigarette smoking). Models that also included diet, physical activity, and body mass index suggested that these variables may lie in the pathway from area features to TD2. Diabetes prevention efforts may need to consider features of residential environment that encourage physical activity and promote healthy diets.

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DIABETES AND INCIDENCE OF HEARING LOSS.

*D M Nondahl, K J Cruickshanks, D S Dalton, B E K Klein, R Klein, T L Wiley, T S Tweed (University of Wisconsin, Madison, WI 53726)

Diabetes is associated with macrovascular and microvascular complications including cardiovascular disease, peripheral vascular disease, nephropathy and diabetic retinopathy. As part of the Epidemiology of Hearing Loss Study, a population-based study of hearing loss in Beaver Dam, WI, the association between diabetes and incidence of hearing loss was assessed. Hearing loss was defined as a pure tone average (0.5, 1, 2, and 4 kHz) > 25 decibels Hearing Level (dB HL) in either ear. Participants without hearing loss at baseline (1993–1995) were followed for up to 10 years (n = 1655; ages 48–86 years at baseline). Diabetes status at baseline was determined for 1610 of these participants by self-reported physician diagnosis, glycated hemoglobin level, and blood glucose level. Five participants with probable Type 1 diabetes were excluded from the analyses, leaving 109 people with Type 2 diabetes. Discrete-time proportional hazards models were used. After adjusting for age, sex, obesity, education, occupation and marital status, having diabetes at baseline was associated with an increased but nonsignificant hazard of developing hearing loss (Hazard Ratio (HR) = 1.26, 95% Confidence Interval (CI) = 0.87, 1.83). Diabetes at baseline was associated with the incidence of hearing loss for men (HR = 1.82, 95% CI = 1.01, 3.27) but not women (HR = 1.17, 95% CI = 0.72, 1.89). Among participants with diabetes at baseline, neither glycated hemoglobin level nor duration of diabetes were associated with the incidence of hearing loss. However, these results suggest that, for men, hearing loss may be another potential vascular complication of diabetes.

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FAST FOOD CONSUMPTION AND RISK OF TYPE 2 DIABETES IN THE BLACK WOMEN'S HEALTH STUDY.

*S Krishnan, L Rosenberg, J R Palmer (Slone Epidemiology Center, Boston University, Boston, MA 02215)

Fast food consumption has increased greatly in the United States, as has the prevalence of obesity. However, the effect of eating fast foods on risk of type 2 diabetes has not been studied. We examined the association of fast food consumption with risk of diabetes among 59,000 African-American women enrolled in the Black Women's Health Study. Diet was assessed at baseline in 1995 and again in 2001 with a modified version of the NCI-Block food frequency questionnaire. During 10 years of follow-up, there were 2,846 incident cases of diabetes. Incidence rate ratios (IRRs) were estimated using Cox proportional hazards models with control for age, physical activity, and family history of diabetes. At baseline, the median intake of fast foods was 1.6 times per week, and 10% of the women reported eating fast foods 7 or more times a week. Fast food consumption was positively associated with risk of type 2 diabetes: the IRR for 7 or more servings per week was 1.29 (95% confidence interval 1.11–1.49) relative to less than 2 servings per month (p for trend < 0.0001). The positive association disappeared after adjustment for body mass index and energy intake, suggesting that the increased risk from frequent fast food consumption is mediated by increased caloric intake and weight gain. In view of the current epidemic of type 2 diabetes in the United States, these findings are of public health importance in that they identify a dietary risk factor that could well be modified.

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RACIAL DIFFERENCES IN INSULIN RESISTANCE AMONG THOSE WITH CHILDHOOD-ONSET DIABETES.

*K K Danielson, C L Estrada, L Hampton, M L Drum, R B Lipton (University of Chicago, IL 60637)

Research demonstrating insulin resistance (IR) in individuals with type 1 diabetes, and its association with vascular complications, has been limited to Non-Hispanic whites (NHW). IR was studied in a diverse sample with diabetes diagnosed <18 years of age (n = 70) from the Chicago Childhood Diabetes Registry Family Study (NHW = 30%, Non-Hispanic black [NHB] = 41%, Mexican Hispanic [MH] = 9%, Other/Mixed [OM] = 20%). Data were obtained from questionnaires, a physical exam, and urine and fasting blood samples. IR was calculated using hemoglobin A1c, waist circumference, and presence of hypertension to estimate glucose disposal rate (eGDR [mg/kg/min]; lower eGDR = higher IR). Diabetes type was based on C-peptide, islet autoantibodies, and treatment type (type 1 = 77%, type 2 = 10%, mixed = 13% of sample). Nephropathy was defined as an albumin/creatinine ratio ≥30 mg/g and/or physician diagnosis. Mean age was 15.6 (range: 4.1–45.3) years and mean diabetes duration was 7.3 (0.4–45.0) years. Treatment included insulin only (91%), insulin and pills (3%), or pills only (6%). Age was negatively associated with eGDR. Adjusted for age, eGDR was significantly lower in NHB ($\Delta = -2.1$) and OM (-2.1), and nonsignificantly lower in MH (-1.4), compared to NHW; eGDR was not associated with diabetes type, treatment, C-peptide, neuropathy, or dyslipidemia. In the final multivariable model, presence of nephropathy ($\Delta = -2.7$), age, and race were the only significant predictors of eGDR. Consistent with previous research, IR was associated with kidney impairment. In addition, we found clinically significant racial differences in IR. This may partly explain the higher risk of kidney disease in minorities diagnosed with diabetes in childhood compared to NHW.

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FEW DIFFERENCES IN ONSET FEATURES OF CHILDHOOD TYPE 1 (T1), TYPE 2 (T2), AND MIXED PHENOTYPE (MDM) DIABETES.

*R B Lipton, M L Drum, K K Danielson, C L Estrada, L Hampton (University of Chicago, IL 60637)

As obesity increases among children, so does the diagnosis of T2 diabetes; it is not clear how often this is appropriate. Onset medical records and long-term follow-up of 74 patients, diagnosed at ages 0–17, were used to address this question. At diagnosis, 19 patients were obese, had other T2 features (polycystic ovaries, acanthosis), or were actually diagnosed with T2. The remaining 55 patients apparently had autoimmune T1 diabetes. C-peptide (CP) and islet antibodies (AB) were measured, 2.3–19.7 (mean = 8.6) years after diagnosis. At follow-up, 49 patients with no residual β cell function were classified as "true" T1. 15 patients were CP+ and AB- and thus were considered "true" T2. 10 patients with both T1 and T2 features were classified as MDM. T1 were younger at onset (7.5 years vs 12.1 in T2; 12.2 in MDM) and had higher initial glucose values (637 mg/dL vs 409 in T2; 574 in MDM), but there were no significant differences among phenotypes in race, sex, diabetes in siblings/parents, polydipsia, polyphagia, or weight loss. Ketoacidosis at onset was significantly more prevalent in T1, adjusted for race (OR 5.6, 95% confidence interval 1.3–25.2; p = 0.02). 18 subjects (24%) were reclassified at follow-up, 6 from T2/MDM to T1; 5 from T1 to T2; 7 from T1 to MDM. Diabetes with mixed features was common; many subjects were reclassified from their initial diagnoses. Despite the widespread belief that acanthosis, race and female gender are hallmarks of T2, they did not distinguish T2/MDM from T1, suggesting the need to revise current diagnostic approaches in children. Careful assessment of all young people with diabetes is essential to correctly determine phenotype and carry out effective treatment.

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DIAGNOSED PRE-DIABETES IN THE UNITED STATES: PREVALENCE AND ODDS FROM THE 2004–2006 BRFSS.

*N Everage, A Gjelsvik, D Goldman (Brown University & the Rhode Island Department of Health, Providence, RI 02912)

Estimating the number of people with diagnosed pre-diabetes allows public health practitioners to set benchmarks for future screening and intervention activities as well as address potential racial and ethnic inequities. To assess the prevalence and odds of diagnosed pre-diabetes by race and ethnicity in the United States we used the complete national data from the 2004–2006 Behavioral Risk Factor Surveillance System (BRFSS). Persons indicating a previous diagnosis of pre-diabetes by a health care professional of which were included in the final analysis (n = 11,200). Prevalence and odds ratios, developed from logistic regression models, were computed. The prevalence of diagnosed pre-diabetes in the United States from 2004–2006 was .96 (95% Confidence Interval (CI) .92–1.00). Non-Hispanic, American Indian or Alaskan Natives had the highest diagnosed pre-diabetes prevalence (1.61) followed by Non-Hispanic Blacks (1.05 (95% CI .93–1.18)) and Other Races (1.05 (95% CI .82–1.27)). The prevalence of diagnosed pre-diabetes increased with age and decreased with education and income. Odds of diagnosed pre-diabetes were highest for racial/ethnic populations with the highest prevalence. An inverse relationship occurred between education and income and odds of diagnosed pre-diabetes in crude and adjusted models. Compared with having one health care provider, persons with > one health care provider had 1.32 (1.17–1.49) greater odds of diagnosed pre-diabetes. Prevalence and odds of diagnosed pre-diabetes appear to differ by race and ethnicity. These results may serve as benchmarks for future comparisons to ameliorate health disparities related to pre-diabetes diagnosis.

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THE EFFECT OF EXERCISE COMPLIANCE ON DIABETES CONTROL IN PERSONS USING ORAL GLUCOSE LOWERING MEDICATIONS AND/OR INSULIN: FINDINGS FROM THE NHANES 1999–2002. *N Everage and K L Lapane (Brown University Providence, RI 02912)

Therapeutics are frequently prescribed when lifestyle changes have failed to control diabetes. Increased exercise along with medicinal therapy may increase insulin control. This study included participants (n = 645, weighted = 9,242,950) of the National Health and Nutrition Examination Survey from 1999 to 2002 receiving oral glucose lowering medications and/or insulin for diabetes mellitus and who were ≥20 years of age. Hemoglobin A1c (HbA1c) provided an indication of diabetes control (i.e. <7% = control, ≥7% = uncontrolled). Weighted logistic regression provided odds ratio estimates and 95% confidence intervals (CI) between exercise guideline compliance and diabetes control. Only 39% of persons with diabetes treated with oral medications and/or insulin had HbA1c control. Similar levels of exercise guideline compliance were found between people with and without controlled HbA1c levels (i.e. 59.9% compared to 62.5%, respectively). However, adjusted odds ratio estimates indicate that persons with diabetes using medical therapeutics and/or insulin and who met exercise guidelines had .860 (CI .398–1.859) the odds of having diabetes control, compared to similar survey participants who did not meet exercise guidelines. Protein, carbohydrate, smoking and alcohol guideline compliance increased the odds of diabetes control. Exercise guideline compliance leads to modest increases in odds of diabetes control for persons using oral glucose lowering medications and/or insulin. Yet, few treated persons with diabetes adhere to exercise recommendations. Interventions to promote exercise among persons with diabetics are warranted.

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REHOSPITALIZATION IN YOUTH-ONSET DIABETES. *C L Estrada, K K Danielson, L Hampton, M L Drum, R B Lipton (University of Chicago, Chicago, IL 60637)

Rehospitalization (RH) after diabetes (DM) diagnosis in youth signals a failure of outpatient management. To examine risk factors for RH, 535 patients diagnosed with DM <age 18 from the Chicago Childhood Diabetes Registry were interviewed to collect demographic and DM management data, 0.1–19.2 (mean = 5.1) years after diagnosis. The sample was 45% male; 55% non-Hispanic black (NHB), 12% non-Hispanic white (NHW), 17% Hispanic, and 17% other race; 81% reported Type 1 DM; and 47% had Medicaid or no health insurance. Overall, 46% of participants reported RH for DM. In multiple variable logistic regression, any RH was significantly associated with Type 1 DM (versus (v.) non-Type 1; odds ratio (OR) = 3.24), diagnosis at a community hospital (CH) (v. tertiary care facility (TC); OR = 2.04), NHB (v. NHW; OR = 2.11), head of household with <high school education (HS) (v. ≥HS; OR = 1.75), Medicaid or no health insurance (v. private insurance; OR = 1.66), and duration (OR = 1.23 per year). Low blood sugar (BS) RH was significantly associated with checking BS less than once per day (OR = 11.24), head of household with <HS (v. ≥HS; OR = 3.10), and duration (OR = 1.14 per year). High BS RH was significantly associated with NHB (v. NHW; OR = 3.91), insulin monotherapy (v. other treatment; OR = 2.91), diagnosis at a CH (v. TC; OR = 2.49), interview age (OR = 1.06 per year), and duration (OR = 1.03 per year). Those with RH for both low and high BS were significantly younger at diagnosis (OR = 0.90 per year), had longer duration (OR = 1.11 per year), and were from households with annual income <$50,000 (v. ≥$50,000; OR = 4.15). Social factors contribute to RH of young DM patients, indicating the need to improve outpatient DM management for low-income children and those diagnosed outside TC facilities.

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EGG CONSUMPTION AND THE RISK OF DIABETES IN CHINESE ADULTS. *Z Shi, B Yuan, C Zhang, M Zhou, G Holmboe-Ottesen (Jiangsu Provincial Center for Disease Control and Prevention, China)

Although egg consumption has been associated with elevated plasma levels of cholesterol and triglyceride in some populations, epidemiologic studies on egg consumption and the risk of diabetes are extremely sparse, particularly in Chinese population. Method and Results: Data from a household survey in year 2002 among 2849 adults aged ≥20 years from a nationally representative sample in Jiangsu province, China were used. Dietary information was assessed by a validated food frequency questionnaire and three days weighed food records. Fasting blood specimens were collected. After the adjustment for age, total caloric intake, education, smoking, family history of diabetes, and sedentary activity, egg consumption was significantly and positively associated with diabetes risk, particularly in women. The odds ratios (OR)(95% CI) of diabetes associated with egg consumption <2/wk, 2–6/week, and ≥1/day were 1.00, 1.75, 2.28 (1.14–4.54), respectively (p for trend 0.029). Corresponding ORs (95% CI) in women were 1.00, 1.66 and 3.01 (1.12, 8.12) respectively (P for trend 0.022). Additional adjustment of BMI and fat intake attenuated the associations, but the association remained significant. There was a similar, however not statistically significant, association in men. Plasma triglyceride and total cholesterol levels were significantly higher in women who consumed > 2 eggs/wk than those who consumed less. Conclusion: Egg consumption was significantly and positively associated with the risk of diabetes among Chinese, particularly in women.

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THE ROLE OF HYPERTENSION IN THE INDEPENDENT ASSOCIATIONS OF DIABETES AND OBESITY WITH RENAL CELL CANCER. *E L Evans, R P Ojha, L A Fischbach (UNT Health Science Center, Fort Worth, TX 76107)

Pervasive comorbidity of diabetes, obesity, and hypertension hinders interpretation of independent associations with renal cell cancer (RCC). We employed a stratified approach to determine the role of hypertension in the independent associations of diabetes and body mass index (BMI) with RCC. We utilized self-reported data for adults age >18 years (n = 226,953) from combined National Health Interview Surveys (1997–2003), a United States population-based cross-sectional study. We stratified the data by dichotomous hypertension status. We used separate weighted logistic regression models to estimate prevalence odds ratios (ORs) for the association between diabetes and RCC, and between BMI (<25[normal/underweight], ≥25[overweight/obese]) and RCC after adjusting for age, gender, alcohol consumption, smoking status, and race. A negative association between diabetes and RCC persisted with and without hypertension in the model (OR = 0.73, 95% CI 0.72, 0.74; OR = 0.81, 95% CI 0.80, 0.82, respectively), but the ORs were discordant after stratification by hypertension (Normotensive: OR = 1.23, 95% CI 1.19, 1.26; Hypertensive: OR = 0.58, 95% CI 0.56, 0.59). A positive association between BMI ≥25 and RCC persisted with and without hypertension in the model (OR = 1.16, 95% CI 1.14, 1.17; OR = 1.30, 95% CI 1.29, 1.32, respectively), but the ORs were discordant after stratification by hypertension (Normotensive: OR = 0.82, 95% CI 0.81, 0.83; Hypertensive: OR = 1.56, 95% CI 1.53, 1.58). Our results suggest that hypertension may modify the independent associations of diabetes and obesity with RCC, and contrasts the common notion that hypertension is a confounder in this scenario. Prospective studies are required to confirm our findings.

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DIABETES GENES AND PROSTATE CANCER RISK IN THE ATHEROSCLEROSIS RISK IN COMMUNITIES (ARIC) STUDY. *T E Meyer, E Boerwinkle, K A Volcik, A C Morrison, M Sanderson, A L Coker, J S Pankow, A R Folsom (University of Texas School of Public Health, Houston, TX 77030)

Prostate cancer (PCa) is an important cause of morbidity and mortality, yet few consistent risk factors have been found. Meta-analyses show a reduced PCa risk in men with type 2 diabetes (T2D), but the mechanism is unknown. Recent genome-wide association studies have found single nucleotide polymorphisms (GWAS SNPs) that consistently predict T2D risk. We examined associations between these T2D GWAS SNPs and PCa risk in 6,642 men from the ARIC study, a population-based cohort aged 45–64 years at baseline. From 1987 to 2000, 397 incident PCa cases (129 blacks and 268 whites) were ascertained through state or county cancer registries. Baseline prevalence of diabetes was 12% (9% in PCa cases). Genotyping was done by TaqMan assay for nine T2D GWAS SNPs in or near CDKAL1, CDKN2A, FTO, HHEX, IGF2BP2, KCNJ11, PPARG, SLC30A8, and TCF7L2 and a SNP on chromosome 11p. Hazard ratios (HR) were calculated for the association between PCa and the ten SNPs. Two SNPs predicted reduced PCa risk as hypothesized ($p \leq 0.1$). At least one copy of the TCF7L2 rs7903146 T allele was associated with reduced PCa risk in both races using a dominant model (race-adjusted HR = 0.79; p = 0.03). However, results for an additive model of IGF2BP2 rs4402960 T allele may differ by race (HR = 0.98; p = 0.82 in whites and HR = 0.79; p = 0.07 in blacks). Joining TCF7L2 and IGF2BP2 SNPs in a multi-locus model yielded stronger associations with PCa that were similar by race (race-adjusted HR = 0.79; $p < 0.01$). Our results imply that the link between T2D and reduced PCa risk may be partly due to genetic variation in TCF7L2 and IGF2BP2, but other studies should verify these results as multiple tests were done.

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AN ASSOCIATION ANALYSIS OF CORONARY ARTERY DISEASE. *J A Tackett (University of Cincinnati, Cincinnati, OH 45267)

Coronary artery disease (CAD) is a complex disease related to multiple genetic and environmental factors. A genetic association analysis was conducted to investigate the relevance of certain genes hypothesized to influence the development of CAD through hypertensive or ischemic heart disease pathways. Genes were selected for the analysis based on their biological and functional relevance to cardiovascular diseases in general. Data were obtained from subjects in the Framingham Heart Study Offspring Cohort who had been genotyped for phenotypes strongly suggestive of CAD. Of five genes [angiotensin-converting enzyme (ACE), angiotensinogen (AGT), alpha 1A adrenergic receptor (ADRA1A), renin(REN), and cardiac troponin T2 (TNNT2)] evaluated in an exploratory factor analysis (EFA), ADRA1A and TNNT2 were associated with CAD in this population. Further findings from a two-factor maximum likelihood analysis solution suggest that ACE, ADRA1A, and REN (genes influencing hypertension) may be involved in the pathogenesis of CAD. Although both hypertensive and inflammatory genes may be involved in the pathogenesis of CAD, untreated hypertension may be an independent risk factor.

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EVALUATION OF IMMUNE GENE POLYMORPHISMS AND HUMAN PAPILLOMAVIRUS-16 (HPV-16) SEROPOSITIVITY IN NHANES III. *R Waltenburg, A Yesupriya, M-H Chang, E Unger, M Gwinn, S Chanock, S Wang (Centers for Disease Control and Prevention, Atlanta, GA 30341)

The association between genetic polymorphisms within human immune and oxidative stress genes and antibody response to HPV-16 infection (HPV-16 seropositivity) was explored. Forty-four single nucleotide polymorphisms (SNPs) in 22 genes and HPV-16 serology were assessed among participants ≥12 years of age with surplus sera in Phase 2 of NHANES III (1991–1994). HPV-16 serology was assessed using a direct HPV-16 virus-like particle ELISA and genotyping was performed using TaqMan or MGB Eclipse assays. Both genotype data and HPV-16 serology were available for 5351 participants. The analysis was restricted to those who had ever had sexual intercourse. A weighted analysis using SUDAAN 9.0 was performed separately for males and females. SNPs significantly associated with HPV-16 seropositivity were further explored using logistic regression. Age and race were included *a priori* as potential confounders. Sexual history was included in all models as an indicator for potential exposure to HPV-16. Genotype prevalences and HPV-16 seropositivity in this subpopulation were similar to those found in the overall sample. Overall, 13.6% of participants were HPV-16 seropositive (19.1% among females, 7.8% among males). SNPs in the immune response gene *TGFB1* were associated with HPV-16 seropositivity in both males and females. SNPs in *MBL2* (immune response) and *CAT* (oxidative stress) were additionally associated with seropositivity among females. Among males, a SNP in *CCR2* was also associated. Our results suggest that SNPs in immune and oxidative stress genes may be associated with HPV-16 seropositivity.

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INFORMATION ISSUES CONCERNING LIVING WITH HIV/AIDS, ITS STIGMA, DISCRIMINATION AND SOCIAL JUSTICE. *O Emeka (Aboundant Life Support Group, Umuahia, Nigeria)

The paper examines the information and knowledge issues concern living with HIV/AIDS in Africa, its stigma, discrimination's and social justice. The paper starts by presenting an overview of the HIV/AIDS pandemic citing evidence which shows clearly the level of the infection in Africa, the information needs and behavior of PEOPLE LIVING WITH HIV IN AFRICA. the final section proposes the knowledge management at national and grassroots level as the best way to improve the local production, transfer and sharing of HIV/AIDS knowledge and information in Africa which lead to innovation and concrete action to curb the spreed of the disease.

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SOCIO-ENVIRONMENTAL FACTORS ASSOCIATED WITH THE SEXUAL BEHAVIOR OF SEX WORKERS PARTICIPATING IN AN STI/HIV INTERVENTION IN BRAZIL. *S A Lippman, A Donini, D Kerrigan, M Chinaglia, A Reingold, J Diaz (University of California, Berkeley, CA 94720)

Sex workers experience stigma and exclusion from civic life, which can discourage the forging of cohesive communities, impede access to public services, and undermine safer sexual practices. We analyzed baseline data from a longitudinal cohort study of 420 sex workers participating in a sexually transmitted infection (STI)/HIV prevention program in Brazil to determine the association between sexual behaviors and prevalent STI and perceived social cohesion, participation in public life, and access to material resources. At recruitment, participants provided a urine sample for chlamydia and gonorrhea testing and responded to a questionnaire including multi-item indexes for social cohesion, access to material resources, and participation in social networks and public life. Indexes were summed and standardized. Outcomes included prevalent STI and unprotected penetrative sex acts with clients and non-paying partners in the past week. Cross-sectional associations were determined using multivariate logistic and linear regression. Increased perception of mutual aid, trust, and connectedness among sex workers (cohesion) and participation in public life (social capital) were inversely associated with the number of unprotected sex acts in the past week (β $-.17$ and β $-.16$, respectively). Neither access to material resources nor participation in social networks were associated with outcomes. Prevalent STI was not associated with social environment measures. Longitudinal analysis of the cohort will inform whether the intervention successfully improved the social environment and elucidate the impact of improved social environment on STI and behavioral outcomes.

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ACCOUNTING FOR EXPOSURE MISCLASSIFICATION USING G-ESTIMATION OF STRUCTURAL NESTED MODELS: EFFECT OF HIGHLY ACTIVE ANTIRETROVIRAL THERAPY ON INCIDENT AIDS. *L E Cain, S R Cole, T T Brown, J S Chmiel, L Kingsley, R Detels (Johns Hopkins U, Baltimore, MD 21205)

HIV researchers often use calendar periods as an imperfect proxy for antiretroviral therapy (ART) when estimating the effect of ART on time to AIDS. We report on 583 HIV+ homosexual men followed from 1984 to 2007 in 4 US cities. 91% of men were Caucasian and mean age was 35 ± 8 yrs at seroconversion (known ± 2 yrs). 107 of 583 men incurred AIDS and 93 were lost to follow up during 3,570 person-years. All models adjust for age and infection-duration using restricted cubic splines. The hazard ratio (HR) for AIDS in those reporting highly active ART use was 0.74 (95% confidence limits [CL]: 0.46, 1.19) that of those reporting no ART use. However, prior randomized and observational evidence suggests that this estimate is severely null-biased due to confounding-by-indication. The HR for AIDS in the highly active ART calendar period ($\geq$1996) was 0.20 (95% CL: 0.10, 0.42) that of the no ART period ($<$1990). However, this estimate is likely biased due to misclassification of ART use by calendar period. Simple calendar period approaches may circumvent confounding-by-indication at the cost of inducing exposure misclassification. Using calendar periods and reported ART use in g-estimation of a structural nested model, the HR for AIDS given highly active ART was 0.36 (95% CL: 0.21, 0.66) that of no ART. Unexpectedly, this correction for misclassification yielded a weaker estimate than that based solely on calendar periods. Competing explanations will be contrasted. For example, we assume the 93 men were lost to follow up at random given age and infection-duration and that calendar periods meet the un-testable conditions of an instrumental variable.

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EPIDEMIC STORY-TELLING: DO HIV INCIDENCE DATA TELL US MORE THAN PREVALENCE DATA ALONE? *S Braunstein, J van de Wijgert, D Nash, E Geubbels, J Vyankandondera (Columbia University, New York, NY 10032)

Public health practitioners and others in the field argue that data on HIV incidence are more important for programming and research on HIV/AIDS than are data on prevalence, as new infections represent the epidemic's ''leading edge,'' while prevalent cases record the epidemic's history. These writers highlight the paucity of timely incidence data in many settings around the world, and call for its collection. While in theory it makes sense that incidence data would complement or even enhance the utility of prevalence data—especially for prevention planning—the broad need for incidence data has yet to be demonstrated. In this paper, we will discuss the relative merits of incidence and prevalence data for informing the public health response to HIV/AIDS, and describe the important influences of the specific epidemic setting and stage, the history and current state of an epidemic, and the goals of the particular public health investigation. We will outline scenarios in which incidence and prevalence data provide complementary epidemiologic information about HIV transmission patterns, as well as those in which the information the two data sources provide leads to the same epidemiologic conclusions and actions, and discuss the implications of both. In circumstances or settings in which HIV incidence data are needed, it may be wise to consider the use of alternative methods of data collection to the conventional prospective cohort study, whose logistical and methodological limitations are well known. To this end, we will also describe the methods and theoretical basis of antibody-based assays, such as the BED-CEIA and Avidity Index, for estimating HIV incidence in cross-sectional population samples.

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EPIDEMIOLOGIC FEATURES OF NONALCOHOLIC FATTY LIVER. *S Celebi, A Demir (Selcuk University, Istanbul, Turkey)

Background and Aim: Nonalcoholic fatty liver disease (NAFLD) is a common condition in Western. The aim of this study was to determine the prevalence of NAFLD which was diagnosed by ultrasonography and the risk factors in an Eastern country (in Turkish general population which is a country between Asia and Europe). Patients and methods: A hepatobiliary ultrasonography was performed on 459 subjects selected randomly from the general population in Elazig provinence. BMI (Body Mass Index) and waist circumference were calculated; plasma lipids, glucose, aminotransferases levels, and viral serology were evaluated. Statistical Analysis: chi-square, t-test and logistic regression were all used. Results: 408 subjects; age: range from 18 to 80 years included. Four subjects were excluded due to the regular alcohol consumption in 1 subject and chronic viral hepatitis in 3. Of the 404, the prevalence of NAFLD was 19.8%; and 16.5% female and 23.7% were male (%females vs. %males, $p < 0.05$). NAFLD was the most prevalent in the fifth decade and more common in males than females under 40 years age group ($p < 0.05$). There was a significant association between NAFLD and BMI, waist circumference, serum ALT and triglyceride levels. Logistic regression analysis revealed that waist circumference and advanced agein females while waist circumference and increased ALT in males were independent predictors for NAFLD. Conclusion: NAFLD is a common disease in Turkey as well as in Western. NAFLD affects one-fifth of the Turkish population and more common in young males. Central obesity appears an indipendent factor for the development of NAFLD.

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WITHDRAWN

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RECOGNIZING HOSPITAL UTILIZATION PATTERNS BY RISK FACTOR ANALYSIS. *R Fang, J Lu, J Millar, L Drasic (Provincial Health Services Authority of BC, Vancouver, BC, V6Z 2H3 Canada)

As Canadians live longer, the population with chronic diseases increases and becomes an increasing burden to the publicly funded health care system especially the hospital sector in Canada. We conducted a population-based study to recognize the patterns of hospital utilization by patient groups with various risk factors. The study included the entire population of the City of Richmond with 171,145 residents for the 2003/04 fiscal year. Medical service data, hospital discharge records and demographic information were provided by BC Ministry of Health. The 2001 Canadian Census data were used as a proxy for socioeconomic status for all individuals. Multivariate logistic regression was used to model hospitalization experience against various factors. Two outcome variables were risk of hospitalization and risk of high-cost hospitalization (patients in the top 5% of users by cumulative days in hospital). We found that the type of chronic diseases, level of comorbidity and absence of a single physician providing majority services of care (MSOC physician) were strong predictors for both risks of hospitalization and high-cost hospitalization. The top 5% high-cost users collectively consumed 51.5% of the total hospital days. Immigrant effect was seen to reduce risk of hospitalization. Household income was found to be irrelevant to hospitalization. The study result underscored the need to prevent and manage chronic diseases in the community. A significant amount of hospital utilization can be eliminated through efforts to reduce the prevalence of chronic diseases, network patients with MSOC physicians and target and coordinate case management approach for residents with complex and multiple chronic diseases.

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HEALTH RELATED BARRIERS TO EMPLOYMENT: DATA FROM A WELFARE REFORM PROGRAM. *A Maguire, Q Xiang, D Eastwood, S Tarima (Medical College of Wisconsin, Milwaukee, WI)

The impact of health on unemployment is poorly understood. We analyzed data from a state-wide survey to screen for barriers to employment administered from 2003–2006 to adults at a large Wisconsin welfare reform agency. Among 35,855 adults seeking services, 10,060 were eligible and completed the survey. 92.5% were female. 44.6% lacked a HS diploma. 72.3% were African American. 45% were < 30 yrs of age. Lack of education (8.0%), physical limitations (10.1%) and mental health problems (6.1%) were common. 7.2% reported an unspecified ''other medical limitation''. 1,044 individuals reported a physical limitation and 635 individuals identified mental health barriers. Pain was the most frequent physical limitation and depression was the most common mental health condition. Logistic regression analysis was used to analyze the effect of multiple variables including age, gender, ethnicity, education, AODA, lack of education, limited English proficiency, domestic violence, homelessness, and legal problems on the presence of physical and mental health barriers to employment. Age > 40 yrs was associated with physical (OR $= 2.55$, $p < 0.0001$) and mental health (OR $= 2.29$, $p < 0.0001$) barriers to employment. AODA (OR $= 3.63$, $p < 0.0001$), domestic violence (OR $= 3.12$, $p = 0.0001$), lack of education (OR $= 2.41$, $p < 0.0001$) and female gender (OR $= 2.30$, $p = 0.0081$) were associated with mental health barriers to employment. Female gender (OR $= 2.17$, $p = 0.0004$), and lack of education (OR $= 1.68$, $p = 0.0006$) were associated with physical limitations. Physical and mental health problems are common barriers to employment in this population of unemployed urban Wisconsin residents. Further study is warranted to understand the reasons for the increased prevalence of employment barriers among women.

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CLICK AND LINK—AUTOMATION OF REPORT BY DRAWING DOWN DATA USING SAS. B Hwang, *H Wu, A Sharip, P Araki, and E Kajita (Los Angeles County Department of Public Health, Los Angeles, CA 90012)

The Los Angeles County (LAC) Syndromic Surveillance Quarterly Reports summarize the trend analysis of emergency department visits in LAC by the syndrome category (gastrointestinal, respiratory, rash and neurological). The report provides a summarized table displaying the total number of signals and case investigations observed by each hospital, for each syndrome. Numbers in the table are hyperlinked to conveniently allow users to access more detailed information. Manually creating the hundreds of hyperlinks and the content behind each hyperlink for each syndromes-hospital combination is very time consuming and may be prone to human error. We developed a SAS program to automatically create all tables and information with hyperlinks. These tasks are completed directly from raw data by running a single SAS program. The SAS programming techniques exhibited for completing these tasks include creating: 1) the summary table displaying the total number of signals for each hospital; 2) the data elements determining each hospital signal: the count of the report date, the counts from day 3 to day 9 previous to the report date, the average count and standard deviation from the previous 7 days, and the threshold; 3) the list of cases on each signal date; and 4) the hyperlinks that allow users to move forward and back between the information.

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COOPERATION, INTEGRATION AND LONG-TERM COMMITMENT: WHAT SOLOMON ISLANDERS AND DEVELOPMENT WORKERS SAY ABOUT HEALTH SECTOR AID. *A L C Martiniuk MSc, PhD, H C Millar MIPH, G Malefoasi MBBS, MHA, P Vergeer BSc MA Int.Rel, T Garland AM, S Knight (The George Institute for International Health, Sydney, NSW, Australia, 2050)

Introduction: A recent tsunami and on-going civil unrest has led to an influx of foreign aid into the Solomon Islands. While there are frameworks (eg Sector-wide approach) for coordination of aid there is no published information regarding the actual experiences, requirements and views of the recipients of aid. Methods: Data was collected using previously published literature, government and non-governmental documents as well as in-person interviews with key stakeholders in the Solomon Islands. An inductive content analysis was done using the constant comparative method to identify key words, phrases and themes. Results: Two key themes emerged from the interviews: the need for coordination and integration of aid, and the need for this integration to occur over the long-term. Subthemes included: negative effects of donations, desire for coordination, the influence on priority setting by external donors, the value of building local capacity through long term relations such as mentorship, importance of local cultural competence, and the importance of trust in aid partnerships. These themes will be presented using quotations from key informants. Conclusion: These findings help inform theoretical frameworks for coordination, particularly in conflict-affected states. Several actions are recommended including: increasing the use of information systems to enhance coordination, educating smaller non-governmental organizations (NGOs) on guidelines for good engagement, and fostering local leaders through long-term commitment such as mentorship.

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DISPARITIES IN EYE CARE SERVICES USE AMONG US ADULTS. *A Ryskulova, R Klein (Centers for Disease Control and Prevention, Hyattsville, MD 20782)

Regular use of eye care services can help to diagnose eye diseases in their early treatable stages and prevent vision loss. Data from the 2002 and 2006 National Health Interview Survey, a nationally representative sample of the U.S. civilian noninstitutionalized population were examined. We included bivariate and multivariate analyses of dilated eye examination use, visits to eye care professionals, and inability to buy eyeglasses by selected sociodemographic covariates and diabetes status. In 2002 55.0% of U.S. adults had a dilated eye examination in the past 2 years, 36.7% of persons visited eye doctor or eye health professional in the past 12 months, and 5.4% of adults needed but could not afford to buy eyeglasses in the past 12 months. Women were more likely then men to receive an eye exam and to visit eye doctor. Hispanics, persons with less than high school education, and adults without health insurance were less likely to use eye care services. American Indian and Alaska Native and black persons reported inability to buy needed eyeglasses more frequently compared with other racial/ethnic groups. While persons with diabetes were more likely to have had a dilated eye exam they also reported inability to buy eyeglasses two times as persons without diabetes history. There were no significant changes in use of eye care services between 2002 and 2006, however, the inability to buy eyeglasses increased from 5.4% to 6.8%. The national data demonstrate that use of eye care services varies by sociodemographic factors and diabetes status. Collaborative efforts of eye care and public health professionals, and health educators are needed to increase use of regular eye care services.

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MULTIVARIATE ANALYSIS OF STATE VARIATION AMONG UNINSURED CHILDREN WITH SPECIAL HEALTH CARE NEEDS IN THE US, 2005–2006. *M D Kogan, P W Newacheck, B Strickland, S J Blumberg, G K Singh, M B Zeni, L Honberg (Maternal and Child Health Bureau, Rockville, MD 20857)

Insuring children has been a recent focus of national attention. State variations in the percent of uninsured children have been documented, but state variations in uninsurance among children with special health care needs (CSHCN) have not been explored. About 13.8% of children have special health care needs, yet CSHCN account for 42% of medical costs for children. The 2005–2006 National Survey of CSHCN, a nationally representative study of 40,000 CSHCN that can produce state estimates, was analyzed to examine this question. CSHCN were considered uninsured if they did not have any health care coverage for all or part of the previous 12 months. We calculated the unadjusted prevalence for uninsurance in each state. Using logistic regression, we calculated state-specific odds and prevalence for uninsurance, adjusting for poverty level, race/ethnicity, gender, family structure, language use /immigration status, insurance type, and severity of child's health condition. Unadjusted uninsurance rates for states ranged from 3–17%. Adjustment did not diminish the range of prevalence rates. Multivariate analysis indicated that CSHCN's state of residence had a very strong association with their likelihood of being uninsured. The odds of being uninsured were 6–7 times greater for CSHCN in some states compared to Hawaii, which had the lowest rate of uninsured CSHCN. Individual-level factors do not explain variation among states, indicating that the disparity may be driven largely by macro-level factors.

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OUTCOME EVALUATION FOR LONG-TERM VENTILATOR-DEPENDENT PATIENTS UNDER RESPIRATORY CARE INTEGRATED DELIVERY SYSTEM IN TAIWAN. *H F Tan, Y T Lin, H F Tseng (Chang Jung Christian University, Tainan, Taiwan, 71101)

Since 2000 the Bureau of National Health Insurance (NHI) in Taiwan launched the Integrated Delivery System (IDS) for ventilator-dependent (VD) patients. Respiratory care services were reimbursed by capitation. In this study, we analyzed the outcome of respiratory care provided for VD patients under the new IDS system. This retrospective longitudinal study included subjects who were above 17 years old and continuously used ventilator for more than 21 days in respiratory care wards of 7 regional hospitals in Taiwan between 2005 and 2006. Date of admission, date of discharge, reasons for discharge, causes of VD, date of first ventilator use, and date of ventilator weaning were extracted from medical records. Ventilator weaning curve and survival curve were analyzed by Kaplan-Meier methods. The average age of the 625 subjects included in this study was 72.4 ± 13.8, and the length of ventilation before admission was 229 ± 339 days. Forty seven (7.5%) patients successfully weaned themselves from ventilator. Among them, 24 (51%) weaned themselves within three months of admission, and 31 (65%) weaned within six months. The 6-month, 1-year, and 5-year survival rate was 84%, 77%, and 45%, respectively. The 1-year survival rates appeared to be highest in the chronic obstructive pulmonary diseases group (91%) and lowest in the cardiovascular disease group (42%). After adjusting for sex and age, renal disease was significantly associated with higher mortality (hazard ratio = 1.72, $p = 0.013$). The results revealed that causes of VD and length of ventilation were important predictors of weaning and survival rates. An early customize care plan based on patients' disease history might be helpful.

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THE INFLUENCE OF DEMOGRAPHIC AND METABOLIC CHARACTERISTICS ON CHRONIC KIDNEY DISEASE INCIDENCE AMONG NEW DIAGNOSED DIABETES PATIENTS. *J-S Liu, H-C Hung, M-C Tseng, W-T Tseng, Y-C Hung, C-H Lee (Faculty of Public Health,Kaohsiung Medical University, 100, Shi-chuan 1st Rd.,Kaohsiung, Taiwan, R.O.C.)

A proper diabetes care via continuing medical attention and patient self-management education can effectively reduce the risk of its subsequent complications. To understand what demographic and metabolic characteristics affect the incidence of chronic kidney disease (CKD) among diabetes patients, we analyzed a representative dataset that was prospectively collected by Taiwan medical care system. A cohort consisting of 21,887 new diagnosed diabetes patients with no complications and their age and gender matched non-diabetes controls were identified from the database of Taiwan National Health Insurance in 2000. Study participants were followed up annually until 2004. The Cox proportional hazard model was used to evaluate the effect of demographic and metabolic characteristics on the incidence of CKD associated with the condition of diabetes. On an average of 4.5-years of follow-up, diabetes patients without hypertensive and hyperlipidemia were observed to have a 2.4-fold higher risk of contracting CKD than the controls. However, the risk (hazard ratio = 1.1, 95% CI: 0.9–1.3) was not significant for diabetes patients with hypertensive and hyperlipidemia identified by 6-months of diabetes diagnosis. Our findings suggest that diabetes patients might raise the related medical attentions because of the comorbidity of metabolic syndromes. Such enhancing medical care might be linked to the incidence of CKD among new diagnosed diabetes patients.

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COMORBIDITIES ASSOCIATED WITH PSORIASIS IN THE NEWFOUNDLAND AND LABRADOR FOUNDER POPULATION. *N Gladney, D MacDonald, W P Gulliver, K Collins, R Alaghehbandan, Z Tomi, J Dowden (Newfoundland and Labrador Centre for Health Information, St. John's, NL, Canada)

PURPOSE: To investigate comorbidities associated with psoriasis and potential prognostic factors among the Newfoundland and Labrador founder population from 1995–2006. METHODS: Clinical and administrative data were linked to investigate comorbidities associated with psoriasis among the Newfoundland founder population. Medical records of a large cohort of psoriasis patients were linked to the hospital database via provincial health insurance number. Descriptive analyses of clients who utilized health services was performed based on age, sex, age of onset, disease severity, genetic markers, and associated comorbidities. RESULTS: Among 3226 psoriasis patients, 1494 were identified as having one or more hospitalizations, mean age of first admission was 45.0 (±18.0). More than half of the patients had moderate/severe psoriasis (54.8%) and were diagnosed after age 25 years (52.4%). Preliminary analysis identified digestive and circulatory system diseases as the leading comorbidities among psoriatic patients (27.4% and 25.8%, respectively); symptoms, signs and ill-defined conditions ranked third (21.8%). Among the general population, circulatory and digestive system diseases were the leading comorbidities (15.4% and 12.4%, respectively), with respiratory system disorders ranking third (8.7%). CONCLUSION: Compared to the general population, psoriatic patients had a higher prevalence of digestive and circulatory diseases. Findings from this phase will be used as a basis of future research to broaden the understanding of comorbidities among individuals with psoriasis.

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COUNTERFACTUAL ANALYSES: EPIDEMIOLOGISTS RESCUE HEALTH SERVICES RESEARCH. *A Ward and P J Johnson (University of Minnesota, Minneapolis, MN 55455)

Epidemiologists often make use of counterfactuals and propensity scores in their analyses. In contrast, Health Services Researchers (HSRs) rarely use either. One possible reason for this difference is that the research problems in which Epidemiologists are most interested require the use of different methods than those in which HSRs are most interested. We believe this is incorrect and that HSRs can and should make use of counterfactuals and propensity scores in their analyses. For example, HSRs often hypothesize that health status and employment status are determinants of health insurance. We assess the utility of propensity score matching for estimating the causal effects of these two hypothesized determinants of insurance status. We use data from the 2004–2006 National Health Interview Survey to investigate the determinants of insurance. We examine, for adults ages 18–64 years, how insurance is related to determinants such as race/ethnicity, age, sex, marital status, employment, poverty status, self-reported health, and geographic region. We then demonstrate two HSR-type analyses of the determinants of insurance using a counterfactual framework, explicit causal contrasts, and propensity score matching methods. The outcome of interest is health insurance status (insured/uninsured). In separate analyses, the exposure of interest is health status (high, moderate, low) and employment status (unemployed, small employer, large employer). Covariates for propensity score matching include all available factors expected to differ across levels of exposure. These analyses provide transparency into the relation between hypothesized determinants of insurance and having insurance. We conclude that HSRs can make productive use of epidemiological methodologies.

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INVESTIGATING GENERALIZABILITY OF A PRACTICE-BASED RESEARCH NETWORK BY COMPARISON TO A STATEWIDE PRESCRIPTION REGISTRY. *C A Porucznik, J D Panichello, S A Sims, R T Rolfs (University of Utah, Salt Lake City, UT 84108)

Practice-based research networks (PBRN) allow larger secondary data analysis projects than are feasible within a single medical practice. A limitation of PBRN studies is the lack of an identified population denominator to use for rate calculations and comparisons to other populations. Methadone prescriptions were queried from the Utah Health Research Network (UHRN). We created a demographic profile of the UHRN patients and compared it to the census of methadone prescriptions from the statewide controlled substance registry. The UHRN population may be considered as a sample from the state, and we tested the hypothesis that the sample is representative of the source population. The total number of filled methadone prescriptions captured by the registry increased 1.2-fold each year. The number of prescriptions written captured by UHRN increased each year, but by a variable amount (1.7, 2.1, 1.5-fold). There were no significant differences in mean age between the UHRN patients and the registry. In 2003, the proportion of females was higher in UHRN than the registry (67.4% compared to 54.2%), but there was no difference in the other years. Patient-level data such as diagnosis and co-morbidities are available in the UHRN records, but not in the prescription registry. The data sources can provide complementary information about outpatient methadone use. This analysis suggests that the UHRN population of patients for whom methadone is prescribed may be different from the statewide population of people filling outpatient methadone prescriptions and that results from UHRN may not be generalizable.

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CAUSAL DIAGRAMS FOR MEASUREMENT ERROR IN EPIDEMIOLOGIC RESEARCH. *O A Arah (Department of Social Medicine, AMC, University of Amsterdam, Amsterdam 1100 DE, Netherlands)

Studies based on observational data suffer from important shortcomings such as measurement error or variable misclassification, unmeasured confounders, and selection bias. Of these shortcomings, measurement error which is ubiquitous seems to be the least acknowledged in epidemiology and other health sciences. The several techniques developed to handle measurement error analytically are still rarely used by most researchers who seem to depend more on intuitions and qualitative appraisals. Unfortunately, intuitions can be misleading when considering whether all or some target parameters in a model are biased if one or more variables are measured with error while other covariates are perfectly measured. Extending the growing literature on directed acyclic graphs for depicting causal assumptions, this study shows how causal diagrams can be augmented with information on non-differential measurement error in exposure, confounders or even outcome. The augmented diagrams can be queried visually to reveal the directed paths through which target effect parameters are biased by measurement error: through all backdoors or front-doors left open by the unobserved true exposure, confounders or outcome. Other important results include the finding that in the absence of measurement error in confounders, the exposure effect estimate is only biased by the degree to which the exposure variable is mismeasured. Furthermore, the augmented diagrams support the use of regression calibration whose equations can be written simply upon visual inspection of the diagrams. Scenarios involving exposure or confounder measurement error, correlated confounders, uncontrolled confounding, change-in-outcome models, and adjustment for unnecessary surrogates are presented.

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BIAS DUE TO UNCONTROLLED CONFOUNDING: DEMONSTRATING THE VALUE OF EXTERNAL ADJUSTMENT. *K Heavner, C V Phillips, J Hu, S Newman (U of Alberta, Edmonton, Alberta, T6G2L9)

Residual confounding is often present in epidemiologic study results; we illustrate the importance and ease of externally adjusting for it. Risky or ostensibly risky behaviors (drug use, diet, etc.) often occur in constellation. Epidemiologic studies typically adjust only for variables measured (often quite imprecisely) in that study, and imply that inclusion of whatever covariates happen to be available has eliminated confounding. As a result, our literature effectively blames each risky behavior for some of the effects of other behaviors; this is particularly problematic when assessing whether a risk is small or nonexistent. Data from studies that assess multiple health-affecting behaviors (e.g., NHANES survey) allows estimation of correlations of behaviors, and estimates of the effects of well-studied exposures on disease outcomes can then be used to make adjustments. Such estimated effects of residual confounding can easily exceed the estimated small effects of exposures. As an example, when external corrections are applied to studies of smokeless tobacco (ST), it becomes apparent that the ostensible effects of ST are often explained by residual confounding. ST users are more likely to smoke, drink heavily, use illicit drugs, have many sexual partners, be obese, and have an unhealthy diet compared to non-ST users. Yet the confounded estimates of the effects of ST are used to influence on tobacco policy and discourage tobacco harm reduction. Use of external adjustments in epidemiology is resisted because analyses become more complicated and involve layers of imprecise estimates. But scientific analysis should pursue the right answer, rather than follow a well-defined recipe that yields an estimate with known bias.

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BIAS ESTIMATION FOR PROPENSITY SCORE CALIBRATION. M Lunt, R J Glynn, K J Rothman, J Avorn, and *T Stürmer (Division of Pharmacoepidemiology, Harvard Medical School, Boston, MA 02120)

Propensity score calibration (PSC) can be used to adjust for unmeasured confounding in the main study using a cross-sectional validation study without information on the disease-outcome (Y) based on a strong surrogacy assumption. It has been pointed out that surrogacy may not be as natural or credible for the propensity score than it is for measurement error. Using directed acyclic graphs, we have developed a framework for PSC and a formula to predict presence and magnitude of bias of PSC in the simplest setting of a binary exposure (A) and one standard normal confounder (X) that are observed in the main study and the validation study and one standard normal confounder (C) that is observed in the validation study only. Presence and magnitude of PSC bias are predicted based on parameters that can be estimated from the data and a single unobservable parameter, the relative risk associated with C (RR_{CY}). To test the performance of this bias prediction, we simulated 1,000 cohort studies each with a Poisson distributed outcome Y, varying parameter values over a wide range. When using the true parameter for RR_{CY}, the formula predicts the median bias from PSC over simulations almost perfectly in this simple setting (correlation with observed bias over 22 scenarios assessed $r = 0.997$). We conclude that the bias from PSC observed in certain scenarios can be corrected by estimating the joint distribution of X and C with the exposure A in the validation study and assuming a range of plausible values for the unobservable RR_{CY}. This development of PSC is a great step towards the applicability of PSC as a sensitivity analysis around a single unobservable parameter (RR_{CY}), for which an informed guess can often be made from the literature.

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REGRESSION CALIBRATION OF DIETARY VARIABLES WITH MANY ZERO INTAKES. *G E Fraser, P Ferrari (Loma Linda University, CA 92350)

Regression calibration allows some correction for measurement error in a dietary analysis. It calibrates the questionnaire data to more accurate reference dietary data. The expected value of the truth(T|covariates) is used in the disease regression rather than the questionnaire data(Q). However a potential problem exists when many in the population do not eat a particular food, for instance meat. How does the calibrating equation perform in these highly non-Gaussian circumstances? Using EPIC study data, nut consumption was related to risk of colon cancer. We used either a linear calibrating equation or a mixture model. The mixture model was in two parts, first when $Q = 0$ and second a linear model when $Q > 0$. Using a single linear model the residuals are heteroscedastic and non-normal, which is allowed by the regression calibration algorithm. When $Q = 0$ there are some values of $T \neq 0$. When $T = 0$ there are very few with $Q \neq 0$. In fact, T is not observed, rather R, a reference dietary method, which results in further complications. An un-calibrated logistic disease regression produced an Odds Ratio for the nut/colon cancer association of 0.911 ($p = 0.276$), per gram nuts/day. Using a single linear calibrating equation this changed to 0.63 ($p = 0.167$). When separate calibrating equations were used the OR was also 0.63 ($p = 0.145$). The residuals of the calibrating equations were examined carefully, and there were no strong deviations from expectation indicating good model fit even close to zero intake values. We conclude that simple linear calibrating models can be used in this situation, but model fit should be checked carefully where Q~0. We will show further work on the accuracy of boot strap standard error estimates with such heteroscedasity.

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RANDOM ERROR IN BIOMARKERS AND THE APPEARANCE OF CORRELATED ERROR BETWEEN DIETARY INTAKE MEASUREMENTS.

*S R Preis, D Spiegelman, B Zhao, W Willett (Harvard School of Public Health, Boston, MA)

The validity of food frequency questionnaires (FFQ) has been evaluated by comparisons with 24-hour diet recalls (24HR) or diet records (DR). However, correlated errors between the FFQ and these unstructured methods could lead to overestimation of the FFQ's validity. Using a measurement error model to account for the presence of correlated errors between the methods, Kipnis et al. (Am J Epidemiol 2003;158:14–21) analyzed the Observing Protein and Energy Nutrition (OPEN) study to assess the FFQ's validity in measuring energy (doubly labeled water, DLW) and protein (urinary nitrogen, UN). Correlated errors between the FFQ and 24HR were reported, implying that the FFQ's validity had been previously overestimated. However, with a single DLW measure, OPEN could not account for within-person variation in DLW, which would overestimate correlated errors between the FFQ and 24HR and underestimate FFQ validity. In the USDA Doubly Labeled Water Study, repeated DLW and UN were collected approximately one year apart among 50 men and women. The intraclass correlation coefficients for men and women, respectively, were 0.68 and 0.22 for energy (DLW) and 0.71 and 0.48 for protein density (UN/DLW). The correlations between the FFQ and a single biomarker measurement of protein density for men and women, respectively, were 0.28 and 0.36. The correlation between the FFQ and the average of two biomarker measurements of protein density, deattenuated for random error, for men and women were 0.35 and 0.65. These findings indicate that important within-person variation in biomarkers exists and failure to account for it can lead to the underestimation of FFQ validity.

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BORROWING AND SELLING TO AFFORD HEALTH CARE: EVIDENCE FROM CROSS-SECTIONAL POPULATION SURVEYS.

*E Goldmann, M E Kruk, S Galea (University of Michigan, Ann Arbor, MI 48109)

While survey data indicates that health spending can be a substantial part of household budgets, comparable cross-national data on the extent of borrowing and selling household items to pay for health care has not yet been available. We used data from the nationally-representative World Health Surveys (WHS) to estimate the 12-month prevalence of borrowing money or selling household items (jointly called hardship financing) to pay for health services in 41 primarily low- and middle-income countries and to analyze predictors of hardship financing and differences in hardship financing between wealth groups. The WHS data represented a combined population of 3,771,854,270, or approximately 59.9% of the world population. The mean response rate was 88%. The prevalence of hardship financing varied from a low of 1.8% [95% confidence interval (CI), 1.3% to 2.4%] in Spain to a high of 68.7% [95% CI, 59.1% to 76.9%] in Burkina Faso, with a global mean of 24.6%. In multivariable modeling, hardship financing was higher in countries with lower levels of government and private insurance (log scale, $\beta = 0.3$, $p = 0.04$), controlling for other factors. The poorest 20% of the population had significantly higher levels of hardship financing than the richest 20% in over 80% of the countries (p-values <0.006). We conclude that households commonly resorted to borrowing money or selling items to afford health care, with poorer households experiencing the greatest burden. Such financing is associated with low levels of government health insurance, depletes households' assets, and increases risk of impoverishment. Health care systems are failing to protect their populations, especially the poorest, from the financial risks of seeking health care.

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IS PRECARIOUS EMPLOYMENT DAMAGING TO HEALTH? RESULTS OF PROPENSITY SCORE MATCHING METHODS USING A PANEL DATA IN SOUTH KOREA.

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We examined the health effects of precarious employment, using a sample of 1991 male and 1378 female waged workers from the 4th wave of the Korea Labor and Income Panel Survey. We defined precarious employment by which a waged worker was employed on a temporary or daily basis, worked part-time, or had a contingent job. The outcome was self-rated health on the 4th wave. Covariates included age, marital status, education, industry and occupation of current employment, household income, residential area, and prior health status on the 3rd wave. Propensity scores for each individual to be a precarious worker were calculated from logistic models, by which precarious workers were matched to non-precarious ones within a caliper of 0.1 using a greedy algorithm without replacement. Most covariates, which differed significantly between employment conditions in the original sample, became balanced by matching. Precarious employment was associated with poor health in the matched analysis as well as in the multiple regression models before matching. Much of the health gap could be attributable to disadvantageous socioeconomic conditions. Also, job insecurity, job dissatisfaction, and material condition could be potential pathways. All analyses were done separately by gender but with little differences. For improving precarious workers' health in Korea, strategies to tackle channeling of the socially disadvantaged into precarious jobs and to eliminate discrimination against precarious workers are required. Also, job insecurity should be minimized by suspending neo-liberal labor policies.

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POLICING, COCAINE MARKETS, AND CHANGES IN WELFARE ASSISTANCE: INVESTIGATING AGE-SPECIFIC RELATIONSHIPS WITH HOMICIDE IN THE 1990S.

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Previous research has reported conflicting findings about the contribution of "broken-windows" policing, the fall of the cocaine markets and economic growth on the decline in homicide in the 1990s. This study tests whether changes in neighborhood misdemeanor policing, cocaine consumption and welfare receipt had a different relationship with homicide among youth (15–35) and adults (36+) in New York City (NYC) in the 1990s. We estimate the relationship between changes in misdemeanor arrests, proportion of accident decedents with positive cocaine toxicology, and receipt of public assistance and changes in homicide rates with pooled, cross-sectional time-series data for 59 NYC Community Districts in 1990–99. We used Bayesian hierarchical models with time and space random effects with conditional autoregressive priors, to account for serial correlations in homicide over time and across adjacent neighborhoods. Analyses indicate that although increase in misdemeanor arrests was associated with a small decrease in homicide among youth (median (95% confidence interval): −0.002 (−0.004, −0.001)) and adults (−0.0006 (−0.001, −0.0001), increase in cocaine-related deaths was associated with an increase in homicide only among adults (0.07 (0.03, 0.12) and increase in welfare receipt was only associated with a decrease in adult homicide (−33.55 (−56.05, 11.24). This study highlights the importance of investigating the specific neighborhood-level mechanisms involved in homicide trends in different age groups, and calls into question prior research which hypothesized that the impact of drug market declines on homicide operated mainly through the young adult population.

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THE MENTAL HEALTH BENEFITS OF WORK: DO THEY APPLY TO WOMEN ON WELFARE? *D Zabkiewicz (Alcohol Research Group, Emeryville, CA 94608)

The relationship between employment and improved mental health is well documented. However, no research has documented whether this relationship applies to women on welfare. Given that women on welfare have high rates of depression and are currently being mandated into the labor market through welfare reform, understanding the connections between work and mental health has become more salient not just for mental health epidemiology but for social policies targeting employment and poverty. This study draws on data from the Welfare Client Longitudinal Study (WCLS), a representative community-based study of welfare recipients from a large county in California. Welfare applicants were interviewed as they applied for services in 2001. A sub-sample of aid recipients was randomly selected for follow-up and re-interviewed annually for 4 years post-baseline. The analyses here are confined to the 419 female recipients of the federal Temporary Aid to Needy Families (TANF) program. Generalized estimating equations were utilized to assess the role of current employment and characteristics of job stability on depression status over time. On average, the odds of depression were 27% less among currently employed women, and 29% less among women who obtained full-time work, compared to unemployed women. However, only women who reported working 10–12 months during the year reaped the benefit. These findings suggest that it is the characteristics of employment that matter, rather than employment per se, given that no mental health benefits from part-time employment or shorter term employment were found. This finding is of concern given that the lack of employment continuity is a growing trend in the U.S. labor market, particularly among lesser educated women.

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REDUCING BLACK:WHITE DISPARITIES IN UNITED STATES (US) MORTALITY: THE POSSIBLE ROLE OF FEDERAL LAW AND ADMINISTRATIVE POLICY. *R S Levine, G Rust, C H Hennekens (Meharry Medical College, Nashville, TN 37205)

Black:white disparities in US mortality increased after three lifesaving, disease-specific innovations with clear start dates, namely Surfactant for Respiratory Distress Syndrome (RDS), licensed by the Food and Drug Administration (FDA) in 1989; Highly Active Anti-Retroviral Therapy for Human Immunodeficiency Virus (HIV disease) licensed by the FDA from December 1995 to March 1996 ; and mammography re-imbursement by Medicare in 1991. For RDS, mean ($\pm$standard deviation) 5 year pre- and post-innovation black:white Mortality Rate Ratios (MRRs) were 1.92 ($\pm$0.26) and 2.70 ($\pm$0.37) ($p = 0.005$). The corresponding MRRs were 3.98 ± 0.51 and 7.98 ± 0.37 ($p < 0.001$) for HIV mortality (age-adjusted, 25–64 years) and 0.93 ± 0.05 and 1.04 ± 0.04 ($p = 0.003$) for breast cancer (age-adjusted, 65–85+ year old women). Thus, after each innovation, rates declined less in blacks than whites, translating into thousands of avoidable deaths among blacks through 2004. These descriptive data are compatible with the hypothesis that federal law (conceptualizing health insurance as a cash benefit) and administrative policy (basing drug marketing decisions on biological safety/efficacy without considering possible adverse social effects) contribute to disparities in black:white mortality, in part, by failing to assure that benefits of life saving innovations accrue equally to blacks and whites. Collaborative analytic epidemiologic studies between academia, government and industry to confirm or refute this hypothesis are a necessary, but certainly not sufficient, next step to reduce black:white disparities in US mortality.

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VERY LOW BIRTH WEIGHT AND THE RISK OF CHILDHOOD CANCERS. *L G Spector, S E Puumala, S E Carozza, E J Chow, E E Fox, S Horel, K J Johnson, C C McLaughlin, B A Mueller, P Reynolds, J Von Behren (University of Minnesota, Minneapolis, MN 55455)

Incidence of hepatoblastoma (HB) is highly elevated among very low birth weight (VLBW: <1500 grams) children, possibly because some component of neonatal treatment is carcinogenic when combined with the immature defenses of VLBW infants. If true, the risk of other childhood cancers may also rise following VLBW, albeit to a lesser degree, given that associations of a large magnitude have not emerged to date. To examine this hypothesis we pooled five datasets, comprising 17,672 cases and 57,966 controls, which were created by linking the California, Minnesota, New York, Texas, and Washington state cancer and birth registries. Cases were diagnosed with cancer at ages 28 days to 14 years during 1980–2004; controls were matched for birth year and excluded deaths at <28 days. Subjects known to have Down syndrome were excluded. We examined the association of VLBW (compared to 2500–3999 grams birth weight) and the 10 most common childhood cancers in this dataset, each including >400 cases, as well as HB. Odds ratios (OR) and 95% confidence intervals (CI) were calculated using logistic regression adjusting for sex, gestational age, plurality, birth order, maternal age, maternal race, state, and birth year. HB demonstrated the only significant positive association with VLBW (OR = 14.6; 95% CI: 5.9–36), while gliomas (OR = 2.0; 95% CI: 0.65–5.8) and retinoblastoma (OR = 2.0; 95% CI: 0.80–5.1) showed increased but imprecisely estimated odds ratios. These results more precisely estimate the association of VLBW with HB and rule out moderately strong associations of VLBW with most other childhood cancers.

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WOMEN HAVE ELEVATED LIPID CONCENTRATIONS 8 YEARS AFTER PRETERM BIRTHS NOT COMPLICATED BY PREECLAMPSIA OR GROWTH RESTRICTION. *J M Catov, J M Roberts, K S Tyrrell, G Harger, R B Ness (Univ of Pittsburgh OB/GYN & Epidemiology, Pittsburgh PA)

Women with preterm birth (PTB) are at increased risk for cardiovascular disease (CVD). Women with spontaneous PTB have early gestation dyslipidemia, but it is unknown if lipid aberrations persist post partum. We compared women who delivered preterm (<34 weeks, n = 41; 34−<37 weeks, n=18) to 183 women with term births (≥37 weeks). Women with preexisting medical conditions, preeclampsia or growth restriction were excluded. Mean concentrations of total cholesterol, triglycerides, LDL-C, HDL-C and apolipoprotein B (APOB), collected 7.8 years (SD 1.8) post partum, were compared. Women with a prior preterm (pPTB) vs. term birth had higher concentrations of total cholesterol, and women with pPTB <34 weeks had the highest concentrations (<34 weeks, 203.8.1 [SD 42.4]; 34−<37 weeks, 188.8 [35.3]; ≥37 weeks, 183.7 [38.3]; $p < 0.01$). Results were similar for APOB ($p = 0.02$) and LDL-C ($p = 0.06$). After adjustment for race, age, smoking and body mass index, total cholesterol among women with pPTB <34 weeks was on average 19.3 mg/dl higher ($p < 0.01$), LDL was 14.3 mg/dl higher ($p = 0.01$), and APOB was 10.9 mg/dl ($p < 0.01$) higher compared to women with term births. Women with pPTB (<37 weeks) were 3.0 (1.2, 7.8) times more likely to have cholesterol >240 and 2.7 times (95% CI 1.0, 7.4) more likely to have LDL >160 compared to women with term births, after covariate adjustment. Triglyceride concentrations tended to be higher in women with pPTB <34 weeks ($p = 0.09$), but there were no differences in HDL-C. Eight years post partum, women with a history of spontaneous pPTB had substantially elevated atherogenic lipid concentrations. Dyslipidemia may be a mechanism linking PTB to later CVD.

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LIFETIME OVULATORY CYCLES AND OVARIAN CANCER SURVIVAL—UNITED STATES, 1980–1997.

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Although the number of lifetime ovulatory cycles (LOCs) has been positively associated with ovarian carcinogenesis, the association between number of LOCs and ovarian cancer survival is unknown. To investigate the relationship between LOC and ovarian cancer survival, we conducted a longitudinal analysis of 410 women aged 20–54 diagnosed with epithelial ovarian cancer during 1980–1982 from the Cancer and Steroid Hormone Study, a population-based, case-control study. LOC estimates were based on self-reported dates of last menstrual period and menarche, and number of anovulatory cycles caused by breastfeeding, oral contraceptive use, or pregnancy. Vital status (through 1997) was obtained from the Surveillance, Epidemiology, and End Results (SEER) Program. We estimated 15-year survival probabilities using Kaplan-Meier methods and hazard ratios (HRs) for death by LOC quintile using Cox proportional hazards models, controlling for age at diagnosis and cancer stage. During a median follow-up of 110 months, 212 women died. Survival tended to decrease with increasing LOC. Fifteen-year survival rates were best among women in the lowest LOC quintile (79.8%, 95% confidence interval [CI] = 69.0–87.1) and worst among women in the highest quintile (23.5%, 95% CI = 14.8–33.4). Women in the highest LOC quintile had three times the risk of death compared with those in the lowest LOC quintile (HR = 3.01, 95% CI = 1.26–7.22) while risk of death did not differ significantly between other quintiles and the lowest quintile. Number of LOCs was positively associated with risk for death among women with ovarian cancer. Future studies are needed to determine whether this finding should influence treatment decisions.

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DIFFERENTIAL COHORT EFFECTS IN CORONARY RISK FOR BLACKS AND WHITES: PRELIMINARY ASSESSMENT OF FOUR U.S. COHORTS.

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BACKGROUND: It has been recommended that existing data in blacks be merged to increase precision and effective comparisons. We have person-level data from 4 bi-racial U.S. cohorts with start dates spanning 3 time periods: early 1960s (Charleston and Evans County Heart Studies – CHS and ECHS); early 70s (NHANES I Follow-up Study – NHEFS) and; late 70s (NHANES II Mortality Study –NH2MS). Follow-up ranged 16 to 32 years. AIMS: Given advances in cardiovascular research and treatment over this period and perceived disparities in population subgroup impact, we aim to assess the magnitude of difference in baseline and 10-year coronary risk measures. METHODS: With 20,504 adults(18% black) coronary disease free at start, age-standardized risk factor means and proportions are compared over cohorts for race-sex groups. Ten-year race-sex specific risk estimates for coronary death are derived using multivariable Cox models and compared over cohorts. RESULTS: From ECHS to NH2MS, blacks had greater declines in mean systolic and diastolic pressures; but greater increases in mean serum cholesterol and proportion diabetic. Ten-year risk estimates for coronary death among black females rose 0.7 to 1.8 for cholesterol, 1.6 to 4.2 for diabetes but fell 4.8 to 1.1 (cholesterol) and was unchanged at 3.1 (diabetes) for white females. Risk estimates for cholesterol fell among males, more for whites (1.7 to 1.1) than blacks (1.8 to 1.6). COMMENTS: Despite similar trends, extent of differences between early 60s and late 70s varied greatly if CHS or ECHS was used as comparison. Mean blood pressures and cholesterol remained higher in blacks and whites respectively despite greater declines. More research is needed, but it is suggested that differential cohort effects for blacks and whites be considered when merging these data.

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URINARY SODIUM AND POTASSIUM EXCRETION AND RISK OF HYPERTENSION IN CHINESE: REPORT FROM A COMMUNITY-BASED COHORT STUDY IN TAIWAN.

*K-L Chien, H-C Hsu, T-C Su, P-C Chen, W-C Chang, M-F Chen, Y-T Lee (Institute of Preventive Medicine, National Taiwan University, Taiwan)

Dietary sodium intake is associated with blood pressure and hypertension risk. However, most studies have been conducted in Caucasians and it is not clear whether the effects exist in Asian populations. The purpose of this study was to investigate the role of 24-hour urinary sodium excretion and hypertension risk among ethnic Chinese from a prospective cohort design on community. We recruited 1520 middle-aged and elderly participants who were free from hypertension at baseline and had available urine electrolyte data. During a median 7.93 years of follow up (10023 person-years), we documented 669 cases of incident hypertension. The multivariate risk was 1.26 (95% confidence interval[CI], 1.01 to 1.57, P = 0.043) for individuals in the highest quartile of urinary sodium excretion, as compared with those in the second quartile. A significant J-shape relationship between urinary sodium excretion and risk of hypertension with the test for linear relation being rejected (P = 0.046). Participants who were in the highest quartile of urinary sodium excretion and also baseline higher blood pressure had a 2.43-fold increased risk of hypertension (95% CI, 1.72–3.22), compared with those in the lowest quartiles of urinary sodium and lower blood pressure. In conclusion, urinary sodium excretion was associated the risk of hypertension among ethnic Chinese. The urinary sodium excretion, as a marker of dietary sodium intake, can be useful for comprehensive evaluation of hypertension risk in Asian populations.

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SOCIAL PATTERNING OF CHRONIC DISEASE RISK FACTORS IN A LATIN AMERICAN CITY.

*N L Fleischer, A V Diez Roux, M Alazraqui, H Spinelli (University of Michigan, Ann Arbor, MI 48109)

Most studies of socioeconomic status (SES) and chronic disease risk factors have been conducted in high-income countries, and most show inverse social gradients. Few studies examine these patterns in lower-income countries. Using cross-sectional data from a 2005 national risk factor survey in Argentina, we investigated the associations of individual- and area-level SES with chronic disease risk factors (body mass index [BMI], hypertension, and diabetes) among residents of Buenos Aires. Associations of risk factors with income and education were estimated after adjusting for age, sex (except in sex-stratified models), and the other socioeconomic indicator. BMI and obesity were inversely associated with education and income for women, but not for men (mean differences in BMI for lowest versus highest level 1.55 kg/m2 (95% Confidence Interval [CI] 0.72–2.37; P for trend <0.0001) for education and 0.98 kg/m2 (CI 0.17–1.79; P for trend 0.0119) for income). Low education and income were also associated with increased odds of hypertension diagnosis in all adults (Adjusted Odds Ratio [AOR] 1.48, CI 0.99–2.20 and 1.50, CI 0.99–2.26 for lowest compared to highest education and income categories, respectively). Lower education was strongly associated with increased odds of diabetes diagnosis (AOR 4.12, CI 1.85–9.18 and 2.43, CI 1.14–5.20 for lowest and middle education categories, respectively, compared to highest). Area-level education also showed an inverse relationship with BMI and obesity; these results did not vary by sex as they did at the individual level. This cross-sectional study of a major urban area provides some insight into the global transition with a trend toward concentrations of risk factors in poorer populations.

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PROSPECTIVE EVALUATION OF RISK FACTORS FOR MALE BREAST CANCER. *L Brinton, D Richesson, G Gierach, J Lacey, Jr, Y Park, A Hollenbeck, A Schatzkin (National Cancer Institute, Rockville, MD 20852)

Male breast cancer is extremely uncommon, accounting for only 0.7% of all breast cancers. Identification of risk factors has been difficult, with most results deriving from small case-control studies that are subject to recall biases. In the NIH-AARP Diet and Health Study, we prospectively assessed risk factors among 324,928 men, ages 50–71 years, recruited during 1995–1996. In follow-up through December 2003, 121 male breast cancers (median age = 68) were identified. Multivariable Cox proportional hazards models were used to estimate relative risks (RRs) and 95% confidence intervals (CIs). Obese subjects were at increased risk (RR and 95% CI = 1.8, 1.1–2.9 for body mass index, BMI >30 vs. <25). Even after adjustment for BMI, there was some evidence of a protective effect of physical activity, with the RR being 0.49 (95% CI 0.28–0.87) for men who regularly engaged in lifting or climbing on their jobs. Men who reported a first-degree relative (male or female) with breast cancer were at a 1.9-fold increased risk (95% CI 1.2–3.1). Smokers were at somewhat higher risk than non-smokers, although there were inconsistent trends according to intensity and duration of smoking. Alcohol consumption was unrelated to risk. Of various medical conditions examined, only a history of having had a bone fracture after the age of 45 related to risk (RR = 2.2, 95% CI 1.2–3.9). Diabetes was unrelated to risk. The identified risk factors show some commonalities with female breast cancer and suggest the importance of hormonal mechanisms. Differences in risk factors (e.g., alcohol, fractures) may reflect unique mechanisms associated with androgens and their ratio to bioavailable estrogens.

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PHYSICAL ACTIVITY AND CHANGE IN MAMMOGRAPHIC DENSITY. *S M Conroy, L M Butler, D Harvey, E B Gold, B Sternfeld, J Bromberger, N Oestreicher, L A Habel (UC-Davis, Davis, CA 95616)

The pathway by which physical activity decreases breast cancer risk may involve mammographic density. We hypothesized that baseline physical activity was associated with a negative rate of change in percent mammographic density (area of breast density/total breast area) over time. To test this hypothesis, we evaluated longitudinal data from 739 participants in the Study of Women's Health Across the Nation (SWAN), a multiethnic cohort of pre- and early perimenopausal women, 42–52 years of age at baseline. We evaluated physical activity indices for sports, household/caregiving, and active living in relation to change in breast density using multivariable, repeated-measures linear regression analyses. Percent breast density was measured in an average of 4.7 mammograms per woman [standard deviation (SD) = 1.8], over an average of 6.2 years (SD = 2.0). During the study period, percent breast density declined an average of 1.1% per year (SD = 0.1), after adjusting for age and menopausal status. For the active living index, we observed a modest, statistically significant positive rate of change in percent breast density ($\beta = 0.39$ and $\beta = 0.13$ for median and greater than median activity level, respectively, $p = 0.01$), compared to women with less than median values ($\beta = -0.91$), after adjusting for potential confounders. Contrary to our hypothesis, these results suggest that activities, such as walking and biking to/from errands are related to a positive rate of change in mammographic density. In conclusion, our results do not support a pathway by which physical activity reduces breast cancer risk that includes mammographic density. Supported by: NR004061, AG012554, AG012539, AG012546, and R01CA89552.

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MASTITIS AND THE RISK OF BREAST CANCER—A POPULATION-BASED STUDY (SWEDEN). *M Lambe, A Johansson, D Altman, S Eloranta (Dept of Medical Epidemiology, Karolinska Institutet, 171 77 Stockholm, Sweden)

Introduction: Results from animal studies indicate that inflammatory cells may facilitate neoplastic processes by playing a vital role in orchestrating the tumour microenvironment. Many cancers arise from sites of infection and inflammation. Little is known about the role of inflammation in the etiology of breast cancer. Aim: To examine possible associations between a history of mastitis and subsequent risk of breast cancer. Methods: Encompassing 2,576,927 women, this cohort study utilized data from the Swedish Inpatient Register, the Multi-Generation Register and the Cancer Register. The relative risk of breast cancer was assessed by Poisson regression modelling. Results: We identified 107 women with a discharge diagnosis of mastitis in the Inpatient Register that had a subsequent breast cancer diagnosis in the Cancer Register. We were able to assess laterality for both the mastitis and the malignancy among 86 (80 %) women. Compared to women with no recorded mastitis, the incidence rate of breast cancer – regardless of laterality—was higher in women with mastitis, yielding an incidence rate ratio of 1.31 (95 % CI 1.08–1.59) after adjustment for age, age at first birth and parity. In the group of women among whom information on laterality was available for both the mastitis and the malignancy, side of lesions corresponded for 53 % (95% CI 43–64 %). Conclusions: The overall risk of breast cancer was elevated in women with a history of hospitalization for mastitis. The absence of a correlation between laterality, however, does not support a causal association between inflammation and the development of breast cancer. Our finding of an increased breast cancer risk may reflect a shorter cumulative duration of breast feeding in women with mastitis because of pain and discomfort in the index pregnancy, and possibly also subsequent pregnancies.

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MEAT, FAT, AND DAIRY INTAKE IN RELATION TO BREAST CANCER INCIDENCE IN THE BLACK WOMEN'S HEALTH STUDY. *L Rosenberg, D A Boggs, J R Palmer, L L Adams-Campbell (Slone Epidemiology Center, Boston, MA 02215)

Meat and animal fat consumption have been associated with an increased incidence of breast cancer in some studies. The influence of these dietary factors on breast cancer incidence In African American women has not been studied. We assessed the associations of meat, fat, and dairy intake with breast cancer incidence in U.S. Black women using data on 1091 incident cases of breast cancer identified during 442,430 person-years of follow-up in the Black Women's Health Study. Follow-up was carried out biennially with mail questionnaires. The dietary data were collected at baseline in 1995 and again during follow-up in 2001 with modified versions of the Block-NCI short food frequency questionnaire. Incidence rate ratios (IRRs) were estimated with Cox regression models that controlled for confounding factors, including age, energy intake, body mass index, hormone use, exercise, parity, education, and family history of breast cancer. There was no association of intake of red meat (with or without inclusion of processed meats), total fat, saturated fat, or dairy products with breast cancer incidence overall, or with premenopausal or postmenopausal breast cancer. However, three dietary factors were associated with increased incidence of estrogen receptor negative breast cancer. For dairy intake, there was a trend of increasing risk across quintile of intake ($p < .001$) and the IRR for the highest quintile relative to the lowest was 1.94 (95 % confidence interval 1.08–3.48). IRRs were also increased, but not significantly so, for high levels of red meat and saturated fat intake. These findings require confirmation in dietary studies with information on breast cancer receptor status.

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REPRODUCTIVE AND HORMONAL RISK FACTORS FOR POSTMENOPAUSAL LUMINAL, HER2-OVEREXPRESSING, AND TRIPLE-NEGATIVE BREAST CANCER. *A I Phipps, K E Malone, P L Porter, J R Daling, C I Li (Fred Hutchinson Cancer Research Center, Seattle WA 98109)

Molecular profiling studies have identified subtypes of breast cancer that can be approximately classified by estrogen receptor (ER), progesterone receptor (PR), and HER2-neu (HER2) expression. These molecular subtypes are prognostically significant, but differences in their etiologic profiles have not been established. Reproductive factors may plausibly be differentially related to risk of different breast cancer subtypes since these factors are presumed to impact exposure to endogenous sex hormones. We pooled two population-based case-control studies of breast cancer in women aged 55–79 years, for an analysis including 1,476 controls and 1,023 luminal, 39 HER2-overexpressing, and 78 triple-negative cases. Using polytomous logistic regression to compare each case group to controls we found that an early age at menarche was only associated with risk of HER2-overexpressing disease [odds ratio (OR) = 2.7, 95% confidence interval (CI): 1.4–5.5], breast feeding for 6 months or longer was only protective for luminal and triple-negative disease (OR = 0.8, 95% CI:0.6–1.0 and OR = 0.5, 95% CI: 0.3–0.9, respectively), and that a late age at menopause and use of estrogen plus progestin hormone therapy were only associated with risk of luminal disease (OR = 1.6, 95% CI: 1.1–2.2, and OR = 1.7, 95% CI: 1.3–2.1, respectively). In contrast, no differences in risks associated with parity, age at first live birth, or menopausal status were observed by molecular subtype. Our data indicate that risk factor profiles vary by molecular tumor subtype, and suggest that reproductive factors may have a greater impact on risk of luminal breast cancer than non-luminal subtypes of disease.

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HIV INFECTION IN THE US HOUSEHOLD BASED POPULATION 18–49 YEARS OLD: RESULTS FROM NHANES 1999–2006. *G McQuillan, D Kruszon-Moran (Centers for Disease Control, NCHS, Hyattsville, MD 20782)

To measure prevalence of HIV infection in the US household population, serum or urine samples from the National Health and Nutrition Examination Survey (NHANES) 1999–2006, a representative sample of the U.S. population, were tested for HIV antibody. In 1999–2006, there were 67 positive individuals of the 11,928 tested. The prevalence of infection for those 18–49 years was 0.47% (95% confidence limit (CL) 0.34–0.64). The prevalence of infection was higher among men (0.72%, 95% CI 0.49–1.06) compared to women (0.22%, 95% CI 0.14–0.36%). The prevalence of infection was also higher among those age 40–49 years of age (0.61%, 95% CI 0.38–0.98) compared to those 18–29 years of age (0.25, 95% CI 0.13–0.48). Among non-Hispanic blacks the prevalence of infection was 2.0 % (95% CI 1.50–2.69). This estimate was significantly higher when compared to the estimate for non-Hispanic whites (0.23% 95% CI 0.11–0.48) and Mexican Americans (0.30 95% CI 0.13–0.69). The highest prevalence of infection was in non-Hispanic black men age 40–49 years (3.87%, 95% CI 2.24–6.61). HIV prevalence was associated with HSV-2 infection, especially among non-Hispanic blacks where prevalence was 3.69% (95% 2.55–5.30) among those HSV-2 infected compared to 0.46% (95% CI 0.17–1.27) among those not infected with HSV-2 . Twenty-three percent of HIV positive individuals had CD4 counts <200 cells/mm3 as compared to 3% of HIV negative persons. Prevalence estimates among those age 18–39 years (the only age group available for direct comparison between the current and past NHANES survey (1988–1994)) were similar (0.40 (94% CI 0.26–0.61 and 0.38% (95% CI 0.22–0.68) respectively). In conclusion, HIV prevalence in the general population is less then one percent, but with significant differences by race/ethnicity. Prevalence estimates among those age 18–39 years did not change during the approximately 10 years between the current and previous NHANES surveys. This suggests that in the general household population not selected for HIV risk behaviors, HIV infection appears to be stable.

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PREGNANCY AND HIV INFECTION IN YOUNG WOMEN IN NORTH CAROLINA. *E Torrone, P Leone, L Hightow-Weidman (University of North Carolina at Chapel Hill, Chapel Hill, NC 27599)

Although mother-to-child transmission of human immunodeficiency virus (HIV) in the United States has decreased significantly since the Centers for Disease Control and Prevention's 1995 recommendation of HIV testing during prenatal care, women diagnosed during pregnancy represent a population who may have decreased access to routine HIV testing and/or a low perception of risk. To identify an at-risk population which could be targeted for increased HIV screening, we conducted a retrospective review of state HIV epidemiologic records on all women aged 18–30 years with newly diagnosed HIV infection in North Carolina (NC) between 2002–2005. In the four year period, 551 woman aged 18–30 were newly diagnosed with HIV in NC of which 166 (30.1%) were diagnosed while pregnant. Women pregnant at time of diagnosis were less likely to have exchanged sex for drugs/money (Prevalence Ratio (PR) = 0.55 95% Confidence Interval (CI): 0.30, 1.01), to have had more than one sexual partner in the last year (PR = 0.74 95% CI: 0.57, 0.96) or to have used recreational drugs (PR = 0.72 95% CI: 0.43, 0.96). Pregnant women were more likely to be Hispanic (PR = 1.56 95% CI: 1.15, 2.17) and only 11.5% of Hispanic pregnant women reported a previous HIV test compared to 30% of non-Hispanic pregnant women (p = 0.05). Women diagnosed with HIV during pregnancy did not report typical risk factors, such as drug use and high risk sexual behaviors. This suggests that there are few identifiable screening predictors and lends support to universal HIV testing during prenatal care. However, ethnic differences in co-diagnosis and in previous testing history suggest young Hispanic women may have differential access to routine HIV screening and/or risk perception.

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INEQUITY IN THE PROVISION OF HEALTH SERVICES AS A CAUSE OF DISPARITIES IN MORTALITY: THE ADVENT OF HAART AS A NATURAL EXPERIMENT. *G D Datta, C Delpierre, I Kawachi, T Lang, P Grosclaude (Harvard University, Boston, MA 02446)

Background: The introduction of Highly Active Antiretroviral Therapy (HAART) since 1996 has dramatically reduced mortality from HIV. However, with the advent of treatment racial and socioeconomic disparities in HIV mortality have also begun to emerge. Objective: To our knowledge, no study has examined the change in HIV survival disparities from the beginning of the epidemic through the introduction of HAART using individual-level data from the general population. Here we present such a study and examine trends in survival by race after diagnosis with Kaposi's sarcoma (KS), an essentially AIDS-specific cancer. Methods: We obtained population-based incidence (1980–2000) and survival (1980–2002) data from the SEER program nine area public-use database. KS cases were selected according to the International Classification of Disease-Oncology, 2nd Edition as those with a histology code of 9140. Our final analytic dataset consisted of 11,122 men and Cox models were constructed to assess racial differences in survival across treatment era. Results: Adjusting for age, marital status, and ecologic socioeconomic status, white men had an 18% higher odds of 24-month survival from 1980–1995 (HR: 1.18, 95% CI: 1.08–1.27) and a 38% higher odds of survival from 1996–2000 (HR: 1.38, 95% CI: 1.12–1.70) in comparison with black men. Conclusion: While there were relatively small disparities in mortality before treatment for HIV became available, those disparities increased significantly in the HAART era. These results lend additional evidence to the possibility that the introduction and differential diffusion of an innovation may, in part, explain mortality differences across race in the US.

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DIABETES TRENDS AMONG HOSPITALIZED HIV-INFECTED INDIVIDUALS IN THE UNITED STATES, 1994–2004. *P Bansil, A P Kourtis, H S Kahn, S P Posner, D J Jamieson (Centers for Disease Control and Prevention, Atlanta GA)

Prevalence of diabetes in the US is rising. As HIV-infected individuals live longer, they become more susceptible to chronic diseases such as diabetes. In addition, some antiretroviral agents have been linked to impaired glucose tolerance and increased diabetes risk. To estimate the burden and trends of diabetes among hospitalized HIV-infected individuals in the US, we used data from the 1994–2004 Nationwide Inpatient Sample, a nationally representative survey of inpatient hospitalizations. Odds ratios (OR) and 95% confidence intervals (CI) were adjusted for demographic and hospital characteristics using logistic regression. The estimated total number of hospitalizations with a diabetes code increased among HIV-infected people from 12,407 in 1994 to 23,396 in 2004 (by 88.6%). Among HIV-uninfected people, the corresponding increase was 64.0%. Since 1998 the mean age of HIV-infected hospitalized people with a diabetes diagnosis rose from 45 to 66 years and became similar to that of HIV-uninfected people. Compared with 1994–1996, in 2002–2004 there was an increased overall probability for hospitalizations with diabetes (OR = 1.38, 95% CI: 1.36–1.41). Other significant predictors for a hospitalization containing a diabetes code included increasing age (OR = 22.5, 95% CI: 21.9–23.2 for >65 years compared to <25 years) and Medicare/Medicaid as the primary payer (OR = 1.69, 95% CI: 1.67–1.71). Given the increasing number of diabetes cases among HIV-infected hospitalized individuals, it will be important to monitor such trends closely and in addition the effects of different types of antiretroviral regimens in order to optimize comprehensive long-term care of HIV-infected persons.

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HETEROSEXUALS AT HIGH RISK OF HIV INFECTION: A PRELIMINARY ANALYSIS OF THE NATIONAL HIV BEHAVIORAL SURVEILLANCE SYSTEM IN CHICAGO. *S Tilmon, N Prachand (University of Illinois at Chicago, Chicago, IL 60612)

Heterosexual sex accounts for an increasing proportion of HIV transmission, especially among women, non-Hispanic African-Americans and Hispanic-American groups. For prevention programs, policies and evaluation programs to be effective and efficient, risk factors for heterosexual HIV transmission need to be known. To this end, the Centers for Disease Control and Prevention (CDC) designed the National HIV Behavioral Surveillance (NHBS) system to identify contemporary behavioral dynamics of HIV risk among three populations, one of which is heterosexuals at risk for HIV infection. In 2007, the CDC implemented the NHBS-heterosexual cycle in cities across the country and, rather than targeting high-risk individuals, targeted high-risk areas (identified as areas with high rates of poverty and HIV/AIDS). The project was meant to identify risk factors for the heterosexual HIV epidemic by identifying HIV/STD risk behaviors, HIV testing behaviors, exposure to HIV prevention and trends in risk behavior. After a period of formative assessment, data was collected between March and October of 2007. In Chicago, venue-based sampling was implemented with a sample size goal of 750 heterosexual persons; 866 (447 male, 419 female) were determined to be eligible and completed the survey. OraSure HIV testing was conducted for 816 of the participants. 1.5% of the sampled population was HIV-positive, of whom half were previously naïve of their HIV status. Risk behaviors and profiles are presented.

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STRENGTHENING THE REPORTING OF OBSERVATIONAL STUDIES IN EPIDEMIOLOGY: PROS AND CONS OF THE STROBE CHECKLIST. *N Weiss (University of Washington, Seattle, WA)

As a means of improving the reporting of the methods and results of nonrandomized epidemiologic studies, a group of epidemiologists and biostatisticians developed the STROBE statement. Included in this is a checklist of 22 items that can be used to evaluate the completeness with which manuscripts presenting the results of observational studies have adequately characterized the work that has been done, the findings observed, and the interpretation of those findings. More than 40 journals, including a number of prominent general medical journals, have incorporated the checklist in their review of submitted articles, while others (primarily epidemiology journals) have explicitly chosen not to do so. The presentations at this symposium will describe the rationale for the STROBE checklist, a number of its features, and potential advantages and disadvantages of having such a checklist used to gauge the adequacy of a manuscript for publication.

Speakers:
Jan P. Vandenbroucke, Leiden University Medical Center, "*The making of STROBE: Considerations that went into making the checklist*."
Noel S. Weiss, University of Washington School of Public Health and Community Medicine, "*The STROBE statement has risks as well as benefits*."
Charles Poole, University of North Carolina School of Public Health, "*The ghost of guidelines past*."

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METHODOLOGICAL ISSUES IN THE ANALYSIS OF NEW BIOMARKERS. *E F Schisterman, R W Browne, R J Little, O Harel (Eunice Kennedy Shriver National Institute of Child Health and Human Development, Rockville, MD 20852)

Problems in analysis of analytical laboratory data commonly arise in epidemiologic studies because measurement procedures often have detection thresholds below which, quantification is challenged. The data (or lack thereof) that result raise issues for epidemiologic investigation. We evaluate the differences between methods commonly employed by laboratory analysts for estimating detection limits in order to better understand how to interpret the estimates they provide. In addition, we examine the threshold deemed "the limit of quantification (LOQ)" and consider the effect of measurement error on data above and below this threshold. We describe a Bayesian measurement error model that yields prediction intervals for the true assay value throughout the range. Finally, we consider the scenario where there are often multiple assays that can measure a particular chemical exposure; and, while assays with a lower limit of detection may be available, they tend to be more expensive or invasive. We consider a cost effective laboratory design strategy for minimizing the effects of detection limits by utilizing multiple assays and a flexible class of regression models which incorporates both sets of measurements.

Speakers:
Richard W. Browne, PhD, "*Determination of Analytical Limits of Detection: Practical Consideration of Laboratory Techniques*."
Roderick Little, PhD, "*How well quantified is the limit of quantification*?"
Ofer Harel, PhD, "*Using Multiple Assays Subject to Detection Limits in Assessing the Relationship Between Exposure and Outcome Using Regression Modeling*."

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DETERMINATION OF ANALYTICAL LIMITS OF DETECTION: PRACTICAL CONSIDERATION OF LABORATORY TECHNIQUES. *R W Browne, B W Whitcomb and O von Ehrenstein (SUNY Buffalo, Buffalo, NY 14214)

Problems in analysis of analytical laboratory data commonly arise in epidemiologic studies because measurement procedures often have detection thresholds below which, quantification is challenged. Investigators have applied various strategies for dealing with 'missing' data; however these strategies are often employed without knowledge of the nature of the detection limit, and may lead to improper inference. There are different types of detection limits which vary conceptually and practically between laboratories. In the design and analysis of epidemiologic studies it is important to understand the nature of these detection limits and how they have been determined for appropriate treatment of affected data. We discuss methods commonly employed by laboratory analysts for estimating detection limits. We use an HPLC based analysis of fat-soluble vitamins and micronutrients in human blood plasma to exemplify two common approaches; a blank sample based approach and an experimental approach. In the former approach, detection limits are determined by evaluating the distribution of the instrumental signal in blank samples and calculating the smallest amount of a substance that can be distinguished from the absence of that substance. In the latter approach a series of progressively lower concentrations are analyzed and detection limits are calculated to reflect the lowest concentration of substance detectable or quantifiable with some stated degree of reliability. We demonstrate that the blank approach generally provides a lower value compared to empirical approaches and indicative of presence or absence of a substance (LOD) whereas the empirical approach provides an estimate of the reliability of the quantity reported.

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HOW WELL QUANTIFIED IS THE LIMIT OF QUANTIFICATION? *R Little and Y Guo (University of Michigan, School of Public Health, Ann Arbor, MI 48109)

Raw data on the relationship between known and measured values of an analyte are collected and analyzed to determine the limit of quantification (LOQ) of an assay. In most LOQ problems, the researcher is given an observed value for the marker of interest if this value is greater than the LOQ, and a missing value (are measurements assay the of analyses subsequent for analysis our implications The analyte. particular a data calibration on model illustrate and range, throughout value true intervals prediction yields that error measurement Bayesian describe We support. is there assumption plausible A LOQ. under values infinite LOQ, above no implicit purposes, statistical For otherwise.

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USING MULTIPLE ASSAYS SUBJECT TO DETECTION LIMITS IN ASSESSING THE RELATIONSHIP BETWEEN EXPOSURE AND OUTCOME USING REGRESSION MODELING. P S Albert, *O Harel, N Perkins, and R Brown (University of Connecticut, Storrs, CT 06269)

The goal of many studies in environmental epidemiology is to assess the relationship between chemical exposure and disease outcome. Often various assays can be used to measure a particular chemical exposure, with some assays being more expensive or invasive than others. We consider the situation where two assays can be used to measure chemical exposure, where the first assay has measurement error and is subject to a lower detection limit and the second assay has less measurement error and is not subject to detection limits. In this situation, the first assay is less expensive and/or less invasive and is measured on all study participants, while the second assay is more expensive and/or more invasive and only measured on a subset of subjects. We develop a flexible class of regression models which incorporates both sets of measurements, and allows for continuous, binary, and longitudinal outcome variables. One design strategy is to only measure the second more expensive assay when the first assay is below detectable limits. Although such an approach results in unbiased estimation, we demonstrate through extensive simulations the efficiency advantages of measuring the second assay on at least a fraction of cases where the first assay is above detectable limits. We illustrate the methodology using data from a study examining the effect of environmental PCB exposure on the risk of endometriosis.

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INTENT-TO-TREAT ANALYSES OF RANDOMIZED CONTROLLED TRIALS: CAN WE IMPROVE ON THE GOLD STANDARD? *M M Glymour, J Weuve, and K Hoggatt (Columbia University, Mailman School of Public Health, New York, NY 10025)

Intent-to-treat (ITT) analyses of randomized controlled trials are the gold standard for demonstrating causal relationships in health research. However, ITT analyses sometimes provide misleading or inadequate answers to important questions about treatment effects. This is especially true for behavioral interventions, where participant blinding is typically impossible, adherence is imperfect, and the direction of treatment effects may differ across subgroups. Methodological innovations are available to help remediate these problems, but are rarely integrated into trial design or primary reporting of trial results. As a result, key questions are sometimes addressed incompletely or not at all in primary reports from trials. This symposium will consider results from influential randomized trials, including: a trial of diaphragm use to prevent HIV transmission (MIRA); a trial of a psychosocial intervention to promote recovery after stroke (FIRST); and a trial of housing vouchers to promote moves to low poverty communities. Each trial had complexities that rendered the ITT analyses alone inadequate to address substantively crucial questions about the magnitude and direction of treatment effects.

Speakers:
Dr. Lisa F Berkman: "*Contrasting Results from Observational and Intervention Studies: Why Do They Come Up with Different Answers So Often*?."
Dr. Michael Rosenblum: "*Analyzing Direct Effects in Randomized Trials with Secondary Interventions: Results from the MIRA Trial of Diaphragm Use to Prevent HIV Transmission.*"
Dr. Greg Duncan and Dr. Jens Ludwig: "*Estimating Neighborhood Effects on Health Using Data from a Randomized Mobility Experiment.*"

Discussant:
Dr. Tyler VanderWeele

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CONTRASTING RESULTS FROM OBSERVATIONAL AND INTERVENTION STUDIES: WHY DO THEY COME UP WITH DIFFERENT ANSWERS SO OFTEN?

*L F Berkman PhD (Harvard School of Public Health, Boston, MA 02115)

Data from longitudinal cohorts have consistently found associations between social conditions related to social networks, support and integration and a broad range of health outcomes. Randomized controlled trials in which investigators have attempted to modify social networks or support have frequently reported null effects. This pattern in which observational studies show strong associations between exposures of interest and health outcomes and RCT's show null or even negative associations is not restricted to exposures related to social conditions. Similar findings have been reported in relation to a host of health behaviors and with pharmacologic agents. There are several interpretations for the contrasts found. Some interpretations draw on issues related to unmeasured confounders, others relate to the dose of the exposure or group heterogeneity. Still others relate to the period of etiologic exposure. In this presentation, we will briefly review the findings contrasting results of observational studies with parallel RCTs drawing on examples related to social conditions and then discuss different interpretations for the contrasting findings.

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ANALYZING DIRECT EFFECTS IN RANDOMIZED TRIALS WITH SECONDARY INTERVENTIONS.

*M Rosenblum, N P Jewell, M J van der Laan, S Shiboski, A van der Straten, and N Padian (University of California, Berkeley, CA)

The Methods for Improving Reproductive Health in Africa (MIRA) trial is a recently completed randomized trial that investigated the effect of diaphragm and lubricant gel use in reducing HIV infection among susceptible women. 5,045 women were randomly assigned to either the active treatment arm or not. Additionally, all subjects in both arms received intensive condom counselling and provision, the "gold standard" HIV prevention barrier method. There was much lower reported condom use in the intervention arm than in the control arm, making it difficult to answer important public health questions based solely on the intention-to-treat analysis. We adapt an analysis technique from causal inference to estimate the "direct effects" of assignment to the diaphragm arm, adjusting for condom use in an appropriate sense. Issues raised in the MIRA trial apply to other trials of HIV prevention methods, some of which are currently being conducted or designed.

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ESTIMATING NEIGHBORHOOD EFFECTS ON HEALTH USING DATA FROM A RANDOMIZED MOBILITY EXPERIMENT.

*G Duncan and J Ludwig (Northwestern University, Evanston, IL 60208)

In 1994 the U.S. Department of Housing and Urban Development (HUD) launched a 5-city randomized mobility experiment known as Moving to Opportunity (MTO), in which a sample of 4600 low income minority families with children living in public housing were offered the chance via random lottery to use a housing voucher to move to less distressed neighborhoods. Previous intent to treat analyses show that assignment to either of MTO's two mobility treatment arms improve adult mental health and some physical health risk behaviors compared to the control group, and had mixed effects on health outcomes for youth. This presentation will discuss ways of using the MTO experimental data to go beyond intent to treat analyses to try to learn more about larger causal hypotheses about how and why neighborhood environments impact health. Specifically, we will discuss an instrumental variables (IV) approach that uses interactions of MTO demonstration site and mobility treatment group assignment as instruments for specific neighborhood attributes. We demonstrate that this approach has some value in trying to distinguish between, say, the impact of neighborhood desegregation along race rather than social class lines.

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THREATS TO EPIDEMIOLOGIC SCIENCE FROM ORGANIZED INTERESTS.

*C V Phillips (University of Alberta, Edmonton, Alberta, Canada)

There has been substantial interest recently in external influences on the conduct and legitimacy of epidemiology as a science, including series of articles in the International Journal of Epidemiology and Epidemiologic Perspectives & Innovations. A recurring theme is that non-scientific interests are a threat to the science, though there is some disagreement as to which interests pose the larger threat, and whether the fundamental problem really lies in the science. Concerns include the usual suspects (industry, particularly the tobacco, pharmaceutical, and petrochemical industries), but also government, activist organizations (particularly anti-tobacco groups) and the public health orthodoxy in general. Documented threats to the integrity of the science include pressure in favor of producing particular results, distortions of the implications of research results (often by the researchers themselves), and attempts to censor scientific inquiry by keeping data secret or attempting to prevent particular results from being published. While these issues generate substantial attention, it is usually in the form of competing monologues and accusations of bias. This session is an opportunity to discuss differing ideas about the sources of these problems and to propose realistic and balanced solutions.

Speakers:
Carl V Phillips; University of Alberta—"*Conflict with what interest? Agreeing on the what is the problem.*"
Arthur Schafer, Professor, University of Manitoba, Department of Philosophy -and- Director of the Centre for Professional and Applied Ethics—"*Why should epidemiologists worry about Conflict of Interest?*"
James E Enstrom, Professor, University of California, Los Angeles—"*Conducting honest epidemiologic research with industry funding.*"
Malcolm Maclure, Pharmaceutical Services Division, British Columbia Ministry of Health—"*Causation of bias in research on pharmaceutical policy.*"

Discussant:
Charles Poole, University of North Carolina School of Public Health, Department of Epidemiology.

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INTEGRATION OF BIOLOGICAL PATHWAYS IN EPIDEMIOLOGIC RESEARCH OF THE SOCIAL GRADIENT IN HEALTH.

*C F M de Leon (Rush University Medical Center, Chicago, IL 60612)

The social gradient in health remains a pervasive and incompletely understood public health issue. There is increasing recognition that the determinants of this gradient likely involve a variety of biological processes that contribute to the development of major adult-onset chronic conditions. This has led to a newer generation of epidemiologic studies that have begun to integrate a growing set of markers of these biologic processes as potential mediators in the causal pathway between social disadvantage and poor health outcomes. The purpose of the symposium is to review recent progress in this research by presenting examples from several epidemiologic studies. Presentations will focus on a variety of biological markers in relation to social disadvantage, including markers that represent cardiovascular, infectious, inflammatory and stress-related processes. The symposium also will include a discussion of conceptual frameworks that characterize the pathways linking social disadvantage, biological processes and the development of chronic disease in mid- and late-life. The overall goal is to inform on recent advances in epidemiologic research on the social gradient in health, and to stimulate future studies that will continue to examine the complex interactions among social conditions and biological processes that give rise to the social gradient in health.

Speakers:
Carlos Mendes de Leon, PhD, "*Black-white differences in C-reactive protein among older adults: findings from the Chicago Health and Aging Project.*"
Nalini Ranjit, PhD, "*Socioeconomic position, race/ethnicity and telomere length in the Multi-Ethnic Study of Atherosclerosis.*"
Jennifer Dowd, PhD, "*Socioeconomic position, race/ethnicity and burden of Infection.*"
Sue Everson-Rose, PhD, "*Does serotonin mediate the impact of socioeconomic factors on carotid atherosclerosis?*"

Discussant:
Thomas Glass, PhD

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BLACK-WHITE DIFFERENCES IN C-REACTIVE PROTEIN AMONG OLDER ADULTS: FINDINGS FROM THE CHICAGO HEALTH AND AGING PROJECT.

*C F M de Leon, L L Barnes, J Kelly, T L Beck, D A Evans (Rush University Medical Center, Chicago, IL)

There is a growing interest in identifying the underlying biological pathways that may account for the increased health risks and health disparities among African Americans. C-reactive protein (CRP) has emerged as a promising biomarker of activation of inflammatory pathways that are thought to be involved in several chronic disease processes. In this study, we examine racial differences in CRP using baseline data from a population-based study in diverse population of 1,426 community-dwelling adults aged 65 years and older, of whom 65% were black and 35% white. In multivariate linear regression models, blacks had significantly higher levels of (log-transformed) CRP compared to whites (coefficient = 0.209, $p < .001$), after adjusting for age, sex, and education. Further adjustment for smoking, relative weight, and history of cardiovascular conditions and iabetes slightly lowered the association between race and CRP (coefficient = 0.153, $p = .004$). Years of education were associated with lower levels of CRP (coefficient = −0.023, $p = .002$), but the association between race and CRP did not vary as a function of education ($p = .30$). Although causal inferences are not possible due to the cross-sectional nature of these data, our findings suggest the possibility that pro-inflammatory processes play a role in racial differences in health among older adults.

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SOCIOECONOMIC POSITION, RACE/ETHNICITY AND TELOMERE LENGTH IN THE MULTI-ETHNIC STUDY OF ATHEROSCLEROSIS.

A V D Roux, *N Ranjit, S Shea, N Jenny, M Cushman, T Seeman (University of Michigan, Center for Epidemiology and Population Health, Ann Arbor, MI 48109)

Telomere length has recently emerged as a marker of aging-related changes linked to oxidative stress and other processes. Little is known about the association of telomere attrition with socioeconomic position (SEP) or with race/ethnicity. We examined these associations in a sample of 514 males and 467 females, aged 44–84, drawn from the Multi-Ethnic Study of Atherosclerosis. Regression models were used to examine the cross-sectional associations of race/ethnicity and SEP with telomere length (assessed as T/S ratio, the amount of telomeric DNA (T) divided by the amount of single-copy DNA (S). After adjustment for age, sex, and SEP, blacks and Hispanics had shorter telomeres than whites (mean differences (SE) −0.030 (0.017) and −0.028 (0.017) in blacks and Hispanics respectively). No consistent differences were observed by SEP. Age was more strongly associated with telomere length in Blacks and Hispanics than in whites (sex and SEP adjusted mean differences (SE) per 10 year difference −0.03, −0.06, and −0.06 in whites, blacks, and Hispanics respectively, P for black-white difference = 0.058; p for Hispanic-white difference = 0.048). In stratified analyses, these differences were present in women but not in men, and persisted after additional adjustment for diet, physical activity, smoking, and BMI (fully adjusted mean differences (SE) for whites, blacks and Hispanics −.024, −.076, and −0.072 respectively, P for both black-white and Hispanic-white difference <0.02). The significance of these differences and their causes remain to be investigated but may involve cumulative exposures over the lifecourse.

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SOCIOECONOMIC POSITION, RACE/ETHNICITY AND BURDEN OF INFECTION.

*J B Dowd, A E Aiello, A Zajacova, G A Kaplan (University of Michigan, School of Public Health, Ann Arbor, MI)

The biological mechanisms linking socioeconomic position (SEP) and health outcomes in the U.S are poorly understood. Increasing evidence suggests links between infectious and chronic disease, but the socioeconomic patterning of the burden of infection has not been previously studied. We analyzed survey and biological data from 498 men and women aged 18–89 participating in the Chicago Community Adult Health Survey (CCAHS) to determine whether income, education, and race/ethnicity are related to the burden of persistent infection as measured by summed positive serostatus to cytomegalovirus (CMV), herpes simplex virus-1 (HSV-1), and *Helicobacter pylori (H pylori).* Ordered logit models were used to analyze four categories of burden (0 infections, 1 infection, 2 infections, or 3 infections). All models adjusted for age, sex, and household size. Having less than a high school education was associated a higher burden of infection compared to those with some college controlling for race and income (OR 4.8, 95% CI 2.6–8.9). A family income in the lowest category was also associated with an increase in infectious burden controlling for race and education (OR 1.7, 95% CI 1.01–2.7) compared to the highest level of income. Non-Hispanic Blacks and Hispanics are significantly more likely to have an additional persistent infection relative to Whites, controlling for education and income (OR 3.4, 95% CI 2.2–5.4 for Blacks, OR 2.9, 95% CI 1.5–5.6 for Hispanics). This study suggests that burden of infection may play a role in health disparities, and future research should test whether burden of infection can help explain existing relationships between SEP and chronic disease.

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DOES SEROTONIN MEDIATE THE IMPACT OF SOCIOECONOMIC FACTORS ON CAROTID ATHEROSCLEROSIS? *S Everson-Rose, D Musselman, J Lynch, J Salonen, G Kaplan (University of Minnesota, Minneapolis, MN 55414)

Socioeconomic gradients in the development and progression of atherosclerotic vascular disease are well documented. Central and peripheral serotonin (5HT) have known cardiovascular effects, and some have suggested lower socioeconomic status (SES) is related to altered serotonergic function. Thus, 5HT may mediate the impact of SES on CVD, although little is known about this pathway. We examined associations among 3 measures of SES (income, education, occupation), whole blood serotonin (WBS), a peripheral measure of 5HT feasible for use in large-scale epidemiologic studies, and carotid intimal-medial thickening (IMT) in 1,455 subjects (51% female, 49% male), ages 53–71, from the Kuopio Ischemic Heart Disease Study, a population-based study of CVD risk factors in eastern Finland. WBS was assayed from fasting blood samples (mean (SD) = 143.6 (77.5) ng/mL). IMT was assessed non-invasively via B-mode ultrasonography. A social gradient in WBS was observed, with the strongest association noted for income. Mean WBS values, adjusted for sex, age, use of psychotropic medications and medications for CVD, were 152.1, 148.8, 146.6, 137.8 and 133.3 ng/mL, respectively, from the lowest to the highest income category ($p = .008$). All SES indicators were significantly associated with mean and maximum IMT values (all p?.02), however, WBS was unrelated to IMT outcomes ($p > .9$). Findings from this population-based study failed to support the hypothesis that altered serotonergic function mediates the effect of SES on subclinical atherosclerosis.

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A FOREST-BASED APPROACH TO IDENTIFYING GENE AND GENE-GENE INTERACTIONS. X Chen, C-T Liu, M Zhang and *H Zhang (Department of Epidemiology and Public Health, Yale University School of Medicine, New Haven, CT 06520-8034)

Multiple genes, gene-by-gene interactions, and gene-by-environment interactions are believed to underlie most complex diseases. However, such interactions are difficult to identify. While there have been recent successes in identifying genetic variants for complex diseases, it still remains difficult to identify gene-gene and gene-environment interactions. To overcome this difficulty, we propose a forest-based approach and a concept of variable importance. The proposed approach is demonstrated by simulation study for its validity and illustrated by a real data analysis for its use. Analyses of both real data and simulated data based on published genetic models show the effectiveness of our approach. For example, our analysis of a published data set on age-related macular degeneration (AMD) not only confirmed a known genetic variant (p-value = 2e-6) for AMD, but also revealed an unreported haplotype surrounding single nucleotide polymorphism (SNP) rs10272438 on chromosome 7 that was significantly associated with AMD (p-value = 0.0024). These significance levels are obtained after the consideration for a large number of SNPs. Thus, the importance of this work is two-fold: a powerful and flexible method to identify high-risk haplotypes and their interactions, and the revelation of a potentially protective variant for AMD.

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BREAST CANCER RISK POLYMORPHISMS AND INTERACTION WITH IONIZING RADIATION AMONG U.S. RADIOLOGIC TECHNOLOGISTS. *P Bhatti, M M Doody, B H Alexander, J Y, S L Simon, R M Weinstock, M Rosenstein, M Stovall, M Abend, D L Preston, J P Struewing, A J Sigurdson (Division of Cancer Epidemiology and Genetics, NCI, NIH, Bethesda, MD 20852)

Genome-wide association studies are discovering relationships between single nucleotide polymorphisms (SNPs) and breast cancer, but the functions of some SNPs are obscure. Examining these SNPs in conjunction with environmental exposures may help elucidate SNP function, but more importantly, identify subgroups with genetic backgrounds that are particularly sensitive to environmental exposures. We tested eleven variants, initially identified for confirmatory genotyping by the Breast Cancer Association Consortium, for gene-radiation interaction among 859 breast cancer cases and 1083 controls that were occupationally exposed to ionizing radiation and are nested within the U.S. Radiologic Technologists cohort. Ionizing radiation is an established breast cancer carcinogen and has been previously associated with breast cancer risk in this cohort. To evaluate SNP-radiation effect modification, we assessed the heterogeneity of occupational radiation-related excess odds ratios across SNP genotypes using likelihood ratio tests. All regression models were adjusted for year of birth and included radiation exposure from personal diagnostic examinations. We found that the radiation-associated breast cancer risk varied significantly by genotype for rs2107425 in the H19 gene (pinteraction = 0.005). Further testing of the H19 gene and the rs2107425 variant in biologically-based radiation assays may illuminate possible functional relevance for this gene in directly affecting cellular control of radiation-induced damage, apoptosis, or proliferation or by epigenetic mechanisms.

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THE GC2 ALLELE OF THE VITAMIN D BINDING PROTEIN IS ASSOCIATED WITH A DECREASED POSTMENOPAUSAL BREAST CANCER RISK, INDEPENDENT OF THE VITAMIN D STATUS. *S Abbas, J Linseisen, T Slanger, S Kropp, E Mutschelknauss, D Flesch-Janys, J Chang-Claude (Division of Cancer Epidemiology, German Cancer Research Center, Heidelberg, Germany)

Vitamin D pathway gene polymorphisms may influence breast cancer risk by altering anticarcinogenic effects of vitamin D. The association between polymorphisms in the vitamin D binding protein gene (Gc) and postmenopausal breast cancer risk with additional focus on the influence of serum 25-hydroxyvitamin D [25(OH)D], the biomarker for vitamin D status, has not been examined so far. We assessed the effects of two functional polymorphisms in the Gc gene (rs4588, rs7041) -composing the phenotypic alleles Gc1s, Gc1f (combined:Gc1) and Gc2- on postmenopausal breast cancer risk and effect modification by 25(OH)D in a population-based case-control study including 1402 cases and 2608 matched controls. Odds ratios (OR) for breast cancer adjusted for confounders were calculated for Gc genotypes. 25(OH)D concentrations in the control group significantly differed by Gc genotype being lowest in Gc2 allele carriers (geometric mean 25(OH)D = 53.0, 47.8 and 40.4 nM, for Gc1-1, Gc2-1 and Gc2-2 genotypes, respectively). Gc2-2 genotype was associated with a significantly decreased postmenopausal breast cancer risk [OR (95% confidence interval) = 0.72 (0.54–0.96), compared with Gc1s-1s genotype. No interaction between 25(OH)D and Gc genotype was observed nor did the association change considerably after adjustment for 25(OH)D status. Our results provide evidence for a 25(OH)D independent effect of Gc2 allele carrier status in postmenopausal breast cancer.

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CASE ONLY DESIGN TO STUDY DRUG-ENVIRONMENT INTERACTIONS. *S Hernández-Díaz, A Lanas, L A García-Rodríguez (Harvard University, Boston, MA 02115)

The case-only design has been proposed as an efficient alternative to the typical case-control sampling to study gene-environment interactions. We have used it to study the interaction between H. pylori infection and non-aspirin non-steroidal anti-inflammatory drugs (NSAIDs) on the risk of upper gastrointestinal bleeding (UGIB). A hospital-based case-control study with prospective ascertainment of patients with an endoscopically verified active peptic ulcer and retrospective data collection was conducted in Spain in 2001. Age-matched controls were selected among those attending the general outpatient clinics for reasons considered to be unrelated to NSAIDs. Cases and controls were interviewed within 48 hours after admission. Drug exposure was defined as use of NSAIDs during the week prior to the UGIB date. The presence of H. pylori infection was determined in 340 cases and 354 controls by western blot analysis of the presence of antibodies to CagA and/or to VacA antigens in serum. We assessed departure from multiplicative effects by estimating the odds ratio (OR) between NSAIDs and H pylori infection among cases. We adjusted for age, sex, past ulcer history and smoking using logistic regression. The OR between NSAIDs and H pylori infection was 0.19 (95% confidence interval: 0.09–0.38) among cases. We also conducted a traditional case-control analysis to 1) test the assumption of independence between H pylori infection and NSAID among controls (OR = 0.86; 0.43–1.72) and 2) confirm the interaction through traditional methods (OR = 0.33; 0.11–0.97). Findings suggest that the multiplicative effect of NSAIDs on the risk of UGIB is stronger in the absence of H. pylori infection. A weaker NSAID effect among infected subjects might still translate into a higher number of extra cases given the elevated risk of UGIB in infected individuals. Case-only designs can be an efficient method to study drug-environment interactions when exposure information is only readily available for cases (e.g. H. pylori infection in clinical practice). However, this design is very sensitive to violations of the independence assumption and to differential misclassification of the exposure with respect to drug use or vice versa.

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DISPARITIES IN MATERNAL HYPERTENSION AND PREGNANCY OUTCOMES. M L Miranda, G Swamy, S Edwards, *P Maxson, A Gelfand, S James (Duke University, Durham, NC 27708)

Geronimus's weathering hypothesis postulates that disparities in birth outcomes are in part due to the cumulative effects of stressors on the health of black women. A potential physical manifestation of stress in pregnancy is maternal hypertension (HTN). We sought to determine disparities in incidence of HTN in blacks relative to whites and whether disparities widen with advancing maternal age. We used data on all NC births from 1994–2003. We restricted the analysis to singleton births, with no congenital anomalies or maternal medical complications, except women with HTN. We restricted our analysis to women aged 15–44 who delivered live births $\geq$ 24 weeks gestation and birthweight $\geq$ 400 grams. The restricted dataset included 740,716 births. Logistic regression was used to determine the contribution of race and maternal age to incidence of maternal HTN, controlling for standard covariates (maternal education, marital status, tobacco use, and birth order). Black women are at elevated risk for HTN relative to white women, and the relative risk increases with age. The adjusted odds ratio for black women aged 15–19 relative to white women is 1.12; the adjusted odds ratio is 1.21, 1.39, 1.57, and 1.67 for black women aged 20–24, 25–29, 30–34, and 35–39, respectively. Even among only hypertensive women, birthweight is estimated to be 211 grams less ($p < .0001$) for black women relative to white women. Black hypertensive women are more likely to have low and very low birthweight, preterm and very preterm birth, and shorter gestation outcomes relative to white hypertensive women. Thus, disparities in the presentation of maternal HTN and associated pregnancy outcomes are consistent with the weathering hypothesis.

387-S

QUANTIFYING RACIAL DIFFERENCES IN ACCESS TO HEALTH-RELATED RESOURCES. *M Smiley, S Brines, A Diez-Roux, D Brown (University of Michigan, Ann Arbor, MI 48109)

Though access to place-based resources is thought to be associated with racial health disparities, there is little empirical evidence on spatial patterning of multiple resources. We assembled Geographic Information Systems data for New York City (963 block groups), Baltimore (804), and Forsyth County, NC (197) and constructed kernel densities of supermarkets, recreation facilities and retail use as indicators of access to healthy foods, recreational resources, and land use mix respectively. The measures were examined independently and as equal components of a health opportunity index. We used US 2000 Census data to estimate the percent of residents of different race/ethnic group by block group quartiles of resource access. Access to supermarkets and recreational facilities was strongly patterned by race/ethnicity in all three sites, as illustrated by New York: 16% of whites, 32% of blacks and 35% of Hispanics live in the lowest supermarket access quartile vs. 52% of whites, 14% of blacks, and 13% of Hispanics in the highest; 22% of whites, 23% of blacks, and 36% of Hispanics live in the lowest recreation facility access quartile, vs. 48% of whites, 18% of blacks and 12% of Hispanics in the highest. Land use differences were less pronounced: 28% of whites, 23% of blacks, and 36% of Hispanics live in the lowest retail access quartile vs. 33% of whites, 24% of blacks and 15% of Hispanics live in the highest. These patterns persist in the health opportunity index: 24% of whites, 19% of blacks, and 37% of Hispanics in New York live in the lowest opportunity quartile vs. 43% of whites, 19% of blacks, and 14% of Hispanics in the highest. These results provide evidence that spatial access to health-related resources is patterned by race/ethnicity.

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RACE, ETHNICITY, SOCIAL TRUST, AND SELF-REPORTED HEALTH AMONG US ADULTS. *C Foy, K Loftin-Bell, D Mount, K Hairston, J Hunter, D Easterling (Wake Forest University Health Sciences,Winston-Salem, NC 27127)

This cross-sectional investigation examined the association between race/ethnicity and self-reported health status in a large sample of US adults. We analyzed data from 25,970 adults aged 18 years or older who participated in the 2000 Social Capital Community Benchmark Survey (SCCBS). The relationship between race/ethnicity (non-Hispanic whites ("whites" reference category); non-Hispanic African-Americans ("blacks"); and Hispanics) and self-reported "fair or poor" health was examined using a series of multivariable logistic regression models with adjustment for several demographic and economic variables. In additional models, indicators of social capital (social trust, social support, inter-racial trust, diversity of friendships) were added to determine if the association between race/ethnicity and health status was attenuated. The analyses involved weighted estimates due to the SCCBS sampling design. After adjustment for demographic and economic variables, blacks and Hispanics exhibited higher odds ratios (ORs) of reporting fair or poor health compared to whites (OR = 1.25, $p < 0.001$; OR = 1.56, $p < 0.001$ respectively). However, after adjustment for social trust, blacks no longer had significant differences vs. whites (OR = 0.97, $p = 0.70$), and the OR for Hispanics was lower (OR = 1.26, $p = 0.001$). Social trust itself was associated with lower odds of fair or poor health (OR = 0.56; $p < 0.001$). Further adjustment for social support, racial trust and diversity of friendships did not attenuate the relationship between social trust and self-reported health. These results suggest that social trust is associated with self-reported health, and may be associated with health disparities according to race and ethnicity.

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PERSISTENT PATHOGENS LINKING SOCIOECONOMIC POSITION AND PHYSICAL IMPAIRMENT. *M Amanda, M P H Simanek, A E Aiello (Department of Epidemiology, Center for Social Epidemiology & Population Health, University of Michigan-School of Public Health, Ann Arbor, MI)

Studies have documented a strong inverse association of socioeconomic position (SEP) and physical impairment in old age. More recently, persistent infections have been associated with physical impairment in the aged. The purpose of this study was to investigate whether persistent pathogens mediate the association between SEP and physical impairment. We used data from the the National Health and Nutrition Examination Survey III, subjects $\geq$ 60 years of age, tested for seropositivity to cytomegalovirus (CMV) and/or herpes simplex virus type-1 (HSV-1). Physical impairment was defined as difficulty with one or more activities of daily living (ADL) or instrumental activities of daily living (IADL), SEP as education level, and pathogen burden as summed seropositivity to CMV and HSV-1. Logistic regression was conducted to generate odds ratios (OR) and 95 % confidence intervals (CI) and the Sobel test was used to assess mediation. Seropositivity to CMV, HSV-1, and pathogen burden were significantly associated with SEP. CMV seropositivity was associated with ADL difficulty even after adjusting for age, gender, race and SEP (OR = 1.40, 95% CI 1.04, 1.87). Compared to those with higher education, the odds of ADL impairment for those with less than a high school education decreased by 3.9 % after adjusting for CMV, suggesting mediation by CMV seropositivity (Sobel test statistic for mediation = 2.40, p = 0.0160). CMV is the only pathogen that significantly mediates the relationship between SEP and physical impairment, after controlling for confounders. Reducing socioeconomic disparities in CMV infection may mitigate physical impairment in aging populations.

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COMPARING NEIGHBORHOOD MEASURES OF SOCIOECONOMIC STATUS (SES) USED FOR STUDYING DISPARITIES IN MYOCARDIAL INFARCTION (MI) INCIDENCE: ATHEROSCLEROSIS RISK IN COMMUNITIES (ARIC) COMMUNITY SURVEILLANCE. *R E Foraker, K M Rose, M D Patel, C M Suchindran, E A Whitsel, J L Wood (University of North Carolina at Chapel Hill, Chapel Hill, NC 27599)

Neighborhood SES (nSES) measures can be used to monitor health disparities, yet there is no consensus regarding which measures are sufficient for this purpose. We compared the association of nSES with incident MI among 8,193 persons aged 35–74 years in four U.S. communities under surveillance by the ARIC study, 1993–2002. We categorized neighborhood census tract SES measures into tertiles. Measures compared included median household income (MHI) and a composite index based on MHI, housing values, occupation, education, and receipt of interest income. We used generalized linear Poisson mixed models to estimate incidence rate ratios and 95% confidence intervals (RR, 95% CI) that account for the clustering of cases within census tracts. Graded inverse relationships were observed among all race and gender groups across nSES tertiles. For MHI, those in the lowest tertile of census-tract MHI had a higher risk of MI than did those in the highest tertile: Black women (2.1, 1.3–3.2), Black men (1.6, 1.1–2.5), White women (1.8, 1.6–2.0) and White men (1.3, 1.1–1.4). Similar associations were noted for the nSES composite index: Black women (2.0, 1.3–3.0), Black men (1.3, 0.9–1.9), White women (2.6, 2.1–3.2) and White men (1.4, 1.2–1.7). In summary, based on the similarity of the observed associations, it appears that a single census-based measure of nSES, MHI, is sufficient for monitoring socioeconomic disparities in MI incidence. Further, as MHI requires minimal data and is relatively simple to construct, it is advantageous for surveillance purposes.

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SOCIAL INTEGRATION AND INCIDENT STROKE IN A NATIONALLY REPRESENTATIVE SAMPLE. *T DeFries, K Ertel, M Glymour (Columbia University, New York, NY 10032)

Social integration predicts cardiovascular risk and cognitive function in the elderly; but its impact on stroke incidence is uncertain. Social integration may influence stroke via its link to cardiovascular health and health behaviors. We examined whether social integration predicts first incident stroke in a nationally-representative longitudinal study of US residents age 50+. Stroke-free Health and Retirement Study participants (n = 15,970) were followed an average of 6.9 years for onset of stroke (1,006 events). A social integration index (range 0–5) was constructed based on ties in five domains: marital status, volunteer activities, contact with parents, children and neighbors. We used Cox proportional hazard models to estimate the hazard ratio (HR) associated with social integration score and each domain, adjusting for age, sex, race, Southern birth and both adult and childhood socioeconomic status. Supplementary models adjusted for baseline cardiovascular risk factors: overweight, obesity, alcohol intake, current smoking, hypertension, diabetes, and heart disease. Models were weighted to the 1998 US population aged 50+. Each additional point on the social integration index predicted a 10% reduction in hazard of incident stroke (95% CI: 0.84, 0.97). However, of the five domains of integration, volunteer activities were the most protective (HR = 0.774, 95% CI: 0.665, 0.902) while contact with children predicted excess risk of stroke (HR = 1.438, 95% CI: 0.924, 2.237). Stratification by sex and race yielded similar results, although social integration did not predict stroke among participants < stroke. first onset against protect may integration Social associations. attenuate not did factors risk cardiovascular measured adjustment Additional 65.

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WAR-RELATED STRESSORS AND PTSD AMONG KUWAITI CIVILIANS: INFLUENCE OF PRE-WAR EXPERIENCES. *C J Clark, J Behbehani, S F Suglia, M Fay, J Evans, R J Wright (Harvard School of Public Health, Boston, MA 02115)

Prior trauma has a sensitizing effect on the development of Posttraumatic Stress Disorder (PTSD) following exposure to a subsequent trauma. This association is relatively unexplored in civilian, non-refugee populations exposed to war. We examined the relationship between exposure to war-related stressors (WRS) and subsequent PTSD adjusting for potential confounders among Kuwaiti civilians present during the Iraqi invasion and occupation (1990–91). In stratified analyses, we examined the influence of experiencing pre-war trauma (PWT) on the relationship between WRS and PTSD. In 2006–7, 1925 (682 men and 1243 women) Kuwaitis completed a self-report questionnaire including a modified version of the Harvard Trauma Questionnaire to ascertain WRS, the Brief Betrayal Trauma Survey for PWT, and the Short Screening Scale for DSM-IV PTSD. Rasch modeling was used to summarize WRS which was subsequently categorized as none, low, intermediate, and high exposure. The prevalence of PTSD was 28.1% (14.2% in men, 35.7% in women).Compared to those with no WRS, persons with intermediate exposure had an Odds Ratio [OR, (95% Confidence Interval)] of 1.86 (1.34, 2.59); those with the highest level had an OR = 2.68 (1.93, 3.72). When stratified by level of exposure to WRS, persons exposed to PWT had higher ORs for PTSD at every level than those not exposed to PWT: low [OR = 1.84 (1.15, 2.93) vs. OR = 1.13 (0.74, 1.72)], intermediate [OR = 2.65 (1.69, 4.14) vs. OR = 1.95 (1.29,2.92)], and high [OR = 4.38 (2.89,6.65) vs. OR = 2.25 (1.47,3.43)]. When stratified by gender, this pattern remained clear only among women. While exposure to PWT sensitizes subjects to developing PTSD following WRS, this effect may be gender-specific.

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LIFETIME MATERNAL EXPERIENCES OF ABUSE AND RISK OF PRENATAL DEPRESSION: INFLUENCE OF SOCIOECONOMIC POSITION AND RACE/ETHNICITY.

J W Rich-Edwards, T James-Todd, *A Mohllajee, K Kleinman, A Burke, M W Gillman, R J Wright (Harvard University, Boston, MA 02115)

Depression affects roughly 12% of pregnancies in the US. Identification of modifiable risk factors is therefore important. We examined associations of physical and sexual abuse with the risk of prenatal depression symptoms in two large cohorts in Boston, including 1351 participants from the largely privately insured Project Viva and 638 participants recruited from urban community health centers to Project ACCESS. In mid-pregnancy, we administered the Personal Safety Questionnaire and Edinburgh Depression Scale to both cohorts. Edinburgh scores >13 indicated probable prenatal depression. 8.4% of Viva participants and 19.1% of ACCESS participants had depressive symptoms; 39% of women in Viva and 51% in ACCESS reported lifetime physical or sexual abuse. In merged analysis, women reporting lifetime physical or sexual abuse had an odds ratio (OR) for probable depression of 1.43 (95% CI 1.05–1.94), adjusted for age, race/ethnicity, education, marital status and smoking. The association of lifetime physical abuse with probable depression was similar in both cohorts (merged OR = 1.49 (1.10–2.03)). However, the association of lifetime sexual abuse with probable depression differed between cohorts: The adjusted OR in Viva was 1.51 (0.74–3.12) compared with 5.13 (2.47–10.65) in ACCESS ($p = 0.05$ for test of interaction). In conclusion, physical and sexual abuse histories were positively associated with prenatal depression symptoms in two socioeconomically and ethnically divergent populations. Factors associated with low socioeconomic position or race/ethnicity may interact with sexual abuse to heighten risk of prenatal depression.

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ASSOCIATION BETWEEN MIGRAINE AND MOOD AND ANXIETY DISORDERS IN THE ZURICH COHORT STUDY OF YOUNG ADULTS.

A Kalaydjian, L Cui, J Angst, W Rössler, K Merikangas (National Institute of Mental Health, Bethesda, MD)

BACKGROUND: Although the comorbidity of migraine with mood and anxiety disorders has been well established in cross-sectional studies, there has been little examination of the mechanisms underlying these associations in prospective datasets. METHODS: The Zurich Cohort Study consists of a sample of 591 young adults evaluated six times over a 20-year time span. The Structured Diagnostic Interview for Psychopathologic and Somatic Syndrome interview (SPIKE) was used to generate DSM-IV diagnoses of mental disorders and modified International Headache Society Criteria diagnoses of headache subtypes. RESULTS: The lifetime prevalence of migraine was 25.1% in females and 8.7% in males. There was a strong association between migraine with both mood and anxiety disorders over time, particularly among those with recurrent migraine. No association between tension-type headache and depression or anxiety emerged. Participants with comorbid mood/anxiety disorders had greater severity and impairment from migraine than those with either of these conditions alone. CONCLUSIONS: This study is the first to investigate both the stability of the migraine diagnoses over time and patterns of comorbidity with mood and anxiety disorders in a representative sample of young adults. Although previous research has focused more on comorbidity with mood disorders, these data suggest that there is even greater overlap with anxiety disorders. Further research should investigate potential biological mechanisms for this overlap as well as how this comorbidity impacts on the evaluation, course, severity and treatment of either disorder.

395-S

THE LONGITUDINAL COURSE OF PTSD AFTER MASS TRAUMA: AN AGENT-BASED MODELING APPROACH.

*M Tracy, J Cowan, S Li, G Kaplan, S Galea (University of Michigan, Ann Arbor, MI 48104)

There is ample evidence of substantial psychopathology [particularly post-traumatic stress disorder (PTSD)] in the general population after mass traumas and disasters. Although several risk factors for PTSD have been identified, dominant analytic techniques in population health are ill-suited to help us understand how multiple factors interact dynamically to shape population health after mass traumas. We used RePAST (Recursive Porous Agent Simulation Toolkit) to create a computational platform for studying post-traumatic psychopathology in the general population. Agent (person) characteristics (age, gender, race, income, education, etc.) and household sizes were generated using US Census data. Agents were assigned baseline trauma and mortality rates, as well as conditional probabilities of PTSD for each of ten sentinel traumas, using joint probabilities from existing population-based cohort studies. We found that the long-term burden of psychopathology after mass trauma depends, to a large extent, on the social and economic consequences of the mass trauma rather than the scope of the trauma itself ($p = 0.017$). Also, although agents with larger social networks are more likely to be exposed to traumas ($p < 0.001$), greater social support among these agents mitigates the cumulative burden of PTSD over time ($p = 0.001$). Efforts to mitigate the consequences of mass traumas may fruitfully focus on increasing social supports, like recent efforts to enhance post-trauma psychological first-aid. This model provides an illustration of a generic, population-based environment simulating agents, households, social networks, and neighborhoods for the purposes of understanding the complex and dynamic determination of population health.

396-S

PREVALENCE OF ADHD IN A COMMUNITY SAMPLE OF ADULTS.

*V Santiago, P Cohen (Columbia University, New York, NY 10032)

Background: In recent decades Attention Deficit Hyperactivity Disorder (ADHD), previously considered a disorder of childhood, has been increasingly diagnosed in adulthood. However, research on the prevalence and valid diagnosis of ADHD in adulthood has been limited. Key areas of interest are estimates of DSM IV-disorder prevalence in community samples and the validity of specific DSM IV diagnostic criteria such as age at symptom onset and developmentally relevant symptom thresholds. Objective: This study estimates the prevalence of ADHD in a community sample of adults and examines the impact of the age at onset criteria and symptom thresholds on these prevalence estimates. Methods: The young adult follow-up of The Children in the Community Study, a prospective community cohort study of psychopathology in two counties of New York State will be used (N = 776; mean age = 22.1years (SD = 2.7); age range = 17–28 years). Probable ADHD in early adulthood was measured via self-report on the Diagnostic Interview Schedule for Children (DISC) and supplemental questions to estimate DSM IV ADHD criteria. Information to determine DSM IV age at onset criteria was collected both retrospectively and concurrently for a portion of the sample for which assessments before the age of 7 were available (n = 486; 62.6% of sample). We will examine how these two methods of measuring the age at onset criteria may impact prevalence estimates for this portion of the sample. Symptom thresholds will also be varied based on recommendations in the recent literature on adult ADHD and the resulting impact on prevalence will be examined. Implications: Findings from this study will be compared with that of other recent studies on the prevalence of ADHD in adult samples and potential implications will be discussed.

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ALCOHOL USE TRAJECTORIES AMONG ADULTS IN AN URBAN AREA AFTER A DISASTER: EVIDENCE FROM A POPULATION-BASED COHORT STUDY. *M Cerdá, D Vlahov, M Tracy, and S Galea (University of Michigan, Epidemiology, Ann Arbor, MI 48104)

Alcohol use increased in the New York City (NYC) metropolitan area in the first months after the September 11, 2001 terrorist attacks. We investigated alcohol use trajectories in the NYC metropolitan area in the three years after September 11, and examined the relative contributions of acute exposure to the attacks and ongoing stressors to these trajectories. We used a population-based cohort of 2,752 non-institutionalized adults recruited through a random digit dial telephone survey in 2002; participants completed three follow-up interviews over 30 months. We used growth mixture models to assess trajectories in levels of total alcohol consumption and binging in the past 30 days, and predictors of these trajectories. We identified five trajectories of alcohol consumption levels and three binging trajectories. Predictors of higher levels of use over time included ongoing stressors, traumatic events, and lower income. Ongoing exposure to stressors and low income also play a central role in binging trajectories. While point-in-time mass traumatic events may matter in the short term, their contribution subsides over time.

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CHANGE IN DIET PATTERNS IN RELATION TO WEIGHT GAIN IN THE BLACK WOMEN'S HEALTH STUDY. *D A Boggs, J R Palmer, L L Adams-Campbell, L Rosenberg (Slone Epidemiology Center, Boston, MA 02215)

The prevalence of obesity is increasing in the US, particularly among black women. The relation between diet and weight gain is controversial, and no prospective studies have investigated the association between diet patterns and weight gain in US black women. We examined the relation between change in diet patterns and weight gain among 27,152 women in the Black Women's Health Study. Dietary data and body weight were ascertained in 1995 and 2001 through mailed questionnaires. Prudent and Western patterns were derived for both time points using factor analysis, and weight gain for the six-year period from 1995–2001 was calculated. High and low scores on each of the patterns were defined as the top and bottom two quintiles, respectively. Regression models adjusted for age, physical activity, smoking, education, age at menarche, parity, age at first birth, oral contraceptive use, and female hormone use. Women who decreased their score on the Prudent pattern had significantly greater weight gain (7.13 kg) than women who increased their score (3.95 kg) or maintained a high Prudent pattern (4.93 kg). Women who increased their score on the Western pattern had significantly greater weight gain (5.90 kg) than women who maintained a low score (5.11 kg). Among women with baseline BMI<25, risk of obesity in 2001 was associated with a decreased Prudent score (OR = 2.3, 95% CI 1.5–3.6) or a continuing low Prudent pattern (OR = 1.6, 95% CI 1.1–2.3) compared to a continuing high Prudent pattern. Our results suggest that a diet high in vegetables and whole grains and low in red meat and high-fat dairy is associated with decreased weight gain among US black women.

399-S

OBESITY AND WEIGHT CHANGE AMONG INCARCERATED WOMEN IN RHODE ISLAND: PRELIMINARY RESULTS. *M E Waring and J G Clarke (Center for Primary Care & Prevention, Memorial Hospital of Rhode Island, Pawtucket, RI 02860)

Background: There are over 2 million incarcerated adults in the U.S. and the number of women prisoners is increasing. Female prisoners are more likely to be racial/ethnic minorities, be of low income, and have history of drug/alcohol use and/or sexual or physical abuse. Prison physicians report that obesity and weight gain are common, yet data on obesity or weight change during incarceration are sparse. Methods: Data are from an ongoing pilot study of obesity and weight change during incarceration at the Rhode Island Department of Corrections Adult Correctional Institutions Women's Facilities. Research assistants interviewed women and measured their height and weight. Results: Of 57 women enrolled to date, 30 had been incarcerated for < 2 weeks at their baseline assessment (median: 12.5 days; range: 1 – 4914 days). At baseline, 2% of women were underweight, 25% normal weight, 42% overweight and 32% obese. Of those with follow-up, (n = 32; median 16 days later) women gained an average of 1.5 pounds/week (SD: 2.4 pounds/week, range: −1.3 to 9.2 pounds/week; p = 0.0019). Conclusions: Overweight and obesity are common and women appear to gain weight during incarceration. Potential determinants include poverty, common use of psychiatric medication, low physical activity, forced smoking/drug cessation, and stress. Additionally, a 2600 kcal/day diet may be inappropriate for many incarcerated women in RI. Continued research is needed to better understand determinants of obesity and weight change among incarcerated women to inform development of appropriate obesity prevention and treatment programs for this population.

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PREPREGNANCY BODY MASS INDEX CHANGE BETWEEN PREGNANCIES AND PRETERM BIRTH IN THE FOLLOWING PREGNANCY. *A Chen, M A Klebanoff, and O Basso (Creighton University, Omaha, NE 68178)

Maternal prepregnancy body mass index (BMI) may affect the risk of preterm birth. However, it is unclear how changes in BMI after a pregnancy modify the risk of preterm birth in the following pregnancy. We studied the effects of BMI change on the risk of preterm birth in the Collaborative Perinatal Project. A total of 3,175 women had consecutive index and outcome pregnancies enrolled in the 1960s, when obesity was uncommon and the prevalence of labor induction was low. We used a Cox proportional hazard model to calculate the hazard ratio of BMI reduction (<25th percentile of change) and BMI increase (>75th percentile) relative to BMI stable (25th–75th percentile) on the risk of preterm birth. After adjustment for prepregnancy BMI at the index pregnancy and other covariates, BMI reduction was associated with a non-significant increased risk of preterm birth, hazard ratio 1.15 (95% confidence interval 0.91–1.46); BMI increase was associated with a borderline decreased risk, hazard ratio 0.82 (0.64–1.06). An increase in prepregnancy BMI was not associated with a higher risk of preterm birth in the following pregnancy, and it might be associated with a slightly reduced risk. This study involved mainly low-to-normal weight women with spontaneous deliveries. The effects of BMI change in overweight and obese women need to be studied using contemporary data.

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ASSOCIATIONS BETWEEN ANTENATAL DEPRESSION AND CHILD ADIPOSITY AT AGE 3 YEARS. *K A Ertel, J W Rich-Edwards, S L Rifas-Shiman, M W Gillman (Harvard University, Boston MA 02115)

Background: Antenatal depression is associated with premature birth and low birth weight, but very few studies have examined its impact on body size during childhood. Exposure to antenatal depression may alter fetal development; such changes may persist in childhood, affecting body size and adiposity. The objective of this analysis was to examine the association of antenatal depression with adiposity at age 3 years. Methods: Study subjects were 828 mother-child dyads in Project Viva, a prospective pre-birth cohort study. We assessed maternal depression at mid-pregnancy (mean 28 weeks' gestation) with the Edinburgh depression scale; score>12 indicated depression. Trained study staff assessed child outcomes at age 3: body mass index (BMI) z-score and two measures of adiposity, sum of subscapular (SS) + triceps (TR) skinfold thickness for overall adiposity and ratio of SS:TR for central adiposity. Results: Sixty-eight (8.2%) pregnant women experienced antenatal depression. Mean (SD) for BMI z-score was 0.44 (1.01); for SS + TR was 16.68 (4.01) mm; for SS:TR was 0.64 (0.15). In multivariable linear regression models adjusted for maternal age, BMI, race, marital status, education, household income, and postpartum depression; paternal BMI; and child sex and age, we found that antenatal depression was associated with lower BMI z-score (−0.33, 95% confidence interval (CI) −0.61, −0.05), but higher SS:TR (0.06 ; 95% CI 0.01, 0.10). We did not find an association with SS+TR (−0.20 mm; 95% CI −1.31, 0.92). Conclusion: Depression during pregnancy was associated with lower overall body size, but increased central adiposity in offspring at age 3.

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ASSOCIATION BETWEEN MATERNAL BODY MASS INDEX AND DAUGHTER'S AGE AT MENARCHE. *S A Keim (National Institute of Child Health and Human Development, NIH, Bethesda, MD 20852)

The role of inter-generational influences on age at menarche have not been thoroughly explored beyond the association between mother and daughter's menarcheal ages. Small size at birth and childhood obesity have been associated with younger age at menarche, but the influence of maternal overweight or obesity on daughter's age at menarche has not been thoroughly examined. A follow-up study of the Collaborative Perinatal Project (1987–91) asked grown daughters for their age at menarche. Data from the original CPP (1959–66) included their mothers' height and pre-pregnancy weight. 598 of 622 daughters in the follow-up study had complete menarche and maternal data available. Polytomous logistic regression was used to examine the association between maternal overweight (BMI 25–29.9) or obesity (BMI $\geq$ 30) and daughter's age at menarche (<12 years, 12, 13, $\geq$14). Compared to those whose mothers had a BMI less than 25, daughters with obese mothers experienced younger age at menarche (unadjusted OR = 0.48, 95% CI: 0.26–0.89) and also when adjusted for maternal age at menarche, maternal parity, race, and study site (OR = 0.45, 95% CI: 0.24–0.86). Effect estimates for maternal overweight were not significantly different from the null (unadjusted OR = 0.92, 95% CI: 0.62–1.37; adjusted OR = 0.89, 95% CI: 0.59–1.33). Addition of a variable representing daughter's obesity status during childhood did not alter effect estimates. Maternal obesity is associated with younger menarcheal age among daughters in this study, possibly via shared genetic factors or daughters' in utero exposure to biologic factors stemming from maternal obesity.

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ASSOCIATION BETWEEN ARSENIC EXPOSURE FROM DRINKING WATER AND PROTIENURIA. *Y Chen, J H Graziano, M V Gamble, M Liu, V Slavkovich, F Parvez, and H Ahsan (Department of Environmental Medicine, New York University School of Medicine, New York, NY10016)

Proteinuria, or albuminuria, has been recognized as a risk factor for cardiovascular disease risk and progression to end-stage renal disease. We evaluated the association between arsenic (As) exposure from drinking water and proteinuria detected by biennially urine dipstick tests among 11,121 participations in the Health Effects of Arsenic Longitudinal Study (HEALS), a prospective cohort study initiated in 2000 in Araihazar, Bangladesh. Arsenic exposure variables included baseline well As and urinary As changes modeled as time-dependent variables in the analyses. At baseline, well As was positively related to prevalence of proteinuria; odds ratios (ORs) across increasing quintiles of well As ($\leq$ 7, 8–39, 40–91, 92–179, and 180–864 μg/L) were 1.00 (ref), 1.08 (95% CI 0.82–1.42), 1.36 (1.04–1.76), 1.44 (1.10–1.89), and 1.64 (1.26–2.14) (P for trend $<$ 0.01). During the follow-up of 4 years, average change in urinary As was positively related to incidence of proteinuria; relative risks (RRs) across increasing quintiles of average change in urinary As ($<$ −70, −70 ~ −17, −16 ~ 15, 16–68, and >68 μg/L) were 1.38 (95% CI 1.09–1.74), 1.14 (0.93–1.40), 1.00 (ref), 1.49 (1.24–1.80), and 2.10 (1.70–2.58) (P for trend $<$ 0.01). However, there was no association between baseline well As and proteinuria incidence since baseline. In conclusion, we found positive associations of low-to-moderate level of As exposure and long-term change in As exposure with risk of proteinura. Proteinura may be a modifiable risk factor for renal and cardiovascular impairment due to As exposure.

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THE LEGIONELLA PNEUMOPHILA IN ENVIRONMENT OF HOSPITALS AND SUSCEPTIBLE INPATIENTS. *I F Mao, L L Huang, C T Huang, M L Chen (Chung Shan Medical University, Taichung, Taiwan)

Legionnaires' disease (LD) is an environmental disease. The aim of this study was to detect the sources and distributions of Legionella pneumophila (L. pneumophila, Lp) in hospital and assess the infectious risk for susceptible inpatients. In total, 180 water samples from 30 hospitals' cooling towers were analyzed to determine whether Lp was present by buffered charcoal yeast extract (BCYE) and BCYE with dyes, glycine, vancomycin, and polymyxin (DGVP) agar in 6 hospitals. Another 584 air environmental samples from respiratory care wards (RCWs) and intensive care units (ICUs) were also examined. This also determined the serum single indirect fluorescence antibody titer of 325 inpatients and cultured Lp from sputum specimens, the latex agglutination and direct immunofluorescent antibody tests were performed to identify the Lp serogroups. The results demonstrated that 30.0% of cooling towers were contaminated by Lp, the Lp-1 serogroup was the most virulent and dominant strain. And found Lp-1 was detected in 2.7% (3/112) of air samples, and Lp- 1, Lp-6 were detected in 6.3% (15/240) of tap water samples. Four of 325 inpatients were infected with Lp, two of whom had nosocomial infection in the RCWs. We recommend that hospitals perform periodic environmental surveys, and regularly clean water towers using an effective disinfection method. Environmental surveillance of special medical units in hospitals should be given attention.

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ARE MATERNAL OCCUPATION AND RESIDENTIAL PROXIMITY TO INDUSTRIAL SOURCES OF POLLUTION RELATED? *J Brender, L Suarez, P Langlois, M Steck, F B Zhan, K Moody (Texas A&M Health Science Center, College Station, TX 77843)

Both occupation and exposure to industrial pollution have been associated with adverse pregnancy outcomes. We examined the relation between maternal occupation and residential proximity to industrial sources of air pollution in two case-control study populations of birth defects. Occupational and residential information were obtained from 1996–2000 Texas live birth records of 9163 case and comparison births and maternal interviews of 1532 Texas participants in the National Birth Defects Prevention Study who gave birth during 1997–2001. Residential proximity to industrial sources of air pollution was determined through geographic information systems. In both study populations, women employed in service, sales and office, and production occupations were more likely to live within a mile of one or more industrial facilities with reported chemical air emissions than women in managerial/professional occupations. Case- and control-women in production and related occupations were respectively 2.1 times (95% confidence interval [CI] 1.2, 3.8) and 1.9 times (95% CI 1.1, 3.1) more likely to live near such facilities than women in management/professional positions. Furthermore, these women were 3.7 times more likely (95% CI 1.0, 13.4) than women in managerial/professional occupations to live within one mile of three or more industrial facilities. In conclusion, maternal occupation was associated with residential proximity to industrial sources of air pollution during pregnancy. Studies of maternal occupational and environmental exposures may need to take into account both sources of exposures to understand the relative contribution of either set of exposures to risk of adverse pregnancy outcomes.

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EXCESS CANCER RISK AMONG A POPULATION EXPOSED TO ENVIRONMENTAL CARCINOGENS. *S Moller, A Zambelli-Weiner, M Hawkins, S Kramer (Epidemiology International, Owings Mills, MD 21117)

A community in Kentucky (KY) was exposed to carcinogenic chemicals including dioxins, polychlorinated biphenyls (PCBs), vinyl chloride, and trichloroethylene, released at an industrial site from 1951 to 1989. Initial studies of the exposed population over the period 1980–1995 found elevated rates of all cancer sites combined, hematopoietic cancers, and other subtypes. Factors such as the persistence of dioxins and PCBs in the environment, aging of the population, and latency prompted an additional study to determine if cancer rates in the exposed community remained elevated over the period 1995–2003 compared to three reference populations: KY counties demographically-similar (DS) to the exposed community; the state of KY, excluding the exposed region; and the United States, represented by SEER 9 data. The exposed community was defined as the two zip codes closest to the industrial site. Incident cases of cancer in the exposed and reference communities were obtained from the KY Cancer Registry and SEER. Standardized incidence ratios (SIR) and 95% confidence intervals (CI) were calculated. From 1995–2003, a total of 99 cases of cancer occurred in men and women of all ages in the exposed community, representing a 31% increase in risk for all cancer sites combined compared to DS-KY counties (SIR = 1.31, 95% CI: 1.06–1.59). Elevated risks of specific cancer subtypes were observed across all three reference populations, with the most consistent association seen for non-Hodgkin's lymphoma in adults aged 40–64 (SIR range: 3.88–4.62, CIs not including 1). Our findings are consistent with initial studies of the exposed community, and with the literature regarding the carcinogenic effects of these chemicals.

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A FOLLOW-UP OF RESPIRATORY HEALTH AMONG RESIDENTS LIVING NEAR GROUND ZERO. *S Lin, R Jones, J Reibman, and S-A Hwang (New York State Department of Health, Troy, NY)

This study investigated whether residents living near the World Trade Center (WTC) continued to experience respiratory problems several years after September 11, 2001 (9/11), and what factors contributed to symptom persistence. Among participants surveyed after 9/11, we followed-up 136 and 69 affected area residents (i.e., lived <1 mile from the WTC) ~2 and ~4 years after 9/11, respectively. The follow-up surveys asked about upper and lower respiratory symptoms, symptom severity, unplanned medical visits, family history of asthma, psychological stress, access to care, and indoor environmental characteristics. Survey data from affected area residents at follow-up were compared with affected and control area data collected in the original survey. Generally, we observed declines in symptom rates, new lower respiratory diagnoses, unplanned medical visits, and steroid medication use over time. However, many affected area residents still reported lower respiratory symptoms at follow-up (47.8% at 2 years, 47.8% at 4 years). The prevalence of lower respiratory symptoms among affected area residents at follow-up remained higher than in the control area (20.3%) after 9/11. The most common lower respiratory symptoms at follow-up, as in the original survey, were cough and shortness of breath. Stress, dust/odors, and moisture were significantly associated with symptoms at follow-up. We conclude that despite a general decline in lower respiratory symptoms, rates in the affected area remained high 2 and even 4 years after 9/11 compared to original rates in the control area. Home conditions and psychological stress may be contributing to the persistence of symptoms in this population.

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HEAT EXPOSURE AND SOCIO-ECONOMIC VULNERABILITY AS SYNERGISTIC FACTORS IN HEAT-WAVE-RELATED MORTALITY. *G Rey, A Fouillet, E Jougla and D Hémon (INSERM-U754, Villejuif, France F-94807)

Objectives: We evaluated the respective parts of heat exposure and factors for socio-economic vulnerability in the explanation of the excess mortality during the August 2003 heat wave in France. Methods: The analyses were conducted under an ecological angle on the canton scale (3706 spatial units over the whole country). Temperature and ozone data were obtained on a 10km-step over the whole territory. A heat exposure index was defined in order to maximize its association with the excess mortality by canton. A deprivation index was used to describe the variations of the association between the heat exposure index and the excess mortality during the August 2003 heat wave in France. The analyses were conducted separately for five levels of urbanization. Results: The heat exposure index explained 68% of the extra-Poisson spatial variability of the heat wave mortality ratios by canton during the heat wave. The heat exposure index was larger in the most urbanized zones which probably reflects the urban heat island effect. High excesses mortality rates from 3rd to 15th August, 2003 were observed for all levels of urbanization and all deprivation quintiles. For the three upper quintiles of heat exposure in the Paris area, excess mortality rates were twice higher in the most deprived cantons than in the less deprived ones. Such an interaction between heat exposure and deprivation was not observed for the rest of France, which was much less exposed to heat and less heterogeneous in terms of deprivation. Conclusion: Although a large increase in mortality related to heat wave exposure was observed for all degrees of deprivation of the canton, high deprivation appears to be a vulnerability factor with respect to heat wave exposure.

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THE INFLUENCE OF URBAN FORM ON WALKING IN THE BLACK WOMEN'S HEALTH STUDY. *P F Coogan, L F White, J R Palmer, L Rosenberg (Slone Epidemiology Center, Boston, MA 02215)

We assessed the relation between urban form and walking in the Black Women's Health Study, a prospective cohort study of US black women followed since 1995 with mailed biennial questionnaires. Women reported hours/week (<1,1-2,3-4,5-6,7-9,10+) spent walking for transport (i.e., to a destination) or for exercise on all questionnaires. We followed 20,354 women who lived in Los Angeles, New York, or Chicago through 2001. Variables describing urban form were calculated within a -mile network radius of each participant's residence using geographic information systems. We assessed the relation of each urban form variable with walking for transport and exercise with odds ratios and 95% confidence intervals from repeated measures multinomial logit models adjusting for individual and neighborhood covariates. Women who lived in pedestrian friendly neighborhoods characterized by sidewalks, high housing density, and high intersection density and small block size (indicators of street interconnectedness) were significantly more likely to spend more time walking for transport than those who lived in less pedestrian friendly neighborhoods. For example, women in the highest quintile of housing density were 6.2 times more likely to be in a higher category of time spent walking for transport than those in the lowest quintile. Women living in neighborhoods with the highest density of street intersections were 2.3 times more likely to be in a higher category of walking for transport than women in the lowest quintile. No urban form variable was associated with walking for exercise. This is the first longitudinal study showing a strong positive relation between indicators of pedestrian-friendly urban form and time spent walking for transport.

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ENVIRONMENTAL RISK FACTORS AND RISK OF CANINE MALIGNANT LYMPHOMA, A MODEL FOR HUMAN NON-HODGKIN LYMPHOMA. *S Zagarins, L Barber, E Procter-Gray, A Gollenberg, E Bertone-Johnson (University of Massachusetts, Amherst, MA 01003)

Epidemiologic studies of companion animals offer an important opportunity to identify risk factors for cancers of relevance to both animals and humans. Canine malignant lymphoma (CML) has been established as a model for non-Hodgkin lymphoma (NHL) and previous studies have suggested that exposure to environmental chemicals such as 2,4-dichlorophenoxyacetic acid (2,4-D) may relate to the development of CML. We conducted a case-control study of dogs presented to the Foster Hospital at Tufts University between 2000 and 2006. Cases were 263 dogs with biopsy-confirmed CML. Controls included 240 dogs with benign tumors and 230 dogs undergoing surgeries unrelated to cancer. Dog owners completed a 10-paged questionnaire measuring demographic, environmental, and medical factors. After adjustment for age, weight and other factors, we did not find either household smoking or use of flea/tick control products to be associated with risk of CML. Use of professionally-applied lawn care products was positively associated with CML risk. In particular, herbicide use was associated with a significant 50% higher risk of CML (odds ratio (OR) = 1.5; 95% confidence interval (CI): 1.1–2.3), while pesticide use was associated with an 80% higher risk (OR = 1.8; 95% CI: 1.2–2.9). Home owner application of these chemicals was unrelated to risk, though the OR for use of insect growth regulators was 2.7 (95% CI = 1.1 – 6.9). These findings suggest that some lawn care chemicals may increase the risk of CML. Additional analyses are needed to evaluate what specific chemical components of these products such as 2,4-D may be related to risk of CML and perhaps to human NHL as well.

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LOW-LEVEL MERCURY EXPOSURE AND PERIPHERAL NERVE FUNCTION. *M B Ishak, A Franzblau, R A Werner, B W Gillespie, J W Albers, S Gruninger, C Siew, C Hamann (University of Michigan, Ann Arbor, MI 48109)

Context: Most studies of inorganic mercury exposure and its effects on peripheral neuropathy have been conducted at very high mercury exposure levels, whereas there are few studies of low-level mercury exposure which is more relevant for the general population. Objective: To assess associations between low-level inorganic mercury exposure and hand nerve conduction measures. Study Design: 3,989 observations were collected over a 10 year period (1997–2006) in this cross-sectional study using a convenience sample of dental practitioners. Urine mercury concentrations were measured to assess current inorganic mercury exposure. Subjects underwent sensory electrodiagnostic testing on their median and ulnar nerves. Outcome Measures: Sensory nerve amplitude and peak latency of the ulnar and median nerves in the dominant hand. Results: Urine mercury concentrations were significantly positively associated with median peak latency and with ulnar peak latency, after adjusting for age, Body Mass Index (BMI) and sex. A one unit (microgram/liter) increase in urine mercury concentration increased median peak latency by 0.006 msec (p value = 0.002) and increased ulnar peak latency by 0.005 msec (p value = 0.05). The strength of these associations were consistent even when observations with urine mercury concentrations above 10 μg/l were excluded. No statistically significant associations were observed between urine mercury concentrations and sensory nerve amplitudes. Conclusions: Low-level inorganic mercury exposure can impact nerve latencies, even at mercury levels similar to the background level of the general population. These new findings highlight the importance of low-level mercury exposure in peripheral nerve function.

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EFFECTS OF PERSISTENT ORGANIC POLLUTANTS ON THYROID HORMONE LEVELS DURING PREGNANCY. *JD Peck, C Robledo, B Neas, A M Calafat, A Sjodin, R Wild, L D Cowan (University of Oklahoma Health Sciences Center, Oklahoma City, OK 73104)

Several environmental contaminants are suspected to alter thyroid hormone homeostasis, but human studies of low level exposures are limited. We conducted a pilot study to evaluate the association between persistent organic pollutants and thyroid function in a sample of 42 pregnant women ≤22 weeks gestation in Central Oklahoma. Serum samples from the first prenatal visit were analyzed for 10 polybrominated diphenyl ethers (PBDE), 35 polychlorinated biphenyls (PCB), 9 persistent pesticides, 7 polyfluoroalkyl chemicals, total thyroxine (T4), total triiodothyronine (T3), free T4, and thyroid stimulating hormone (TSH). Analyses were restricted to 22 analytes detected in >60% of samples. Measurements below the limit of detection were imputed by dividing detection limits by $\sqrt{2}$. Linear regression models compared mean thyroid hormone levels between women with concentrations categorized as > or ≤75th percentile for each compound. Controlling for age, body mass index and gestational age, higher exposures to PBDEs (BDE-47, BDE-99, BDE-100), PCBs (PCB74, PCB99, PCB153, PCB170, PCB138/158) and persistent pesticides (hexachlorobenzene, trans-nonachlor and p,p'-DDE) were associated with reduced free T4 levels, with mean reductions ranging from 0.10–0.17 ng/dL. Mean T4 levels shifted downward by 2.0 to 2.7μg/dL for women with elevated concentrations of BDE-47, PCB138/158 and p,p'-DDE. Mean TSH levels increased by 0.6–0.7 mIU/mL among women with higher concentrations of BDE-47, PCB74 and 2-(N-methyl-perfluorooctane sulfonamido) acetate. No associations with T3 levels were observed. T4 deficits during fetal development are linked to hearing loss and neurobehavioral abnormalities in animal studies.

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EXPOSURE TO PERSISTENT ORGANIC POLLUTANTS AND ADDITIONAL RISK OF MYOCARDIAL INFARCTION IN DIABETES PATIENTS: A POPULATION STUDY, 1993–2004.

*A Sergeev and D Carpenter (Ohio University, Athens, OH 45701)

Environmental exposure to persistent organic pollutants (POP)—such as polychlorinated biphenyls, dioxins, and persistent pesticides—is an emerging risk factor for atherosclerosis-associated diseases, including myocardial infarction (MI). Some studies suggest that exposure to POP can also increase risk of diabetes mellitus, a well-known atherosclerosis risk factor. To investigate whether POP-related atherogenesis is diabetes-dependent or not, we conducted an ecologic study of MI in POP-exposed and unexposed diabetes populations. To examine the effect of exposure to POP on MI hospitalization rates in diabetes populations, we used the New York Statewide Planning and Research Cooperative System data on 55,083 hospital discharges for MI in 25–74 years old patients with diabetes for a 12-year period (1993–2004). Residents of zip codes containing or abutting POP-contaminated sites were considered environmentally exposed. Adjusted relative risks (RR) and 95% confidence intervals (CI) were estimated by Poisson regression. Income level was controlled for by restriction. MI hospitalization risk was higher in a POP-exposed diabetes population compared to an unexposed one (adjusted RR = 1.16, 95% CI: 1.01, 1.34). In adjusted analysis, MI hospitalization risk was also higher in males (RR = 1.83, 95% CI: 1.75, 1.91), in Blacks compared to Whites (RR = 1.84, 95% CI: 1.62, 2.09), and in older age groups ($p < 0.05$); these observations are consistent with existing knowledge of MI risk factors and serve as a model quality indicator. Our results support the hypothesis that environmental exposure to POP, per se, poses additional risk of MI in diabetes populations.

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NEUROPSYCHOLOGICAL EFFECTS OF EXPOSURE TO PBDES.

*E Fitzgerald, R McCaffrey, S Hwang, and K Kannan (University at Albany, Rensselaer, NY 12144)

Polybrominated biphenyl ethers (PBDEs), used worldwide as flame retardants, are new and emerging environmental contaminants whose human health effects are not well known. To test the hypothesis that they may disrupt the nervous system of older adults, a group already at risk for age-related deficits, a study was conducted among residents of upper Hudson River communities in NY. A total of 144 men and women between 55 and 74 years of age were interviewed, tested for deficits in cognition, reaction time, fine motor control, olfactory function, and affective state, and donated blood for congener-specific PBDE analysis. Polychlorinated biphenyls (PCBs) were also analyzed. Lipid adjusted serum total PBDE values ranged from 5 to 1,590 parts per billion (ppb) with a median of 24 ppb. These levels are similar to those reported in other American studies and higher than those for most European and Japanese populations. After controlling for a comprehensive set of potential confounders with multiple linear regression, no significant main effects were seen between serum total PBDEs and any of the neuropsychological tests. However, there was evidence of interaction between PBDEs and PCBs. That is, deficits in three tests of memory and learning were associated ($p < 0.05$) with serum total PBDE among persons whose serum total PCB concentrations were above the median, whereas no such associations were observed for persons with serum PCB concentrations below the median. Similar associations were also found for two other memory and learning tests at $p < 0.10$. These results are significant in that they are the first regarding the neuropsychological effects of PBDEs in humans, and suggest that they may interact with PCBs to negatively impact learning and memory.

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EFFECTS OF IN UTERO AND HOME EXPOSURE TO TOBACCO SMOKE ON ASTHMA IN CHILDREN 1999–2004.

*C Marano, D Brody, S Schober, C Zhang (National Center for Health Statistics, CDC, Hyattsville, MD 20782)

To investigate the effects of in utero exposure and home exposure to tobacco smoke on the risk of having asthma, we used a sample of 6127 children 3 to 15 years old from the 1999–2004 National Health and Nutrition Examination Survey. Responses to the home interview were used to assess in utero and home exposure to tobacco smoke and whether the child currently had asthma. Home exposure was defined as the presence of household members who smoked in the home. In utero exposure was defined as biological mother smoking at any time during pregnancy. The prevalence of in utero exposure was 17.9%, while the prevalence of home exposure was 23.9%. The prevalence of current asthma was calculated stratified by sociodemographic characteristics and exposure categories. The prevalence of current asthma was 6.9% (95% CI 4.8–9.7) among children who had both in utero and home exposure, 10.4% (95% CI 6.4–16.6) among those who only had in utero exposure, 8.3% (95% CI 6.5–10.5) among those who only had home exposure, and 10.1% (CI 8.7–11.6) among those who had neither exposure. The association of the risk of asthma and in utero and home exposure was examined in a multivariate logistic regression model adjusting for age, gender, race/ethnicity and poverty status. We found no association between asthma risk and in utero exposure; however, the risk of having asthma was 50% less for children with home exposure compared to those who did not have home exposure. Our study suggests that the presence of a child with asthma may influence the smoking behavior of adults inside the home. Further analysis examining the length of in utero exposure, and home exposure defined by the number of cigarettes smoked in the home per day, is ongoing.

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CHROMAMETER 'L' READINGS TO PREDICT SERUM 25 HYDROXYVITAMIN D LEVELS.

J Chan, *G E Fraser, K Jaceldo (School of Public Health, Loma Linda University, CA 92350)

Measuring serum 25 hydroxyvitamin D (s25OHD) levels for epidemiological studies is expensive. Statistical models using less expensive tests, such as chromometer L readings and/or questionnaire data to predict s25OHD levels would reduce costs. The greatest contributors to s25OHD levels are sun exposure and skin type. Adventist Health Study-2 has sun exposure, chromometer and nutritional vitamin D intake data on 438 subjects taken at the same time as their s25OHD levels were measured. Two multivariate models to predict s25OHD level were compared. The first used skin type based on tanning response, and sun exposure (product of duration and amount of skin exposed to the sun). In the second, chromometer L readings of unexposed skin (buttocks) and the difference between exposed and unexposed sites (buttocks and wrist), were substituted for skin type and sun exposure. Both models were adjusted for age, gender, BMI, dietary and supplemental vitamin D intake and season of blood collection. For Whites, both models with questionnaire exposure sun data ($p = .002$) and chromameter data ($p = .03$) were significant, and R^2 readings were similar (0.26 and 0.22 respectively). In the first skin tones lost significance, as did the unexposed L reading in the second model, both significant in univariate analyses. For blacks, L readings in both uni—and multivariate models were not significant. CONCLUSION. Chromometer L readings of exposed and unexposed skin sites appear to predict s25OHD levels almost as well as skin type and sun exposure data in whites, but not for blacks.

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COMPARISON OF CHEMICAL EXPOSURE AMONG WOMEN WITH PLANNED AND UNPLANNED PREGNANCIES.

*C Robledo, J D Peck, B Neas, A M Calafat, A Sjodin, R Wild (University of Oklahoma Health Sciences Center, Oklahoma City, OK 73104)

Time-to-pregnancy studies often restrict participation to couples intending to become pregnant. The degree to which environmental exposures may vary by pregnancy planning status is not known. Cross-sectional data from a pilot study conducted to assess environmental exposures during pregnancy were used to evaluate the association between planned pregnancies and persistent organic pollutants. During their first prenatal visit, serum samples from 50 women $\leq$ 22 weeks pregnant were collected and analyzed for 10 polybrominated diphenyl ethers (PBDE), 35 polychlorinated biphenyls (PCB), 9 persistent pesticides, and 7 polyfluoroalkyl chemicals (PFC). Analyses were restricted to 22 analytes detected in $\geq$ 60% of the study population. Measurements below the limit of detection were imputed by dividing detection limits by the square root of 2. Multiple linear regression was used to compare mean log-transformed chemical concentrations among women with planned and unplanned pregnancies. After adjusting for age and body mass index, mean concentrations of PCB153, PCB170, PCB180 and total PCBs were found to be higher among planners than non-planners ($p < 0.05$). Among the PCBs associated with the planning status, PCB153 was present in the highest concentration with a geometric mean of 5.73 (95% CI 3.71–8.86) ng/g lipid for planners and 3.54 (95% CI 2.85–4.41) ng/g lipid for non-planners. No differences were observed for PBDEs, persistent pesticides or PFCs. Although these findings would suggest pregnancy planners may be more highly exposed to some compounds such as PCBs, results should be interpreted with caution due to the small sample size.

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DUST CLOUD EXPOSURE DURING THE WORLD TRADE CENTER ATTACK AND LOWER RESPIRATORY SYMPTOMS IN LOWER MANHATTAN RESIDENTS.

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Few studies have focused on the respiratory health of residents near the World Trade Center (WTC) following the September 11th, 2001 (9/11) attacks. A sample of registrants from the World Trade Center Health Registry (n = 4375) was utilized to assess the association between post-9/11 onset of lower respiratory symptoms and exposure to the dust and debris cloud from the collapse of the WTC towers. Participants were recruited using passive and active methods from all who resided in Lower Manhattan at the time of the attack. This sample excluded those with pre-9/11 diagnoses of asthma or emphysema, ever smokers, area office workers, and rescue/recovery workers. Self-reported data on dust cloud exposure and onset of lower respiratory symptoms post-9/11 were collected by telephone interview between 2003–2004. Cumulative incidence ratios (CIR) were estimated using a modified Poisson regression model with robust standard errors. Dust cloud exposure was reported by 40% of the sample. Residents exposed to the dust cloud were more likely ($p \leq 0.0001$) to report two or more lower respiratory symptoms (35.1%) as compared to the unexposed (21.2%). Dust cloud exposure was shown to increase the risk for two or more lower respiratory symptoms (CIR = 1.57; 95% CI 1.33–1.84), after adjusting for sex, age, race/ethnicity, and education. A similar association was shown (CIR = 1.54 95% CI 1.29–1.83) in a subset (n = 3727) analysis utilizing residents who provided a geocodable location for when the dust cloud first reached them. These results demonstrate an increased risk of lower respiratory symptoms among residents exposed to the dust cloud who did not work in the area and were not part of rescue/recovery efforts.

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LONG-TERM AMBIENT PM10 CONCENTRATIONS AND INCIDENCE OF EMPHYSEMA IN NONSMOKING CALIFORNIA ADULTS: RESULTS FROM THE AHSMOG STUDY.

*S Metghalchi, S Knutsen, L Beeson (Loma Linda University, Loma Linda, CA 92350)

The aim of this study was to assess the relationship of long-term concentrations of ambient particulate matter with an aerodynamic diameter less than 10μm (PM10) and risk of emphysema. A cohort of 6,338 nonsmoking, non-Hispanic white Californian adults, ages 25–100, was followed from 1977 to 2000 for self-reported incidence of emphysema and other health outcomes. Monthly residence and work location histories and other personal characteristics were obtained for the period 1977 through 2000 or date of death by using mailed questionnaires, by telephone, and interviewing of surrogates for deceased subjects. These questionnaires also included lifestyle and housing characteristics relevant to exposure to ambient air pollutants and indoor sources of air pollutants. Monthly ambient air pollution data from central monitors were interpolated to zip code centroids according to home and work location histories and averaged over 1973–1977. Logistic regression analysis was used to study associations between incidence of emphysema and varying levels of ambient air pollution. In single-pollutant model, the odds ratio (OR) and 95% confidence interval (CI) for PM10 for a 10 μg/m3 increase was 1.22(95% CI = 1.01–1.49). In two-pollutant models, the ORs for PM10 did not change appreciatively when the gasses were added in two pollutant models: (PM10 OR = 1.24 with sulfur dioxide, 95% CI = 0.99–1.53);(PM10 OR = 1.24 with nitrogen dioxide, 95% CI = 0.96–1.59); and (PM10 OR = 1.22 with ozone, 95% CL = 0.99–1.52). These associations were independent of age, gender, education and past cigarette smoking. These data suggest that long-term exposure to PM10 is associated with incidence of emphysema in these study participants.

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THE ROLE OF EPIDEMIOLOGY IN CHARACTERIZING HIGH-PROFILE, BUT LOW-LEVEL, ENVIRONMENTAL HAZARDS.

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Epidemiological evidence is indispensable in evaluating the effects of low-level environmental exposures on the general population. However, as pointed out by Taubes (Science 1995;269:164–169; New York Times Magazine, Sept. 16, 2007), the findings of epidemiological studies on a given topic are frequently contradictory and misleading. This presentation describes the role of epidemiologists as well as other parties (including regulatory and health agencies, politicians, advocates, and the media) in the "manufacture" of several major "health hazards" which have received enormous attention over the past two decades. These include DDT and other organochlorine compounds; electromagnetic fields; residential radon; and environmental tobacco smoke. In each of these instances, early epidemiological studies showing dramatic relationships were over-interpreted by scientists, sensationalized by the media, and taken up by activists. As a result of the degree of attention and public concern, special government programs were set up to support research on some of these topics. Over the course of several decades following the initial reports, many additional studies appeared, in most cases pointing to a much smaller hazard than was originally alleged. In the case of electromagnetic fields, over twenty years of experimental and epidemiological studies have failed to produce any reproducible evidence of the hazard originally identified in 1979. Detailed consideration of these four case studies suggests that weak and inconsistent evidence was not interpreted with sufficient skepticism and that salient facts putting the alleged hazards in perspective were rarely given the attention they merited. These examples underscore how important it is for epidemiologists to appropriately characterize results that have the potential to be misinterpreted and unduly exaggerated when communicated to the public.

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FINANCIAL AND SOCIAL CIRCUMSTANCES AND THE INCIDENCE AND COURSE OF POSTTRAUMATIC STRESS DISORDER IN MISSISSIPPI DURING THE FIRST TWO YEARS AFTER HURRICANE KATRINA. *M Tracy, F Norris, S Coffey, S Galea (University of Michigan, Ann Arbor, MI 48109)

Hurricane Katrina was, in death toll and economic impact, the most devastating natural disaster to hit the United States in the past 75 years. We collected data from 810 persons who were representative of adult residents living in the 23 southernmost counties of Mississippi before Hurricane Katrina to assess the prevalence of posttraumatic stress disorder (PTSD), its correlates, and course during the first two years after Hurricane Katrina. The prevalence of PTSD since Hurricane Katrina was 24.3% using broad criteria (symptom and duration) and 17.0% using strict criteria (all criteria, including functional impairment). The determinants of PTSD were experience of hurricane-related traumatic events (OR = 1.81, 95% CI 1.04–3.16), hurricane-related financial loss (OR = 2.52, 95% CI 1.48–4.28), high level of postdisaster stressors (OR = 2.74, 95% CI 1.58–4.77), low social support (OR = 2.76, 95% CI 1.43–5.33, compared to high support), high level of postdisaster traumatic events (OR = 2.20, 95% CI 1.14–4.27) and lifetime PTSD history (OR = 10.81, 95% CI 5.30–22.05). Kaplan Meier survival curves suggest that exposure to hurricane-related traumatic events and financial and social stressors influenced the duration of PTSD symptoms. These findings suggest that the prevalence of PTSD in Mississippi in the first two years after Hurricane Katrina was high and associated principally with hurricane-related stressful financial and social circumstances. Absent effective measures to prevent natural disasters affecting populations, postdisaster interventions that aim to improve manipulable stressors after these events may influence the onset and course of PTSD.

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WITHDRAWN

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PSYCHOLOGICAL DISTRESS AND RISK OF MOTOR VEHICLE CRASH. *Martiniuk ALC, Ivers R, Lam L, Glozier N, Boufous S, Stevenson M, Norton R (The George Institute for International Health, Sydney, NSW, Australia, 2050)

Introduction: Previous evidence is conflicting as to the role of psychological distress and risk of motor vehicle crash (MVC). Objective: Use a prospective cohort study design to determine role of psychological distress and risk of MVC, taking into account exposure and other possible confounders. Methods: Data on psychological distress (Kessler 10) was obtained via online questionnaires in 2003–04 in the DRIVE study of 20,822 novice Australian drivers 17–24 yrs old. Baseline survey data was linked using license numbers, to data on crashes from the Road and Traffic Authority of Australia. Data were analyzed using multivariate Poisson regression with backward elimination including an offset being time in the study. Results: No psychological distress (Kessler level 0; score 10–15) was reported by 5822 (29%) individuals, a little distress (Kessler level 1; score 16–21) by 7664 (38%) individuals, some distress (Kessler level 2; score 22–29) by 4992 (25%) individuals and last, the most distress (Kessler level 3; score 30–50) by 535 (8%) individuals. The final model investigating risk of MVC for those with psychological distress found [Kessler level 0 as reference]; level 1 (relative risk) RR = 0.84 (95% CI = 0.75–0.95) p = 0.004; level 2 RR = 0.93 (95% CI = 0.82–1.06) p = 0.3 and level 3 RR = 0.86 (95% CI = 0.71–1.04) p = 0.12; controlling for: average hours of driving, country of birth, socio-economic status, regular access to a car, risky driving behaviors, urban/rural status, sensation seeking, sex, number of times driving test taken, and time on P and L plates. Conclusion: Individuals who report a ''little'' psychological distress (a Kessler10 score of 16–21) are significantly protected from having a MVC.

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INTENTIONAL SELF-HARM AND RISK OF MOTOR VEHICLE CRASH. *A L C Martiniuk, R Ivers, L Lam, N Glozier, S Boufous, G Patton, M Stevenson, R Norton (The George Institute for International Health, Sydney, NSW, Australia, 2050)

Introduction: Intentional self-harm refers to behavior intended to physically damage one's body and person. About 5–9% of adolescents engage in self-harm each year. There is no quantitative literature about self-harm and risk of motor-vehicle crash (MVC). Objectives/ Hypotheses: To determine whether those who engage in self-harm are at higher risk for MVC compared to those who do not self-harm, taking into account exposure time, age, gender, country of birth, drug/alcohol use, risk taking, sensation seeking, SES, driving lessons, sleep and psychological distress. Methods: Data on self-harm was obtained via online questionnaire in 2003–04 in the DRIVE prospective cohort study of 20, 822 novice drivers 17–24 yrs old. Baseline survey data was then linked using license numbers, to data on crashes from the Road and Traffic Authority of Australia. Poisson regression analyses with an offset being time in the study were conducted and potential confounding variables assessed using backward elimination. Results: In the DRIVE sample 1544 (8%) reported engaging in self harm. Those with self-reported self harm have an increase risk of MVC; RR = 1.36 (95% CI = 1.17–1.57) $p < 0.001$. This relationship was attenuated slightly after controlling for variables remaining after the backward elimination time spent on L plates, average hours spent driving each week, urban/rural region and sex; RR = 1.28 (95% CI = 1.10–1.48) P = 0.0014. Conclusion: Those who report self harm have an increased risk of MVC even after controlling for exposure to driving and other important covariates.

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PSYCHOLOGICAL DISTRESS AND SELF-PERCEIVED HEALTH STATUS IN COMMUNITY RESIDENTS WITH OBESITY.

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Obesity is an increasingly prevalent public health problem in Canada affecting between 20% and 30% of the Canadian population. Obesity is strongly predictive of diabetes mellitus, cardiovascular disease, chronic back pain, degenerative joint disease, and other chronic medical conditions. In addition, being overweight is associated with important social and economic consequences. The objective of the present study was to determine the joint effect of psychological distress and obesity on health status in a community sample. We used data from the Canadian Community and Health Survey (CCHS 3.1) (n = 57,531) which was a nationally representative survey conducted in 2005 by Statistics Canada.. Psychological distress was measured by the 10-item Kessler (K10) instrument. Obesity (BMI > 30), self-assessed health status, and long-term reduction in activities were assessed by personal interview. Subjects with obesity and high psychological distress reported more often activity limitations and fair/poor health status (64% and 46%, respectively) than those with obesity and low psychological distress (28% and 17%, respectively) and those without obesity and high psychological distress (45% and 29%, respectively). Adjusted odds ratio for activity limitations was 1.3 in subjects with obesity alone (poor/fair health status: 1.4), 3.5 for subjects with high psychological distress alone (poor/fair health status: 3.5), and 5.9 for subjects with both, obesity and high psychological distress (poor/fair health status: 6.8). The results suggest that there is a joint effect of depression/anxiety and obesity on activity limitations on self-perceived health status. Detecting and managing psychological problems might be particularly beneficial for persons with obesity.

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VALIDITY OF THE SHORT MOOD AND FEELINGS QUESTIONNAIRE AND BRIEF DEPRESSION SCREENS IN A COMMUNITY SAMPLE OF YOUNG ADOLESCENTS.

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Using a sample of 521 sixth-grade students attending public middle schools, we assessed the validity of the Short Mood and Feelings Questionnaire (SMFQ) and one- and two-item screening instruments for major depression in a community sample of young adolescents. Child and parent versions of the SMFQ were administered to evaluate the child's depressive symptoms. Major depressive disorder during the previous month was assessed using the Diagnostic Interview Schedule for Children (DISC) as a criterion standard. Child, parent, and combined scores of the full SMFQ, two-item score for mood and anhedonia items, and the single mood item score were assessed for diagnostic accuracy by calculating the area under the receiver operating curve (AUC), sensitivity and specificity. Eight (1.2%, weighted) participants met DISC criteria for depression. The combined child-parent SMFQ score had high accuracy with an AUC of 0.91, sensitivity of 0.85, and specificity of 0.83, at a cutpoint of 12. However, accuracy was only moderate for the child-report score (AUC = 0.75) and low for the parent-report score (AUC = 0.65). For the two-item screen, the parent version showed moderate accuracy (AUC = 0.70) while the child and combined versions demonstrated low accuracy. The child, parent, and combined versions of the one-item screen all displayed low accuracy. Because of its high accuracy as well as its relative ease of administration, the combined child-parent score of the full SMFQ shows promise as a screening tool for identifying adolescents with major depression in the general population. One- and two-SMFQ-item screens are less promising.

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DISASTER, MINOR STRESSORS, AND MENTAL HEALTH IN THE FIRST YEAR POSTPARTUM.

*E W Harville, X Xiong, P Buekens, G Pridjian, K Elkind-Hirsch (Tulane University, New Orleans, LA 70112)

The long-term impact of a disaster on mental health may be due to either its direct impact or the minor hassles that follow. The authors conducted a cohort study of 252 women from New Orleans and 114 women from Baton Rouge. At the first interview, shortly after delivery, women were asked about their experience of the hurricane. At interviews at 6 and 12 months, women were asked about daily hassles using the Daily Stress Inventory. Post-traumatic stress disorder (PTSD) was assessed with the Posttraumatic Stress Checklist, depression with the Edinburgh Depression Scale, and other mental health problems with the Symptoms Checklist-90. 209 women have completed the 6-month interview and 129 have completed the 1-year interview. Severe hurricane experience was associated with increased reporting of daily hassles ($p < 0.01$). Both hurricane experience and daily hassles were strongly associated with mental health measures at all time points. High amounts of hassles at 6 months predicted depression (OR 7.0, 3.0–16.4), PTSD (5.5, 2.1–14.1), anxiety (8.0, 3.1–20.4), somaticization (6.8, 2.8–16.4), obsessive-compulsive symptoms (11.6, 4.9–27.5), and hostility (4.6, 2.0–10.3) at 12 months. When both hassles and hurricane experience were included in a model, they contributed independently to risk of mental health problems, but did not interact (on the multiplicative scale). Both continued to be strongly predictive after adjustment for race, age, education, income, parity, and hospital. Both major and minor life events contribute to mental health problems after disaster.

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RELIGIOSITY AND MENTAL HEALTH AFTER DISASTER.

E W Harville, *X Xiong, P Buekens, G Pridjian, K Elkind-Hirsch (Tulane University, New Orleans, LA 70112)

Although religion is an important part of many people's response to stressors, little is known about the influence of religiosity on mental health after disaster. A cohort of new mothers was recruited after Hurricane Katrina. 136 women from New Orleans and 71 from Baton Rouge completed the brief Multidimensional Measure of Religiousness/Spirituality, which includes scales for daily spiritual experiences, meaning, values, forgiveness, public and private religious practices, and religious social support. Posttraumatic stress disorder (PTSD) was assessed with the Posttraumatic Stress Checklist, depression with the Edinburgh Depression Scale, and other mental health problems with the Symptoms Checklist-90. Those who reported giving and receiving less forgiveness were more likely to report depression (odds ratio (OR) for lowest compared to highest forgiveness, 2.4, 95% confidence interval (CI): 1.0–5.4), PTSD (3.5, 1.4–8.8), anxiety (4.5, 1.7–11.9), or hostility (5.7, 2.2–14.8). Those who reported more daily spiritual experiences or religious coping (without self-blame) were less likely to report depression and hostility. A reduction in public practices after the hurricane (attending church less often) was associated with increased depression (2.0, 1.0–4.1), PTSD (2.7, 1.2–5.9), anxiety (2.7, 1.1–6.6), and hostility (4.3, 1.8–10.4). Severe experience of the hurricane and religious variables independently predicted mental health, even after adjustment for race, income, education, age, and parity, but they did not interact (on the multiplicative scale). Forgiveness and continuity in religious practices seem to be associated with better mental health after disaster. Whether this is a cause or correlate is not clear.

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THE PATHWAYS TO MENTAL HEALTH CARE OF FIRST-EPISODE PSYCHOSIS PATIENTS: A SYSTEMATIC REVIEW. *K K Anderson, R Fuhrer, A Malla (McGill University, Montreal, H3A 1A2 Canada)

The help-seeking pathways of patients suffering from a first psychotic episode are complex, and may involve such diverse contacts as general practitioners, psychiatrists, emergency services, social services and the criminal justice system. We conducted a systematic review of the literature on the nature and determinants of the pathways to care of patients experiencing a first episode of psychosis. Four databases (MEDLINE, Healthstar, EMBASE, PsycINFO) were searched to identify relevant articles published between 1985 and 2007. We also conducted a hand search of reference lists and relevant journals. Studies were included in the review (n = 18) if they described the pathways to care taken by patients with a first-episode of psychosis after the onset of psychotic symptoms. The included studies explored both the first contact in the pathway to care, as well as the final referral source prior to the contact where successful treatment was initiated. In eight of the twelve studies that looked at the first contact in the pathway to care, the point of contact for the majority of patients was a physician. However, in four of the six studies that used the referral source as a measure of care pathways, a majority of patients used emergency services as the source of referral. The specific pathways taken by first-episode psychosis patients differed based on the location of the study, likely due to systemic and cultural factors. Very few studies (n = 7) explored the gender, socio-economic, cultural or geographic determinants of the pathway. Further research is needed to understand the sequencing of the help-seeking behaviour of patients experiencing a first-episode of psychosis, as well as the determinants of this pathway to mental health care.

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LUNG CANCER SCREENING BY SPUTUM CYTOLOGY AND CHEST X-RAY: MORTALITY RESULTS FROM THE JOHNS HOPKINS LUNG PROJECT (JHLP) AND THE MEMORIAL SLOAN-KETTERING LUNG STUDY (MSKLS). *V P Doria-Rose, P M Marcus (NCI, Bethesda, MD 20892)

The JHLP and MSKLS were two randomized controlled trials of lung cancer screening with similar designs that were conducted in male smokers aged 45 years and older between 1973 and 1985. Both compared two screening arms, one offered both annual chest x-ray and 4-monthly sputum cytology examination (dual-screen), and the other offered annual chest x-ray alone; exams were offered for 5–8 years. Neither trial reported a lung cancer mortality benefit in the dual-screen arm. However, because each was under-powered to detect a modest mortality benefit, and because previous reports did not incorporate all follow-up time, we sought to combine and re-analyze data from these trials to explore the possibility of a reduction in lung cancer mortality with the dual-screen regimen. In our analyses, a total of 10,194 men in the dual-screen arm and 10,232 men in the chest x-ray only arm were followed for an average of 7.3 years. Lung cancer mortality rates of 3.6 and 4.0 per 1000 person-years, respectively, were observed (rate ratio (RR) 0.89, 95% confidence interval (CI) 0.75, 1.05). This decrease was due entirely to reductions in squamous cell carcinoma (RR 0.76, 95% CI 0.53, 1.09) and large-cell carcinoma (RR 0.76, 95% CI 0.50, 1.14) mortality; associations for small-cell carcinoma and adenocarcinoma mortality were null. Though this combined analysis did not find a significantly reduced risk of lung cancer mortality with the addition of sputum cytology to a chest x-ray regimen, there is a suggestion of a small benefit of screening due to reductions in squamous cell and large-cell carcinomas.

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DO DEATH CERTIFICATES PROVIDE AN ADEQUATE SOURCE OF CAUSE OF DEATH INFORMATION IN RANDOMIZED CONTROLLED TRIALS OF CANCER SCREENING? *V P Doria-Rose, A B Miller, P C Prorok, P M Marcus (NCI, Bethesda, MD 20892)

Often in randomized controlled trials (RCTs), cause of death is determined by a mortality review committee, which reviews pertinent clinical records from deceased subjects and achieves consensus regarding the underlying cause of death. However, mortality review is time-consuming and expensive, and little is known regarding how much improvement it affords over use of death certificates alone. To explore this question, we re-analyzed data from 4 US RCTs of cancer screening (the Health Insurance Plan of New York mammography trial (HIP), the Minnesota trial of fecal occult blood testing, and the Johns Hopkins and Mayo Lung Projects, which each examined chest x-ray and sputum cytology). For each trial, we compared 2 intent-to-treat analyses, with cause of death determined either by mortality review committee or by death certificate data alone. The trials collectively enrolled 126,844 volunteers, with 17,734 deaths over the course of follow-up. Overall, death certificates were reasonably accurate in recording the underlying cause of death, with sensitivity ranging from 84.5–90.3% and specificity ranging from 98.9–99.9% as compared to mortality review. Modest changes in screening effectiveness estimates were observed when death certificate data only were used, ranging from −2% to +10%. However, in one case (HIP) a statistically significant benefit of screening was observed when mortality review committee data were used (rate ratio (RR) 0.75, 95% confidence interval (CI) 0.61, 0.94), but not when death certificate data were used (RR 0.81, 95% CI 0.64, 1.02). While the bias introduced by using only death certificate data is generally small, it is desirable to conduct mortality review when resources permit.

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EFFECTS OF MAMMOGRAPHIC SCREENING ON BREAST CANCER RISK PREDICTION. *N Cook, B Rosner, S Hankinson, G Colditz (Harvard University, Boston, MA 02115)

Use of screening mammography can potentially distort estimated effects in breast cancer risk prediction models. Mammography data were available in the Nurses' Health Study starting in 1988, and breast cancers were accrued through 2000. A total of 39,396 women free of cancer in 1988 had complete data on risk factors for breast cancer and potential predictors of screening mammography. We fit logistic models for screening mammography in each two year follow-up period, and used inverse probability weighting (IPW) to adjust parameters in a previously determined breast cancer risk model. Approximately 80% of women had a screening mammogram in each two year period, with increases over time, and 1815 cases of breast cancer accrued. Screening mammography was positively associated with history of benign breast disease, family history of breast cancer, hormone therapy, alcohol use, physical activity, multivitamins, and calcium supplements, and negatively associated with post-menopausal status, current smoking, and body mass index. While cardiovascular disease was negatively associated, markers of medical attention, including hypertension, high cholesterol, and osteoarthritis, were positively associated. IPW led to small changes in effects of benign breast disease, family history, and duration of estrogen use in an established breast cancer risk prediction model. An apparent protective effect of 10 pack-years of current smoking (relative risk (RR) = 0.84, 95% confidence interval (CI) = 0.70–1.00) in unadjusted models was eliminated after weighting (RR = 1.00, 95% CI = 0.83–1.21). Thus, many risk factors for breast cancer and cancer diagnosis are associated with mammographic screening. Control for these, however, had limited impact on a breast cancer prediction model.

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STRATIFYING A POPULATION BY RACE. *M Root (University of Minnesota, Minneapolis, MN 55455)

Biomedical scientists attempt to understand variations within a population in a biomedical trait, e.g., risk of heart disease or rate of diabetes-related death, by stratifying the population using a demographic variable like sex, age, or race and studying the statistical relationship between the variable and the trait. In order to do so, they assign each member of the population or sample a race and assume that there is one correct way to make the assignment, e.g., by ancestry, other-reports or ancestry. I argue that there is no one correct way to assign an individual to a racial category and that what race an individual should be assigned depends of the trait whose variation the social or biomedical scientist is attempting to understand; as a result, a member of the population might be assigned one race for the purpose of understanding a variation in one biomedical trait and a different race for the purpose of understanding a variation in a different one, white in relation to sickle-cell disease and black in relation to congestive heart failure. I propose an approach to race similar to one some economists have adopted towards an index like poverty, viz. that there is no best way to define 'poverty' and which definition is best depends on what the term is to be used for. My proposal would improve the research in the biomedical sciences on racial difference and oppose the common view that race is an intrinsic property of persons. In order to illustrate my approach to racial variables, I consider a study by (Rosenberg, 1999) of the quality of the statistics on death rates by race published by the NCHS and explain how Rosenberg's findings would have been different had he identified the actual value of the race variable with other-reported rather than self-reported race.

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PROBABILISTIC SENSITIVITY ANALYSIS FOR MATERNAL VITAMIN USE AROUND THE TIME OF PREGNANCY IN A STUDY OF CHILDREN WITH DOWN SYNDROME AND LEUKEMIA. *A Jurek, G Maldonado, L Spector, J Ross (University of Minnesota, Minneapolis, MN 55455)

Recent studies in childhood cancer suggest that maternal vitamin supplementation may reduce the risk of leukemia, neuroblastoma, and certain types of childhood brain tumors. For example, Ross et al. (Cancer 2005;104:405–10) found a significantly reduced risk of acute lymphoblastic leukemia (ALL) but not acute myeloid leukemia (AML) in children with Down Syndrome whose mothers reported any vitamin supplementation use prior to knowledge of pregnancy (ALL odds ratio (OR) = 0.51, 95% confidence interval (CI): 0.30, 0.89; AML OR = 0.92, 95% CI: 0.48, 1.76). Recall of exposures, including maternal vitamin supplement use, however, may be difficult and subject to error. Epidemiologists are encouraged to quantitatively adjust for systematic error in study results but often do not. We quantified the impact that misclassification of maternal vitamin supplement use may have had on observed ORs in this study. We used probabilistic sensitivity analysis to calculate odds ratios corrected for inaccurate reporting of vitamin supplement under assumed probability distributions for exposure misclassification parameters. Given our assumptions, protective effects were more often found in ALL than AML data. Validation data are needed to determine the appropriateness of assumptions used in our sensitivity analyses. This research was supported by NIH grant R01 CA75169 and the Children's Cancer Research Fund (Minnesota).

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USE OF IMPUTATION IN THE EPIDEMIOLOGIC LITERATURE. *M Klebanoff, S Cole (NCHHD, NIH, Bethesda MD 20892)

Missing data are ubiquitous in epidemiologic research. Traditional missing data methods such as complete case analysis and missing indicators can reduce precision and introduce bias. Modern methods to impute missing data (assuming missingness at random conditional on covariates) include multiple imputation (MI), inverse probability weighting (IPW), and maximum likelihood estimation with the Expectation Maximization algorithm (EM). To estimate how commonly these methods are used, how imputation affects study results, and the level of reporting detail, the authors searched for the phrase "imput" in the full text of original research articles published in Am J Epidemiology; Int J Epidemiology; Ann Epidemiology; and Epidemiology during 2005 and 2006. Sixteen articles, representing less than 2 percent of manuscripts in these journals, utilized MI (n = 12), IPW (n = 3) or EM (n = 1); in several more the description was so vague that it was impossible to determine what method was used. The degree of detail provided was highly variable. Only 8 papers listed the variables used to impute missing data; 8 provided some measure of how imputation changed the results; 5 presented only results from imputed data; 3 stated that imputation did not change results. The authors conclude that use of modern imputation methods remains rare in the epidemiologic literature; the small number of manuscripts and diversity of reported detail precluded systematic analysis. To increase the field's comfort with these procedures the authors suggest that analyses employing them at least state: 1) the number of observations deleted due to missing data and the number recovered by imputation; 2) the variables used to impute missing data; 3) imputed and unimputed primary results and their confidence intervals.

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A COMPREHENSIVE APPROACH TO AGE-PERIOD-COHORT ANALYSIS. *K M Keyes, G Li (Columbia University, New York, NY 10032)

Understanding the effects of age, period, and cohort on disease incidence may help identify etiological factors and inform prevention programs. Despite extensive research in recent decades, a comprehensive approach to age-period-cohort (APC) analysis remains elusive. We seek to redress this situation by proposing a three-phase method that conceptualizes the cohort effect as a partial interaction between age and period. This paper describes our method, consisting of the classical graphical presentation and inspection, a median polish to remove the additive components of age and period effects, and a simple linear regression of residuals from the median polish to quantify the cohort effect. As an example of the application of the three-phased method, we analyzed homicide mortality data for US males for the years 1935–2004 and found that individuals born after 1970 have a significantly increased risk of homicide mortality relative to those born during 1930–1934. For instance, the risk of homicide mortality for men born between 1980 and 1984 is 2.11 (95% confidence interval 1.98–2.25) times the risk for men born between 1930 and 1934. Our method offers several advantages, including comprehensiveness, interpretability, and robustness.

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A COMPREHENSIVE SMOKING INDEX TO MODEL SMOKING HISTORY IN CANCER STUDIES.

*K Leffondré, W Wynant, Z Cao, and J Siemiatycki (University of Montreal, Montreal, Quebec, H2W 1V1 Canada)

Multi-dimensionality of smoking history presents challenges for the analyzes of epidemiological studies. Although all aspects of exposure (smoking status, duration, intensity, time since cessation, and age at initiation) need to be carefully adjusted for each other to prevent confounding, such adjustments are difficult because of multicollinearity. To avoid these problems, a comprehensive smoking index (CSI) that simultaneously accounts for intensity, duration, and time since cessation has been recently proposed and successfully applied for modelling the risk of lung cancer (Statistics in Medicine 2006;25:4132–46). The CSI has never been investigated for modelling the risk of other cancer sites. Yet, such an overall smoking indicator is an attractive alternative for testing or adjusting for the overall effect of smoking. Our objective was to investigate the best parametrization of the CSI for modelling the risk of different cancers, and to compare its performance to more conventional representation of smoking. To this aim, we used data from a case-control study undertaken in Montreal in 1979–1985, which was designed to investigate the associations between occupational exposures and cancer of several sites (oesophagus, stomach, colo-rectum, liver, pancreas, lung, prostate, bladder, kidney, melanoma and lymphoid tissue). A total of 3,726 cancer patients and 533 population controls were interviewed. We performed separated analyzes for each type of cancer to investigate the best parametrization of the CSI for each of these cancer sites, and to compare its performance to more conventional modelling of smoking. Our results suggest some potential benefits in using the CSI for some cancer sites.

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STATISTICAL METHODS FOR ESTIMATING INCIDENCE AND REMISSION RATES FROM CROSS-SECTIONAL SURVEY DATA.

*J Roy, W Stewart and R Lipton (Geisinger Center for Health Research, Danville, PA)

Cross-sectional epidomioglic studies have often been criticized for containing limited information about the order and timing of events. However, with a carefully constructed survey, we show how longitudinal information can be extracted from these studies. In particular, we develop statistical methods for estimating age-specific incidence and remission rates from self-reported data such as age of onset and age at interview. We use Bayesian semi-parameteric models to estimate smooth curves. The methodology is applied to the American Migraine Prevalence and Prevention study, a mailed survey sent to 120,000 U.S. households. We compare our results with rates that have been reported from longitudinal studies. We discuss advantages of the cross-sectional approach over the longitudinal approach.

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COMBINING DATA FROM TWO SURVEYS TO ASSESS THE EFFECTS OF NEIGHBORHOOD-LEVEL CHARACTERISTICS ON HEALTH OUTCOMES.

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There is increasing interest in understanding the role of neighborhood-level factors on the health of individuals. Many large scale epidemiological studies exist that measure health status of individuals and individual risk factors accurately. Sometimes these studies are linked to area-level databases (e.g., census) to assess the effect of crude area-level characteristics on health. However, information from such databases may not be scientifically connected to a particular disease outcome. More recently, large scale epidemiological studies have begun collecting data to measure specific features of neighborhoods using ancillary surveys. The ancillary surveys are composed of a separate, typically larger, set of individuals. The challenge arises then on combining information from these two surveys to assess the role of neighborhood-level factors. We propose a method for combining information from the two data sources using a likelihood-based framework. We compare it to currently used ad-hoc approaches via a simulation study. The simulation study shows that the proposed approach yields estimates with better sampling properties (less bias, and better coverage probabilities), compared to the other approaches. However, there are cases where some ad-hoc approaches may provide adequate estimates. We also compare the methods by applying them to the Multi-Ethnic Study of Atherosclerosis and its Neighborhood Ancillary Survey.

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QUANTIFICATION OF BIAS IN HOSPITAL-BASED CASE-CONTROL STUDIES WITH UNREPRESENTATIVE CONTROL DISEASES.

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Background: The validity of a hospital-based case-control study rests on the assumption that the distribution of exposure in the controls is representative of the source population that gave rise to the cases. The aim of this study is to quantify the bias that can arise when controls at least within strata of matched factors are included who do not represent the exposure prevalence of the source population. Methods: We derived mathematical formulas to calculate the relative and absolute odds ratio bias and bias factor. To illustrate the effect of biasing hospital controls, we assigned several relative weights to the biasing and valid controls. The relative weight of biasing controls expresses the proportion of biasing controls. We studied several exposure prevalences of biasing controls within the control group. Results: The bias increases with increasingly biased exposure prevalence of the biasing controls and increasing relative weights of biasing controls. The relative OR bias is independent of the magnitude of the true OR. However, the absolute bias depends on the magnitude of the true OR. The absolute OR bias due to biased control diseases is larger the further away the true exposure prevalence of the source population is from 0.50. Conclusions: The amount of bias due to unrepresentative hospital controls depends not only on the relative weight of those biasing hospital controls and their exposure prevalence difference but also on the underlying true exposure prevalence in the source population.

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DOES SELECTION METHOD AFFECT REPRESENTATIVENESS OF CONTROLS? NATIONAL BIRTH DEFECTS PREVENTION STUDY (NBDPS), 1997–2003.

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To investigate how selection method affects representativeness of controls, we compared demographic and health factors from natality data of target populations to that of controls selected for a multi-state case-control study from 10/1997–12/2003. Within target geographic areas, 4 sites (CA, NY, TX, GA[10/1997–12/1999]) used stratified random selection of controls (n = 2,891) by month and birth hospital weighted by the number of births per hospital per year and 5 sites (IA, MA, NC, UT, GA[1/2001–12/2003]) randomly selected controls (n = 2,724) from electronic birth certificates (BC). Both hospital and BC controls did not differ from their target populations in maternal race/ethnicity, age, diabetes, and prenatal care entry. We observed small differences between the selection methods as follows: Hospital controls did not differ from their target populations in maternal education, but a lower percent of hospital control infants (versus [v] target) were low birth weight, 5.1 v 7.1% (Chi-square test, $P < 0.01$), preterm, 7.3 v 9.7% ($P<0.01$) and/or part of multiples, 1.3 v 2.9% ($P < 0.01$), and a higher percent of mothers were nulliparous (54.4 v 52.0%, $P = 0.03$). Compared with their target populations, BC controls did not differ in birth outcomes and nulliparity, but a higher percent of BC controls had < high school education, 16.6 v 14.4% ($P = 0.03$). The data suggest that the selection method generally does not affect whether controls represent their target populations in NBDPS. However, hospital-based control selection may underascertain infants with certain adverse birth outcomes.

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EXPOSURE MISCLASSIFICATION ARISING FROM THE APPLICATION OF A GENERAL POPULATION JOB-EXPOSURE MATRIX IN A MATCHED CASE-CONTROL STUDY: BAYESIAN ADJUSTMENT WHEN POSITIVE EXPOSURE-RESPONSE ASSOCIATION IS SUSPECTED.

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It is common to assess occupational exposure in a community-based case-control study using a job exposure matrix (JEM) that relates occupational classification to binary exposure estimate. Here we consider an asthma-specific JEM applied in a 1:1 matched case-control study of new onset adult asthma. We aim to develop a Bayesian method to correct odds ratios (OR) for suspected non-differential exposure misclassification (without validation data) and to explicitly acknowledge in the analysis that agents of interest are suspected to cause asthma with varying degrees of certainty. The exposure model is in logistic form, without distributional assumptions about the variation between matched pairs. Given conditional independence within a pair, we can rewrite the OR in terms of true probabilities of all four possible exposure patterns for a matched pair (θs). To determine the *posterior distribution* of OR, we elicit from ''experts'' guesses about distributions of sensitivity (SN), specificity (SP), true OR, prevalence of exposure in general population, and the within pair correlation in exposure due to matching. This information allows us to set up the hyper-parameters in *priors*: Beta distributions for SN and SP, Dirichlet distribution for θs. Initial results suggest that with defensible and weakly informative guesses the adjusted OR is further away from the null than the naïve OR. The method we propose holds considerable promise because it explicitly corrects for imperfections in exposure assessment by JEM while emphasizing the strength of the JEM that exposures suspected of causing the disease of interest.

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BAYESIAN METHOD FOR IMPROVING ODDS RATIO ESTIMATE UNDER GROUP-BASED EXPOSURE ASSESSMENT WITH ADDITIVE MEASUREMENT ERROR.

H-M. Kim, *I Burstyn (University of Alberta, Edmonton, Alberta, Canada)

Group-based exposure assessment has been used in occupational epidemiology when it is difficult or impossible to measure exposures on the full cohort, and the investigators are only able to measure exposures on a sample of the cohort stratified on exposure groups. This procedure leads to attenuation in the estimate of odds ratio when the variability among worker in each group is ''large'' and group means are close together. We propose a Bayesian method aimed and reducing this attenuation bias. Group-based strategy, with normally distributed exposure metrics, leads to approximate Berkson error with error variance approximated by between-worker within-group variance. Thus, we use a Bayesian method for Berkson-type error in de-attenuating odds ratio estimates. In a simulation study, we generate hypothetical occupational cohorts that employed group-based exposure assessment and compared estimates of odds ratios before and after Bayesian correction for attenuation due to between-worker within-group variance that was assumed to be known. The preliminary results show that the Bayesian correction method gives improved estimates when between-worker within-group variance is large and group means are close together. This is achieved at the expense of acceptable loss of precision. The new method we propose can be easily implemented and extended in freely available software. The already successful group-based exposure approach in occupational epidemiology (semi-ecological study design) can mostly likely be further improved in the case of logistic disease model by correction for attenuation through Bayesian procedure that takes into account between-subject within group variance.

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ASSESSMENT OF THE INITIAL ASSUMPTIONS OF THE GAMBIA HEPATITIS INTERVENTION STUDY (GHIS) AFTER TWENTY YEARS OF OPERATION.

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The main goal of GHIS is to evaluate the protective effectiveness of hepatitis B vaccination in childhood in preventing HBV chronic carriage and primary hepatocellular carcinoma (HCC) later in adult life. The GHIS was based on a series of assumptions with limited data at the time on the age-specific liver cancer incidence, prevalence of HB chronic carriage, vaccine coverage and efficacy against HB chronic carriage, risk of HCC attributable to HBV, and attrition in the cohort during 35 to 40 years of total follow-up. We assessed these assumptions against the available data, and found that: 1) HB vaccine coverage was greater than originally assumed. 2) Protective antibody titres (anti-HBs "d10 IU/ml) did not depend on the number of vaccine doses received in contrast to assumptions. 3) In contrast with the assumptions, only 0.6–0.7% of vaccinated children became chronic carriers. Perinatal infection was also negligible and unlikely to influence the estimate of HB vaccine efficacy in The Gambia. 4) Sixty to 80% of HCC under age 50 was attributable to HBV, also lower than initially assumed. 5) In order to have a 95% chance of detecting a significant difference between the HB vaccinated and unvaccinated children a sample size of between 31 and 46 cases of HCC is required in the unvaccinated group. 6) The assumption of a potential 50% attrition of the GHIS cohort due to demorgraphic factors and or logistics is sustainable. 7) Overall, between 30 and 35 years of total follow-up will be necessary to obtain unequivocal results. This is a much shorter period than originally estimated.

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BIAS FROM MATCHING ON AGE AT DEATH OR CENSOR IN NESTED CASE-CONTROL STUDIES. *M J Hein, J A Deddens, M K Schubauer-Berigan (National Institute for Occupational Safety and Health, Cincinnati, OH 45226)

Background: Incidence density sampling in nested case-control studies frequently matches controls to cases based on attained age because age is one of the most important risk factors for mortality. Additional matching criteria such as sex, race or year of birth have been used in order to reduce confounding. Recently it was suggested that an additional matching criterion be age at death or censor with eligible controls having an age at death or censor within a specified number of years of the case's age at death. Methods: We used simulated occupational cohorts to evaluate the potential for this additional matching criterion to bias the estimated hazard ratio (HR) from Cox proportional hazards regression. An additional objective was to investigate issues related to exposure lagging; therefore, we compared estimated HRs from analyses including and excluding lagged out workers. Results: The use of the additional matching criterion resulted in downwardly biased HR estimates. In these simulations, when risk was related to a lagged cumulative exposure, the estimated HRs from analyses including lagged out workers (assigned zero lagged cumulative exposure) were generally similarly or less biased than estimated HRs from analyses excluding lagged out workers. Conclusion: Incidence density sampling with matching based on attained age plus age at death or censor introduces bias and is not recommended for nested case-control studies. The observed bias was not unexpected since information used to select controls must be known at the time of selection. Since there can be no way of predicting the age of death or censor for the controls, this information cannot be used for selecting controls in incidence density sampling.

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ANALYZING DATA SUBJECT TO A LIMIT OF DETECTION: COMMON PRACTICES IN CURRENT RESEARCH. *L A Rosenthal, N J Perkins, B W Whitcomb, E F Schisterman (DESPR, NICHD, NIH, 6100 Executive Blvd., Bethesda, MD 20852)

Data in epidemiological studies are often subject to a limit of detection (LOD) due to instrument sensitivity. Affected datasets complicate data analysis and, as a result, often lead to biased results and conclusions. In this paper, the authors review common practices in epidemiological research to evaluate such censored data, including omission of and substitution for missing values as well as maximum likelihood estimations where appropriate. The authors investigated the effect of the different methods with respect to estimation of mean and variance; coefficients in both linear and logistic regressions were considered as well. Data for estrogen levels from the BioCycle study and interleukin-6 levels from a study of cytokine levels in women with and without spontaneous abortion were used for analysis. Through implementation of these methods with the two data sets possessing low (15.2% missing) and moderate (31.2% missing) degrees of censoring, the authors compared estimates of mean and variance of biomarkers and regression coefficients under each approach to handling censored data. Estimations of the mean and variance were subject to the method used. Similarly, beta coefficients in both linear and logistic regressions were substantially affected; with moderate censoring there was as much as a three-fold difference between estimates of the relation between IL-6 and birth weight. The examples demonstrate the degree to which the approach impacts the results of such analysis. The approach selected among these commonly used methods for handling data with an LOD strongly affects results, which could explain discrepant findings in the literature, and has implications for proper inference.

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GENERALIZED ROC CURVE INFERENCE FOR A BIOMARKER SUBJECT TO A LIMIT OF DETECTION AND MEASUREMENT ERROR. *N J Perkins, E F Schisterman, A Vexler (DESPR, NICHD, NIH, 6100 Executive Blvd., Bethesda, MD 20852)

The receiver operating characteristic (ROC) curve is a tool commonly used to evaluate biomarker utility in clinical diagnosis of disease, especially during biomarker development research. Assessment of emerging biomarkers is often hindered by random measurement error and limits of detection, masking discriminatory ability by negatively biasing the estimates of ROC curves and subsequent area under the curve. Methods have been developed to correct the ROC curve for each of these sources of bias but here we develop a method by which the ROC curve is corrected for both simultaneously through replicate measures and maximum likelihood. Our assertions of asymptotic unbiasness and nominal coverage probability of our proposed point and confidence interval estimates, respectively, for the generalized ROC criterion are confirmed via simulation study. As motivation, these methods are applied to two potential discriminators of women with and without preeclampsia, demonstrating the positive effects of properly planning and correcting for a limit of detection and measurement error during biomarker development.

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FLEXIBLE, MULTIVARIABLE MODELS TO ESTIMATE COMPLETE LIFE TABLES. *B Rachet, C Maringe, L Woods, L Ellis (London School of Hygiene & Tropical Medicine, London, UK, WC1E 7HT)

Complete life tables, specific to geographic area, socioeconomic status or ethnicity, are useful tools in demography and public health, and essential in relative survival analysis, which uses the background mortality provided by those life tables. The CONCORD study recently demonstrated the noticeable impact on cancer survival estimates in the USA of using State- and ethnicity-specific life tables instead of national life tables. Such life tables are often based on small populations, leading to unstable background mortality estimates. Several approaches have been proposed to smooth these estimates, including the widely used four-parameter relational model and the Elandt-Johnson method. We developed two new multivariable approaches which exploit the flexibility of spline functions to model the age-specific mortality rates by various factors. We compared our models with the conventional approaches, using both real and simulated data. The goodness-of-fit of our models was comparable to the best conventional approach with large populations. With populations less than half a million, overall and age-specific goodness-of-fit both improved, and the cancer survival estimates were more accurate. The increasing interest in cancer survival for more tightly defined populations broadens the utility of such models.

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INTEGRATION AND QUALITY OF FAMILY HISTORY DATA IN THE NATIONAL BIRTH DEFECTS PREVENTION STUDY.

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To date, little published evidence exists regarding the quality of maternal reports of birth defects among relatives. The authors report on the integration and quality of family history data collected from mothers enrolled in the National Birth Defects Prevention Study (NBDPS). Eligible mothers were those whose children were diagnosed with an orofacial cleft and delivered on or after January 1, 1998 at 1 of 3 NBDPS centers, Arkansas (AR), Iowa (IA) or New York (NY). Mothers were mailed a family history questionnaire (FHQ) and a kit to collect buccal (cheek) cells for DNA extraction. To explore the feasibility of integrating a FHQ in the NBDPS, participation rates for buccal sample collection were calculated with and without the FHQ. Also, maternal evaluations of FHQ items were examined. To evaluate the quality of family history data collected, reports of birth defects for offspring were compared with state surveillance data. Participation rates for collection of FHQs were similar in IA (80%) and AR (76%), but lower in NY (55%). For each center, rates for buccal sample collection were higher when participants were asked to complete a FHQ. Using data abstracted from medical charts as the 'gold standard', the sensitivity of FHQ responses was >97% for presence of a cleft and 40% for other major defects diagnosed. Specificity of responses was >98%. These results suggest that collection of family history data from NBDPS participants was feasible using a self-administered FHQ. Maternal evaluations of the wording of FHQ items permitted revisions to the FHQ to improve systematic collection of other structural birth defects. Future studies will evaluate expansion of the FHQ to other defects and NBDPS centers.

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COMPARISON OF METHODS TO ACCOUNT FOR NON-CANCER AIDS COMPETING RISKS WHEN ESTIMATING THE EFFECT OF HIGHLY ACTIVE ART ON INCIDENT CANCER AIDS AMONG HIV+ MEN.

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The association of highly active antiretroviral therapy (ART) with specific clinical incident AIDS events is unclear. We compare 3 methods, accounting for incident non-cancer AIDS as competing risks, to assess the effect of highly active ART on incident cancer AIDS. 1,911 HIV+ men (493 incident and 1,418 prevalent) from the Multicenter AIDS Cohort Study were included. Calendar period was used as a proxy for ART. Hazard ratios (HR) of cancer AIDS in the highly active ART (≥1996) versus mono/combo therapy (1990–95) era were estimated using Cox proportional hazards models, adjusted for age, infection duration and race. Method 1 (Biometrics 1995; 51: 524) duplicates the data, estimating HRs for the event and competing risk. Method 2 (AIDS 2001; 280: 1497) excludes the outcome and person-time contributed by competing risks. Method 3 (IJE 2002; 31: 951) extends the person-time of competing risks to the date of analysis. Infection duration was imputed 20 times for prevalent men with data from incident men; data were combined using standard methods. 228 cancer AIDS and 616 competing events occurred in 14,202 person-years. For method 1, the HR for cancer AIDS in the highly active ART era versus the mono/combo therapy era was 0.16 (95% confidence limits [CL] 0.08, 0.34), for method 2 the HR was 0.14 (95% CL 0.07, 0.27) and for method 3 the HR was 0.14 (95% CL 0.07, 0.29). 3 methods for handling competing risks produced similar estimates of the effect of highly active ART on incident cancer AIDS. It is unclear how these methods compare to more formal competing risks models(mixture models and cumulative incidence regression).

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METHODOLOGICAL CHALLENGES IN TESTING AND ESTIMATING INTERACTIONS WITH MULTI-DIMENSIONAL EXPOSURES.

*A Liu, M Abrahamowicz, J Siemiatycki (Department of Epidemiology, Biostatistics and Occupational Health, McGill University, Montreal, QC, H3A 1A2 Canada)

Epidemiological research increasingly recognizes the advantages of studying multiple components of exposure history, instead of, or in addition to, simple comparisons of "exposed" vs. "un-exposed" subjects. For example, to fully assess the impact of an environmental exposure, one should consider such components as exposure duration, intensity, time since cessation, and/or age at first exposure. Different implications for disease etiology and/or prevention will be drawn depending on which component(s) affect the outcome and on relative strength of these separate effects. Accurate modeling of several separate effects of inter-related components of such multi-dimensional exposures requires well designed analytical strategy[1]. Little attention has been given to, even more complex, issues related to testing and estimation of interactions involving multi-dimensional exposures. Yet, assessing if a given exposure affects differently men vs. women or persons with different genotypes may yield important new insights. To illustrate challenges in assessing such interaction, we conducted a series of simulation. Results showed that 1) Residual confounding due to either ignoring some components or mis-modeling dose-response relationships may induce an inflated type I error for testing spurious interactions; 2) Testing interaction with a "wrong component" may induce lower power and/or etiologically incorrect conclusions; 3) Identification of the "correct" among many "candidate" interactions, each involving a different component, presents a challenge which requires further methodological studies. [1]Leffondre K, et al. AJE 156(9):813–23.2002.

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ESTIMATING THE POPULATION OF INTACT TWIN PAIRS FOR PLANNING AND EVALUATING TWIN REGISTRIES.

*N S Whitehead, F Zhang, P C Chulada, P J Blackshear (RTI International, Atlanta, GA 30341)

Twin study designs are valuable for investigating the contribution of genetic and environmental factors to disease. Twin registries are frequently established to help identify and recruit twin pairs for such studies. For instances, several European countries have national twin registries and combined them into the GenomEU twin registry. Several US registries also exist, although there is no national registry. We estimated the size and characteristics of the population of intact twin pairs in the US in order to assess the potential size of a US national registry. We used national vital statistics data on natality and mortality to complete a period life table analysis of the population of twin pairs. We treated a twin pair as a unit in the analysis and calculated the probability the pair would be broken as the probability that one or both twins had died. The analysis was conducted by age, race and the sex composition of the twin pair for twins born in the US between 1931 and 2004. We assumed the relative risk of infant mortality for twins compared to singletons to be 5.0, based on published literature. We estimated that almost 2.8 million twin pairs were born in the US between 1931 and 2004, and that slightly less than 2.1 million of the pairs are intact. Overall, 82% of the intact pairs are white, 15% are black, and 3% are of another race. The racial distribution of intact pairs changes over time however, due to greater mortality among nonwhite twins. For example, 17% of twin pairs born in 1954 were nonwhite, but only 13% of the estimated 50-year-old intact twin pairs were nonwhite. A similar but weaker effect was observed for sex. While 32% of the twin pairs born in 1954 were male-male pairs and 34% were male-female pairs, (a ratio of 0.94 male twin pairs for every female pair). The male to female ratio 50-year-old single sex twin pairs was 0.87 in 2004. In the 2004 US general population, 83% of 50-year-olds were white and 49% were male. When considering the population of US twins, it is important to remember the effects of compounding racial and sex differences in mortality across two twins on the overall likelihood that a twin pair is intact.

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ASSEMBLING A RETROSPECTIVE COHORT TO EXPLORE A LINK BETWEEN BCG VACCINATION AND ASTHMA. *M El-Zein, M-E. Parent, M-C Rousseau (INRS-Institut Armand Frappier, Laval, QC, H7V 1B7 Canada)

A lack of early childhood infections might modify the development of the immune system by favoring TH2 immune mechanisms thus promoting atopic disorders. It is unclear whether Bacillus Calmette-Guérin (BCG) immunization known to stimulate TH1 immune processes could protect against the development of childhood asthma. A BCG immunization campaign was held in Quebec between 1949 and 1974 targeting newborns and school-age children. We describe the process of assembling a retrospective cohort of 28370 subjects vaccinated either during their first year of life or later during childhood. Focusing on the last five years of the campaign, 39254 vaccinated subjects were identified in our computerized database. We excluded 704 (1.5%) subjects either because of missing information on birth date (183), inconsistent data on dates (34), data entry errors (4) or duplicate cases (483). Because linkage to administrative databases is only possible starting 1983, we further excluded subjects born prior to 1964 resulting in a final sample of 28370 subjects. Complete information on identifiers (last name, birth date) was available. Only 100 (0.3%) subjects had no information on both first and father's names. Almost half are males (51.5%), 44.4% were vaccinated within the first year of birth, 5% between 1 and 4 years, 38.1% between 5 and 7 years, and 12.6% between 8 and 10 years. Among those vaccinated past their first year of birth, 99.7% had negative tuberculin test response. Vaccinations took place mostly in 1973 (48.7%) and 1974 (47.8%). These results suggest the feasibility of matching this cohort with administrative health databases to investigate the prospective effect of BCG vaccine on asthma and other allergic diseases.

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HIERARCHICAL LINEAR MODELING VERSUS CONTEXTUAL MODELING: SURGICAL OUTCOME FACTORS, FEMALE BREAST CANCER PATIENTS, FLORIDA, 2000–2004. *S Leadbetter and L Richardson (Centers for Disease Control and Prevention, Division of Cancer Prevention and Control, Atlanta, GA 30341)

Recognizing the influence of social contexts on the behavior of individuals, researchers employ *hierarchical linear modeling* (HLM) or *contextual modeling* (CM) approaches to determine both individual- and group-level (e.g., county) factors associated with individual-level health outcomes. HLM accounts for the clustering effect of individuals nested within groups, but no statistical software that supports HLM also accounts for the clustering effects of complex survey designs. CM circumvents this analytic barrier by using complex survey software to analyze all covariates at the individual level, disaggregating group-level data to the individual level. As researchers assert incorrectly that CM accounts for the nested clustering effects of HLM, we employ both modeling approaches to contrast the respective results of these two models. We model surgical treatment outcome factors of 2000–2004 female breast cancer patients (n = 50,782) from the Florida Cancer Data System, linked to 2000–2004 radiation therapy facility and macro socioeconomic data from the 2006 Area Resource File for the 67 Florida counties. As these data sources do not involve complex survey designs, we are not restricted to complex survey software, using appropriate statistical software to obtain unbiased HLM effect size and standard error (SE) estimates. The corresponding CM underestimates group-level SEs and identifies several group effects not indicated by HLM. Our findings demonstrate critical differences between the results of CM and HLM. Researchers should not confuse multistage, complex survey design hierarchy with the nested hierarchical structure of HLM.

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IDENTIFICATION AND EVALUATION OF SURROGATE OUTCOMES FROM OBSERVATIONAL DATA. *M Joffe (University of Pennsylvania, Philadelphia, PA 19104)

Surrogate outcomes have been a topic of intense interest in recent years. Ideally, a surrogate outcome would provide early evidence about the effect of treatment for a group or individual, mitigating the necessity to wait for definitive clinically relevant outcomes. Observational studies might also be used for selecting surrogate outcomes for randomized trials, or for evaluating their benefits in other observational studies. While there has been substantial work in randomized trials on criteria appropriate for selecting or evaluating surrogate outcomes, there has been minimal formal work on this topic for observational studies. Two criteria that have been used in randomized trials are 1) that the putative surrogate mediates all or most of the effect of the treatment of interest on the clinical outcome; and 2) that the effect of the treatment on the surrogate predicts its effect on the outcome. Each of these criteria is in principle appropriate for observational studies; however, application will require modification from the approaches used in randomized trials. I consider these ideas in more detail in the context of observational studies, using ideas derived from the potential outcomes or counterfactual approach to causal inference.

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EXTENDING THE DEFINITION OF CONFOUNDING UNDER A DETERMINISTIC MODEL OF EFFECTS. *G Maldonado (University of Minnesota, Minneapolis, MN 55455)

Greenland and Robins (Int J Epidemiol 1986;15:413–419), using a deterministic model for exposure effects, showed that confounding is absent when $(p_1 + p_3) = (q_1 + q_3)$, where p_i and q_i are the proportions of individuals in the exposed and unexposed groups, respectively, of causal type *i*, where they defined type 1 as doomed, type 2 as exposure causative, type 3 as exposure preventive and type 4 as immune. In a paper that also examined the concept of confounding, Maldonado and Greenland (Int J Epidemiol 2002;31:422–429) explained that the target of a scientific question could be: (1) the exposed group, (2) the unexposed group, or (3) some other group. From the perspective of Maldonado and Greenland (2002), one can see that Greenland and Robins's (1986) definition of no confounding applies only to scenario 1 (the target is the exposed group) and to an incidence-proportion ratio (IPR) or difference (IPD). Here we extend Greenland and Robins (1986) to define the absence of confounding for an IPR or IPD measure for Maldonado and Greenland's (2002) scenarios 2 and 3. Under scenario 2, confounding is absent if $(p_1 + p_2) = (q_1 + q_2)$. Under scenario 3, two conditions must be met: $(t_1 + t_2) = (p_1 + p_2)$ and $(t_1 + t_3) = (q_1 + q_3)$, where t_i is the proportion of individuals of causal type *i* in a group other than the exposed or unexposed. We also describe the no-confounding conditions for an odds ratio measure under scenarios 1, 2 and 3, and we show them to be different than those for an IPR measure.

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A METHOD FOR INDIVIDUAL CAUSATION. *D L Weed (Kensington, MD 20895)

Individual causation is at the center of most pharmaceutical, chemical exposure, and food safety litigation where epidemiologists act as expert witnesses. No established method for making claims about individual causation exists and epidemiology's role in addressing the problem is unclear, due to: (1) a lack of experience with the problem (few epidemiologists participate in litigation), (2) epidemiology's traditional focus on populations rather than individuals, and (3) little research on finding solutions to the methodological problem. Nevertheless, such a method is needed. In this paper, the characteristics of and constraints on a method for judging individual causation are described. Constraints include: (1) the fundamental problem of causal logic, ''counterfactuals'', (2) the fundamental problem of causal inference, ''underdetermination,'' and (3) the unobservability of causation. Important past work connects Bradford-Hill's strength notion (at RR>2) to the probability of causation in individuals, revealing untestable assumptions about biological mechanisms that obscure causal judgments. Nevertheless, many courts accept RR>2 as a precondition for making claims of individual causation. A method for individual causation must go beyond ''strength of association,'' taking into account low exposure doses, challenge-rechallenge phenomena, the uncertainties of personal recall, the vagaries of medical records, and the nature of judgment itself. The method must incorporate the legal standard of proof—''more likely than not''—when examining the extent to which an individual (plaintiff) was exposed (or not) and was diseased (or not). The probability calculus for combining the likelihood of events may not be as useful in this situation as a ''weight of evidence'' approach.

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FLEXIBLE NON-PARAMETRIC ESTIMATION OF DOSE-RESPONSE CURVES. *R MacLehose, D Dunson, D Richardson (NIEHS, Research Triangle Park, NC)

In many applications, there is interest in estimating a collection of related functions. For example, in epidemiology these functions may correspond to dose-response curves for an environmental exposure at different lag times or spatial locations. Our focus is on estimating the dose-response effects of chrysotile asbestos exposure during multiple previous times on current mortality. Data come from an occupational cohort study of textile workers in South Carolina. We focus on Bayesian nonparametric methods for incorporating dependence in collections of related functions through an appropriate prior. The standard choice in such settings is a Gaussian process (GP) with a separable covariance function. We propose a more general class of kernel mixtures of Gaussian processes (KMGP), which induces flexible dependence in random functions. Some theoretical properties of the KMGP are formalized. We use the KMGP to develop a class of generalized additive distributed lag models, which are useful in assessing time-varying effects of predictors. Efficient MCMC algorithms are developed for posterior inference. The methods are illustrated using simulations, and an application to the occupational cohort study examining the health effects of asbestos exposure.

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METHODOLOGIC AND ETHICAL FAILURES IN EPIDEMIOLOGIC RESEARCH, AS ILLUSTRATED BY RESEARCH RELATING TO TOBACCO HARM REDUCTION (THR). *K Heavner, C Heffernan, C V Phillips (U of Alberta, Edmonton, Alberta, T6G2L9 Canada)

Flaws in epidemiologic methods and controversial or politically-motivated health science analyses are often treated as isolated departures from an otherwise sound science. But irregularities in one area of epidemiologic literature, relating to THR, illustrate a systematic pattern in the science. THR, the substitution of less risky nicotine sources for cigarettes, provokes controversy in public health. Despite evidence that modern smokeless tobacco and pharmaceutical nicotine are approximately 99% less harmful than cigarettes, advocates of nicotine abstinence oppose THR and attempt to generate epidemiology to support their political agendas. Reviewing literature generated by anti-THR activists reveals various forms of publication bias, including only reporting results from outlier subgroups; unacknowledged confounding; ignoring differences in exposures, outcomes, and populations; nonsensical meta-analyses; and misinterpreting descriptive epidemiology that clearly shows the success of THR in Sweden. The ethical failures in this literature extend beyond wilful misrepresentation of data to misusing the scientific process to imply that worldly conclusions follow immediately from relative risk estimates. This pattern might be dismissed as an anomaly in a highly-politicized arena but the pattern is possible only because such mal-analysis is not considered unacceptable in epidemiology. Indeed, it is not difficult to show that similar misrepresentations permeate the literature. Political influence provides a convenient scapegoat to excuse poor epidemiology, but it is ultimately the flaws in the science that open the door for political activists to produce misleading claims.

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CATEGORIZATION OF CONTINUOUS VARIABLES: RECOGNIZING AND REDUCING THE BIAS CAUSED BY THE CHOICE OF CUTPOINTS. *C V Phillips, K Heavner, W Hare (University of Alberta, Edmonton, AB, Canada)

Epidemiologic analyses typically convert continuous variables to categories (most often only 2), and report results as if no other categorization were considered, or even possible. Sometimes the category cutpoints are based on known dose-responses (e.g., the level of exposure where biological effects are known to start) or univariate distributions (e.g., dividing at the sample median), methods with well-known limitations. But often the categorization is influenced by correlations in the data, the extreme being choosing the categorization cutpoint that maximizes the effect estimate. When the effect estimate influences the cutpoint, the meager snapshot of the data that is typically reported (i.e., a single RR point estimate and the corresponding confidence interval created by a particular choice of categorizations) will result is publication bias, and may not usefully represent the data. We use National Health and Nutrition Examination Survey (NHANES) data and a series of simulations to illustrate how choices of cutpoints influence effect estimates. The results demonstrate how presentation of one model may dramatically overestimate the exposure-disease association, possibly resulting in erroneous policy recommendations. Actual examples from epidemiology relating to tobacco harm reduction and other policy-relevant studies show that this problem is not speculative. We propose simple alternative methods for reporting results to better inform readers and minimize hidden bias. The most promising options seems to be graphically showing the distribution of effect estimates that result from alternative plausible cutpoints, rather than misrepresenting the data as generating a single clear result.

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COMPARISON OF MODEL-BUILDING WHEN ESTIMATING RATIO MEASURES OF EFFECT VERSUS POPULATION ATTRIBUTABLE FRACTIONS (PAFS). *D Rosenberg and K M Rankin (University of Illinois at Chicago School of Public Health, Chicago, IL 60612)

Epidemiologic analyses typically use ratio measures of association between risk factors and outcomes. Attributable risk measures, which are functions of both the strength of associations and prevalence of risk factors have been used less frequently, in part because of analytic difficulties in estimating these impact measures in a multivariable context. The refinement of the average population attributable fraction (PAF) has provided a tool for producing mutually exclusive and adjusted PAFs which can inform prevention strategies. Producing useful PAFs, though, may require a new framework for addressing issues such as variable handling, model specification, consideration of causality, and interpretation and presentation of results. We discuss these issues as they arise in two parallel multivariable analyses of childhood overweight in African-American adolescents: one focused on ratio measures (odds ratios), and the other on impact measures (average PAFs). Data are from the National Survey of Children's Health (NSCH). When focusing on ratio measures, the emphasis on parsimony and statistical significance resulted in fewer variables in a model than when focusing on impact measures since modifiable factors with weaker associations may have high PAFs if their prevalence in the population is high. Physical activity and screen time had the highest average PAFs, while neighborhood factors had the highest odds ratios. Decisions regarding categorization of variables, their level of measurement, and the focus on effect modification can also differ across the two approaches. Use of PAFs can provide a new perspective on public health issues.

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SOMATIC AND CRANIAL GROWTH AND SCHOOL READINESS IN PREMATURE INFANTS WITH RESPIRATORY DISTRESS SYNDROME. *D Huo, M E Msall, A I Patrianakos, J D Marks, M D Schreiber (University of Chicago, IL 60637)

To examine the dynamics of somatic and cranial growth in very low birth weight infants with respiratory distress syndrome (RDS), and to examine its relationship with readiness for elementary school, we conducted a 6-year cohort study of 207 premature infants with RDS requiring ventilatory support who were enrolled in a clinical trial of inhaled nitric oxide. Z-scores for weight, height, and head circumference (HC) were calculated to compare with normal children of the same sex and age. A z-score <–2 was considered subnormal. School readiness was determined using neurodevelopmental assessments of basic concepts, perceptual skills, receptive vocabulary, daily living functional skills, and need for special education. Among 168 survivors, the mean birth weight was 1039+/–389g, with 7% classified as small for gestational age (SGA). Subnormal height was present in 52% at age 1, 14% at age 2, and 9% at age 6. Subnormal weight was present in 46%, 32%, and 13% at ages 1, 2, and 6 years, respectively. 18%, 16% and 29% of children had subnormal HC at ages 1, 2, and 6 years respectively. SGA children had less catch-up growth. At age 6, 44 (33%) children were not ready for school. HC at age 6 years was strongly correlated with school readiness ($p < 0.001$). In addition, subnormal HC at age 2 was found to predict school readiness at age 6. Of children with subnormal HC at age 2, 73% were not school-ready, compared with 20% of children with normal HC ($p < 0.001$). Premature infants with RDS demonstrated catch-up growth in weight and height throughout childhood. Subnormal head circumference at either 2 or 6 years increased substantially a child's risk for requiring special education services.

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MTHFR POLYMORPHISM AND PD RISK. *X Gao, K C Simon, M A Schwarzschild, A Ascherio (Harvard School of Public Health, Boston, MA 02115)

High plasma homocysteine has been implicated as a risk factor for neurodegenerative diseases. The 5,10-methylenetetrahydrofolate reductase gene (MTHFR) is one of the major determinants of homocysteinemia. The MTHFR 677TT genotype is associated with hyperhomocysteinemia, especially in subjects with low B vitamin intake. We, therefore, examined association between two common single nucleotide polymorphisms (C677T and A1298C) for the MTHFR gene and PD risk in a prospective, nested case-control study of 298 PD incident cases and 1,284 age- and sex-matched controls, who participated in the two large prospective cohorts, the Health Professionals Follow-up Study and the Nurses' Health Study. Dietary intake was assessed by validated food-frequency questionnaires. Conditional logistic regressions were used to calculated odds ratios (ORs) and 95% confidence interval (CI). We did not observe significant associations between either MTHFR polymorphism and risk of PD. ORs comparing two homozygous genotypes were 0.81(95% CI: 0.52, 1.27) for C677T (TT vs. CC), and 1.05(95% CI: 0.68, 1.64) for A1298C (CC vs. AA, where C is the allele associated with reduced MTHFR activity). Adjustments for smoking, caffeine intake and other covariates did not change the non-significant associations. We did not find significant interactions between these two polymorphisms and sex, smoking, intake of alcohol and B vitamins (folate, vitamin B-2, B-6, and B-12; high vs. low based on median intake for each vitamin) ($P > 0.05$ for all). Our findings did not support the hypothesis that genotypes of MTHFR have a role in PD risk. A further study with larger sample size including assessment of plasma homocysteine and vitamin concentrations is needed to better clarify the relationship between homocysteine and PD.

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BLOOD METAL LEVELS IN PARKINSON'S DISEASE. *J A Hoppin, F Kamel, M Korell, D M Umbach, G W Ross, S Goldman, G S Bhudhikanok, A Blair, D P Sandler, C M Tanner (NIEHS, Research Triangle Park, NC 27709)

Metals have been suggested as risk factors for Parkinson's disease (PD). An earlier study reported higher whole blood levels of copper, iron, magnesium, and zinc in PD cases compared to controls. In the FAME study, a nested case-control study of PD in the Agricultural Health Study, we measured whole blood metal levels using inductively coupled plasma-mass spectrometry in 99 confirmed PD cases and 116 matched controls. Samples were collected in trace metal free vacutainers during home visits to farms in Iowa and North Carolina between 2002–2006. The mean time between diagnosis and home visit was 7.4 years. Seven of ten elements analyzed were detected in almost all subjects (copper, iron, lead, magnesium, manganese, selenium, and zinc). While we saw expected associations of metals with known predictors (e.g., lead and smoking, lead and age), we observed no differences in blood metal levels between cases and controls. Further, the values that we found for both cases and controls are similar to those reported for cases in the previous study. Among cases, we saw no differences related to time since diagnosis. The half-life of metals in blood is relatively short, and the latency between metal exposure and disease may be long. Thus measuring current blood levels may not reflect the etiologically relevant time-window. In conclusion, metal levels in samples collected from cases after PD diagnosis do not differ from control levels.

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THE NIH TOOLBOX FOR ASSESSING NEUROLOGICAL AND BEHAVIORAL FUNCTION IN LONGITUDINAL EPIDEMIOLOGIC STUDIES. *K J Yost, R Gershon, C J Nowinski, D Cella, Havlik R, Korper S, and Wagster MV (Evanston Northwestern Healthcare, Evanston, IL 60201)

Many NIH-funded studies collect information on neurological and behavioral function. Unfortunately, there is little uniformity in the measures used, making comparisons or combining data across studies problematic. Also, such measures are rarely included in large cohort studies due in part to a lack of brief, well-validated instruments. To address these issues, NIH awarded a contract in 2006 to develop the NIH Toolbox. State-of-the-art psychometric research and novel testing methods will be employed to develop an innovative approach to neurological and behavioral function measurement in epidemiologic studies and prevention/intervention trials across the lifespan (3–85 yrs). The following criteria were recommended by 147 experts in a request for information: The Toolbox should take 2 hours to administer; be precise and accurate across the range of normal function, literacy, and diverse populations (e.g., English and Spanish); and easy to administer, score, and interpret with minimal cost. Existing measures of cognitive, sensory, motor, and emotional function were identified following a literature review and interviews with 45 experts. In all domains, development of new measures and addition of new items to existing measures to cover the range of function across the lifespan were warranted. Integration of statistical techniques with advanced technological approaches will be exploited to develop a measurement tool that is adaptable over time in response to advances in science and/or technology. The NIH intends this assessment tool to serve as a national resource for the scientific community.

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ADMINISTRATIVE AND ENGINEERING CONTROL MEASURE FOR NOSOCOMIAL TB IN PUBLIC HOSPITALS IN CENTRAL THAILAND. *W Jiamjarasrangsi, S bualert (Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand)

The purpose of this study was to examine the administrative and engineering control measure for nosocomial tuberculosis (TB) in public hospitals in central Thailand. Study samples were 323 high and low nosocomial TB exposure risk departments/areas in 42 community and general hospitals in central Thailand. Data were collected during 2005–2006 by (a) structured interviewing the hospital administrators and/or departmental head; (b) walk-through survey, and; (c) ventilation measurement by the tracer gas method and reported as air change per hour (Ach). Results showed that only 11 and 3 out of 42 hospitals had well-structured TB identification and isolation measures respectively at the outpatient and emergency departments. Twenty four hospitals had separated service channel specifically for TB patients. Only 4 hospitals installed HEPA-Filter (High Efficiency-Particulate Air Filter) and/or UV lamp (Ultraviolet lamp) at the outpatient and emergency departments. Concerning indoor ventilation, while 65.0 percent (210/323) of the areas had ventilation exceed 2 Ach (the recommended minimum ventilation rate), only 46.4 percent (150/323) exceeded the recommended standard. Detailed analysis showed that ventilation in the air-conditioned areas was poorer than the naturally ventilated areas. The proportions of areas which had ventilation rate exceed the recommended minimum 2 Ach were 44.6 and 88.4 percents respectively for the both areas. In conclusion, enormous enhancement in administrative and engineering control measures is needed in order to adequately prevent nosocomial TB in public hospitals in central Thailand.

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POTENTIAL NOSOCOMIAL TUBERCULOSIS EXPOSURE IN PUBLIC HOSPITALS IN CENTRAL THAILAND. *W Jiamjarasrangsi (Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand)

The purpose of this study was to estimate potential nosocomial tuberculosis (TB) exposure of hospital personnel in central Thailand. Study samples were 42 community and general hospitals located in 42 districts of 5 provinces in central Thailand. Potential TB exposure rate in each hospital was calculated and present as number of case-days per year. Information utilized in the calculation included numbers of registered TB and human immunodeficiency virus (HIV) infected cases of each district in 2005, prevalence of TB among HIV infected cases and prevalence of HIV infection among TB cases, admission rates of TB and HIV infected cases, duration of delayed diagnosis of outpatient and in-patient TB cases. Results showed that total potential TB exposure rate [median (range)] of the study hospitals was 541.7 (80.3–4,126.0) case-days per year, and potential exposure rates at outpatient and inpatient departments were 207.5 (30.8–1,580.8) and 334.1 (49.5–2,545.1) case-days per year respectively. Three provinces with highest TB exposure risk had total potential TB exposure rates [median (range)] of 1,389.7 (761.7–4,126.0), 1,105.4(362.2–2,405.4), and 861.5(396–3263.9) case-days per year respectively. In conclusion, basing on the risk categorization of the U.S. Centers for Disease Control and Prevention, all study hospitals in central Thailand had moderate to high risk of nosocomial TB exposure. Stringent prevention and control measures are thus seriously needed.

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RHEUMATOID ARTHRITIS IN AN ASBESTOS-EXPOSED OCCUPATIONAL COHORT. *P A Sullivan and G Cooper (National Institute for Occupational Safety and Health, Division of Respiratory Disease Studies, Morgantown, WV 26505)

This study evaluated non-respiratory effects in a cohort of asbestos-exposed vermiculite workers. We followed 1672 white male Libby, Montana, vermiculite miners, millers, and processing workers with amphibole fiber exposure. Using the NIOSH Life Table Analysis System, age-adjusted underlying cause arthritis mortality through 2001 was compared to white men in the U.S. population. Allowing for a 15-year lag, these workers were 9.5 times (95% CI 3.1–23.5) more likely than expected to die with a diagnosis of arthritis (n = 5). After death certificate review to identify any mention of rheumatoid arthritis (n = 12 deaths), multiple cause mortality was evaluated using the Cox proportional hazards model. After controlling for years since hire and pack years, using age at death as the time dimension, the relative hazard ratio (HR) for rheumatoid arthritis was 1.3 (95% CI 0.8–1.9) per 100,000 fibers/cc-years. For duration, the HR was 1.05 (95% CI 0.99–1.12), suggesting a 5% increase in risk of dying with rheumatoid arthritis for each year of employment. The HR for pack-years was 1.017 (95% CI 0.998–1.036). The association with smoking was expected given previous research on rheumatoid arthritis. These findings are consistent with a recently published report of excess rheumatoid arthritis morbidity among a subset of Libby vermiculite workers (Noonan et al., 2006). Taken together, that report and the findings reported here suggest that exposure to asbestos fibers may be associated with at least one systemic autoimmune disease. Disclaimer: This abstract does not necessarily reflect EPA policy.

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EMPLOYMENT AND CULTURAL CHARACTERISTICS ASSOCIATED WITH ALCOHOL USE AMONG US HIRED FARMWORKERS: THE NATIONAL AGRICULTURAL WORKERS SURVEY, 1999–2001.

*A L Steege, S D Harlow, S Baron (University of Michigan, Ann Arbor, MI 48103)

Hired farmworkers are designated as a vulnerable worker population by the National Institute for Occupational Safety and Health due to the high proportion of workers who are low-paid, seasonal, itinerant, immigrant and non-English speaking. Data from the National Agricultural Workers Survey(NAWS) 1999–2001 were analyzed to determine employment and cultural characteristics associated with drinking/binging in the last month. The NAWS is a workplace-based multi-stage sample, representative of farmworkers employed in the continental U.S. SAS survey procedures that account for multi-stage sampling were used to conduct multiple logistic regression analyses. Workers were mainly Hispanic(91%), and male(80%), with a median age of 30. Approximately 22% worked for farm labor contractors(FLC) and 32% had worked in farm work for a year or less. Hispanic and non-Hispanic male farmworkers' drinking habits were remarkably similar(58.7% vs. 57.4% reported drinking, and 22.6% and 22.4% reported binging, respectively). In contrast, Hispanic female farmworkers were significantly less likely to drink/binge than Non-Hispanic female farmworkers(10.9% vs 35.2% for drinking, and 3.1% vs 12.9% for binging, respectively). For all males and for Hispanic males the odds of drinking for someone earning<$5.26/hour were depressed while the odds of binging for someone making>$9.55 were elevated compared to those with an hourly wage between $5.26–$7.74. Controlling for age, other factors associated with binging for men were working on farms with less than 150 employees, and working directly for growers. For Hispanic workers, intermediate English speaking ability was associated with binging.

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RISK OF LUNG CANCER AFTER OCCUPATIONAL EXPOSURE TO CADMIUM, CHROMIUM VI, AND NICKEL.

*R Beveridge, J Pintos, J M-E Parent, J Asselin, J Siemiatycki (Centre de Recherche du CHUM, Université de Montréal, Montreal, QC, Canada)

Objective: To investigate the relationship between respiratory exposure to cadmium, chromium VI, and nickel, and risk of lung cancer among workers with occupational exposure to these agents incurred at various levels and over a wide range of occupations. *Methods*: We conducted a population-based case-control study in Montreal (1996–2001), including 738 lung cancer cases and 899 age frequency-matched controls. Detailed job histories were obtained by interview, and evaluated by an expert team of chemist-hygienists in order to estimate intensity, duration, and cumulative exposure to multiple substances over the course of each participant's lifetime. Odds ratios (ORs) and 95% confidence intervals (CIs) for lung cancer were estimated using logistic regression, adjusting for confounders including detailed smoking history, education, and respondent status. *Results*: No significant association was found between lung cancer and exposure to chromium VI (OR = 0.99, 95% CI = 0.65,1.50) or nickel (OR = 1.29, 95% CI = 0.89,1.86), and these estimates were not modified by smoking status. Smoking history modified the effect of cadmium: while no increased risk was found in smokers (OR = 0.88. 95% CI = 0.53,1.45), cadmium significantly increased risk of lung cancer in non-smokers (OR = 4.54, 95% CI = 1.71,12.05). *Discussion*: At the exposure levels experienced by this population and in a wide range of occupations, we did not find excess risk of lung cancer among workers exposed to nickel or chromium VI, likely reflecting the low exposures experienced by this population relative to those in older occupational cohorts. Occupational exposure to cadmium seemed to increase lung cancer risk, but only among non smokers.

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WORKPLACE ROBBERIES IN CONTEXT: THE ROLE OF AREA-BASED SOCIOECONOMIC FACTORS.

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Community factors that influence the level of violence in a workplace have rarely been investigated. We address this deficit by examining the relationship between area-based social indicators and workplace robbery using a case-control design with workplaces as the unit of analysis. Cases (n = 219) were workplace robberies obtained from law enforcement agency crime reports from 1998–99. Control workplaces (n = 210) were randomly selected from a comprehensive listing of businesses in operation in North Carolina (NC) between 1994 and 1998. The workplaces were geocoded and spatially linked to United States 2000 Census block groups and NC law enforcement jurisdictions for characterization of social and crime data. Scores, derived from factor analysis, were created for the three key social determinants: poverty, human capital, and transience. Odds ratios (OR) and 95% confidence intervals (CI) were estimated from generalized estimating equations logistic regression models, adjusted for industry, law enforcement crime reporting type, and various workplace characteristics. Workplace robberies were predominately in retail establishments (66% cases vs. 54% controls). Area poverty (OR = 1.39, 95% CI = 0.64, 3.03) and transience (OR = 1.26, 95% CI = 0.60, 2.65) were consistent predictors of workplace robbery even after adjustment for workplace level factors and crime. The effect of poverty on workplace robbery was attenuated in areas where human capital was high (OR = 0.78, 95% CI = 0.26, 2.28) and elevated in areas with low human capital (OR = 3.24, 95% CI = 1.25, 8.43). Understanding of workplace violence and development of effective crime prevention controls requires recognition of social processes involved in the production of crime.

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RISK FACTORS FOR OCCUPATIONAL VIOLENCE AGAINST EDUCATORS.

*S G Gerberich, N M Nachreiner, A D Ryan, T R Church, P M McGovern, M S Geisser, G D Watt, D M Feda, S K Sage, E Pinder (University of Minnesota, Minneapolis, MN 55455)

Little is known about risk factors for violence against teachers; yet, they are known to be at high risk for assault. To investigate this problem, a two-phase study was implemented. Phase 1 (mailed 12-month retrospective survey, 84% response) collected demographics, personal characteristics, and occurrences of physical assault (PA, 8/100 per year) and non-physical violence (NPV, 38/100 per year); Phase 2 (mailed case-control survey, 84% response) collected exposures: activities; others in the environment; and school infrastructure and administration. From 26,000 randomly selected state-licensed, working kindergarten-grade 12 educators (6,469, eligible), cases (student-perpetrated, n = 290) reporting at least one PA were questioned about exposures in the month before the incident; controls (1116), were questioned about exposures on a randomly selected working month. Potentially confounding variables were identified a priori for multivariable logistic regression from causal directed acyclic graphs; re-weighting adjusted for potential biases from non-response and unknown eligibility. Odds ratios (OR) and 95% confidence intervals (CI) were identified. Increased risks for PA were: school social work (OR, 7.3; CI, 2.8–19.2) and special education (OR, 6.1; CI, 4.2–8.8) activity; soft, compared to bright lighting (OR, 1.4; CI, 1.0–2.0); presence of physical barriers (OR, 1.5; CI, 1.1–2.2); increasing risk with decreasing family/guardian involvement (OR, CI range, 0.2; 0.1–1.0 to 2.8; 1.7–4.6) for 5-point outstanding to poor categories. Decreased risk was identified with presence of easily accessible exits (OR, 0.3; CI, 0.2–0.7). Results suggest opportunities for interventions and further research.

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VALIDATION OF INDUSTRIAL WORKPLACE SECONDHAND SMOKE QUESTIONNAIRE USING VAPOR-PHASE NICOTINE MONITORING. *Y-H Chiu, J Hart, D Spiegelman, E Garshick, T J Smith, F Laden (Harvard School of Public Health, Channing Lab, Boston, MA)

Evidence suggests an association of adult exposures to secondhand smoke (SHS) with adverse health effects. The high smoking rate among blue-collar workers and the potential for SHS exposure at work indicate that it is important to study SHS exposure in studies of industrial populations. However, most large epidemiologic studies have relied only on self-reported SHS exposure, with no information on actual measurements. We conducted a questionnaire validation study to determine what questions would be most useful to capture exposure meaningfully. We measured SHS exposure at work over two days using both personal monitoring of vapor-phase nicotine and self-administered questionnaires in a subset of non-smoking workers ($n = 203$, median $0.87\mu g/m^3$) in a large US trucking industry cohort. Questionnaire variables considered including workers' perceived exposure duration and intensity, smoking policy, job and demographic characteristics, and sensory irritations. The results of multiple regression (using robust variances) indicated that workers who reported spending at least 30 minutes with 3 or more smokers in designated smoking areas in general had a $3.16\mu g/m^3$ higher nicotine exposure level compared to other workers ($p = 0.03$), after adjusting for truck terminal, job title, work shift, perceived smoking policy, education level, and age, which were also significant predictors of nicotine levels. Our findings suggest that self-reports of duration and intensity of SHS exposure among non-smokers is relatively reliable, and it is important to include questions about job characteristics and smoking policy for a survey to a larger population.

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TIME TRENDS IN THE USE OF ANTI-HYPERTENSIVE MEDICATIONS: RESULTS FROM THE MULTI-ETHNIC STUDY OF ATHEROSCLEROSIS. *J A C Delaney, R L McClelland, C D Furberg, R Cooper, S J Shea, B M Psaty (University of Washington, Seattle, WA 98155)

Background: Research has suggested that emerging evidence from randomized controlled trials (RCT) is often not reflected in physician selection of medication class for first-line anti-hypertensive therapy. Objectives: To evaluate the impact of new RCT evidence in December 2002 from the antihypertensive and lipid-lowering treatment to prevent heart attack (ALLHAT) trial on use of anti-hypertensive medications (AHM) in a multi-ethnic cohort. Methods: Using data from the Multi-Ethnic Study of Atherosclerosis (MESA), we examined whether the release of ALLHAT was associated with an increase in diuretic use by new users of AHM. The MESA study, a population-based study of 6,814 adults from 4 ethnic groups with no clinical cardiovascular disease at baseline, had four separate assessments of drug use. We used the changes in AHM use among new users at different MESA panels to study the association between this new evidence and the prescription of diuretics. We excluded baseline AHM users. Results: In panel 2 (starting in 2002), 32% of new users of AHM were prescribed a diuretic as compared to 44% in panel 3 (starting in 2004) and 39% in panel four (starting in 2005). After the publication of ALLHAT, there was an increase in the proportion of new users taking diuretics (comparing new users in panels 2 to new users in panel 3 of MESA); (Relative Risk (RR):1.31;95% Confidence Interval(CI):1.09–1.59). This increase in the rate of diuretic use among new users of AHM declined slightly but could still be detected in panel four (RR:1.28; 95% CI:1.04–1.57). Conclusions: The immediate result of new RCT evidence was an increase in medication use of among the drug class with new evidence of efficacy (diuretics).

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TAMOXIFEN-TREATED BREAST CANCER PATIENTS AND THE RATE OF CARDIOVASCULAR EVENTS IN A DANISH COHORT. *R K Hernandez, H T Sørensen, and T L Lash (Boston University School of Public Health, Boston, MA 02118)

Although the effectiveness of tamoxifen in preventing recurrence of breast cancer has been established, associations between tamoxifen and cardiovascular outcomes are not as clear. This study explores the relation between tamoxifen and several cardiovascular outcomes: ventricular arrhythmia, systolic ventricular thrombosis, atrial fibrillation, acute myocardial infarction, angina, heart failure, and diastolic ventricular thrombosis/pulmonary embolism (DVT/PE). The study population of 15,162 women was identified in the Danish Breast Cancer Cooperative Group (DBCG) Registry, including those diagnosed with stage I or II estrogen-receptor positive breast cancer between 1990 and 2004 at ages 45–69. The DBCG has enrolled nearly all Danish breast cancer patients younger than age 70 at diagnosis into its clinical database since 1977. Incident rates, rate ratios, rate differences, and crude and adjusted hazard ratios (HR) were calculated for each outcome comparing tamoxifen-exposed subjects to unexposed subjects. A protective association between tamoxifen and angina was shown (adjusted HR = 0.80, 95% CI 0.67–0.97) over the follow-up period. Adjusting for age and comorbidity, we found exposed women were at higher risk for DVT/PE during the first two years after exposure (HR = 2.5, 95% CI 1.5–4.1), but afterward were no longer at increased risk (HR = 1.2, 95% CI 0.68–2.0). This study is the first to demonstrate that the association between tamoxifen and thromboembolic events diminishes with duration of therapy. This finding has potential implications for monitoring cardiovascular outcomes for women on tamoxifen, indicating that the first 2 years may be the most crucial time for surveillance for thromboembolic events.

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RISK OF CERVICAL CANCER IN INFLAMMATORY BOWEL PATIENTS BY MEDICATION USE. *S Hutfless, B Fireman, S Kane, L J Herrinton (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205)

Background & Aims: Cervical cancer risk is increased among immune suppressed women. We evaluated the relationship of inflammatory bowel disease (IBD), an immune-related condition, and IBD medications with risk of cervical cancer. Methods: The nested case-control study included female members of Kaiser Permanente Northern California (KPNC), aged 15–68 years during 1996 to June 2006. Women with IBD were compared to a random sample of women without IBD. Cervical intraepithelial neoplasia grade three or greater was ascertained using the KPNC Cancer Registry. IBD medications of interest were aminosalicylates (ASA), immune modulators, corticosteroids and infliximab. The odds of cervical cancer were analyzed using logistic regression adjusted for age, ethnicity and smoking using multiple imputation. Cervical cancer analyses were restricted to women with a Pap smear in the three years preceding the index date. The prevalences of Pap smear testing were compared using a log binomial model. Results: Ten cervical cancer cases occurred among 1,165 women with IBD and 72 cases among 12,124 women without IBD. The adjusted odds ratio [OR] of IBD with risk of cervical cancer was 1.45 (95% confidence interval [CI] 0.74 – 2.84). The medication ORs were 1.65 for ASA, 2.79 for corticosteroids and 3.45 for immune modulators (all $p > 0.05$). No case had used infliximab. The adjusted absolute increase in Pap smears among IBD women compared to women without IBD was 4 percent (95% CI 2–5%). Conclusions: Although not statistically significant, IBD and IBD medications were associated with an increased risk of cervical cancer. Regular cervical cancer screening in women with IBD is recommended. HPV vaccination should also be considered.

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NATIONAL ESTIMATES AND PREDICTORS OF MEDICATION SAMPLE USE IN THE US.

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Background: One rationale for the use of free medication samples (SAM) is economic benefit to patients, but early studies question this. We performed the first multiyear nationally representative study of sample use in the US. Methods: We analyzed the proportion of subjects receiving SAM among respondents to the Medical Expenditures Panel Survey from 1999–2004 and used multiple logistic regression to investigate the influence of demographic, income, and insurance variables on the likelihood of a subject receiving SAM. Results are presented as [adjusted odds ratio, 95% confidence interval]. Results: From 1999–2004, an annual average of 63.4% of respondents received $\geq$1 prescription medication; of these, 18.6% of patients identified $\geq$1 of their medications as a free sample (15.6% in 1999 to 19.2% in 2004). SAM use was highest in young adults [1.09, 1.01–1.17] and lowest in children [0.57, 0.53–0.62] relative to middle-aged adults. Compared to non-Hispanic whites, minorities were less likely to receive SAM (non-Hispanic blacks [0.74, 0.68–0.79]; Hispanics-any race [0.68, 0.63–0.74]; Asian/Pacific Islanders [0.77, 0.67–0.88]; Native American [0.67, 0.51–0.89]). Versus those with private medical insurance, the uninsured were more likely to receive SAM [1.12, 1.01–1.23]; those with Medicaid only [0.56, 0.49–0.63] or Medicaid and Medicare [0.56, 0.49–0.64] were less likely. Subjects without private prescription drug insurance were more likely to report SAM use [1.15, 1.07–1.24]. Income (measured as federal poverty category) did not have an effect on SAM use. Discussion: Use of free medication samples is common and increasing in the US. Free samples are not directed to the most economically disadvantaged patients.

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USE OF PHTHALATE-CONTAINING MEDICATIONS AND URINE PHTHALATE LEVELS IN THE US POPULATION.

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There is concern about the potential reproductive and developmental toxicity of phthalates. Manufacturers use low weight phthalates to make coatings for oral medications. We published a case report on a patient with extremelly high concentrations of monobutyl phthalate (MBP). The source of phthalate exposure was Asacol (mesalamine with enteric coating of dibutyl phthalate) used to treat ulcerative colitis. The association between use of phthalate-containing medications and urinary levels of specific phthalates has not been studied for other medications. We evaluated such association using data from NHANES, a periodic health examination survey conducted by the U.S. National Center for Health Statistics. For certain study periods, survey participants were asked if they had taken a prescription medication. Urine samples were collected for a sub-sample of individuals and, for certain study periods, phthalate metabolites were quantified. The data in the current analyses are derived from publicly-available files from the NHANES 1999–2002 surveys; 5351 persons had laboratory information on phthalate levels. We had a priori identified medications containing phthalates as inactive ingredients from pill coatings (mesalamine, theophylline) or syringes and canisters (insulin, corticosteroids). There were two subjects exposed to mesalamine. Their individual MBP concentrations were 4691 and 4358 ng/mL; the mean concentration was 45 ng/mL among non-users ($p < 0.0001$). Users of theophylline had elevated concentrations of monoethyl phthalate ($p < 0.0001$) and users of insulin had elevated concentrations of mono-(2-ethylhexyl) phthalate ($p < 0.0001$); their mean levels were 5 and 2 times higher than the mean for non-users, respectively. Given the crude measures and likely misclassification of medication use, these associations likely underestimate the true impact of exposure to phthalates in medications. These findings reinforce the fact that medications are a relevant source of exposure to high levels of phthalates.

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NON-ILLICIT DRUG POISONING DEATHS IN UTAH 1999–2004: HOW ARE LEGITIMATE PRESCRIPTIONS INVOLVED?

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Fatalities related to prescription drugs, primarily opioids, increased twenty one-fold in Utah between 1997 and 2005. We used a combined deterministic and probabilistic algorithm to link Utah's controlled substance prescription registry to the death certificate and medical examiner databases to examine non-illicit poisonings at an individual level. The goal of this analysis was to determine the proportion of non-illicit poisoning decedents that had legitimate access to drug at the time of and within the year prior to death. Death certificates were linked to the prescription registry for the years 1999–2004, the most recent year for which complete prescription data were available. Decedents with a primary cause of death code for poisoning by narcotics were selected. Suicides, homicides, and deaths with any mention of illicit drugs were excluded. Among the 734 decedents identified, 47% had an active prescription for an opioid drug at the time of death, and 75% had filled such a prescription during the year prior to death. We found no evidence of a previous opioid prescription for only 15% of the non-illicit drug poisoning decedents. The average age at death was 41 years with no difference by prescription status. Among a subset of decedents for whom we had medical examiner data, 40% had an active prescription at death for all drug(s) identified as a cause of death by the medical examiner. The large fraction of decedents with valid prescriptions suggests that interventions need to consider patient safety concerns such as existence of multiple active prescriptions in addition to drug diversion to prevent fatal poisonings.

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DESCRIPTIVE EPIDEMIOLOGY OF INJURIES SEEN AT A SKI AND SNOWBOARD RESORT CLINIC.

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Although snow sport injuries are common, there is little population-based prevention research. We reviewed all injuries (N = 1,636) seen at a single resort-based medical clinic for the 2006–2007 winter season. Among all patients there was no difference in helmet use by sex or riding mode (ski or snowboard). Age was a significant predictor of helmet use with younger patients more likely to use helmets ($p < 0.0001$). Male patients were significantly younger than female ($p < 0.001$), and patients injured snowboarding were younger than those injured skiing ($p < 0.0001$). Patients ranged from 3–85 years old with a mean of 28 years. Upper limb injuries were more common in snowboarders and lower limb injuries were more common in skiers ($p < 0.0001$). Using resort-collected patron-days and demographics, a greater proportion of injuries were seen among athletes <25 years old and snowboarders than would be expected based on the proportion of individuals in those categories. On average, 2 patients were seen in clinic for every 1,000 skier-days with higher rates at the beginning and end of the season. After adjusting for patron load, injury rates were similar on weekdays and weekends. Certain demographics place the athlete at risk for certain types of injuries. The data collected demonstrates that it may be possible to stratify injury risk. Based on these data, we are in process of implementing a multi-center, long-term injury surveillance system. Acknowledgments: Utah Sports Research Network (USRN).

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AN EXAMINATION OF STRATEGIES FOR PREVENTING WORKPLACE HOMICIDES COMMITTED BY PERPETRATORS HAVING A PRIOR RELATIONSHIP WITH THE WORKPLACE OR ITS EMPLOYEES. *K Gurka, S Marshall, and D Loomis (University of North Carolina at Chapel Hill, Chapel Hill, NC 27599)

Intentional violence is an important cause of occupational fatality, but limited research has been conducted examining the epidemiology of workplace homicide. Most of that research has focused on robbery-related violence. Although recommendations for preventing workplace violence exist and many are widely implemented, no studies have systematically assessed whether these strategies reduce the risk of homicide when the perpetrator had a prior relationship with either the workplace or at least one of its employees (prior-relationship homicides). A case-control study examined whether recommended environmental attributes and administrative policies, thought to be protective of robbery-related violence, reduce the odds of prior-relationship homicide. Cases were those North Carolina workplaces experiencing a prior-relationship homicide from 1994 – 2003, and controls were a sample of North Carolina businesses. This study suggested that workplaces located in an industrial park, employing minorities, reporting a history of violence, open any night hours, or open 24 hours any day were more likely to experience prior-relationship homicide. Keeping entrances to the workplace locked when employees were present (odds ratio, (OR) = 0.36, 95% confidence interval (CI): 0.13, 0.99) and having at least one security device, defined as security cameras, alarms, or mirrors, appeared to protect (OR = 0.28, 95% CI: 0.10, 0.74) against prior-relationship homicide. These two interventions, which are widely recommended for robbery deterrence, appear to also be effective at preventing prior-relationship homicides.

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EPIDEMIOLOGICAL PROFILE OF MALE SEXUAL ASSAULT: RESULTS FROM THE NATIONAL INCIDENT BASED REPORTING SYSTEM (2005). *E Choudhary and R Bossarte (Injury Control Research Center, West Virginia University, PO Box 9151, Morgantown, WV 26506)

Sexual assault among males, compared to females, is under-studied and previous research suggests that it is also significantly under-reported. Past studies have used population-based survey data (e.g. Behavioral Risk Factor Surveillance System (BRFSS)) to estimate the prevalence of sexual assault and associated health outcomes. However, survey-based surveillance systems are based on self-reports and may not accurately estimate the true prevalence of male sexual assault victimization. In order to obtain a detailed epidemiological profile of sexual assault among males, criminological database like National Incidence Based Reporting System (NIBRS) may provide an important source of alternative information. The objective of this study was to use 2005 NIBRS data to construct an epidemiological profile of sexual assault among males. NIBRS uses incidence-based reporting and includes data collected on all incidents associated with a reported assault. Available data includes detailed information on incident, offender, victim, and arrest characteristics. Preliminary results suggest that the incidence of sexual assault was higher among young males (less than the 18 years of age), accounting for approximately 90% of all male sexual assault cases investigated in 2005. Sexual assaults, like forcible fondling* (53.58%) and sodomy* (31.10%), were the most prevalent forms of sexual assault. Results include rates and rate ratios stratified by age, race, and geographical location and identification of trends considering time and day of the week. Additional analyses include frequencies for the location of incident and prevalence of incident-related injury. Previous studies using BRFSS data are only capable of providing information on adult males and are subject to under-reporting. Results from our analyses suggest that NIBRS data can be used to provide detailed information related to sexual assault that may be an important compliment to existing surveillance efforts.

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OCCUPATIONAL INJURY AMONG FULL-TIME, PART-TIME, AND CASUAL HEALTHCARE WORKERS. *H Alamgir, S Yu, N Chavoshi, K Ngan (OHSAH, Vancouver, BC, V6H 3X5 Canada)

Background: Previous epidemiological studies have conflicting suggestions on the association of occupational injury risks with employment category across industries. This specific issue has not been examined for direct patient care occupations in the healthcare sector. Aims: This study investigated whether work-related injury rates differ by employment category (part-time, full-time, or casual) for registered nurses (RN) and care aides (CA) in long term and acute care facilities. Methods: Incidents of occupational injury resulting in compensated time-loss from work, over a one year period within three health regions in British Columbia (BC), Canada were extracted from a standardized operational database. Detailed analysis was conducted using Poisson regression modeling. Results: Among 8640 RNs in acute care, 37% worked full-time, 24% part-time and 25% casual. The overall rates of injuries were 7.4, 5.3, and 5.5 per 100 person years respectively. Among the 2967 CAs in long term care, 30% worked full-time, 20% part-time, and 40% casual. The rates of injuries were 25.8 among full-time, 22.9 among part-time, and 18.1 among casual workers. In multivariate models, having adjusted for age, gender, facility and health region, full-time RNs had significantly higher risk of sustaining injuries compared to part-time and casual workers. For CAs, full-time workers had significantly higher risk of sustaining injuries compared to their casual colleagues. Conclusions: Full-time direct patient care occupations have greater risk of injury compared to part-time and casual workers within the healthcare sector.

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WITHDRAWN

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PLACE OF RESIDENCE AND MOTOR VEHICLE CRASH AMONG YOUNG DRIVERS. *H Y Chen, R Ivers, A L C Martiniuk, R Norton, S Boufous, M Woodward and M Stevenson (The George Institute, Sydney, NSW, Australia 2000)

Introduction: A higher motor vehicle fatality rate has been previously shown for young drivers and for those living in rural areas, but the mechanism has not been well explored. Method: The DRIVE study is a prospective cohort study of over 20,000 young drivers (17–24 years). Information on known and hypothesized risk factors was collected using an online questionnaire in 2003–04 and linked to subsequent traffic violations, police-reported crashes, hospitalizations and deaths. Three levels of urbanization, based on categories used by the Australian Bureau of Statistics, were defined by drivers' place of residence: urban (metropolitan cities), regional (country towns and surrounds) and rural (including remote areas). Poisson models were used to analyze the risk of crashes versus no crash, and the risk of single vehicle crash versus multiple crash by place of residence, adjusting for multiple confounders including driving exposure. Results: Multivariate results showed that compared to urban residents, the relative risk (RR) of police-reported crash decreased with increasing rurality (regional RR 0.8, 95% CI: 0.7 to 0.9; rural RR 0.5, 95% CI: 0.3 to 0.7). For single vehicle crash, novice drivers living in rural and regional areas had approximately double the risk (regional RR: 1.9, 95% CI: 1.5–2.5; rural RR: 1.9, 95% CI: 1.1–3.1) of their urban counterparts. Conclusion: Novice drivers living outside cities have lower risk of being involved in crashes, but those who crash are more likely to be involved in single vehicle crashes than those who live in more urban settings.

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ASSOCIATION BETWEEN PER STUDENT EXPENDITURE AND EDUCATORS' RISK OF PHYSICAL ASSAULT. *S K Sage, S G Gerberich, N M Nachreiner, T R Church, P M McGovern, A D Ryan, S J Mongin, D M Feda (University of Minnesota, Minneapolis, MN 55455)

To investigate the relation between schools' resource levels (i.e., per student expenditure per year) and physical assault against Minnesota educators, we utilized data from the two-phase Minnesota Educators' Study (MES) and Minnesota Department of Education (MDE) school-level fiscal and demographic data. The MES examined a randomly selected cohort of state-licensed kindergarten-grade 12 employed educators. From mailed questionnaires, response rates for both Phase I (comprehensive data collection on violent events) and Phase II (case-control) were 84%. Cases experienced a work-related physical assault event in the previous 12 months, controls reported no assaults. Exposure data were collected for cases (month prior to event) and non-injured controls (randomly selected months). Based on the school in which they worked the most time and available MDE school-level data, together with MES questionnaire data, analyses were conducted on 213 cases and 606 controls. Average per student expenditures for cases and controls was $10,287 and $9,000, respectively, and was higher in urban than both rural and suburban schools. Using directed acyclic graphs to guide selection of confounders, multivariate analyses suggested an increased risk of physical assault against educators with increasing levels of annual per student expenditures (reference less than $7900): $7900–8700 (Odds ratio (OR) = 1.4, 95% CI: 0.8, 2.4); $8700–9900 (OR = 1.7, 95% CI: 1.0, 2.9); greater than $9900 (OR = 1.9, 95% CI: 1.0, 3.6). Future work will further explore the impact of specific school resource allocations on the risk of physical assault against educators.

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BYSTANDER INJURY EVALUATION OF CHILDREN FROM MIDWESTERN AGRICULTURAL OPERATIONS. *Q Williams, B Alexander, S Gerberich, A Ryan (University of Minnesota-Twin Cities, MN 55108)

Agricultural production processes involve complex activities, placing at risk not only workers but also those who live on the operation. We evaluated the incidence and determinants of injuries involving children in the Regional Rural Injury Study-II (RRIS-II). RRIS-II followed 16,546 children under 20 years of age (~85% of eligible) from rural communities in the Midwest for two six-month recall periods in 1999 and 2001. Demographic, injury, and exposure data were collected through comprehensive and case-control computer-assisted telephone interviews. Narrative data were used to identify work-relatedness of children's injuries by cataloging narrative scenarios into four categories, those being: directly work-related, indirectly work-related, non-working accomplice, and non-working attendant—the latter three all being bystander categories. Among 463 child injury events 102 were bystanders. Of the bystander-related injuries, 14 were identified as indirectly work-related (working bystanders), 27 non-working accomplice (passengers/tag-alongs), and 60 non-working attendant (playing on the operation). Fleiss' Kappa of 0.74 indicated substantial agreement among 10 raters. Nearly 60% of all 425 cases responded to sometimes or frequently bystanding in six out of seven different agricultural environments. The reported injuries resulted in more than 7 days of restricted activities for 37% of bystander injury events and 36% for working children injury events. Children who live or work on agricultural operations are vulnerable to many of the same hazards as adults. Therefore, the study of bystander injuries is imperative in regard to children growing up in agricultural environments to aid prevention program development.

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ETHNIC DISPARITIES (ED) IN FUNCTIONAL AND MENTAL RECOVERY FOLLOWING TRAUMATIC FRACTURE (TF). *M Walsh and K Egol (New York University Hospital for Joint Diseases (NYUHJD), New York, NY 10003)

Physical function (PF) following TF is often diminished over time. ED have long been manifest in chronic disease, such as diabetes and heart disease, but it is less clear whether similar ED appear with respect to recovery following TF of the distal radius (DR). We examined 493 individuals (250 whites, 100 blacks, and 143 Latinos) with TF of the DR who were part of the NYUHJD Trauma Registry. Assessment of PF, pain and mental well being was conducted at 3, 6 and 12 months following treatment. The Disability of the Arm Shoulder and Hand (DASH) scores were used to assess PF, a visual analogue scale used to assess pain, and the SF-36 used to assess mental well being. Multiple linear regression was used to model PF, pain and well being across ethnicity, while controlling for age, gender, mechanism of injury, level of education, type of fracture, and type of treatment (operative vs. non-operative). Blacks experienced poorer PF than whites, with more than a 10 point DASH differential at each of the 3, 6 and 12 month follow-up periods ($p < 0.001$ at 3, 6 and 12 months). Latinos did not experience a difference in PF compared to whites at any time point. Latinos did, however, report 2 times more pain at each follow-up point compared to blacks and whites ($p > 0.001$ at 3, 6 and 12 months), and subsequently manifested 25% poorer mental well-being at 1 year of follow-up relative to both blacks and whites ($p = 0.008$). These findings suggest that convalescence does not occur equitably across ethnicity following TF of the DR. These ED may result from differential access to care following initial fracture treatment and highlight the need for vigilance in the application of follow-up care across diverse populations.

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INJURY AMONG INFORMAL CAREGIVERS. *E L DeFries, E M Andresen (University of Florida, Gainesville, FL 32610)

Informal caregivers (typically unpaid care provided by family or friends) provide substantial support to people with long term disability or chronic conditions, and may increase the care recipient's ability to maintain independence. If a caregiver sustains an injury, s/he may not be able to provide for the care recipient and may herself need assistance. Utilizing population-based data on informal caregiving collected via the 2005 North Carolina Behavioral Risk Factor Surveillance System (BRFSS), the authors assessed the prevalence of injury among caregivers and identified risk factors. Of the 895 (15.4% weighted) respondents who reported being caregivers of children or adults, 880 answered the question, ''In the past 12 months, have you sustained an injury while helping him/her?'', and 35 said yes (3.6% weighted). Injured and non-injured caregivers were similar on many demographic and care (i.e., relationship to care recipient, areas in which s/he provides most help) characteristics, though caregivers who had a disability (odds ratio [OR] = 2.54, 95% Confidence Interval [CI]: 1.01, 6.44) or who provided more than 40 hours of care per week (OR = 10.53, 95% CI:3.16, 35.10) compared to <8 hrs/wk were more likely to sustain an injury while providing care. There was no significant relationship between injury and caregiver age, care recipient gender, or the caregiver reporting that s/he provided the most help to the care recipient in moving around. Despite the small number of injuries within this sample, these data provide important clues about risk factors for injury among informal caregivers at a population level. Informal caregivers may need education about preventing injury during caregiving, with special attention given to caregivers who have a disability and caregivers who provide full-time or constant care.

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THE ASSOCIATION BETWEEN USUAL SLEEP DURATION AND OCCUPATIONAL INJURY. *R Griffin, G McGwin, Jr (University of Alabama at Birmingham, Birmingham, AL 35294)

There has been increasing interest in the relationship between sleep characteristics and occupational injury. Recent research suggests that fatigue and sleep disorders increase the risk of occupational injury, though lack of information on actual sleep duration represents a significant limitation of this research. To address this limitation, the current study evaluates the association between sleep duration and occupational injury using a continuous measurement of sleep duration. The study population consisted of employed adults who participated in the 2004 – 2006 National Health Interview Survey (NHIS). Logistic regression was used to estimate odds ratios (ORs) and associated 95% confidence intervals (CIs) for the association between occupational injury occurrence during the three months prior to the interview and usual sleep duration. The odds of occupational injury did not differ when comparing those reporting 3–5 versus 6–8 hours of sleep per night (OR 0.96, 95% CI 0.69–1.32). However, those reporting >8 hours of sleep per night had a significantly decreased odds of occupational injury compared to those reporting 3–5 hours of sleep per night (OR 0.54, 95% CI 0.29–0.98). The current results suggest that 8 or more hours of sleep per night may reduce the risk of occupational injury. Future research should utilize the case-crossover design in order to evaluate the role of acute disturbances to regular sleep patterns and the occurrence of occupational injuries.

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DRIVING ERRORS AND THE SUBSEQUENT DECISION TO GIVE UP OR RESTRICT DRIVING. *L Keay, B Munoz, K Turano, S Hassan, C Munro, K J B Roche, S K West (Johns Hopkins University, Bloomberg School of Public Health, Baltimore, MD 21205)

Purpose: To explore the relevance of driving errors to restricting or stopping driving in older drivers. Methods: We enrolled 1425 drivers aged 67–87. Vision and cognition assessment, questionnaires on health and depressive symptoms were completed. A driver monitoring system, fitted to the participants' own car, documented driving errors over 5 days. Multivariate analysis, investigated the impact of driving errors on the decision to stop or restrict driving. The proportions of participants with driving errors were compared using a Fisher's exact test. Results: The mean age was 75 ± 5, 50% were male and 1237, 87% completed one year assessments. Those already limiting their driving were excluded (n = 35). At follow-up, 1.5% (18/1202) had stopped and 3.4% (41/1202) restricted their driving. In the 5-day on road assessment: 32/1171 (2.7%) failed to stop at red traffic lights, 88/1170 (7.5%) did not check for traffic at left turns, 75/1155 (6.5%) did not stop at stop-signs and 172/1172 (14.7%) had at least one error. Average failure rate per traffic light, stop sign and left turn was 0.2%, 2.2% and 0.4% respectively. Adjusting for gender, age, Mini-Mental State Examination score, Vision (contrast sensitivity) and General Depression Score, those who failed to stop at traffic lights were less likely to continue driving (odds ratio 0.81 95% CI 0.67–0.98) but failed stop sign (p = 0.6) and left turns (p = 0.4) were not related. Proportion with errors was similar in those who stopped or reduced (9/53,17.0%) and continued driving (163/1119,14.6%, p = 0.6). Conclusions: In this analysis, drivers with left turn or stop sign errors were no more likely to give up or restrict driving. While a rare event, those who drove through red signals were more likely to restrict or cease driving.

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CHRONIC RENAL FAILURE IN THE NAVAJO AREA INDIAN HEALTH SERVICE. *M Nelson (University of New Mexico, Albuquerque, NM 87122)

Western medicine's arrival to the Navajo Nation has brought a new paradigm of health and healing to a still traditionally minded people. However, unlike many other Native American ethnic groups throughout the U.S., medicine men and other native health practitioners operate in full force among contemporary Navajo. As their patients are actively engaged in the preservation of native traditional healing practices, Western trained health care workers often actively encourage using methods that conflict with traditional Navajo ideals. This paper explores the choices Navajo patients face when traditional medicine conflicts with the possibility of a Western based cure. Ethnographic analysis and personal Interviews with patients served by the Navajo Area Indian Health Service illustrate that the ailing population is in a continual struggle between physical wellness and traditional death.

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

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MORTALITY INEQUALITIES OF PUBLIC HOUSING RESIDENTS IN NEW YORK CITY, 1989–1991 AND 1999–2001. *K Althoff, A Karpati, J Hero and T Matte (New York City Department of Health and Mental Hygiene, New York, NY 10007)

Inequalities in mortality rates (MRs) between poor and wealthier neighborhoods in New York City (NYC) narrowed between 1990 and 2000, but these trends may have been influenced by population in-migration and gentrification. The NYC public housing (PH) population has been less subject to these influences compared to other low-income neighborhoods. We compared trends in MRs from 1989–1991 to 1999–2001 among residents of NYC census blocks consisting entirely of PH with those residing in other low-income (LI) and higher-income (HI) non-PH blocks. PH and LI blocks were restricted to those with $\geq$50% of residents living at $<$1.5 times the federal poverty level (FPL); HI blocks were those with $<$50% of residents living at $<$1.5 times the FPL. Information on deaths was obtained from NYC's Bureau of Vital Statistics. Census data from 1990 and 2000 were used for denominators. We calculated age-standardized, all-cause and cause-specific MRs and ratios (MRRs), with 95% confidence intervals (CI) estimated using the gamma distribution. All-cause MRs in PH, LI, and HI decreased between the decades by 15.9% 22.2%, and 28.2%, respectively. The all-cause MRR of PH vs. LI increased from 1.22 (95% CI 1.17, 1.26) in 1989–1991 to 1.42 (95% CI 1.36, 1.48) in 1999–2001; the relative mortality disparity for PH vs. HI also widened. The age-adjusted MR for cancer increased only in PH; prevention-amenable cancers contributed to this increase. These findings temper the previous observation that inequalities in the health of poor and wealthier NYC neighborhoods have narrowed. NYC PH residents should be a high-priority population for efforts to reduce health disparities.

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WOMEN'S STATUS AND INFANT DEATH. *J Fromewick, I Kawachi, D Robinson, S V Subramanian, and D Acevedo-Garcia (Harvard School of Public Health, Boston, MA 02115)

Within the US, there are wide state-level disparities in infant death. While some suggest these variations are reflections of differences in state demographics, there is considerable evidence that the state in which an infant is born does impact their chances of living past one year. Previous ecological studies have identified state-level women's status as a potential predictor of children's health. This study uses multilevel methods, which allow us to account for variations in individual characteristics which may have explained the associations found in prior work, to: a) investigate the effect of state-level women's status on infant death and, b) to examine whether women's status differentially impacts black and white infants. We fit two-level logistic regression models with 2,556,520 black and white infants born in 2001 at level-1 nested within 50 states at level-2. Our dichotomous outcome was infant death. Women's status was measured by composite scores on four dimensions of women's status (political participation, employment and earnings, economic autonomy, reproductive rights) assembled by the Institute for Women's Policy Research. After adjusting for individual and state covariates, the employment and earnings index and the economic autonomy index were significantly associated with infant death, whereby states with higher levels of equality in these spheres had lower odds of infant death (OR = 0.73, 95% CI = 0.54 to 0.98; OR = 0.71, 95% CI = .60 to .85, respectively.) Significant cross-level interaction effects for race and the two economic indices suggest that although improved women's access to economic resources was associated with outcomes for all infants, there was a weaker protective effect for black infants than for white infants.

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JOHN HENRYISM AND ACUTE MYOCARDIAL INFARCTION IN A COHORT OF FINNISH MEN. S A James, *M S Mujahid, G A Kaplan (University of Michigan, Ann Arbor, MI 48105)

Objective: Studies examining the impact of John Henryism (JH), or high-effort coping, on cardiovascular health have generally focused on blood pressure (BP). Consistent with previous results for BP, we hypothesized that the inverse gradient between socioeconomic position (SEP) and acute myocardial infarction (AMI) would be greater for men scoring high vs low on JH. Methods: We obtained data on 1410 men from the Kuopio Ischemic Heart Disease Risk Factor Study in Eastern Finland. Men were aged 42, 48, 54, or 60 years of age and free from clinical CHD at baseline. JH was measured using the John Henryism Scale. We considered four measures of SEP (childhood SEP, education, income, occupation), and used COX survival models to estimate the relative hazard (RH) of AMI by SEP and JH, before and after adjustment for sociodemographic, psychosocial, and biological risk factors. Results: 207 cases of MI occurred over a median of 14.9 years of follow-up. Men in lower rank (farmer/blue collar) occupations and high JH had a higher age-adjusted risk of AMI than men in higher rank (white collar) occupations (RH farmer/blue vs. white collar: 3.39/2.97). This difference was not present for men with low JH (RH farmer/blue vs. white collar: 1.3/0.98), p = 0.003 for SEP/JH interaction. These associations persisted after adjustment for marital status, hopelessness, Type A behavior, alcohol consumption, smoking status, BMI, high and low-density lipoprotein, total cholesterol, serum blood glucose, fibrinogen, systolic and diastolic BP (RH farmer/blue vs. white collar: 2.67/2.24 for high JH; 1.21/0.98 for low JH, p = 0.014). Results were similar but not statistically significant for other measures of Sep. Conclusion: Chronic high-effort coping (JH) with socioeconomic adversity increased risk for AMI in Finnish men.

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NEIGHBORHOOD FOOD ENVIRONMENT AND GESTATIONAL DIABETES IN NEW YORK CITY. *T Janevic, L Borrell, A Rundle, A Herring, D Savitz (Columbia University, New York, NY 10033)

Neighborhood food environment has been associated with poor diet during pregnancy and obesity, both important risk factors for gestational diabetes. We investigated the relationship between the number of supermarkets, fast food restaurants, healthy food places (supermarkets, fruit/vegetable stores, natural food stores), and unhealthy food places (fast food, pizza, convenience stores, bodegas, bakeries, candy/nut stores, meat stores), and gestational diabetes in New York City. Gestational diabetes, census tract of residence, and individual-level covariates were ascertained from linked birth-hospital discharge data for 209,666 singleton births for the years 2001–2002. Data on retail food places in 2001 were obtained from a commercial database. Adjusted odds ratios(aOR) were estimated using a multilevel generalized linear model for binary responses. Adjusting for neighborhood deprivation, percent commercial space, borough, education, age, parity, Medicaid, race/ethnicity, and nativity, we found no association between any of the neighborhood food environment measures and gestational diabetes, with aORs ranging from 0.95 to 1.04 in magnitude. There was a multiplicative interaction between maternal education and number of fast food restaurants (p = 0.002); the aOR for $\geq$2 fast food places vs. none was 1.11 (95% CI = 0.97,1.23) for women with $<$12 years education, 1.08 (95% CI = 0.96,1.22) for 12 years, and 0.89 (95% CI=0.80,0.99) for $>$12 years. The results did not differ by employment status or race/ethnicity. Future research should seek to identify more specific features of neighborhoods that are related to diet and obesity in pregnant women.

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MONITORING TRENDS IN SOCIOECONOMIC HEALTH INEQUALITIES: IT MATTERS HOW YOU MEASURE.

*Y-H Khang, S-C Yun, J W Lynch (University of Ulsan College of Medicine, Seoul, South Korea)

Background: Odds ratio (OR), a relative measure for health inequality, has frequently been used in prior studies for presenting inequality trends in health and health behaviors. Since OR is not a good approximation of prevalence ratio (PR) when the outcome prevalence is quite high, an important problem may arise when OR trends are used in data in which the outcome variable (e.g., smoking or ill-health) is of relatively high prevalence and varies significantly over time. This study is to compare time trends of odds ratio (OR) and prevalence ratio (PR) for examining time trends in socioeconomic inequality in smoking. Methods: A total of 147,805 subjects (71,793 men and 76,017 women) aged 25–64 from three Social Statistical Surveys of Korea from 1999 to 2006 were analyzed. Socioeconomic position indicators were occupational class and education. Results: Absolute educational and occupational differences in age-adjusted prevalence of smoking increased in both genders between 1999 and 2006. While there were no significant p values for trend in ORs of occupational class among men, trends for PRs were significant. In women, p values for OR trends were similar to those for PR trends. In males, RII by log-binomial regression showed a significant increasing tendency while RII by logistic regression was stable between years. In females, trends of RIIs by logistic regression and log-binomial regression produced a similar level of p values. Conclusions: Different methods of measuring trends in socioeconomic health inequalities may lead to different conclusions about whether relative inequalities are increasing or decreasing. Trends in ORs may overstate or understate trends in relative inequality in health when the outcome is of relatively high prevalence and that prevalence varies significantly with time.

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CONTRIBUTION OF MATERIAL, PSYCHOSOCIAL, AND BEHAVIORAL FACTORS IN EXPLAINING EDUCATIONAL AND OCCUPATIONAL MORTALITY INEQUALITIES IN A NATIONALLY REPRESENTATIVE SAMPLE OF SOUTH KOREA: RELATIVE AND ABSOLUTE PERSPECTIVES.

*Y-H Khang, J W Lynch, S Yang, S Harper, S-C Yun, K Jung-Choi, H R Kim (University of Ulsan College of Medicine, Seoul, South Korea)

The relative contribution of material, psychosocial, and behavioral factors in explaining socioeconomic health inequalities has been debated. Prior investigations examined relative abilities to explain inequalities. In addition, research efforts to explore mechanisms of socioeconomic health inequalities have rarely been made in Asian countries where the prevalence of and socioeconomic distribution of risk factors for mortality are different from Western countries. This study examined relative and absolute abilities of pathways to explain educational and occupational inequalities in mortality in a nationally representative sample from South Korea. The 1998 and 2001 National Health and Nutrition Examination Survey data was linked to national mortality data. Of 8366 men and women aged 30+, 310 died between 1999 and 2005. Nine pathway variables (three each: material factors, psychosocial factors, behavioral factors) were examined. Relative risk and relative index of inequality were used as relative inequality measures while risk differences and slope index of inequality were used as absolute measures. Psychosocial factors showed less explanatory ability over material and behavioral factors. This was true for education and occupational class and for relative and absolute explanatory powers. When the extent of social inequality was measured on a relative scale, material factors showed greater explanatory ability than behavioral factors. Explanatory abilities of pathway variables differed by relative or absolute measures. When social inequality was considered on an absolute scale, the role of behavioral factors was greatest.

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EDUCATIONAL PATTERNING IN BMI, DIABETES, AND HYPERTENSION IN WHITE, BLACK, HISPANIC, AND CHINESE MEN AND WOMEN.

*S Boykin, A Diez-Roux, M Carnethon, S Shrager, H Ni, T G Franklin, M Whitt-Glover (University of Michigan, School of Public Health, Ann Arbor, MI 48109)

Few studies have assessed race/ethnic differences in the social patterning of cardiovascular risk factors in the U.S. Data from the Multi-Ethnic Study of Atherosclerosis (MESA) were used to investigate racial differences in educational patterning of BMI (kg/m^2), diabetes (fasting glucose $\geq$ 126 mg/dl, insulin use, or physician diagnosis), and hypertension (systolic blood pressure (bp) $\geq$ 140 mmHg or diastolic bp $\geq$ 90 mmHg, or taking bp meds). Stratified regression analyses were used to estimate associations of education with risk factors adjusting for age. The strongest and most consistent inverse educational gradients were observed in white and black women with age-adjusted mean (95% confidence interval [CI]) differences in BMI for graduate school vs. $\leq$ high school: -2.7 kg/m^2 (-3.6, -1.7) for white women and -2.3 kg/m^2(-3.5, -1.1) for black women. Odds ratios ([OR] 95% CI) for diabetes were .34 (.13, .86) and .38 (.21, .68) in white and black women; OR of hypertension .54 (.37, .77) and .58 (.38, .87) in white and black women. Findings for Hispanic women were similar to those for white and black women. Similar but slightly weaker associations were observed in white men (mean difference in BMI -1.2 kg/m^2 (-1.9, $-.5$); OR .47 (.26, .86) for diabetes and .60 (.42, .86) for hypertension). Inconsistent patterning was observed in black men, Hispanic men (except for diabetes which was inversely associated with education), and Chinese men and women. The educational patterning of BMI, diabetes, and hypertension is not invariant across gender and race/ethnic groups.

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DEVELOPING A COMMUNITY-BASED INTERVENTION TO INCREASE BREAST CANCER SCREENING AND EARLY DETECTION AMONG LOW-INCOME, BLACK WOMEN.

*I J Hall, C A Turbes, D Beauchesne, N Kamalu (CDC, Division of Cancer Prevention, Chamblee, GA 30341)

The recent decrease in breast cancer deaths in white females is attributed to greater use of breast cancer screening and early detection; however, deaths among Black women continue to increase, in part, because disease is diagnosed at later stages. We designed a 3-phased study to develop a community-based pilot intervention to motivate Black women eligible for no-cost mammograms through the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) to participate in screening. In 2005, we held eight focus groups, segmented by age and screening status, with Black women in Savannah and Macon, Georgia. This formative research gathered information on participants' knowledge and awareness of the NBCCEDP and suggested channels, messages, and sources to reach Black women. Data were analyzed using SPSS.v.10.0 and ATLAS.ti.5.0. The findings showed lack of awareness of the NBCCEDP and that radio and print media were viable channels to disseminate health information to Black women. In 2007, eight focus groups were again conducted in Savannah and Macon. We tested the clarity and potential effectiveness of printed concepts and audio messages developed based on Phase 1 findings. We found that participants valued Black images, presentation of family relationships, and testimonials from Black breast cancer survivors. We will design and evaluate a culturally-appropriate, community-based intervention to increase knowledge and awareness of breast cancer and the availability of low- or no-cost screening services and motivate low-income Black women to get screened for breast cancer. These findings suggest that interventions that aim to increase mammography among Black women and help eliminate racial/ethnic health disparities in breast cancer should consider using multiple communication channels including print media and radio featuring cancer survivors to disseminate health information in the Black community.

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THE INFLUENCE OF CHILDHOOD AND ADULT SOCIOECONOMIC STATUS ON ADULT OBESITY.

*B Schumann, A Kluttig, K Werdan, J Haerting, K H Greiser (University of Halle, Germany)

Socioeconomic status (SES) is a strong predictor of cardiovascular disease. However, there is a lack of information on the longterm effects of childhood SES on risk factors such as obesity independent of adult SES. The association of adult obesity with childhood and adult SES was analysed in a population-based cross-sectional sample of 1779 men and women aged 45–83 years. Occupation of father (as measure of childhood SES) was categorized as manual, non-manual or other, own occupation (as measure of adult SES) as manual, non-manual or self-employed. We assessed the association of body mass index (BMI) and waist-hip ratio (WHR) with SES in sex-specific age-adjusted linear regression models. Mean BMI across levels of childhood SES was in women 28.8 (95% confidence interval 28.2–29.3) for manual, 27.5 (26.9–28.2) for non-manual, and 29.4 (28.6–30.1) for other occupation. For adult SES, BMI was in women 29.9 (29.0–30.7) for manual, 28.3 (27.9–28.7) for non-manual, and 26.9 (24.9–28.8) for self-employed occupation. Adjustment for adult SES and age slightly attenuated the effect of childhood SES: In women, mean BMI was 28.5 (95% CI 27.7–29.3) for manual, 27.5 (26.6–28.4) for non-manual, and 29.1 (28.1–30.0) for other occupation of father. Likewise, the effect of adult SES on BMI was attenuated by adjusting for age and childhood SES: Mean BMI was 29.7 (28.9–30.6) for manual, 28.3 (27.9–28.8) for non-manual, and 27.1 (25.1–29.0) for self-employed own occupation. The influence of childhood and adult SES on BMI was also present in men but less marked. Similar results were found for the association of WHR with SES. In conclusion, our findings support the hypothesis that parental SES has a weak effect on measures of obesity in older age.

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DISABILITY AND THE URBAN BUILT ENVIRONMENT.

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Research on the role of the built environment in the disablement process has been largely absent. Using data from the Chicago Community Adult Health Study (2001–2003), we examined the effect of built environment characteristics on mobility disability among adults age 45+ (N = 1195) according to their level of lower extremity physical impairment. Built environment characteristics were assessed using systematic social observation to independently rate street and sidewalk quality in the block surrounding each respondent's residence in the City of Chicago. Using multinomial logistic regression (and controlling for a wide array of demographic, socioeconomic, and health characteristics) we found that street conditions had no effect on mobility disability among adults with only mild physical impairments (odds ratio (OR) = 1.32, 95% confidence interval (CI) = 0.77, 2.26). However, among adults with more severe impairments in neuromuscular and movement related functions, the odds of reporting severe mobility disability were over four times greater (OR = 4.24, 95% CI = 1.33, 13.51) for those living in neighborhoods with poor street conditions (e.g. cracks, broken curbs, potholes) compared to those living in neighborhoods with streets in good condition. Effects persisted after adjusting for neighborhood social disorder and residential safety. These results highlight the role of the built physical environment in the process of becoming disabled.

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DEVELOPING A THEORETICALLY-BASED MEASURE OF GENDER-BASED POWER AT THE NEIGHBORHOOD-LEVEL.

*S G Merchant, T M Glass, and J M Ellen (Johns Hopkins University, Bloomberg School of Public Health, Baltimore, MD 21201)

Individual-level risk factors have been unable to completely account for racial disparities in sexually transmitted diseases (STDs). This may be due to the lack of consideration given to the context in which these factors occur. Theoretical frameworks are needed to identify the pathways linking the social and physical features of neighborhoods to disease. Power is an important social mechanism operating in neighborhoods that is likely related to STDs. Unfortunately, power has often been a neglected exposure of interest in research due to difficulties in its conceptualization and measurement. The purpose of this study is to develop a theoretically-based measure of gender power that reflects the balance of power between men and women in neighborhoods. The development of this construct is important in that this measure will be used in later examinations of the relationship between gender-based power and sexual risk behavior for STDs. This analysis used multiple data sources from Baltimore City and the US Census to develop the hypothesized measures of power. Using a factor analytic approach, we first estimated the latent constructs of legitimate and coercive power in Baltimore City census block groups. We then assessed the external construct validity of our measures by using multivariate linear regression to explore the relationships between our power constructs and hypothesized neighborhood-level outcomes. Our results supported the existence of two distinct power constructs that demonstrated excellent construct validity in regression analyses. These findings illustrate the feasibility of constructing theoretically-based neighborhood-level measures for use in multilevel analyses.

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MORTALITY IN HOMELESS AND SOCIO-ECONOMICALLY DEPRIVED POPULATIONS: A 5-YEAR RETROSPECTIVE COHORT STUDY.

*D S Morrison, C A Bray (West of Scotland Cancer Surveillance Unit, Glasgow, UK, G12 8DN)

To determine whether the risk of death in homeless individuals is similar to that in deprived non-homeless populations, we carried out a retrospective cohort study on 6,323 homeless adults and an age, sex matched random sample of 12,451 non-homeless local residents in Greater Glasgow, UK. The mean age of participants was 31 years. Over 5 years of observation, 1.7% (209/12,451) of the general population and 7.2% (457/6,323) of the homeless cohort died. Cox's proportional hazards models were used to compare deaths in different socio-economic strata. The hazard ratio of deaths in the homeless compared to the general population was 4.4 (95% CI 3.8,5.2) and was 3.3 times greater than non-homeless residents in the most deprived areas. Compared to the general population, the hazards of death from drugs and suicide were 20 times and 8 times greater, respectively, among the homeless. Homelessness confers a significant excess risk of death than living in deprived but non-homeless circumstances.

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MULTILEVEL EXPLORATION OF HEALTH DISPARITY AND SEGREGATION. *R A Scribner, K P Theall, and K Mason (LSU School of Public Health, New Orleans, LA 70112)

Objectives: To employ a recently described multilevel design to determine whether the risk of premature mortality is explained by between-city differences in racial segregation, and whether this effect is due to the grouping of neighborhood-specific risk in racially segregated cities. Methods: A multilevel analysis of Los Angeles County premature mortality data for the years 1989 through 1991 was modeled as the proportion of deaths in 24,826 cells (deaths and denominators cross-tabulated by age, gender, and race/ethnicity) at level 1 with 1,552 census tracts at level 2, and 105 cities at level 3. Racial segregation was characterized as black isolation. Neighborhood-specific risk was characterized as contextual (alcohol outlet density) and compositional (percent in poverty, family structure, and education) exposures across census tracts. Results: Accounting for the between-city and between-census tract variance in premature mortality reduced the odds of mortality for blacks compared to whites (adjusted Odds Ratios, aOR = 1.59 fixed model; aOR = 0.83 random model). Comparing cities in the lowest and highest quartiles for Black isolation was associated with an increase in mortality risk (aOR = 1.74; 95% Confidence Interval, CI = 1.16, 2.13). Including census tract exposures reduced but did not eliminate the effect (aOR = 1.48; 95% CI 1.33, 1.65). Conclusions: Accounting for the between-city and between-census tract level variance in premature mortality explained health disparities for blacks in Los Angeles County. Partial mediation of black isolation's effect on mortality by risk exposures at the census tract level supports a model of institutional racism to account for health disparities. Likely endogenous effects limit interpretation.

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EVALUATION OF AUTOMATED CODING TO CLASSIFY OCCUPATIONS ON HISTORICAL RECORDS. *M D Patel, K M Rose, C R Owens, H Bang, J S Kaufman (University of North Carolina, Chapel Hill, NC)

The literature on the impact of childhood socioeconomic status (SES) on risk of adulthood chronic diseases is inconsistent, with null associations being more common in studies using childhood SES recalled in adulthood. To compare recalled childhood SES to that obtained from historical records, we abstracted parental occupation from birth certificates and 1930 census records for decedents from the Atherosclerosis Risk in Communities (ARIC) Study. As coding these data into standard census occupational categories is challenging, we assessed the feasibility of automating this process, by comparing two coding systems used with contemporary vital records: a computer program developed by the Washington State Department of Health (DOH); and the National Institute for Occupational Safety and Health's Standardized Occupation and Industry Coding (SOIC) System. Of 308 occupations submitted from birth certificates, DOH coded 92%, whereas the SOIC program coded 85%. Of 250 occupations coded by both programs, 77% were assigned identical occupational codes and 94% were assigned to the same eight occupational categories (kappa = 0.93, 95% Confidence Interval (95% CI) = 0.89, 0.96). Of 279 occupations from census records, DOH coded 95% and SOIC coded 84%. Of 217 occupations coded by both systems, 70% were assigned the same occupational code and 88% were assigned to the same occupational category (kappa = 0.86, 95% CI = 0.80, 0.91). There was good agreement between the DOH and SOIC systems for coding historical occupations and very good to excellent agreement when occupations were grouped into categories. Ongoing validation work is assessing the accuracy of these automated coding systems, but preliminary findings show promise for their use in collecting occupational information.

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DETERMINANTS OF RACIAL HEALTH INEQUALITY IN THE U.S. K Lahiri and *Z Pulungan (Department of Economics, University at Albany—SUNY, Albany, NY 12222)

Using self-assessed health status together with a number of other indicators of health and morbidity, we measure the contribution of certain socio-demographic and neighborhood characteristics to health inequality as measured by Health Gini coefficients and Lorenz curves within four major racial/ethnic groups in the U.S. (cf. Wagstaff, van Doorslaer and Watanabe: ''On decomposing the causes of health sector inequalities'', Journal of Econometrics 2003; 112: 207–223). Data used in this study comes from the Behavioral Risk Factor Surveillance System over 1999–2004 with 1,212,890 sample observations. Income inequality at the county level is found to be associated with lower individual health among Whites, Hispanics and Asians, but not among Blacks and American Indian/Alaskan Natives (AIANs) (cf. Deaton and Lubotsky: ''Mortality, inequality and race in American cities and states''. Social Science & Medicine 2003; 56: 1139–1153). The strongest contributing factor to health inequality among Whites and Blacks is unemployment (30%), whereas income (29%) and education (29%) are most important for Hispanics. The highest health inequality is found within AIANs with employment status again being the strongest factor (42%). Asians have the lowest health inequality with income as the strongest contributing factor (29%). Possible pathways for these causal relations are explored. Keywords: Self-assessed health status; Health inequality; Decomposition analysis

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WITHDRAWN

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SOCIAL DISPARITIES BETWEEN URBAN AND RURAL AND ITS EFFECTS ON SELF-RATED HEALTH IN KOREA. *J W Min, J E Ryu, H J Ku, S J Park, S S Kim, M S Park (National Institute of Health, KCDC, Seoul, Korea)

The disparities in chronic disease morbidity and medical service use between rural and urban area were expected since the large proportion of old population and unfavorable socioecomic circumstances in rural area. To confirm the socio-demographic and life style differences between urban and rural area, and those effects on self–rated health (SRH) in Korea, we analyzed survey data from the community-based cohorts of Korea Genome Epidemiology Study (2004–2007). 23,621 subjects responded the SRH questions, and the disparity in SRH between rural and urban area was examined by general linear model. Several, demographic factors showed statistically significant associations with SRH. Women rather than man, and people over sixty tended to rate themselves as unhealthy. Divorced, widowed, or separated reported lower SRH level than married or never married. Low education level, depression, morbidity of selected disease (hypertension, diabetes and obesity) and smoking were associated with low SRH score. People in rural area reported lower SRH score and older, more bereaved, and less educated than those in urban area. They also tend to be physically inactive, and smoke more and longer. Unlikely other variables, depression level was higher among urban residents. The present findings suggested that special attention on rural residents is needed and SRH is the indicator of community health assessment.

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SURVIVAL DIFFERENCES BETWEEN INDIGENOUS AND NON-INDIGENOUS NEW ZEALANDERS WITH COLON CANCER: CONTRIBUTION OF DISEASE, PATIENT AND HEALTH CARE FACTORS. *S E Hill, D Sarfati, T Blakely, B Robson, G Purdie, I Kawachi (University of Otago, New Zealand)

Ethnic disparities in cancer survival are seen in many populations and cancer types. We examined cancer-specific survival by ethnicity in a cohort of 305 Mâori (indigenous) and 333 non-Mâori New Zealanders diagnosed with colon cancer between 1996 and 2003 and notified to the national cancer registry. Clinical and outcome data were obtained from health care records and the national mortality database. Kaplan-Meier survival curves were constructed and hazard ratios (HRs) calculated using Cox hazards modelling. HRs were sequentially adjusted for five domains of covariates to assess the contribution of each to survival disparities. Mâori had significantly poorer survival than non-Mâori, with a crude HR of 1.34 (95% confidence interval 1.04–1.71). Adjustment for age, sex and year of diagnosis made little difference (HR 1.32), and adjustment for disease characteristics (tumour stage, grade and site and emergency presentation) slightly increased the apparent disparity (HR 1.39). Adjustment for patient factors (comorbidities and smoking) reduced the HR by about a third (HR 1.27). Further adjustment for treatment processes (surgeon type, follow-up, chemotherapy receipt) made little difference (HR 1.29) but adjustment for markers of health care access (treatment facility type, small area deprivation and rurality) reduced the survival disparity by another 30% (HR 1.20). Our data suggest that survival disparities between indigenous and non-indigenous New Zealanders with colon cancer do not arise from biological or treatment factors but are partly accounted for by patient comorbidities and differential access to health services.

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DOES SEGMENTED ASSIMILATION THEORY EXPLAIN PERINATAL HEALTH DISPARITIES AMONG WOMEN OF MEXICAN DESCENT? *M A Johnson and K Marchi (UCLA Department of Social Welfare, Los Angeles, CA)

A higher prevalence of low birth weight (<2,500 grams) has been observed among births to more acculturated women of Mexican descent living in the U.S. when compared to their less acculturated counterparts. Given that less acculturated women tend to be of lower socioeconomic status, this persistent disparity has received considerable attention. Segmented assimilation theory posits that the life chances of immigrants and their offspring are shaped by the cultural fabric of the U.S. communities into which they integrate. The theory was tested as a framework for disentangling the spatial and cultural underpinnings of low birth weight disparities among infants born to women of Mexican descent in California using population-based data from the Maternal and Infant Health Assessment and the 2000 U.S. Census (N = 6,061). As in previous research, births to English-speaking respondents had a significantly higher prevalence of low birth weight (4.2%) when compared to Spanish speakers (3.0%; $p < .01$). Though these figures meet the Healthy People 2010 target of five percent, stratification of the sample revealed that certain English-speaking subgroups had infant low birth weight proportions that exceeded national targets. Few of the individual characteristics examined predicted low birth weight in multilevel logistic regression modeling. Little support was found for the claims of segmented assimilation theory; however, a three-fold increase in the odds of infant low birth weight (OR 3.05; 95% CI = 1.59, 5.84) was observed among English speakers residing in high-density immigrant Latino neighborhoods. New directions for acculturation theory and multilevel research on cultural identity and health are discussed.

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CONTRIBUTINON OF MAJOR CAUSES OF DEATH TO SOCIOECONOMIC INEQUALITIES IN CHILDHOOD MORTALITY: A NATIONAL MORTALITY FOLLOW-UP STUDY IN SOUTH KOREA. *K Jung-Choi, Y H Khang (Department of Occupational and Environmental Medicine, KyungHee Medical Center, Seoul, Korea)

Aims: To determine which causes of death contribute the most to absolute socioeconomic inequalities in childhood mortality in Korea. Methods: The birth certificate data from 1995 to 2003 (n = 5,116,076) were linked to the death certificate data (no. of death = 19,190) from 1995 to 2004 via unique personal identification number. To calculate the contribution of different causes of death to absolute inequalities in mortality, the slope index of inequality by parental education and absolute risk difference by parental job (white vs. blue color) were estimated after adjusting for parental age and parity. Results: In infant, congenital diseases (male27.2%, female28.2%) and birth-related diseases (male 19.0%, female17.0%) were major causes of death. Those causes contributed to absolute socioeconomic inequalities by about 26.7–42.0%. In children aged 1–4 years, injuries were the leading causes of death (male49.6%, female44.9%) and contributed more than 50% to socioeconomic inequalities. In children aged 5–9 years, injuries accounted for more than 50% of deaths (male61.4%, female50.7%). The contribution of injuries to socioeconomic inequalities in mortality was great, especially to the mortality difference according to mother's job (male98.1%, female101.1%). Conclusions: Congenital and birth-related diseases for infant and injuries for the age 1–9 were the major contributing causes to socioeconomic differentials in mortality. To reduce absolute magnitude of socioeconomic inequalities in childhood mortality, policy efforts directed toward injuries are warranted in South Korea.

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MASTERY, FAST FOOD RESIDENTIAL EXPOSURE AND CARDIOMETABOLIC RISK. *C Paquet, M Daniel, L Gauvin, L Dubé (Université de Montreal, Montreal, QC, H2W 1V1 Canada)

We tested the association between mastery (degree to which individuals feel in control of their lives) and cardiometabolic risk across different fast-food residential exposure strata. Blood samples were obtained from 344 individuals (49.7% men) aged 18–57 years (mean: 34.9) sampled from seven Montreal census tracts selected to represent the spectrum of census tract-level socio-economic status and language (French or English). Risk factors were based on Adult Treatment Panel III standards for waist circumference, body mass index, high-density lipoprotein, triglycerides and total cholesterol, and the American Diabetes Association standard for HbA1C. Individual risk factors were summed to obtain a cumulative cardiometabolic risk score. Mastery was self-reported using a validated scale. Fast-food restaurants as a proportion of restaurants within 500-m of participants' residences (range: 0–25%) was obtained using a Geographic Information System. Poisson regression stratified by tertiles of fast food exposure was performed to test the association between mastery and cardiometabolic risk accounting for participants' age, gender, education and income. Generalized Estimating Equations estimators were used to account for the clustering of observations. Mastery was negatively associated with cardiometabolic risk across all fast-food strata (Relative Risk (RR): 0.97 [95% Confidence Interval: 0.94, 0.99]), with the magnitude of the relationship increasing from the lowest (RR: 0.99[0.96,1.03]) to the intermediate (RR:0.96 [0.95,0.98]) and the highest strata (RR:0.94 [0.93,0.96]). A positive relation between mastery and lower cardiometabolic risk was most apparent in residential areas with higher fast-food exposure.

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EDUCATION AND BMI IN GREECE: MALES VERSUS FEMALES. *K Karavolos, P Karnaki, E Riza, I Kotsioni and A Linos (Institute of Preventive Medicine, Environmental and Occupational Health, Athens, Greece)

OBJECTIVE: To assess the interactive effects of gender and level of education on Body Mass Index (BMI) and changes in BMI over a period of 3 years. METHODS: A sample of 10.100 Greeks, 20–92 years old was studied using data from the Greek version of the European Community Household Panel. Mixed effects regression models were used to analyze the data. RESULTS: Significant gender X education (F-value = 117.2, $P < .0001$) and gender X time interactions ($F = 9.6$, $P = .001$) on BMI were observed. In particular, 19% of highly educated women were overweight compared to 53% in men and 4% of highly educated women were obese compared to 8% in men. Differences of similar magnitude can be observed in the moderate education categories. Strikingly, 74% of highly educated women have a BMI in the normal range compared to 40% in men. In addition, for females, there was an inverse association between education and BMI, whereas, for males there was no association. Also, BMI increases over this 3-year period varied by gender (females, estimate = 0.081, $P < .0001$; males, estimate = 0.030, $P = .006$). Results did not change after adjustment for potential confounding variables, such as age, smoking, marital status and self-rated health. CONCLUSIONS: Gender differences on BMI are largely patterned by education, with females having lower BMI levels as their educational level increases and males having no difference on BMI throughout all educational levels. Gender differences also exist in aging as females become heavier than men from one year to the next. Education and gender should be taken into consideration when designing health promotion activities to deal with the fast-growing epidemic of obesity.

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FACTORS INFLUENCING PROSTATE CANCER TREATMENT DECISIONS. *B Drake, S Wagner, J Hebert (Harvard School of Public Health, Boston, MA 02115)

Studies have shown that treatment received by African-American (AA) men with prostate cancer (CaP) is systematically different from that received by white men. Therefore, we investigated what factors influence CaP treatment decisions and whether racial differences exist. Questionnaires were mailed to 1,866 men in SC with a diagnosis of CaP. The dependent variable, treatment, was dichotomized in logistic regression analyses were as: surgery vs. all other treatments; radiation vs. other treatments; and watchful waiting vs. other treatments. The factors influencing treatment were divided into two categories: social (doctor, family, friend, self) and clinical (cure, impotence, incontinence, pain). The treatment choices of AA men were significantly more likely to be influenced by pain and significantly less likely to be influenced by potential for cure compared to white men. Family was a significant social factor that predicted receipt of surgery and radiation in which increasing family support predicted greater odds of receiving either surgery or radiation as treatment as compared to all other treatment choices. Impotence and incontinence were protective against receiving surgery; however, increasing concern about incontinence and impotence was associated with greater odds of receiving radiation. AA men were less likely to report cure and more likely to report pain avoidance as an influence of treatment decisions. Informed decision-making is an important part of CaP treatment decisions. From these results, we are beginning to understand how men make decisions, where cultural preferences exist and where education should be emphasized.

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FOOD SECURITY AND CONCENTRATIONS OF C-REACTIVE PROTEIN AMONG US ADULTS. *R Widome, E D Parker (Healthy Youth Development Prevention Research Center, Division of Adolescent Health and Medicine, Department of Pediatrics, University of Minnesota, Minneapolis, MN 55414)

Purpose: We hypothesized that adults living food insecure households would have increased concentrations of serum C-reactive protein (CRP) due to elevated stress caused by food restriction, metabolic changes that occur from inconsistent energy intake, and over-consumption of energy-dense foods. Methods: Data from the National Health and Nutrition Examination Survey from 1999 to 2004 were analyzed cross-sectionally. Food security was measured by the US Department of Agriculture Household Food Security Scale, serum CRP was quantified using latex-enhanced nephelometry. We used multiple linear regression to calculate mean levels of CRP at each food security category using both minimally adjusted (age, race, sex) and fully adjusted models (age, race, smoking status, physical activity, body mass index, self-report diabetes, total cholesterol, household income, and education) in adults. Results: After full adjustment, food secure adults had a mean CRP concentration of 0.40 mg/dL [95% Confidence Interval (CI) = 0.38–0.42], those who were food insecure with hunger and those who were food insecure without hunger CRP concentrations of 0.37 mg/dL [95% CI = 0.29–0.44] and 0.50 mg/dL [95% CI = 0.45–0.56] respectively. Associations did not differ by gender and the patterns of associations were similar in minimally and fully adjusted models. Conclusions: Living in a household that is food insecure without hunger was associated with an elevated CRP level compared to all other groups. The process may relate to consumption and stress patterns unique to those living with moderate food deprivation and this may influence chronic inflammation.

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FOOD SECURITY AND METABOLIC SYNDROME AMONG US ADOLESCENTS AND ADULTS. *E Parker, R Widome, M Pereira (HealthPartners Research Foundation, Bloomington, MN 55440)

Purpose: The objective of this study was to examine the association of food security and metabolic syndrome (MetS) in a representative sample of the US population. We hypothesized that compared to those in food secure households, adolescents and adults living in food insecure households would have increased odds of (MetS). Methods: Data from the National Health and Nutrition Examination Survey from 1999 to 2004 were analyzed cross-sectionally. Food security was measured by the US Department of Agriculture Household Food Security Scale. In adults, MetS was defined by National Cholesterol Education Program criteria. In adolescents, MetS was defined using modified criteria based on age and sex. We used logistic regression to compute odds ratios (OR) and 95% confidence intervals (95% CI) in the association of household food security and MetS. Models were adjusted for age, gender, race/ethnicity, smoking, and physical activity in adolescents. In adults, models were further adjusted for education and parity in women. Results: After full adjustment, compared to those who were food secure, adults who were food insecure without hunger had 1.3-fold increased odds of MetS (OR = 1.3, 95% CI 1.12–1.51) and adolescents had a 2-fold increased odds of MetS (OR = 2.04, 95% CI 1.39–3.00). In adults and adolescents, food insecurity with hunger was not associated with increased odds of MetS compared to those who were food secure. Conclusion: Members of households that are food insecure without hunger are at increased risk of MetS. A mechanism that may explain the association of food insecurity with MetS is that foods that are inexpensive and easily accessible tend to be energy dense and have low nutritional value.

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CANCER PREVENTION AND SOCIAL DISPARITIES IN CANCER. *P Tehranifar, J C Phelan, Y Liao, M B Terry (Columbia University, New York, NY 10032)

Social disparities in cancer have emerged or persisted at a time when our knowledge and ability to prevent and treat many cancers have improved greatly. One explanation may be that socially advantaged people use their greater access to social resources (e.g. money, knowledge, power) to avoid disease; however, this advantage can only be used when effective medical interventions and knowledge are available. Accordingly, associations between race/socioeconomic status (SES) and mortality would be stronger for cancers with effective screening or treatment (high preventability, e.g., breast cancer) than for cancers with less effective screening or treatment (low preventability, e.g., pancreatic cancer). To test this prediction, we applied previously validated ratings for 30 cancers assessing the degree to which death could be prevented or delayed to data from 9 cancer registries participating in the Surveillance, Epidemiology & End Results program. We used life table and Cox proportional hazard analyses to examine SES (county-level poverty) and racial (African American [AA] vs. white) differences in mortality risk from high and low preventability cancers. Racial and SES differences existed for both high and low preventability cancers, but these differences were larger for high than low preventability cancers, particularly for age groups $\geq$ 50 years. (e.g., adjusted AA vs. white hazard ratio [HR] for low preventability = 1.14, 95% confidence interval [CI] = 1.09–1.19 and HR for high preventability = 1.36, 95% CI = 1.30–1.42, age = 51–64). Findings support the central role of resource utilization for avoiding disease and death.

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ASSOCIATION BETWEEN CHILDHOOD SOCIOECONOMIC POSITION AND ADULTHOOD OBESITY: A SYSTEMATIC REVIEW. L C Senese, N D Almeida, *E B Loucks (McGill University, Montreal, Canada)

Increasingly, studies have investigated effects of childhood socioeconomic position (SEP; often measured as parental education, income and occupation) on disease risk factors such as obesity. However, associations between childhood SEP and obesity have not been systematically assessed in recent years. Objectives: To perform a systematic review to objectively assess the association between childhood SEP and adulthood obesity. Methods: Systematic review on studies published between 1998 and 2007, which builds on a previous review published in 1999. Further inclusion criteria were: human studies examining associations between childhood SEP (assessed for participants aged <19 years) and obesity/adiposity (measured in adults aged $\geq$19 years) for any geographic location, race, ethnicity and gender. Extensive searches of five databases (Cochrane Library, Medline, Embase, PsycINFO, Web of Science) were performed. Table of contents for relevant journals and reference sections of relevant papers were hand searched. Experts in the field were consulted. Results: Overall, 40 publications from 26 distinct studies met the inclusion criteria. Of these 26 studies, 23 (88%) found an inverse association between childhood SEP and adiposity/obesity in adulthood while three studies reported no association. No studies found a positive association. The inverse association was independent of participants' adulthood SEP in 61% (14/23) of the studies that found an inverse association. Findings were quite consistent across gender and geographical region in the predominantly developed countries where studies took place. Conclusions: Current literature suggests that lower childhood SEP is associated with increased levels of adulthood obesity.

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NEIGHBORHOOD SOCIOECONOMIC STATUS IN RELATION TO SERUM BIOMARKERS IN THE BLACK WOMEN'S HEALTH STUDY. *Y C Cozier, M A Albert, J R Palmer, L Rosenberg (Slone Epidemiology Center at Boston University, Boston, MA 02215)

Persons of lower socioeconomic status (SES) have a higher incidence of cardiovascular disease than those of higher SES status. We examined the relationship between neighborhood SES and serum biomarkers of cardiovascular disease risk in the Black Women's Health Study, a prospective follow-up of 59,000 U.S. black women begun in 1995. Blood samples, obtained from 486 study participants aged 43–78 residing in New York, Georgia, and Illinois, were analyzed for serum lipid (high-density lipoprotein, low-density lipoprotein, triglycerides) and C-reactive protein levels. Participant addresses were linked to 2000 U.S. Census block-group data on area income, education, and wealth, from which we derived a neighborhood SES score. Individual-level data were collected through biennial postal questionnaires. We assessed the serum biomarkers in relation to SES in linear regression models after log-transforming the non-normally distributed variables (triglycerides and C-reactive protein). We controlled for individual-level characteristics (age, education, body mass index, alcohol consumption, smoking, menopausal status, female hormone use, and history of hypercholesterolemia, hypertension and diabetes). Women living in the most deprived neighborhoods had the least favorable levels of high-density lipoprotein, triglycerides and C-reactive protein, but there were no significant trends. The largest difference was for C-reactive protein which was 47% greater among women in the lowest quintile of neighborhood SES compared to women in the highest quintile.

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DIVERSITY WITHIN DISPARITY: SOCIAL DETERMINANTS OF AMERICAN INDIAN AND ALASKA NATIVES HEALTH STATUS.

*L G Byers (University of Oklahoma School of Social Work, Tulsa, OK 74135)

Twenty-three years ago, the Department of Health and Human Services released a landmark report that indicated racial and ethnic groups had poorer health outcomes in comparison to White Americans (DHHS, 1985). American Indians and Alaska Natives were discussed within the report as facing a number of health disparities. These disparities persist to this day (IHS, 2001). Yet epidemiological research of American Indian and Alaska Natives is lacking. One potential reason for the under representation of tribal people in research is that as members of federally recognized tribes, American Indian and Alaska Natives can utilize a separate health system that was created to fulfill treaty obligations made between tribal nations and the U.S. Government. The Indian Health Service operates across twelve regional units in the United States to provide health services across reservation and urban contexts. As the largest service provide to tribal citizens, the Indian Health Service provides unique insight into the health disparities of American Indian and Alaska Natives. The most recent data confirmed that the majority of diseases were experienced at higher levels than the U.S. All Races rates. However, the prevalence of disorders varied considerably across the twelve service regions indicating that while all tribal people experience a disproportionate health burden, there was much variation in terms of the conditions that are most pressing for each area (IHS, 2001). The purpose of this paper is twofold: 1) present these disparities by service unit in relation to the national level health disparities and 2) explore the relationship of social determinants (educational attainment, income, poverty, and unemployment) in relation to these differences in disparities. Such knowledge is essential to understanding and improving the health status of Native people.

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THE DIFFERENTIAL EFFECTS OF PAST, PRESENT, AND CONTINUED RELIGIOSITY ON YOUNG ADULT STD INCIDENCE.

*R Jackson, S Lurie, M Martin, and K Cardarelli (UNT Health Science Center, Fort Worth, TX 76107)

Because the transition from adolescence to adulthood is a time of great change, it is unclear whether measures of religiosity based on longitudinal or cross-sectional data better predict health outcomes in this age group. To investigate this matter, we used data from the National Longitudinal Study of Adolescent Health (n = 13,738) to calculate youths' odds of developing a sexually transmitted disease (STD) between 1994/1995 (Wave 1) and 2000/2001 (Wave 3), based on three measures of religiosity: past religiosity (Wave 1 score), present religiosity (Wave 3 score), and continued religiosity (CR; Wave 3 score adjusted for Wave 1 score). Odds ratios (OR) and 95% confidence intervals (CI) were calculated using logistic regression for the past and present religiosity models and using repeated measures multilevel modeling for the CR model. All models were adjusted for gender, age, education, and family structure. Results were stratified by race and religion as these were identified as effect-measure modifiers. Overall, increased religiosity was associated with decreased odds of developing an STD among Whites (CR OR = 0.815; 95% CI = 0.749–0.882) and Blacks (CR OR = 0.818; 95% CI = 0.745–0.890), but the magnitude and significance of this association varied by the measure of religiosity used. We considered ORs calculated with the CR model to be the most accurate because of the model's ability to consider multiple waves of data. ORs calculated with the present religiosity model were more closely aligned with those of the CR model than ORs calculated with the past religiosity model. This suggests that in this population, cross-sectional rather than longitudinal measures of religiosity may better predict health outcomes.

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THE DIFFERENCE IN SUICIDE RATES BEFORE AND AFTER SEPTEMBER 11, 2001.

*M R Prescott, M Tracy, K J Tardiff, G L Larkin, D Vlahov, S Galea (University of Michigan, Ann Arbor, MI 48109)

It is well documented that psychopathologies such as post-traumatic stress disorder, depression and anxiety increase after disasters. As suicide is an extreme outcome of these psychopathologies one might expect an increase in suicide rates after disasters. However, the evidence from all extant studies is conflicting or inconclusive. In addition, previous studies have made use of parametric methods only and none have fully accounted for long-term and monthly trends in suicide rates over time. We examined the effect of September 11, 2001 on suicide rates in New York City taking into account long-term and monthly trends using generalized additive models. We collected information about all suicides from the New York City Medical Examiner's office from 1990 to 2005 and used extrapolated census population estimates to calculate monthly suicide rates. In parametric comparisons, there was no difference in suicide rates after as compared to the period before September 11, 2001 ($X2 = 0.11$, $p = 0.73$). In non-parametric additive models, suicide rates were characterized by significantly non-linear long-term (degrees of freedom(Df), 5.97, $p < 0.01$) and monthly effects (Df 1.26, $p < 0.01$). Although in models accounting for the non-parametric long-term and monthly effects there was a statistically significant increase in the average suicide rates after September 11, 2001 as compared to the period before(beta 0.09, $p < 0.01$), September 11, 2001 did not alter the rate of change($p = 0.56$). This study suggests that there was no effect of the September 11, 2001 terrorist attacks on suicide rates in New York City taking into account long-term and monthly trends of suicides in the City.

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DISASTER EXPOSURES AND ALCOHOL BINGING AFTER HURRICANE KATRINA: A LONGITUDINAL ASSESSMENT OF SOCIOECONOMIC DISPARITIES IN THE RESPONSE TO THE DISASTER.

*MCerdá, J Dowd, M Tracy, K McGonagle, F Stafford, S Galea (University of Michigan, Ann Arbor, MI, 48104)

Hurricane Katrina was, in terms of death toll and economic impact, the most important natural disaster to hit the United States in the past 75 years. We investigated (1) the contribution of exposure to Katrina and its aftermath to change in alcohol binging after Katrina; (2) socioeconomic differences in the association between exposures to Katrina and binging. We used data from the Panel Study of Income Dynamics collected in Mississippi, Louisiana and Alabama on adults aged 18–85 (n = 519): 1) data from 2005 to measure socioeconomic status and pre-event binging and 2) data from 2007 to measure binging, exposure to the Hurricane, peri-event exposures (personal experiences of injury, injury/death to others proximate the respondent, loss of possessions due to Katrina) and post-event exposures (food availability, water, sanitary conditions, in the first month after Hurricane Katrina). We estimated marginal Poisson models that accounted for within-family correlation of responses. We found that peri-event exposures were associated with a 0.7 times lower risk of increased binging (95% confidence interval (CI) 0.52, 096). However, exposure to a higher number of post-event problems was associated with a 1.99 times higher risk of change in binging (95% CI 1.39, 2.86). The highest risk of change in binging associated with exposure to post-event circumstances was found among the lowest two income groups (±$15500 family income per year) and the highest income category ($88400+). Changing post-disaster social and economic circumstances may influence substance abuse behavior differentially across socioeconomic groups, widening preexisting health disparities.

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LIFE COURSE SOCIOECONOMIC POSITION, HEALTH, AND VOTING ABSTENTION. *O A Arah (Department of Social Medicine, AMC, University of Amsterdam, Amsterdam 1100 DE, Netherlands)

Although there is evidence that aggregate voting patterns affect individual and population health, there is still little research on the impact of individual health on individual voting behavior during elections. The unhealthy might perceive the effort involved in voting as greater than the benefits of voting. Also, lifetime socioeconomic position (SEP) influences health and may determine the level of interest in politics exhibited by those in poor health. This study examines sex-specific effects of life course SEP, health and interest in politics on voting abstention, using data from the National Child Development Study, a longitudinal cohort of persons born in a single week in March 1958 in Britain. We used modified Poisson regression with robust error variance to estimate risk ratios for the effect of health on voting abstention adjusting for life course SEP, measures of interest in politics, and other covariates. About 22% abstained from voting. Those who abstained from voting were likely to have been in poorer health, came from a lower lifetime SEP, were disinterested in politics, and did not think politics would benefit them. These effects on voting abstention appear to be partly due to being disinterested in politics and being wary of the benefits of political parties and of the intentions of politicians. This study is the first to explore the effects of life course SEP and interest in politics on individual voting. Given that political engagement in a democracy is a form of social capital which is also conducive to health, it is unfortunate that the unhealthy and those born into disadvantaged continue to have lower voting participation.

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RELATING NEIGHBORHOOD PHYSICAL AND SOCIAL ENVIRONMENTS TO INDIVIDUAL DISTRESS AND HEALTH—GROCERIES, FIRES AND CRIME; FEAR AND LONELINESS IN AFRICAN-AMERICAN NEIGHBORHOODS. *A Furumoto-Dawson, D Sohmer, D Cao, C Mininger, S Gehlert (Center for Interdisciplinary Health Disparities Research, University of Chicago, Chicago, IL 60637)

We explored posited indicators of neighborhood environments and their relationships to individual measures of distress and loneliness in two related study groups: 451 Chicago residents participating in 15 Southside Chicago Community Area-based focus groups in 2004, and African-American women in an ongoing study of breast cancer disparities etiology based in three Chicago hospitals. Quantitative analyses of focus group surveys linked to residential area characteristics showed robust neighborhood clustering of both physical (e.g., vacant lots, fires) and social environment indicators (poverty, major crime rates). Results from generalized latent variable modeling using these indicators demonstrated strong linkages between neighborhood environment factors and individual level psychosocial distress and loneliness in both groups (social isolation - living situation, and felt loneliness, and in women's group, perceptions of safety). In the women's group we then tested for structural relationships between neighborhood environment factors and individual stress-related biomarkers (blood pressures, anthropomorphic measures and salivary cortisol) via subjective measures of neighborhood safety, psychosocial stress and loneliness. The evidence speaks to how we can address complex interactions in social determinants and etiologic pathways underlying population health disparities, which systematically disadvantage African-American neighborhoods and households, in order to create effective interventions that restore the material and social fabric of just civil society.

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DEPRESSIVE SYMPTOMS AND STROKE MORTALITY AMONG ELDERLY BLACKS AND WHITES. *S Everson-Rose, H Guo, P Gaillard, D Evans, C Mendes de Leon (University of Minnesota, Minneapolis, MN 55414)

Although not unequivocal, depression is widely regarded as an important risk factor for cardiovascular disease morbidity and mortality. Yet few systematic, population-based studies have examined if depression is associated with stroke risk or mortality, independent of known risk factors or among racial/ethnic minorities. We studied depressive symptoms, assessed by the 10-item Center for Epidemiologic Studies Depression Scale (CES-D), in relation to stroke mortality among 5,931 (69% female; 61.2% black) elderly adults (mean age, 75 years) participating in the Chicago Health and Aging Project, an ongoing, population-based study of Alzheimer Disease risk begun in 1993. Mortality and cause of death were verified via the National Death Index for 2,162 decedents; 7.9% of all deaths were due to stroke, with mortality ascertainment complete through 12/31/04. Average follow-up was 9.9 years. In a Cox proportional hazards model adjusted for age, sex, race, education, smoking, physical activity, resting blood pressure and body mass index, each 1-point increase in CES-D score increased stroke mortality by 9% (hazard ratio (HR) = 1.09, 95% CI = 1.00–1.17, $p = 0.04$). This association did not differ by race. Excluding 10% who self-reported a history of stroke at baseline weakened the association (HR = 1.08, 95% CI = 0.98–1.18, $p = 0.11$). However, a threshold effect for depressive symptoms was seen. Among those without a stroke history, a CES-D score of 4 or higher predicted 66% greater risk of stroke death compared to a lower CES-D score in an adjusted model ($p = 0.03$). In this biracial sample of older adults, having a high number of depressive symptoms contributes to excess risk of dying from stroke.

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AGE- AND CAUSE-SPECIFIC CONTRIBUTIONS TO INCREASES IN LIFE EXPECTANCY IN KOREA, 1970–2005. *S Yang, Y-H Khang, S Harper, D Lim, J Lynch (McGill University, Montreal, QC, H3A1A2 Canada)

Life expectancy increased from 58.6 to 75.1 in men and from 65.5 to 81.8 in women between 1970 and 2005 in Korea while there was rapid growth in economy. Using data on the life tables (1970–2005) and death statistics (1983–2005) from the Korean Statistical Information Service, we examined age- and cause-specific contributions to increasing life expectancy from 1970 to 2005 by Arriaga's method. Reduction in infants mortality increased life expectancy by 2.7 years (16.7%) in men and 2.9 years (18.3%) in women, followed by older age groups of over 55 in both men (33.8%) and women (33.4%). However, this overall pattern masked important changes of contributions by age groups over time: the contribution by infants decreased dramatically over time while the contributions by old age groups increased in more recent years. Cardiovascular disease was the most important contributor to the life expectancy gain from 1983 to 2005. Hypertensive disease made the largest contribution in both men (12%) and women (10%), followed by cerebrovascular disease (10% in men and 9.5% in women), and ischaemic heart disease (7.7% in men and 8.3% in women) Liver disease was also a major cause of death contributing to life expectancy increase among men (7.8%) as was pneumonia among women (5.4%). While stomach and liver cancer contributed to the increase in life expectancy in both men (7.1%) and women (5.3%), lung cancer made negative contributions to life expectancy gain in men (−2.1%) and women (−1.2%). Life expectancy would have increased more without unfavorable mortality changes in diabetes and suicide in both genders. Reducing deaths from lung cancer, diabetes and suicide should be a public health priority to further increase life expectancy in Korea.

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SOCIAL DISPARITIES IN US ADULT MORTALITY, 1986–2000: DO INEQUALITIES IN LOSSES TO FOLLOW-UP AFFECT OUR CONCLUSIONS? *P J Johnson (University of Minnesota, Minneapolis, MN 55414)

Social disparities in adult mortality have been well documented using vital records. Yet, vital records contain limited information on social context and no information on health status or behaviors. Richer investigations of the social determinants of adult mortality are now possible through the Integrated Health Interview Series (IHIS), a harmonized set of National Health Interview Survey (NHIS) data linked with the National Death Index (NDI). NHIS adult respondents in 1986–2000 are linked to NDI mortality data through 2002. However, 4.2% remain unlinked. We use all records for adults < 65 years (n = 949,233) to examine whether there are systematic differences between those linked to mortality data and those unlinked. We then investigate how social disparities in adult mortality might differ based on alternative assumptions about mortality status among those who were unlinked. Person years (PY) are calculated from date of interview to date of death or 2002, whichever comes first. We impute PY for analyses including the unlinked under varying assumptions. Overall, mortality incidence is 5.3 per 1000 PY. However, under the extreme assumption that all unlinked are dead, mortality incidence is 10.2 per 1000 PY. Mortality incidence (actual and under the extreme assumption) varies by race/ethnicity group: AIAN 6.3 to 10.0; Asian 3.9 to 12.7; non-Hispanic Black 7.2 to 12.8; Hispanic 4.7 to 11.3; non-Hispanic White 5.1 to 9.4 per 1000 PY. Results vary by other social indicators as well. Moreover, characteristics of the unlinked indicate that reasonable assumptions about the unlinked should not be the same across all social groups. Inequalities in losses to follow-up can influence our conclusions about adult mortality disparities.

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THE ASSOCIATION BETWEEN NEIGHBORHOOD POPULATION DECLINE AND INJECTION DRUG CESSATION AMONG INJECTION DRUG USERS IN BALTIMORE, MARYLAND. *A Nandi, S H Mehta, T A Glass, T A Louis, G D Kirk, D Vlahov, S Galea, W W Latimer, H Chu, D D Celentano (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205)

Few studies have attempted to understand how the urban environment influences patterns of injection drug use. As a result of macro-level economic changes, Baltimore City experienced rapid population decline in the latter half of the twentieth century, with the most rapid decrease from 1990–2000. We used data from an ongoing community-based cohort study of injection drug users recruited from 1988–1998 to assess whether neighborhood-level population change from 1990–2000 influenced the likelihood of injection drug cessation. 2502 participants who reported injecting drugs within six months of baseline were geocoded to their neighborhoods of residence. Among 211 neighborhoods, median population decline was 1.0% per year (IQR = 0.4%,1.8%). Logistic regression models with random effects were used; individual-level variables were treated as time-updated covariates. The likelihood of cessation was 50% lower among participants living in neighborhoods in the highest quartile relative to the lowest quartile of population decline, even after adjusting for individual-level characteristics that may have influenced selection into neighborhoods. The sensitivity of our results to alternative definitions of cessation was assessed. Public health efforts aimed at promoting injection drug use cessation must address characteristics of the urban environment.

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TIME TRENDS AND INEQUALITIES OF SUICIDE IDEATION, PARASUICIDES, AND SUICIDES IN SOUTH KOREA. *M H Kim, K H Jung Choi, H J Jun (Eulji University Medical College, Seoul, Korea)

Unprecedented increase in suicides over the last decade makes Korea the first rank among the OECD countries in 2005 (26.1/100000). As an initial step to explain suicides epidemic in Korea, we examined prevalence of suicide ideation and parasuicides, and suicides over time. Prevalence was estimated from the National Health and Nutrition Examination Survey in the year of 1995, 1998, 2001, and 2005, and mortalities from the National Death Registry data. Age-specific (15~24, 25~44, 45~64, 65 years or older) and age-standardized rates were calculated by gender and education. Age-standardized prevalence of suicide ideation decreased across consecutive surveys in both genders (18.6 to 13.7% for men, 26.7 to 22.6% for women), but age-specific prevalence diverged; prevalence of the middle-aged and elderly increased while that of the youth decreased, resulting in the inverse relationship between age and prevalence in 2005. Inverse relationship with education remained clear over time. Parasuicides decreased over time, but group-specific trends could not be identified due to small sample sizes. Suicides were more common among men (34.9/100000 for men and 17.3 for women in 2005). They have increased since 1990 and showed the peak at 1997/98, followed by temporary fall and return to the original trend. Most prominent increases were observed among the elderly in both genders, and educational disparities remained clear over time. Considering that the elderly and the less educated were disproportionately affected by suicides, causal hypotheses focused social determinants such as economic, sociocultural, and institutional factors other than individual-level risk factors should be explored in Korea.

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THE INFLUENCE OF NEIGHBORHOOD CHARACTERISTICS ON COLORECTAL CANCER SURVIVAL. *R Skeete, E Bradley, B A Jones (Yale University School of Medicine, New Haven, CT)

Research on the interplay of individual and neighborhood contextual factors on colorectal cancer (CRC) survival disparities in African Americans is limited. Knowledge of this interrelationship may help explain survival differences. Data are from a population-based cohort study of Blacks and Whites with CRC diagnosed 1987–1991 in Connecticut and followed for survival for 15 years. Participants' census tract information, from Connecticut Tumor Registry (CTR) data, was linked to 1990 census data to describe neighborhood characteristics. Individual-level variables derive from in-person interview, medical record abstraction, physician survey, and the CTR. Cox proportional-hazards models were constructed for the analysis. There were 131 Blacks and 185 Whites in the sample. Black study participants were significantly younger (mean age 60 v. 65 yrs), less likely to finish high school (50% v. 35%) and had lower incomes, (36% v. 15% <$10,000). Similarly, Black participants were more likely to live in high poverty (55% v. 8%), low income (46 v. 12%) neighborhoods, with few high school graduates (52% v. 9%) and high unemployment (51% v 7%). Blacks had higher age-adjusted mortality risk (HR = 1.37; CI = 1.01–1.88). In initial adjusted models, predictors of survival included neighborhood poverty (HR = 1.25; 95% CI = 1.04–1.50), stage of diagnosis (late v. early) (HR = 3.52; CI = 2.53–4.88) and age (HR = 1.04; 95% CI = 1.02–1.06). The results suggest that neighborhood poverty may play an important role in survival for African Americans with CRC. Further understanding of the interplay between individual clinical and socioeconomic factors with the impact of concentrated poverty could aid in strengthening efforts to reduce disparities.

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HEALTHY PEOPLE 2010 SNAPSHOT: PROGRESS, DISPARITY, AND CHANGES IN DISPARITY FOR THE BLACK NON-HISPANIC POPULATION.

*T Carroll, K Keppel, S P Hallquist (National Center for Health Statistics, Hyattsville, MD 20782)

Healthy People 2010 is a national health promotion and disease prevention agenda for improving the health of the U.S. population by the year 2010. It has two overarching goals: (1) increase quality and years of healthy life and (2) eliminate health disparities. This snapshot looks across Healthy People objectives to characterize the health status of the black non-Hispanic population. To assess progress, disparity, and changes in disparity over time, we examined population-based data from multiple sources in the Healthy People database. This snapshot provides information on the availability of data by focus area, objectives with progress toward or away from Healthy People 2010 targets, objectives with the best rate, objectives that have the largest disparity from the best rate, changes in disparity over time, and the relationship between progress and changes in disparity over time. Results show that over two-thirds of the 304 objectives that measure progress for the black non-Hispanic population have moved toward or met their Healthy People 2010 targets. Black non-Hispanics had the most favorable rate for 21% of the 393 objectives for which disparity could be evaluated. Conversely, black non-Hispanics had rates that were at least two times less favorable than the population with the best rate for 17% of those objectives. Although many objectives moved toward the target, the most frequent result was no change in disparity over the tracking period. For those objectives that show a change in disparity, the number of objectives with increases in disparity exceeded the number of objectives with decreases in disparity. Our findings suggest that progress and disparity are independent.

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CREATION OF A CONCENTRATED DISADVANTAGE MEASUREMENT MODEL FOR BALTIMORE CITY, MARYLAND.

*L Jorgensen, S G Sherman and T A Glass (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205)

Multiple measures of socioeconomic disadvantage have been found to be associated with health outcomes, however, no consensus exists as how to best define this measure in different geographic areas. We sought to measure concentrated disadvantage using confirmatory factor analysis to evaluate, and potentially improve upon, the approach developed in Chicago by Sampson and colleagues (*Science* 1997; **277**: 918–24). We gathered 2000 U.S. Census data on 700 block groups in Baltimore City, Maryland. First, a confirmatory factor analysis was used to evaluate the fit of a model using the six indicators used by Sampson *et al.* (poverty, public assistance, female headed households, population under 18, percent of African Americans and unemployment). Our model suggests a relatively poor fit of the Sampson approach; however after accounting for correlated measurement error across indicators, the fit of the Sampson model was substantially improved (Comparative Fit Index [CFI] = 0.95, Tucker-Lewis Index [TLI] = 0.96, Root Mean Squared Error of Approximation [RMSEA] = 0.13). We then tested whether adding two additional dimensions of concentrated disadvantage (educational attainment and crowding) would further improve our ability to model concentrated disadvantage as a latent variable. Crowding was found to improve model fit (CFI = 0.96, TLI = 0.97, RMSEA = 0.095) while educational attainment did not. These results generally confirm that the Sampson model for measurement of concentrated disadvantage can be replicated in another city, but improvements can be made through consideration of the measurement error structure and the addition of crowding.

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THE ASSOCIATION BETWEEN PERCEIVED DISCRIMINATION AND DSM-IV ALCOHOL AND ILLICIT DRUG USE DISORDERS.

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Current studies suggest that in response to discrimination individuals, may engage in risky coping behaviors, like alcohol, tobacco and drug use. However, most of the evidence does not allow us to distinguish between lifetime episodic use and chronic use patterns indicative of clinical impairment or distress. Currently, only two studies have examined the relationship between discrimination and problematic alcohol use and to the best of my knowledge no study has examined the relationship between discrimination and illicit drug use disorders. Furthermore, our understanding of the relationship between discrimination and problematic use among African Americans (AA) and Blacks Caribbeans (BC) is very limited. Using the National Survey of American Life, this study examines the relationship between perceived discrimination and the Diagnostic and Statistical Manual of Mental Disorders criteria for alcohol and illicit drug use disorders among AA and BC. Consistent with other studies, results from logistic regression analyses adjusted for important covariates showed that discrimination is related to alcohol and illicit drug use. AA who experienced discrimination were 2–4 times more likely to have an alcohol and illicit drug use disorder, while BC who experienced discrimination were five times more likely to have an alcohol use disorder when compared to those that did not report discrimination ($p < 0.05$). This study provides additional evidence that discrimination is not only associated with episodic use but also with problematic alcohol and illicit drug use. Furthermore, the results provide additional evidence that future socio-epidemiological studies must consider the ethnic heterogeneity among Blacks.

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METHAMPHETAMINE USE IN PREGNANCY: TRENDS IN NATIONAL TREATMENT ADMISSION AND TREATMENT REQUEST 1994–2006.

*M Terplan, MD, MPH, Erica Smith, MPH, Michael Kozloski, MA, MS, Harold Pollack, PhD (University of Chicago, Chicago, IL 60637)

Although methamphetamine (MA) has been identified as the primary target of federal drug policy, unlike with crack cocaine, little attention has been given to MA use in pregnancy. This silence is especially startling given the fact that MA use among pregnant women admitted into drug treatment has risen sharply and now constitutes their primary drug of choice. Interestingly, MA use in the general population has recently been declining. In order to better understand MA use in pregnancy, we undertook a secondary analysis of the Treatment Episode Data Set (TEDS), an administrative data set that captures at least 70% of all known treatment admissions in the United States. In particular, we investigated risk factors for MA use and how these characteristics have changed over time. These results were then compared with data from the National Survey on Drug Use and Health (NSDUH), an annual population based survey that captures drug use and treatment need. Demographic, geographic and substance use data were collected for the 219,335 pregnant TEDS admissions between 1994 and 2005 as well as for the NSDUH sample from 2002 to 2006. Logistic regression models were constructed by year. Confounding was assessed via backwards elimination strategy with a change-in-estimate criteria of 0.1 considered substantial. Trend results were reported as adjusted proportions and represented graphically. Overall MA prevalence, reported as the primary drug of use upon admission, rose from 8.1% in 1994 to 24.5% in 2005. This increase parallels the data from NSDUH where the proportion of pregnant MA users seeking treatment rose from 21.6% in 2002 to 100% in 2006, while rates of MA use in pregnancy remained stable. As pregnant women occupy a unique place in drug treatment, analysis of national trend data is essential guide both policy and research.

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THE ROLE OF PERPETRATOR ALCOHOL USE IN ADOLESCENT CRIME VICTIMIZATION. *J Yoon (NIAAA, National Institutes of Health, Bethesda, MD 20892)

Objectives: The objective of this study was to explore the relationship of perpetrator alcohol use and physical injury in adolescent victims. Methods: Adolescent victims aged 12–17 from the 2003–2005 National Crime Victimization Survey were selected (N = 2,235,659). Perpetrators were categorized as perpetrators using alcohol only, perpetrators using alcohol with any combination of drugs, and perpetrators using neither alcohol nor drugs. Descriptive statistics were used to summarize the selected variables (i.e., race, ethnicity, gender, region, household income, relation between victim and perpetrator, crime location, crime time). Multivariable logistic regression models were used to derive odds ratios (ORs) to examine the association between perpetrator alcohol use and physical injury in victims. Results: Approximately 10% of adolescent victims reported perpetrator alcohol use (8.1% alcohol only and 1.4% alcohol with drugs). Compared with victims of perpetrators not using alcohol or drugs, the ORs for physical injury were 2.75 (95% CI = 2.70–2.80) for adolescent victims of perpetrators using alcohol only and 11.33 (95% CI = 10.90–11.78) for victims of perpetrators using both alcohol and drugs. The odds for physical injury by perpetrators using alcohol only were higher for the victims of nighttime crime, victims who could not recognize the perpetrators, and victims of adolescent perpetrators (ORs = 2.03–2.12). The odds for physical injury by perpetrators using both alcohol and drugs was higher for the victims who could not recognize the perpetrators (OR = 3.2). Conclusion: This study shows that perpetrator alcohol use has a strong association with physical injury among adolescent victims.

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"WHOSE DATA ARE THEY?"—OPPORTUNITIES AND PITFALLS OF PUBLICLY ACCESSIBLE DATA. *A Wilcox (Editor-in-chief, Epidemiology) and M Hernan (Harvard University, Boston, MA)

Epidemiologists have by long tradition controlled access to the data they collect. Funding agencies increasingly require that epidemiologic data be made openly accessible. Policies supporting more open access to data are a response to the cost of epidemiologic studies, the realization that different analytic approaches to data can provide useful information, and recognition that open access has been successful in other research areas (such as the social sciences). However, these policies raise important new questions about informed consent, the role of collaborators, fieldwork documentation, informatics, and publication policies. If open access is to be successful, it must provide appropriate credit for those who generate the data while improving total scientific benefit. This symposium will present a range of viewpoints on data sharing, both within epidemiology and from other fields. The goal is to help epidemiologists gain perspective and improve their strategies for dealing with this new approach to epidemiologic research. Ample time will be allowed for discussion from the floor. Speakers will prepare commentaries based on their talks, to be published in EPIDEMIOLOGY as part of the series on "The Changing Face of Epidemiology."

Speakers:
Dan Levy
Graham Colditz
Jon Samet

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CLIMATE CHANGE AND HUMAN HEALTH: RISKS AND RESPONSES. *K L Ebi and Marie O'Neill (ESS, LLC, Alexandria, VA)

Injuries, illnesses and deaths attributable to climate change have started to occur, with projections suggesting that millions of additional people will be at risk over coming decades. Three broad categories of health impacts are associated with climatic conditions: impacts relatively directly related to climate variability (e.g. extreme weather events); impacts resulting from environmental changes that occur in response to climate variability and change (e.g. changes in the geographic range and incidence of water-, food- and vectorborne diseases, and changes in the concentrations of air pollutants); and impacts resulting from consequences of climate-induced economic dislocation and environmental decline. Epidemiologists have a critical role to play in identifying exposure-response relationships between weather and climate and adverse health outcomes; early evidence of the health impacts of climate change; key research gaps and constraints to the identification of early evidence; likely future impacts over a range of spatial and temporal scales; populations and regions at higher risk; and measures to prepare for and adequately respond to the challenges posed by climate change. This session will highlight recent research on the health risks of climate variability and change, as well as actions being taken to reduce those risks worldwide.

Speakers:
Kristie L. Ebi—*"Human Health Impacts of and Public Health Adaptation to Climate Change."*
Marie O'Neill—*"Climate change and extreme temperature epidemiology."*
Patrick Kinney—*"Climate, Aeroallergens, and Allergic Disease."*

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HUMAN HEALTH IMPACTS OF AND PUBLIC HEALTH ADAPTATION TO CLIMATE CHANGE. *K L Ebi (ESS, LLC, Alexandria, VA)

Climate change is increasing morbidity and mortality worldwide, with the numbers of people affected expected to increase with additional climate change. Climate-sensitive health outcomes include those: due to extreme weather events (heatwaves, floods, windstorms, wildfires, etc.); where the vector and/or pathogen are sensitive to climatic variation (e.g. water-, food- and vectorborne diseases); where climatic conditions affect the exposure concentrations (e.g. certain air pollutants and aeroallergens); and health consequences of climate-induced economic dislocation and environmental decline. Climate change is making more difficult the control of these health determinants and outcomes, with the consequent increases in their geographic range and/or incidence. Additional mitigation and adaptation policies and measures would benefit health now, as well as to reduce vulnerability to future climate change. The degree to which programs and measures will need to be augmented will depend on factors such as the current burden of climate-sensitive diseases, the effectiveness of current interventions, projections of where, when, and how the burden of disease could change, the feasibility of implementing additional interventions, other stressors that could alter resilience to impacts, and the context within which interventions are implemented. Recent efforts to protect population health in a changing climate will be highlighted.

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CLIMATE CHANGE AND EXTREME TEMPERATURE EPIDEMIOLOGY. *M O'Neill (University of Michigan, Ann Arbor, MI)

This presentation will describe epidemiologic approaches to studying extreme temperature in the context of climate change. Specific examples of study designs and results from recent research and synthesis documents will be provided to illustrate current approaches and future directions. The specific examples will include time series and case crossover mortality/morbidity studies; studies of effect modification using various designs; the use of geographic information systems and spatial statistics to evaluate the social and physical context in which heat-related health problems occur; emerging exposure assessment approaches; and application of research results to policies and interventions. A specific emphasis on vulnerable populations and environmental equity issues will be provided.

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CLIMATE, AEROALLERGENS, AND ALLERGIC DISEASE. *P L Kinney (Columbia University, Mailman School of Public Health, New York, NY)

Aeroallegens are substances present in the air that stimulate an allergic response in sensitized individuals upon inhalation. Forty percent of Americans are sensitized to one or more outdoor aeroallergens, and the prevalence of sensitization has increased over the past 30 years. More than 50 million Americans suffer from allergic diseases including asthma and hay fever. Since the production and distribution of aeroallergens are highly influenced by weather phenomena, it seems plausible that climate change could affect both exposures and associated disease. Historical trends in the onset and duration of pollen seasons have been examined extensively in recent studies, mainly in Europe. Nearly all species and regions analyzed have shown significant advances in seasonal onset that are consistent with warming trends. There is more limited evidence for longer pollen seasons or increases in seasonal pollen loads for birch and Japanese cedar tree pollen. Experimental studies have shown that elevated CO2 concentrations stimulate greater vigor, pollen production and allergen potency in ragweed. Interestingly, significant differences in ragweed productivity were observed in outdoor plots situated in urban, suburban and rural locales where measurable gradients were observed in both CO2 concentrations and temperatures. Cities are not only heat islands but also CO2 islands, and thus represent to some extent proxies for a future warmer, high CO2 world. What remains unknown is whether and to what extent recent trends in pollen and/or mold seasons may be linked with changes in patterns of allergic diseases like hay fever and asthma. We discuss opportunities and challenges for new epidemiology studies addressing this important question.

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CHOOSING APPROPRIATE COUNTERFACTUALS FOR RESEARCH ON THE HEALTH EFFECTS OF SOCIOECONOMIC POSITION AND NEIGHBORHOODS. *D H Rehkopf, I H Yen (University of California, San Francisco, CA)

Research to determine the causal effects of measures of socioeconomic position or neighborhood characteristics on health faces unique challenges. Chief among these are whether such factors can be manipulated such that they can serve as 'plausible' counterfactuals as compared to 'miracle' counterfactuals. A miracle counterfactual involves a situation where there are few, if any, actual examples of a change in a given attribute that are consistent with the specified model counterfactual contrast. A second and related challenge is the extent to which data from the population enables the possibility of plausible contrasts. That is, whether the distribution of levels of potential confounders in the data allows for an interpretation of the examined counterfactual from model based effect estimates. Third, effect estimates from life-course counterfactuals may be biased due to differential survival and early life effects on later life socioeconomic position and health. The individual talks in this session will address aspects of these questions – how relevant are these concerns, and how should they be addressed when they may result in biased estimated effect measures. At issue is how reliably we can estimate the causal effects of socioeconomic and neighborhood factors with observational data – and how valid our results are for informing interventions.

Speakers:
David H. Rehkopf, ScD—*"Comparing effect estimates using different counterfactuals: an example of income and obesity among children."*
J. Michael Oakes, PhD—*"Structural confounding in neighborhood effects research."*
Jay S. Kaufman, PhD—*"Specifying counterfactual contrasts for the health effects of socioeconomic position at different points in the life-course."*

Discussant:
David Harding, PhD

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COMPARING EFFECT ESTIMATES USING DIFFERENT COUNTERFACTUALS: AN EXAMPLE OF INCOME AND OBESITY AMONG CHILDREN. *D H Rehkopf, ScD (University of California, San Francisco, CA)

There are recognized difficulties with inferring causation from observational data on measures of socioeconomic position (e.g. income, education, occupation, wealth) due to the difficulties of obtaining data on potential confounders as well as the potential lack of overlapping distributions of confounding covariates. While generally recognized as problems – it is difficult to understand how biased effect estimates may be without a gold standard of randomized trials of these exposures of interest. One possible approach is to compare estimates using standard regression of observed socioeconomic characteristics with effects from counterfactuals based on policy interventions that result in changes in the level of a particular socioeconomic factor that are not due to individual characteristics. I take this approach with respect to examining the effects of income on childhood obesity. I use data from the children of the National Longitudinal Study of Youth 1979. I estimate the effects of income in two different ways. First, I use standard regression models controlling for a comprehensive list of potential confounders (including parental data) to estimate effects. Secondly, I analyze the effects of changes in the amount of benefits of the earned income tax credit over time. I will highlight the differences between model estimates from these different counterfactual specifications of income, and discuss possible reasons for the differences observed.

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STRUCTURAL CONFOUNDING IN NEIGHBORHOOD EFFECTS RESEARCH. *J Michael Oakes, PhD (University of Minnesota, Minneapolis, MN)

Neighborhood effects research typically aims to estimate the effect of a given neighborhood characteristic (e.g., poverty level, presence of park) on some health outcome. Counterfactually speaking, the goal is to estimate the effect of one neighborhood, as opposed to another, on a person or group's health. Since only one such circumstance may be observed, a counterfactual substitute (i.e., comparison group) must be found. Because the opportunity to run an actual experiment is rare, researchers generally rely on observational data and multiple regression models to construct counterfactual substitute conditions. So common is this approach that multiple regression is typically not viewed as an assumption-laden technique, save perhaps for concerns over omitted variables, collinearity, or a link-function. But fundamental to any such analysis is the necessity that the elements of each group (e.g., persons in neighborhoods) are exchangeable with respect to exposure; that is, elements under investigation must have a non-zero chance of being exposed. This requirement is obviously met in randomized experiments – where the researcher controls the treatment assignment mechanism – and in many epidemiologic studies where, say, a contagious virus appears ubiquitous over time. However, new research shows the empirical validity of this exposure requirement in neighborhood effects research to be questionable. It follows that model-based estimates may be based in what Cochran called the 'no man's land' of data; Oakes calls this 'structural confounding.' We present data showing the phenomena and discuss the requirements and implications of choosing appropriate comparison groups in neighborhood effects research.

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SPECIFYING COUNTERFACTUAL CONTRASTS FOR THE HEALTH EFFECTS OF SOCIOECONOMIC POSITION AT DIFFERENT POINTS IN THE LIFE-COURSE. *J S Kaufman, PhD (University of North Carolina, Chapel Hill, NC)

Life-course SES is currently a popular paradigm for studying social factors in relation to health outcomes across a range of ages. This conceptual model presents many challenges for defining contrasts of etiologic interest, however, since exposures may be compared either conditionally (e.g., the effect of having low SES at age 50 compared to having high SES at age 50) or cumulatively (e.g. the effect of having spent 50 years of low SES compared to 50 years of high SES). Although substantive considerations may drive the choice of analytic contrast, both approaches can produce artifactual variability across the life-course and biased estimates because of confounding by time-window and by conditioning on achieved status or survival, especially when achieved status or survival is a function of previous exposure. Even if unmeasured factors are balanced between exposure groups at one time in the life-course, differential survival or advancement to another SES level can leave subsequent comparisons confounded. The situation can be simplified with some additional assumptions, such as monotonicity of effect and prohibition of reverse causality (i.e., that sickness may not depress subsequent SES level), but even with these rigid conditions, many contrasts are not causally identifiable or interpretable, and many apparent patterns are artifacts of the effect measure scale or the chosen contrast.

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THE "HISPANIC PARADOX": WHAT'S REAL AND WHAT'S NOT. *D A Shoham, K A Cagney, S Barquera, A Palloni (Loyola University Chicago, Chicago, IL)

Hispanic health is a growing area of epidemiologic research, exemplified by the Hispanic Community Health Study that is beginning to collect data. One theme that appears again and again in the literature is the so-called "Hispanic Paradox": the observation that health indicators are often more favorable among Hispanic populations than in non-Hispanic Whites, in spite of the formers' minority status and often adverse socioeconomic position. Studying Hispanic populations presents unique methodological challenges, such as language, cultural issues, and the fluidity of the populations under study. This symposium will focus on how migration, geography, culture, and assimilation influence the observed paradox, and the extent to which the observations capture the true health status of Hispanics in both the U.S. and in sending communities, with a focus on Mexico and Mexican-Americans. Advice will be provided on analysis of data and interpretation of results.

Speakers:
KA Cagney—*"A Social Capital Approach to the Hispanic Paradox."*

S Barquera—*"A Cardiovascular Risk Factor in Mexican and Mexican-American Populations: Observed Differences Are Consistent with the Hispanic Paradox."*
A Palloni—*"SES Gradients Among Mexicans in the U.S. and in Mexico: A New Twist to the Hispanic Paradox?"*

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A SOCIAL CAPITAL APPROACH TO THE HISPANIC PARADOX. *K A Cagney (University of Chicago, Chicago, IL 60637)

Analyses of the Hispanic Paradox have focused almost exclusively on the individual-level factors that might contribute to a health advantage for Latinos born outside the United States. Rarely have these pursuits examined the social context in which individual-level health status is embedded. We invoke theories of neighborhood social capital and the urban ethnic enclave to inform an analysis of morbidity differentials by nativity status. To illustrate, we examine a host of health conditions for Latinos in Chicago, bifurcating by nativity and including a range of social capital and neighborhood socioeconomic status measures. We find that the Hispanic Paradox is shaped in large part by residence in an ethnic enclave. This research suggests that the Hispanic Paradox is largely dependent upon the context in which Latino immigrants reside.

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A CARDIOVASCULAR RISK FACTOR IN MEXICAN AND MEXICAN-AMERICAN POPULATIONS: OBSERVED DIFFERENCES ARE CONSISTENT WITH THE HISPANIC PARADOX. *S Barquera, M C Carrión, R Durazo, A Luke, R Cooper (Instituto Nacional de Salud Pública, Cuernavaca, Mor., Mexico 62508)

Recently diverse studies have analyzed health differentials between Mexicans and Mexican-Americans in mortality and prevalence of diseases and diverse risk factors. Serum total homocysteine concentrations (HCY) in fasting sate have been recognized as a cardiovascular risk factor. HCY levels have been associated with low concentrations and intake of folate and complex B vitamins. The objective of our study was to describe HCY levels between Mexican using the Mexican Health Survey 2000 and Mexican-Americans, using comparable data from NHANES. In men, age-adjusted mean HCY was 9.6 (NH Whites in the US), 9.8 (NH Blacks), 9.4 (Mexican-Americans), and 14.2umol/L (Mexicans). Similar patterns were seen for women, with the lowest concentrations in Mexican-Americans and the highest in Mexicans. These data may reflect the environmental influence of folate and complex B supplementation of grains in the United States, since folate lowers plasma HCY levels. Elevated HCY levels have been linked to increased risk of cardiovascular events. However, the implications of these findings for CVD risk differences in Mexicans and Mexican-Americans remain unclear. Distinguishing the influence of HCY exposure from the myriad confounding factors associated with the national contexts of Mexico and the United States represents a challenge. Potential approaches to this problem will be discussed.

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SOCIOECONOMIC STATUS GRADIENTS AMONG MEXICANS IN THE U.S. AND IN MEXICO: A NEW TWIST TO THE HISPANIC PARADOX? *A Palloni, R Wong, F Riosmena (Northwestern University, Evanston, IL 60208)

We contrast differentials in adult health by socioeconomic status (SES) observed among foreign born Mexicans living in the US and those living in Mexico. We use NHANES (1999–2004) for the US and ENSA (Encuesta Nacional de Salud, 2000) for Mexico. The US and Mexico are at different stages in their health transitions but they are also subject to a number of conditions that move them toward convergence. Among these are changes in diet, physical activity and consumption of substances, all phenomena which have been rapidly changing the health profiles of many populations worldwide. We find steep SES gradients in Mexico on self reported health, obesity, diabetes and hypertension and relatively lesser ones among Mexicans in the US. While attenuation of SES gradient among Hispanics in the US has been reported before, we know of no study that compares such gradient to the one actually experienced by Mexicans living in Mexico nor one that uses biomarkers (rather than only self-reports) to detect the presence of conditions as we do in this paper. Selection and effects of composition by duration in the US are offered as alternative explanations for observed contrasts in the SES gradients.

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BIAS-VARIANCE TRADE-OFF IN PHARMACO-EPIDEMIOLOGICAL STUDIES USING INSTRUMENTAL VARIABLES. *R Ionescu-Ittu, J A C Delaney, M Abrahamowicz (McGill University, Montreal, QC, H3A 1A1 Canada)

The instrumental variable (IV) technique deals with unobserved confounders by replacing the treatment variable with another variable *the instrument* in the analysis. This IV needs to be selected so that it is independent of both observed and unobserved confounders. The key issue in IV analyses is identifying a good candidate instrument. Recently, Brookhart et al. suggested using *physician drug preference* as an IV for pharmacoepidemiologic studies comparing two competing drugs and operationally defined this IV as treatment prescribed to the previous patient of the same physician. This instrument correlates well with the treatment variable only if the physician' preferences determine the treatment choice in a large fraction of patients. Yet, there is often a subgroup of patients whose treatment is not affected by physician's subjective preference. The larger this *unexchangeable subgroup* is, the weaker the IV. We investigated the impact of this weakening on the risk difference estimates obtained from the Brookhart's IV approach. We used simulations to compare conventional regression estimates with Brookhart's IV estimates in the presence of an unobserved confounder. The IV estimates were less biased than the conventional estimates, but at the cost of increased variance. This variance inflation increased rapidly with the size of the unexchangeable subgroup. However, the coverage rate of the 95% CI for the IV estimate was very close to the nominal 95% both with large and small unexchangeable groups, while for the conventional estimates it never exceeded 50%. Despite the variance inflation, the IV based 95% CI is very likely to include the true estimate. Brookhart MA et al. Epidemiology. 2006; 17(3):268–275.

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ASSUMPTIONS OF INVERSE PROBABILITY WEIGHTING TO CONTROL FOR CONFOUNDING. *S R Cole and M A Hernan (Johns Hopkins University, Bloomberg School of Public Health, Baltimore, MD 21205)

When interested in estimating the effect of an exposure, the method of inverse probability weighting (henceforth, weighting) can be used to adjust for measured confounding and selection bias. Despite many recent applications of weighting, the published papers provide little practical guidance regarding how to evaluate the four assumptions of consistency, exchangeability, positivity, and correct specification of the model used to estimate weights. Using initiation of antiretroviral therapy and subsequent change in viral load among 918 HIV infected men and women followed for a median of 5.8 yrs between 1996 and 2005 as an example (Cole, et al AJE 2007; 166:219–27), we describe the role of these four assumptions in weighted estimation, the interpretation of results, and possible tradeoffs that an epidemiologist may encounter when attempting to make inferences. A lack of positivity is illustrated at 2 of 25 levels of joint CD4 cell count and viral load categories. A tradeoff between bias and precision is illustrated as a function of the coarseness of covariate specification. Weight truncation is presented as an informal and easily implemented method to deal with this tradeoff. Recommendations include: exploration of exchangeability by using a variety of potential confounders and functional forms coupled with sensitivity analyses, assessment of positivity for important confounders, and assessment of weight model misspecification by exploring the distribution of weights. Inverse probability weighting provides a powerful methodologic tool that may uncover causal effects of exposures that are otherwise obscured. However, as with all methods, diagnostics and sensitivity analyses are essential for proper use: powerful tools can be dangerous if not handled with care.

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MODELING CUMULATIVE EFFECTS OF TIME-VARYING EXPOSURES IN PROSPECTIVE STUDIES. M P Sylvestre and *M Abrahamowicz (Department of Epidemiology & Biostatistics, McGill University, Quebec, H3A 1A1 Canada)

Many exposures and risk factors evaluated in prospective cohort studies show important variation over time in exposure status and intensity, and their effects cumulate over time to affect health outcomes. Modeling cumulative effects of such time-varying exposures improves the power for testing their effects and yields new insights about etiology [1]. However, while conventional cumulative exposure measures simply sum up all past exposures, etiological relevance of exposures may vary considerably depending on how long ago they did occur. Yet, typically it is difficult to quantify the relative importance of exposures in different intervals in the past. We propose a new flexible method for estimating the weighed cumulative effect (WCE) of a time-varying exposure. We use splines to estimate the weight function, which assigns 'importance weights' to past exposures as a function of the time elapsed since the exposure, without the need for *a priori* assumptions about the function's shape. Confidence bands around the weight function are estimated through bootstrap. The resulting WCE is modeled as a time-dependent covariate in the Cox's model. Simulations demonstrate the ability of our method to identify the etiologically relevant window of exposure, recover various shapes of the weight function, and accurately estimate the hazard ratios for different patterns of exposure history. The method's application to re-assess the associations between selected benzodiazepines and risk of fall-related injuries in the elderly confirms the importance of cumulative effects, and suggests the impact of very recent vs past exposures differs across products. [1] Abrahamowicz et al, J Clin Epi 2006, 59:393–403

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G-ESTIMATION OF STRUCTURAL NESTED CUMULATIVE FAILURE TIME MODELS. *S Picciotto, J Young, M A Hernán (Harvard School of Public Health, Boston, MA 02115)

Unlike conventional statistical methods, the parametric g-formula and inverse probability weighting (IPW) of marginal structural models adjust appropriately for time-varying confounding by factors that predict both future treatment and outcome and are also affected by prior treatment. However, even in the absence of unmeasured confounders, each method has limitations. The parametric g-formula requires modeling and predicting all confounders for each person-time observation, which is computationally intensive and renders results susceptible to model misspecification bias and to the g-null paradox. IPW requires less computation and avoids the g-null paradox, but model misspecification may result in extreme weights that lead to biased/imprecise estimates. A new technique, g-estimation of structural nested cumulative failure time models (SNCFTM), may solve these problems: it relies less on models than the parametric g-formula and does not estimate weights to adjust for confounding. G-estimation of SNCFTMs requires a structural log-linear model for survival and a model for treatment at each time, conditional on prior treatment and covariate history. Under assumptions of no unmeasured confounding and no model misspecification, SNCFTMs model the effect of a final ''blip'' of treatment on the logarithm of subsequent cumulative failure probability. We describe g-estimation of SNCFTMs to evaluate the effects of hypothetical interventions on risk factors for coronary heart disease in a large cohort study. By using the same data analyzed previously with the parametric g-formula and IPW of marginal structural models, we can compare the advantages and disadvantages of the three methods. We also provide software to enable epidemiologists to apply this new technique.

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EXPOSURE TO HIGH LEVELS OF MATERNAL CORTISOL DURING PREGNANCY AND CHILD IQ. *K Z LeWinn, L R Stroud, B E Molnar, J H Ware, K C Koenen, S L Buka, 2007 (Harvard School of Public Health, Boston, MA)

There is a well established link between maternal stress during pregnancy and offspring outcomes. Activation of the hypothalamic-pituitary-adrenal (HPA) axis and the release of cortisol is one of the primary responses to stress. In animal models, high cortisol exposure in utero has detrimental effects on offspring HPA-axis sensitivity and the hippocampus. We examined the relation between maternal cortisol levels during pregnancy and offspring cognitive performance at age 7 measured by the Wechsler Intelligence Scale for Children (WISC). We hypothesized a negative relationship between cortisol and measures of verbal ability, as these tests draw more heavily on the memory of facts and information, which is mediated by the hippocampus. We examined 228 siblings in 113 families from the National Collaborative Perinatal Project in Boston and Providence. Maternal sera samples from the third trimester of pregnancy were assayed for free cortisol. We used fixed effects regression, which controls for family membership, to examine the relation between maternal cortisol in quintiles and full scale, verbal, and performance IQ. This approach reduces bias due to characteristics shared by siblings. We adjusted for characteristics that varied between siblings (e.g. birth weight). Within families, being in the highest quintile of cortisol exposure was associated with verbal IQ scores 5.6 points ($SE = 2.81$, $p = 0.048$) lower than those in the four other quintiles of exposure. We observed no relation between cortisol and full scale IQ or performance IQ. These findings are consistent with prior studies showing that exposure to high levels of maternal cortisol during pregnancy may be related to offspring cognitive skills mediated by the hippocampus.

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THE PARENT-CHILD RELATIONSHIP AS MEASURED BY THE PARENTAL BONDING INSTRUMENT AND ADULTHOOD RISK OF CORONARY HEART DISEASE. *N D Almeida, L Kubzansky, J Pruessner, J Maselko, M J Meaney, S L Buka, E B Loucks (McGill University, Montreal, Canada)

Background: While the early childhood environment influences mental health, few studies have examined parental care as a predictor of coronary heart disease (CHD). Objectives: To evaluate the association between perceived quality of parental care and 10-year risk for CHD. Methods: 287 subjects were drawn from the New England Family Study, a follow-up of 17,921 offspring in the National Collaborative Perinatal Project. A shortened version of the Parental Bonding Index (PBI), comprising validated 4-item care and overprotection subscales, was used. Quality of reported parental care was computed as the average subscale scores for each parent (range: 0–12). PBI, age, smoking and diabetes were assessed by self-report, while plasma samples and blood pressure were obtained at the interview. 10-year CHD risk was calculated using the validated Framingham Risk Algorithm that incorporates age, diabetes, smoking, total and HDL cholesterol, and systolic and diastolic blood pressure. Multiple linear regression assessed effects of parental care on CHD risk after adjusting for race/ethnicity, childhood socioeconomic status, and parental mental illness. Results: Among females, a one-unit increase in the parental care score decreased CHD risk by 0.12% (95% CI: 0.02, 0.22), after adjusting for covariates. No significant effect was seen in males, or for parental overprotection. Conclusion: Parental care as measured by the PBI significantly reduces the calculated 10-year CHD risk in females, but not males. While the gender differences need further investigation, these findings underscore the importance of the early childhood environment in influencing multiple forms of adult chronic disease.

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INTER- AND INTRA-RACIAL VARIATION IN VERY PRETERM BIRTH RATES ACROSS 300 US CITIES.

*M Kramer and C Hogue (Emory University, Atlanta, GA)

Background: Three-fold black-white racial disparities in birth <32 weeks gestation (very preterm – VPT) is a primary source of the disparity in infant mortality and morbidity. We describe the inter-racial disparity in data aggregated at the US city level, as well as the intra-racial variation between cities. Methods: The unit of analysis is city-race groups. VPT rates are calculated in 301, 168 and 169 cities (metropolitan areas) where there were 1000 or more race-specific births for NH white, NH black, and Hispanic women from 2002–4.Mean and SD of city-rates for each race are calculated. Analyses are stratified by maternal education, age, parity, and city characteristics. Results: The mean city-level VPT rate was 12.3, 34.8, and 15.7 per 1,000 live births for whites, blacks, and Hispanics. The variation around the mean of city-level rates for black women was 2.5 times greater than white women (as measured by std. dev. of empiric distribution of city rates, $p < .001$). This pattern held after control for age, education, parity, city size, region of the country, and % black population living in poverty. Conclusion: The average city-level rate for black women is 3 times higher than the average for white women (ecologic corollary of the individual disparity); moreover the variance in rates between cities is significantly higher for blacks compared to whites or Hispanics. The persistence of increased variation after control for likely individual and city level confounders implies an increased sensitivity to place for black women. This suggests a need to identify additional city-level determinants explaining both intra- and inter-racial variation, and cautions investigators comparing cities to insure no violation of model assumptions for homogeneity of variance by race.

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PRE-MORBID IQ, THE METABOLIC SYNDROME AND MORTALITY: THE VIETNAM EXPERIENCE STUDY.

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In comparison to their lower IQ-scoring scoring counterparts, higher performing individuals have more favourable levels of several health behaviours, including cigarette smoking (uptake and cessation), physical activity, and dietary characteristics. However, there are fewer studies exploring the link between IQ and physiological risk factors. In particular, the link between IQ and the cluster of risk indices that comprise the metabolic syndrome is unknown. The extent to which the metabolic syndrome may act as a mediator in the well-replicated relation between high IQ and lower mortality risk also remains unexplored. In this cohort study, 4157 male former Vietnam-era US army personnel with IQ test results in early adulthood (mean age; range: 20.4 yr.; 16–30.) attended a clinical examination in middle-age (38.3 yr.; 31–46) when the components of the metabolic syndrome were measured (body mass index was substituted for waist circumference). Study participants were followed for 15 years for mortality experience. IQ was significantly, inversely related to four of the five individual components comprising the metabolic syndrome: hypertension, high body mass index, high triglycerides and high blood glucose but not low HDL cholesterol. After multiple adjustment, higher IQ scores were associated with a reduced prevalence of the metabolic syndrome itself (odds ratioone SD increase in IQ: 0.87; 0.78, 0.98). The metabolic syndrome appeared to mediate the relation between IQ and cardiovascular disease (metabolic syndrome-adjusted hazards ratioone SD increase in IQ: 0.78; 0.61, 1.00) but not IQ and total mortality (0.72; 0.63, 0.81).

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LIFECOURSE SOCIOECONOMIC POSITIONS AND SUBCLINICAL ATHEROSCLEROSIS IN THE MULTIETHNIC STUDY OF ATHEROSCLEROSIS.

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A major limitation of past work on the social patterning of atherosclerosis has been the reliance on measures of neighborhood or individual-level socioeconomic position (SEP) assessed at a single point in time in adulthood. Risk of chronic disease is thought to accumulate throughout the life-course, so the use of a single point in time measure may result in inaccurate estimates of the social patterning of subclinical disease. Using data from the Multi-Ethnic Study of Atherosclerosis (MESA), we examined the relation between childhood SEP [CSEP] (father or care-taker's education), adulthood SEP [ASEP] (a summary score of income, education, and wealth), and 20-year average exposure to neighborhood poverty [NSEP] and the prevalence of subclinical atherosclerosis, as assessed by common carotid intimal-medial thickness (IMT), in adulthood. After adjustment for age, CSEP and ASEP were both inversely and independently associated with IMT in men [mean difference (micrometers) for highest vs. lowest tertile (95% CI): −20.8 (−40.6, −1.1) for CSEP; −16.3 (−37.6, 4.9) for ASEP]. All three indicators: CSEP, ASEP, and NSEP were inversely and independently associated with IMT in women [−24.0 (−41.0, −7.0) for CSEP; −18.2 (−37.1, 0.6) for ASEP; −24.5 (−41.5, −7.5) for NSEP). Associations were somewhat reduced after adjustment for cardiovascular risk factors. Evidence existed for heterogeneity of effects by gender for the NSEP and IMT association and by race/ethnicity for the ASEP- and NSEP- IMT associations. Our results show that SEP at multiple points in the life-course, and at the individual and neighborhood level, contributes to the development of atherosclerosis.

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SERUM LEVELS OF ORGANOCHLORINE COMPOUNDS AND RISK OF TESTICULAR GERM CELL TUMORS.

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There is speculation that exposure to organochlorine pollutants may increase risk of testicular germ cell tumors (TGCT). To date, one small case-control study has addressed this hypothesis; in that study, elevated levels of polychlorinated biphenyls (PCBs) and certain organochlorine insecticides, chlordanes in particular, were associated with increased TGCT risk. To further investigate this question, we conducted a nested case-control study within the Norwegian Janus serum bank cohort. Incident cases of TGCT (N = 49) diagnosed through 1999 were identified through linkage to the Cancer Registry of Norway. Controls (N = 53) were matched to cases on region, blood draw date and age at blood draw. Measurements of 34 PCB congeners and 11 organochlorine insecticide compounds were performed. An increased relative risk of TGCT was observed for elevated lipid-adjusted serum levels of oxychlordane (tertile 2, odds ratio (OR) 2.8, 95% confidence interval (CI) 0.8–21.5; tertile 3, OR 4.2, 95% CI 0.8–21.5; P = 0.05), *trans*-nonachlordane (3.1, 0.9–11.4; 2.9, 0.9–10.1; P = 0.07) and all chlordanes combined (2.5, 0.8–7.5; 3.4, 1.0–11.7; P = 0.01). Total PCB levels were not associated with risk, although associations were observed for congeners 99 (2.5, 0.8–7.8; 2.3, 0.8–6.3; P = 0.04) and 167 (1.9, 0.5–6.9; 3.4, 0.9–13.4; P = 0.02). Our study, the first prospective investigation of serum organochlorine levels and TGCT reported to date, confirms earlier findings suggesting that exposure to chlordanes, and possibly some PCB congeners, may increase risk. Further research evaluating the biologic effects of chlordanes and other suspected endocrine modulators within the testis is warranted.

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NONSTEROIDAL ANTI-INFLAMMATORY DRUGS AND RISK OF OVARIAN AND ENDOMETRIAL CANCERS IN IOWA WOMEN'S HEALTH STUDY. *A E Prizment, A R Folsom, K E Anderson (University of Minnesota, Minneapolis, MN, 55455)

Background: Several epidemiological studies have shown inverse associations between use of nonsteroidal anti-inflammatory drugs (NSAIDs) and incident ovarian cancer but the results are inconsistent. We investigated associations between NSAIDs use and ovarian and endometrial cancers in prospective cohort of 28,573 women age 62 to 76 old at the beginning of follow-up. Participants were asked how often they used aspirin and non-aspirin NSAIDs. Over 13 years, 300 endometrial and 154 ovarian incident malignancies were identified. Multivariate-adjusted hazard ratios (HR) were estimated using Cox proportional regression. Results: Compared to women who reported no use of aspirin, the relative risks of ovarian cancer for those who used aspirin less than 2, 2–5 times, and more than 5 times per week were 0.84, 0.78 and 0.70, respectively ($p = 0.18$). There was no association between aspirin use and ovarian cancer for women who had reported a hysterectomy. For women with no hysterectomy, HRs for ovarian cancer were 0.92, 0.79, and 0.58 for frequency of aspirin use of less than 2, 2–5, and more than 5 times per week, respectively ($p = 0.07$). We did not observe any association between non-aspirin NSAIDs use and ovarian cancer. Neither did we find associations between aspirin or other NSAIDs use and risk of endometrial cancer. Conclusions: Our results suggest possible inverse association between aspirin use and development of ovarian cancer, particularly among women with no history of hysterectomy. Larger prospective studies are warranted to further examine this association.

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PHYTOESTROGENS AND ENDOMETRIAL CANCER RISK IN A STUDY IN NEW JERSEY. *E V Bandera, M G Williams, C Sima, H Wilcox, A Zauber, and S H Olson for the EDGE Study (The Cancer Institute of New Jersey, New Brunswick, NJ)

Phytoestrogens have been shown to exert anti-estrogenic and estrogenic effects in some tissues, including the breast. However, only a few studies have evaluated their role on endometrial cancer. We conducted a population-based case-control study in northern New Jersey. Cases were identified though the NJ Cancer Registry. Controls were identified by random digit dialing (for women < 65 yrs.) and from Centers for Medicare and Medicaid files and area sampling (for women > 65 yrs). A total of 420 cases and 395 controls completed an interview, including a food frequency questionnaire with supplemental questions for phytoestrogen foods. Risk estimates were derived using unconditional logistic regression, adjusting for age, education, body mass index (BMI), total energy intake, hormone replacement therapy use, and other major risk factors for endometrial cancer. There was some suggestion of a decreased risk with total isoflavone intake [odds ratio (OR): 0.77; 95% confidence interval (CI): 0.48, 1.22 for the highest quartile] and for quercetin (OR: 0.68; 95% CI: 0.44–1.05). There was no relationship with any of the lignans evaluated, total lignans, coumestrol, or total phytoestrogens. The relationship with isoflavones appeared to be limited to lean women (BMI <25) (OR for the highest tertile: 0.49, 95% CI: 0.25–0.97) and those with a waist-to hip-ratio <0.85 (OR: 0.59; 95% CI: 0.33–1.06). There were too few premenopausal women to conduct stratified analyses by menopausal status. However, excluding premenopausal women did not change risk estimates. There was no evidence of effect modification by HRT use. This study suggests an inverse association with isoflavones in lean women.

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POSTMENOPAUSAL HORMONE USE AND OVARIAN CANCER RISK IN THE NIH-AARP DIET AND HEALTH STUDY. *K Danforth, L Brinton, P Hartge, M Leitzmann, A Schatzkin, J Lacey, Jr (Division of Cancer Epidemiology and Genetics, NCI, NIH, DHHS, Bethesda, MD 20852)

Long-duration use of postmenopausal unopposed estrogen (ET) has been associated with an increased risk of ovarian cancer, but whether use of the estrogen plus progestin (EPT) formulation increases risk remains unclear because data are sparse and conflicting. A total of 97,563 women in the NIH-AARP Diet and Health Study, who were recruited during the period 1995–1996, were followed through June 2002, yielding 289 incident epithelial ovarian cancers. Multivariable Cox proportional hazards models were used to estimate relative risks (RRs) and 95% confidence intervals (CIs). Among 73,425 women without a hysterectomy, ovarian cancer risk was non-significantly elevated among current (RR = 1.25, 95% CI 0.90–1.75) and former (RR = 1.32, 95% CI 0.73–2.38) users of EPT. Most current EPT users were also users of long durations (10 or more years), in whom a RR of 1.91 (95% CI 1.19–3.06) was identified. When EPT risks were examined by regimen, both current users of sequential (progestin use less than 15 days per cycle) as well as continuous (progestin use for 15 or more days per cycle) preparations had non-significantly elevated risks (RR = 1.39, 95% CI 0.83–2.34, and RR = 1.27, 95% CI 0.84–1.93, respectively). Among the 23,704 women with a hysterectomy, current ET use for 10 or more years was significantly associated with ovarian cancer risk (RR = 1.88, 95% CI 1.04–3.38). In conclusion, this prospective study found an increased relative risk of ovarian cancer among long-duration EPT users that is similar to the increased relative risk observed among long-duration ET users.

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GREAT LAKES SPORT-CAUGHT FISH CONSUMPTION AND THE INCIDENCE OF ENDOMETRIOSIS IN THE ANGLER HEALTH FOLLOW-UP STUDY (AHFS). *T M Brasky, J E Vena, G M B Louis, M R Bonner (University at Buffalo, Buffalo, NY 14214)

Great Lakes sport-caught fish bioaccumulate organochlorine compounds, including polychlorinated biphenyls (PCBs), which have been suspected of adversely affecting human health. PCBs are hormonally active and have been previously associated with endometriosis risk. The AHFS is comprised of 10,943 males and 7,800 females between ages 15–62 at baseline. All cohort members completed a baseline questionnaire in 1991 that assessed L. Ontario sport-caught fish consumption between 1955–1991 and select demographic characteristics. In 1997, a mailed survey queried for self-reported diagnosis of endometriosis. Prevalent cases of endometriosis were excluded (n = 206), leaving 78 cases of incident endometriosis for analyses. We restricted analyses to female participants with known fish consumption (n = 4,355). Cox Proportional Hazards models estimated hazards ratios (HR) and 95% confidence intervals (95% CI), adjusting for age, parity, and cigarette pack-years. Lake Ontario fish consumption was associated with increased endometriosis incidence (adjusted HR 1.57, 95% CI: 0.99–2.48) and duration of fish consumption was associated with monotonically increasing endometriosis risk (p-trend = 0.01). Similar results were obtained in analyses with a 20-year lag time to account for disease latency (HR = 1.77; 95% CI: 0.98–3.23). L. Ontario fish consumption may be associated with the occurrence of endometriosis. Further study with laparoscopically confirmed disease and more precise estimates of ingested organic pollutants from fish is warranted.

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EFFECTS OF EARLY CHILDHOOD LEAD EXPOSURE ON ELEMENTARY SCHOOL PERFORMANCE. *M L Miranda, D Kim, J Reiter, A Hull, S P Morgan (Duke University, Durham, NC 27708)

Research has long linked childhood lead exposure to deficits in cognitive function, with increasing evidence of negative impacts at blood lead levels well below the CDC blood lead action level of 10 ug/dL. We sought to determine whether exposure to lead contributes to the achievement gap between blacks and whites and whether the effect of lead on educational achievement demonstrates a threshold effect. We linked lead surveillance (age 1–6) and early end of grade testing data (~ age 8–10) for children in NC. We used multivariate regression analysis to examine the correlation of lead exposure with reading and math scores for the 100 counties in NC, controlling for student age, sex, and race, parental education, poverty, and school system. Quantile regression was used to determine whether the impact of lead differed across the distribution of test scores. Average blood lead levels (BLLs) among students designated as ''exceptional children'' were tested for statistical differences. Lead exposure demonstrated a dose-response impact on reading and math scores (all $p < .0001$), with no demonstrable threshold effect. Quantile regression showed that the impact of lead exposure was greater and more highly variable at the low end of the distribution of reading, but not math, scores. Children with learning and behavioral disorders had higher early childhood BLLs ($p < .0001$). Students designated as ''academically and intellectually gifted'' had lower early childhood BLLs compared to ''non-exceptional'' students ($p < .0001$). Accounting for early childhood lead exposure attenuates, in part, the black-white achievement gap in test scores. The results highlight the potential for early combined environmental and educational interventions to improve outcomes for children.

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EFFECT OF PM_{10} ON INFANT MORTALITY IN RESIDENTS OF MEXICO CITY METROPOLITAN AREA, 1997–2005. I Romieu1, L Carbajal, M Medina, L Rojas3, G Tzintzun, P Solis, M Hurtado, M J Schwartz (Instituto Nacional de Salud Publica, Mexico)

Introduction: Evidence has shown a positive association between air pollution and daily mortality. Less is known about modification of this association by socioeconomic status (SES). Objective: To assess the association of particulate matter (PM_{10}) with daily mortality and its modification by SES. Methods: We used a case-crossover approach to evaluate the relationship between average 24-hr PM_{10} levels and postneonatal mortality in residents of Mexico City from 1997 to 2005. We used a monthly time-stratified control sampling, with controls every third day to avoid serial correlation and a conditional logistic regression models controlling for weather and temperature spline. Results: All cause mortality increased by 5% (95% CI 1%–10%) with an increase of 38.7 $\mu g/m^3$ (interquartile range (IQR)) in the 24hr-average PM_{10} with 1-day lag and 7% (95% CI 2%–11%) for 2-day lag. For respiratory mortality 10% (95% CI 2%–18%) for each IQR increases in the average 24-hr PM_{10} levels with 2-day lag. Data stratified by SES showed that infants from lower SES presented higher risk of death to PM_{10} levels for all-cause mortality (10%, 95% CI 2%–18% per IQR), and respiratory mortality (12.7%, 95% CI 1%–26% per IQR). The interaction between PM_{10} and SES was statistically significant ($p < 0.05$). Conclusion: Our data suggest that infant residents of MCMA from low SES are at higher risk of premature mortality when exposed to PM_{10} ambient levels. Supported by HEI.

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INTERACTION BETWEEN ARSENIC EXPOSURE AND ANTIOXIDANT ENZYME POLYMORPHISMS ON ARSENICAL SKIN LESIONS IN A BANGLADESHI POPULATION. *M Argos, M G Kibriya, F Parvez, H Ahsan (University of Chicago, Chicago, IL 60637)

Background: Skin lesions are a hallmark of chronic arsenic toxicity. The pathways responsible for arsenical skin lesions are not well understood; although, oxidative stress is a hypothesized mechanism of arsenic carcinogenesis. Single nucleotide polymorphisms (SNPs) in genes encoding antioxidant enzymes have not been thoroughly investigated in relation to arsenical skin lesion and are explored in this case-control study. Objectives: This study evaluated SNPs in four antioxidant enzyme genes and arsenic exposure in relation to arsenical skin lesions among cases and controls sampled from the Health Effects of Arsenic Longitudinal Study (HEALS) in Bangladesh. The HEALS cohort consists of adults chronically exposed to arsenic through drinking water. Design: Arsenic exposure, DNA samples, and arsenical skin lesions were assessed at the baseline evaluation of cohort participants. We estimated odds ratios (ORs) and their 95% confidence intervals (CIs) using logistic regression for the proposed associations. Results: No significant associations were observed between arsenical skin lesions and the SNPs individually (SOD2 C301T, CAT A344G, GPX1 C401T, and MPO C290T). Individuals who possessed variant mutations in all four SNPs had a suggestive increased risk of arsenical skin lesions (adjusted OR = 1.41, 95% CI = 0.58–3.44). There was no evidence of effect modification between these polymorphisms and arsenic exposure. Conclusion: Polymorphisms in these antioxidant enzymes were not significantly associated with arsenical skin lesions. The role of the oxidative stress pathway in arsenic carcinogenesis may depend on other antioxidant factors or be influenced by other polymorphisms in these genes.

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FAST FOOD AVAILABILITY, CONSUMPTION, & DIET QUALITY: THE MULTI-ETHNIC STUDY OF ATHEROSCLEROSIS. *L V Moore, A V Diez Roux, J A Nettleton, D R Jacobs, M Franco (Universit of Michigan Ann Arbor, MI 48109)

Although diet quality is thought to be negatively influenced by the spatial availability/proximity of fast food outlets and fast food consumption, empirical validation remains rare. We examined the association between diet quality and fast food availability and consumption using data from the Multi-Ethnic Study of Atherosclerosis, a study of cardiovascular disease in adults aged 45–84 in six urban U.S. areas. Participants (n = 5406) reported usual fast food consumption (never, 0–1, $\geq$1/week). Diet was assessed via a 120-item food frequency questionnaire and summarized by a 'Fats & Processed Meats'(FPM) dietary pattern empirically derived from 47 food groups. A healthy diet was defined as scoring in the bottom FPM quintile for these analyses. Fast food availability was measured by GIS-derived densities of fast food outlets within a 1-mile radius of participants' homes and informant reported availability of outlets within the same radius. Logistic regression was used to model the odds of a healthy diet separately by fast food availability and consumption adjusted for study site, age, gender, race/ethnicity, and income. For every standard deviation increase in fast food availability, the odds of a healthy diet decreased 13–17% (Odds Ratio [95% Confidence Interval] (OR) = 0.87[0.79,0.97] for reported availability and 0.83 [0.70, 0.98] for densities of fast food outlets). Those who never ate fast food had a three fold greater odds of having a healthy diet than those eating fast food $\geq$1/week (OR = 3.60[2.91,4.47]). Those eating fast food 0–1/week also had a greater odds of a healthy diet than those eating fast food $\geq$1/week (OR = 1.62[1.29,2.04]). Fast food availability and consumption are associated with poorer diet quality.

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PLASMA ORGANOCHLORINE LEVELS AND RISK OF NON-HODGKIN LYMPHOMA IN THE PHYSICIANS' HEALTH STUDY. *K Bertrand, S Korrick, T Kurth, F Laden (Harvard School of Public Health, Boston, MA 02115)

Introduction: Non-occupational exposure to polychlorinated biphenyls (PCBs) and p,p'-dichlorodiphenyldichloroethylene (DDE) may increase the risk of non-Hodgkin lymphoma (NHL). Methods: We conducted a case-control study nested within the Physicians' Health Study, a prospective cohort established in 1982. We measured concentrations of PCBs and p,p'-DDE in baseline blood samples from 205 men diagnosed with NHL and 409 age- and race-matched controls. Lipid-adjusted organochlorine concentrations were categorized into quintiles based on the distribution among controls. We used conditional logistic regression to estimate odds ratios (ORs) and 95% confidence intervals (CIs) for each quintile relative to the lowest quintile. We also evaluated these associations for NHL subtypes. Results: We found significant associations for total PCBs, the group of immunotoxic congeners, the individual congeners 118, 138, 153, and 180, and the sum of these four congeners with risk of NHL. The OR for the highest quintile of total PCBs versus the lowest was 1.9 (95% CI: 1.1 – 3.2; p-trend < 0.001). The ORs for individual congeners and groups defined as above ranged from 1.7 for PCB 118 to 2.4 for PCBs 153 and 180. Adjustment for height, body mass index, and smoking status did not substantially change the estimates. No association was observed for p,p'-DDE. The strongest associations of PCBs with NHL seemed to be for the diffuse large B-cell and follicular lymphoma subtypes; however, we had limited power for subtype analyses. Conclusions: These results indicate an apparent two-fold increased risk of NHL among individuals with high non-occupational exposure to PCBs and suggest that associations may be stronger for certain NHL subtypes.

L1

UNDERSTANDING WHY PEOPLE AVOID THE FLU SHOT. *T Kelley, R Merrill, E Cox, A Layman, T Harmon, R Lindsay (Brigham Young University, Provo, UT 84602)

Influenza, more commonly known as the flu, is a contagious respiratory illness that affects between 5% and 20% of the United States population each year, with over 200,000 people hospitalized and 36,000 dying as a result. It is caused by the influenza virus and has a number of adverse symptoms and complications. Influenza vaccination is a recommended method for preventing the flu. The current study addresses reasons why college students at a large private university choose not to be vaccinated according to selected demographic and knowledge variables. Analyses are based on a cross-sectional survey, conducted the week of November 25, 2007, among 421 randomly selected students (44% male and 56% female). Approximately 88% had not received or were not sure they would receive a flu shot this year. Among the study participants the leading reasons for not receiving a flu shot were lack of time and money, followed by uncertainty where to receive the shot, and then a basic lack of understanding of the importance of the flu shot. These responses did not significantly differ between males and females or across age. Only 37% believed that the flu was dangerous or could be fatal to them. These people had a significantly greater likelihood of having been or planning to be vaccinated this year (17% vs. 9%, $P = 0.0113$). We will also discuss sources of information about and encouragement for the flu vaccination and how these variables relate to getting the flu shot.

L2

IMPACT OF THE SPANISH SMOKING CONTROL LAW ON EXPOSURE TO SECONDHAND SMOKE AND RESPIRATORY HEALTH IN HOSPITALITY WORKERS. *E Fernandez, M Fu, J A Pascual, M J López, M Pérez-Ríos, A Schiaffino, J M Martínez-Sánchez, C Ariza, E Saltó, M Nebot and the Spanish Smoking Law Evaluation Group (Catalan Institute of Oncology, 08907 Hospitalet, Spain)

A smoke-free law came into effect in Spain on January 2006, affecting all enclosed workplaces except hospitality venues, whose owners can choose among totally smoke-free, partial restrictions (designated areas), or no restrictions on the venues. We assessed changes in secondhand smoke (SHS) exposure and respiratory symptoms before and after the law. We formed a cohort of 476 hospitality workers in Spain (and Portugal and Andorra as control areas). 318 workers were followed up 1 year after the ban, and 137 non-smokers were available for analysis. We assessed self-reported exposure to SHS and presence of respiratory symptoms by questionnaire and collected saliva samples for cotinine measurement at baseline and follow-up. We used generalized least squares and logistic regression models with random effects to assess before-after changes. Salivary cotinine decreased by 55.6% after the ban among non-smoking workers in venues where smoking was totally prohibited, by 27.6% ($p = 0.068$) in venues with designated smoking areas, and by 10.7% ($p = 0.475$) in venues where smoking was allowed whereas in control areas no differences were found. In Spain, reported respiratory symptom declined significantly by 71.9% only among workers in venues that became smoke-free. After adjustment for potential confounders, salivary cotinine and respiratory symptoms decreased significantly only among workers in hospitality venues where smoking was totally banned in Spain. Partial restrictions on smoking in hospitality venues do not sufficiently protect hospitality workers against SHS."

L3

ASSOCIATION OF INTRAUTERINE AND EARLY LIFE EXPOSURES WITH UTERINE LEIOMYOMATA IN YOUNG WOMEN. *A A D'Aloisio, D D Baird, L A DeRoo, D P Sandler (NIEHS/NIH, Research Triangle Park, NC 27709)

Perinatal factors may affect responses to estrogen or progesterone in later life, thus influencing risk of hormone dependent outcomes. While such factors have been studied with regard to breast and other cancers, their associations with uterine leiomyomata (fibroids), for which estrogen and progesterone may play a role, have rarely been evaluated. We explored associations of in-utero and infant exposures with early self-reported diagnosis of uterine fibroids ($\leq$ 35 years of age). Fibroid cases included only women with early diagnosis to limit misclassification from undiagnosed fibroids. Study participants were 13,671 Caucasian women (ages 35 to 59 years) enrolled in the Sister Study, which evaluates exposures and disease outcomes among women having a sister with breast cancer. We estimated risk ratios (RR) and 95% confidence intervals (CI) using a log-binomial regression model. Greater risk of early fibroid diagnosis was associated with being firstborn (RR = 1.21; 95% CI: 1.05, 1.39, 1st versus higher birth order), maternal pre-eclampsia (RR = 1.31; 95% CI: 0.90, 1.91), and soy formula (RR = 1.26; 95% CI: 0.94, 1.70). These associations were not affected by adjustment for potential confounders in preliminary analyses. Exposure to maternal pre-eclampsia and soy formula may influence development of uterine fibroids in early adulthood. This is the first epidemiologic study to evaluate intrauterine and early life exposures in relation to risk of uterine fibroids

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L4

VALIDITY OF MATERNAL RECALL OF PRESCHOOL DIET AFTER 43 YEARS.

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Backgrond: Previously, it had not been possible to validitate early childhood diet recalls by surrogate responders several decades later due to the lack of diet records during this period. Methods: Between 1929 and 1972 parents of children participating in the Fels Longitudinal Study completed a 7-day diet record (DR) every year from their child's birth until age 18 years. In 2006, all surviving women (n = 63) whose children were between 3 and 5 years when DRs were collected were asked to complete a 42-item food frequency questionnaire (FFQ) pertaining to their first child's diet between 3 and 5 years of age. One or more DRs were available for 48 of these women. We calculated Spearman correlation coefficients and their 95% confidence intervals [CI] between mean food intakes reported in the DRs (between 1 and 3 for each individual) and food intakes reported in the FFQ. Results: FFQs were completed, on average, 43 years after DRs (range 35–57y). The correlation between DR and FFQ food intakes was low. The mean correlation coefficient was 0.12, ranging from −0.29 [−0.59–0.02] for ice cream to 0.45 [0.15–0.74] for peanut butter. The correlation (r [95% CI]) between DR and FFQ was moderate for some foods including orange juice (0.44 [0.19–0.64]), butter (0.40 [0.14–0.60]), eggs (0.37 [0.11–0.59]) and French fries (0.34 [0.08–0.57]) but there was not a clear pattern for any particular food group being recalled better than others. Conclusion: Although some foods can be recalled with sufficient validity to be used in epidemiologic studies, overall this questionnaire does not accurately represent preschool food intake when completed by surrogate responders 4 decades later.

L5

ENDOGENOUS HORMONES AND CORONARY HEART DISEASE IN POSTMENOPAUSAL WOMEN.

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The association between serum levels of endogenous estrogens in postmenopausal women and the subsequent risk of CHD was examined in a prospective case-control study nested within the New York University Women's Health Study (NYUWHS). The NYUWHS is a prospective cohort study of 14,274 healthy women enrolled between 1985 and 1991. A total of 99 women who were postmenopausal at enrollment and who experienced major adverse cardiac events, defined as non-fatal myocardial infarction (MI), fatal CHD, a percutaneous transluminal coronary angioplasty (PTCA), or a coronary artery bypass grafting (CABG) prior to 1995, were matched 1:2 by baseline age, blood sampling date, and postmenopausal status to controls who remained free of CHD. Biochemical analyses for total estradiol, estrone, percent free estradiol, percent estradiol bound to sex hormone-binding globulin (SHBG), and SHBG were performed on pre-diagnostic stored serum samples. Participants did not use hormone medications in the 6 months prior to blood collection. After adjusting for smoking status, family history of myocardial infarction, and alcohol consumption, the risk of CHD in the top tertile of bioavailable estradiol was significantly elevated compared with the bottom tertile (OR = 1.97; 95% CI = 1.03–3.79), and the risk in the top tertile of SHBG was significantly reduced (OR = 0.53, 95% CI = 0.29–0.87). However, these associations disappeared after additional control for body mass index and serum levels of cholesterol. These findings suggest that estradiol and SHBG were related to CHD risk in postmenopausal women through their associations with BMI and cholesterol level.

L6

EXPOSURE TO HIGH LEVELS OF MAGNETIC FIELDS AND THE RISK OF POOR SPERM QUALITY.

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A significant world-wide decline in semen quality has been observed in recent years, and the cause of such a decline remains unknown. To determine whether increased exposure to high levels of magnetic fields (MFs) decreases sperm quality, we conducted a population-based case-control study among seemingly healthy sperm donors in the Shanghai metropolitan area. The donors with abnormal sperm motility or morphology were identified as cases. Controls were those with no abnormal sperm indices. All participants were asked to wear an EMDEX-LITE meter for 24 hours to capture their daily MF exposure from all sources. After controlling for confounders, exposure to high MF levels was associated with an increased risk of poor sperm quality: compared to those whose 90th percentile of 24-hour MF level < 1.6 mG, those whose 90th percentile of MF level ≥ 1.6 mG had a two-fold increased risk of poor sperm quality. Increasing duration and amount of exposure above 1.6 mG increased the risk further, a dose-response relationship with a statistically significant trend test. Importantly, the association and dose-response relationship were further strengthened with more accurate measurement reflecting MF exposure during spermatogenesis: odds ratio (OR) = 2.6, 95% confidence interval (CI): 1.2–5.5 for 90th percentile ≥ 1.6 mG for any duration, and OR = 3.9, 95% CI: 1.3–12.1 for MF exposure ≥ 1.6 mG lasting more than 6 hours. Our study showed for the first time that exposure to high levels of magnetic fields may decrease sperm quality. If this finding is further confirmed in future studies, the new finding will have significant public health implications due to the ubiquitous nature of MF exposure.

L7

ANXIETY OUTCOMES OF OFFSPRING WITH DIFFERENTIAL PARENTAL RISK: A PROSPECTIVE COMMUNITY FAMILY STUDY.

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To test whether different parental anxiety groups had distinct effects on offspring to develop anxiety and comorbid disorders, we used a community cohort of 3021 young adults followed up over 10 years. Parents were classified into 4 risk groups: (1) anxiety without comorbid disorders (anxiety alone), (2) anxiety with comorbid disorders, (3) other disorders, and (4) no disorder; and corresponding offspring outcomes were also generated. Binary outcomes were generated from the 4-category offspring outcome variables for ease of model interpretation. Differences in binary outcomes were assessed with odds ratios from logistic regressions. Models were conducted with offspring outcomes as the dependent variable and parental groups as the independent variable with adjustment for relevant confounders. Findings are: first, parents with anxiety, irrespective of gender and comorbidity, have a 2-fold (OR range = 1.9–3.1) association with offspring with anxiety with comorbidity. In contrast, parents with anxiety alone were not associated with offspring with anxiety alone (OR range = 0.8–1.2). Second, anxious mothers with comorbidity, compared to those without, were associated 1.4-fold odds with offspring with anxiety with comorbidity. Third, daughters with anxiety alone were less vulnerable to effects of comorbidity in anxious mothers. Anxiety alone in either parent may not be benign in its association with offspring outcomes, and may confer a risk almost equal to parents with anxiety with comorbidity. Despite anxiety alone being less common in the population, it is of equal importance in terms of risk to offspring for development of comorbid disorders.

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L8

HEALTH-RELATED QUALITY OF LIFE OF PALESTINIAN PRESCHOOLERS. *S Massad, F J Nieto, M Palta, M Smith, M Guillot, R Clark, A Thabet (University of Wisconsin-Madison, Madison, WI 53726)

In 2007, the authors used a cross-sectional random sample of kindergartens to examine factors associated with health-related quality of life (HRQOL) in 350 preschoolers in the Gaza Strip, where political violence and deprivation are omnipresent. The authors also examined the reliability and validity of the Arabic version of PedsQL 4.0- parent report. The analysis supports the reliability and validity of the PedsQL as a parent-proxy report HRQOL measurement instrument for Palestinian preschoolers 3–6 years. About 65% of the mothers reported severely impaired total, psychosocial, and emotional functioning in their children. HRQOL score was comparable to that of US children with Attention-Deficit/Hyperactivity Disorder, with severe cardiac diseases, with newly diagnosed cancer, and children with cerebral palsy. Factors associated with lower HRQOL score were child older age, poor child mental health, more exposures to traumatic events, and being deprived of food, water, and electricity during incursion. Factors associated with lower score on psychosocial health were poor child mental health, child being deprived of water, food, and electricity during incursion, being threatened of killing a family member during incursion, and witnessing assassination of people by rockets. Both violent and nonviolent exposures were associated with HRQOL in preschoolers in the Gaza Strip.

L9

ALCOHOL CONSUMPTION AND RISK OF TYPE 2 DIABETES MELLITUS IN THE FRAMINGHAM OFFSPRING COHORT. *F Imamura, A H Lichtenstein, G E Dallal, and P F Jacques (USDA Human Nutrition Research Center on Aging, Boston, MA 02111)

Alcohol intake has been shown to reduce a risk of type 2 diabetes mellitus (T2DM), but dose-response relationship and beverage types remain to be investigated. To address the issue, we used data from 2,891 non-diabetic white middle-aged adults (54% = women) in the Framingham Offspring Cohort; 161 (5.6%) subjects developed T2DM during 7-years follow-up. Multivariable logistic regression analyses were performed to estimate odds ratio of T2DM based on alcohol intake as %energy or on frequency of alcoholic beverage consumption (beer, red wine, white wine, or liquor), adjusting for T2DM risk factors and caloric intake. Alcohol intake as %energy from alcohol was divided into non-drinkers and 3 equal-sized categories of alcohol intake. The highest alcohol intake group ($\geq$5.5%, median = 10.5%, N = 757) was less likely to develop T2DM than no intake group (0%, N = 811) or the second lowest intake group (0.2–1.5%, N = 753); odds ratios (ORs) (95% confidence intervals (CI)) were 0.51 (0.30–0.87) and 0.49 (0.28–0.85), respectively. The linear trend was statistically significant ($p = 0.002$) based on a logistic regression analysis, but not a J-shaped or U-shaped trend ($p > 0.05$) based on a regression spline technique. Frequency $\geq$1 drinks/day of beer or white wine was significantly associated with lower risk of T2DM, comparing to no consumption of each; ORs (95% CI) were 0.53 (0.30–0.95) and 0.47 (0.24–0.92), respectively, after adjusting for frequency of other types of alcohol beverages. In conclusion, in middle-aged white adults, alcohol intake, particularly from beer and white wine, was associated with lower T2DM risk, and there was no indication of non-linear trend.

L10

ADOLESCENT AND ADULT SOY FOOD INTAKE AND BREAST CANCER RISK: RESULTS FROM THE SHANGHAI WOMEN'S HEALTH STUDY. S-A Lee, X-O Shu, H Li, G Yang, W Wen, B-T Ji, J Gao, Y-T Gao, *W Zheng (Vanderbilt Epidemiology Center, Vanderbilt-Ingram Cancer Center, Vanderbilt University School of Medicine, Nashville, TN 37203–1738)

Background: Soy food is a rich source of isoflavones, a class of phytoestrogens that has both anti-estrogenic and anti-carcinogenic properties. We evaluated the association of adolescent and adult soy food intake with breast cancer risk in a cohort of 73,224 Chinese women who participated in the Shanghai Women's Health Study. Methods: A validated food frequency questionnaire was used to assess usual dietary intake at baseline and again 2 to 3 years after the baseline survey. After a mean follow-up of 7.4 years (540,156 person-years), 592 incident cases of breast cancer were identified for longitudinal analyses using Cox regressions. Findings: Adult soy food consumption, measured either by soy protein or isoflavone intake, was inversely associated with the risk of premenopausal breast cancer ($P_{trend}<0.001$). The multivariate adjusted relative risks (RR) for the upper intake quintile compared to the lowest quintile were 0.41 (95% confidence interval (CI) = 0.25–0.70) for soy protein intake and 0.44 (95% CI = 0.26–0.73) for isoflavone intake. High intake of soy foods during adolescence was also associated with a reduced risk of premenopausal breast cancer (RR = 0.57, 95% CI = 0.34–0.97). Women who consumed a high level of soy foods consistently during adolescence and adulthood had a substantially reduced risk of breast cancer. Interpretations: This large, population-based, prospective cohort study provides strong evidence for a protective effect of soy food intake against breast cancer.

L11

BLOOD FOLATE LEVELS BEFORE FORTIFICATION IN IRISH FAMILIES WITH NEURAL TUBE DEFECTS. *J Byrne, S McGinty, R Scott (Boyne Research Institute, Duke House, Duke Street, Drogheda, Ireland)

Relatives in neural tube defect (NTD) families, especially those related through the mother, have elevated rates of NTDs and of other birth defects. The Irish government is planning to fortify flour with folic acid to increase folate levels, thus reducing the rate of new NTD cases. In a survey of serum folate levels among relatives before fortification, intended to establish a baseline level against which to measure post-fortification change, we assessed the factors that were related to serum folate levels. Relatives were drawn from families who had previously participated in our studies. The reponse rate among eligible, locatable relatives was 49.3%. In 2007 324 relatives gave a blood sample and completed two short questionnaires, one concerning lifestyle; the other a measure of dietary folate. A commercial lab measured serum folate levels. Factors associated with lower folate levels were current alcohol use ($p = 0.009$) and current smoking ($p = 0.04$). Factors that were associated with higher folate levels were current oral contraceptive use ($p = 0.05$), multivitamins containing folic acid ($p = 0.02$) and folic acid tablets alone ($p = 0.007$). Naturally-occurring food folate was weakly associated with serum folate ($p = 0.10$). Fortified or enriched folic acid from food was strongly related ($p = 0.007$). Other factors, including family relationship, gender, age and BMI were not associated with folate levels. In these relatives serum folate levels are sensitive to changes in dietary and lifestyle factors. Future molecular studies may indicate the presence of a genetic susceptibility that moderates the influence of these factors on serum folate levels.

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L12

EFFECTS OF VITAMINS C AND E AND β-CAROTENE ON THE INCIDENCE OF TYPE 2 DIABETES MELLITUS IN THE WOMEN'S ANTIOXIDANT CARDIOVASCULAR STUDY RANDOMIZED CONTROLLED TRIAL. *Y Song, N R Cook, M A Christine, M Van Denburgh, and J E Manson (Division of Preventive Medicine, Brigham and Women's Hospital, Boston, MA 02215)

Vitamins C and E and β-carotene, as major antioxidants, may protect against the development of type 2 diabetes via reduction of oxidative stress; however, data from randomized trials are very limited. To investigate the long-term benefits and risks of vitamins C and E and β-carotene supplementation for primary prevention of type 2 diabetes, we used a cohort of 6592 women free of diabetes mellitus at baseline in the Women's Antioxidant Cardiovascular Study (WACS) randomized trial in which all participants were randomly assigned to receive vitamin C (ascorbic acid, 500 mg/d), vitamin E (d-a tocopherol acetate, 600 IU every other day), and β-carotene (50 mg every other day), or their respective placebos, in a 2*2*2 factorial design. During a median follow-up of 9.2 years, we identified 879 women with an incident diagnosis of type 2 diabetes. There was a trend toward a modest reduction in risk of type 2 diabetes among women assigned to vitamin C as compared with those assigned to placebo (hazard ratio, 0.88; 95% CI, 0.77–1.01; P = 0.06); the inverse association of vitamin C with diabetes risk became somewhat stronger after longer follow-up (^{3}5 years) (P for time trend = 0.46) and was statistically significant after excluding cases that occurred in the first 2 years (RR, 0.86; 95% CI, 0.74–0.99; P = 0.03). In contrast, there was evidence for an elevated diabetes risk associated with vitamin E treatment (RR, 1.14; 95% CI, 0.99–1.30; P = 0.06). No significant difference was observed between the β-carotene and placebo groups in the incidence of type 2 diabetes (RR, 0.97; 95% CI, 0.85–1.11; P = 0.70). In conclusion, our trial data suggest that long-term use of vitamin E or β -carotene does not lower risk of developing type 2 diabetes among women at high risk for CVD. Vitamin C may have a role in the prevention of type 2 diabetes, but the findings require corroboration and may have been due to chance

L13

POLYMORPHISMS IN CAFFEINE METABOLISM AND ESTROGEN RECEPTOR GENES AND RISK OF PARKINSON'S DISEASE IN MEN AND WOMEN. *N Morozova, K Simon, X Gao, M Schwarzschild, A Ascherio (Harvard School of Public Health, Boston, MA 02139)

Caffeine intake has been associated with a decreased risk of Parkinson's disease (PD) in men but the effect in women is less clear, and appears to be modified by post-menopausal estrogens. In a nested case-control study within the Nurses Health Study (NHS) and the Health Professionals Follow-up Study (HPFS), we examined associations between single nucleotide polymorphisms (SNPs) in caffeine metabolizing genes (CYP1A2, NAT2) and estrogen receptors (ESR1 and ESR2), their interaction with caffeine intake (collected prospectively) and risk of PD. We matched 159 female cases to 724 controls and 139 male cases to 561 controls on birth year, source of DNA, and sex. Conditional logistic regression was used for all analyses. The CYP1A2 -163A->C polymorphism (lower enzyme inducibility) was associated with an increased risk of PD (RR = 1.32; 95% CI 1.00, 1.74) in men, but not in women. A significant interaction between this polymorphism and caffeine intake was observed among women (p = 0.05), but not among men (p = 0.72). Among women with the CC genotype, caffeine intake tended to be associated with a higher PD risk (RR, for caffeine > 100 mg vs. caffeine <100 mg/day, = 2.01; 95% CI: 0.78, 5.21), whereas among women with the AA genotype, caffeine intake was associated with a lower PD risk (RR = 0.56; 95% CI: 0.31, 0.99). None of the NAT2, ESR1 or ESR2 polymorphisms were associated with risk of PD. The observed increased risk of PD among female but not male carriers of the -163A->C polymorphism of CYP1A2 and its interaction with caffeine may provide clues to explain the relationship between caffeine intake, estrogen status and risk of PD and needs to be replicated.

L14

THE TRYP64ARG VARIANT IN ADRB3 MODIFIES THE ASSOCIATION OF BODY WEIGHT WITH BREAST CANCER RISK IN PRE-MENOPAUSAL AND HISPANIC WOMEN. *R Baumgartner, S Neuhausen, M L Slattery, C Sweeney, M Murtaugh, B Risendal, A Giuliano, K Baumgartner (University of Louisville, Louisville, KY 40292)

Beta-3 adrenergic receptors are expressed in adipose tissue and regulate lipolysis, thermogenesis and body weight. The Trp64Arg polymorphism in the ADRB3 gene is associated reduced receptor sensitivity, weight gain and obesity, particularly in premenopausal women. We hypothesized that the ADRB3 variant modifies the associations of body mass index (BMI) and weight gain with breast cancer risk in premenopausal women. We tested this hypothesis using data from the 4-Corners Breast Cancer Study for 1,697 women with incident primary breast cancer ascertained in Utah, Arizona, Colorado and New Mexico, and 1,986 age and ethnicity-matched controls. Logistic regression was used to estimate odds ratios and test for interaction between ADRB3 (WW vs WR/RR) and BMI in the referent year, at age 15, and weight gain from age 15 to the referent year. The variant R allele frequency was higher in Hispanic (H) (25.3%) than non-Hispanic white women (NHW) (14.7%), but did not differ between cases and controls. Significant (p < 0.05) interaction was found for ADRB3 with BMI at age 15 in premenopausal women, with similar, non-significant interactions for BMI and weight gain, adjusting for center, ethnicity, and relevant covariates. Risk was inversely associated with BMI and weight gain in women with WW, but there was a null or positive association in those with WR/RR. Interaction also was observed in postmenopausal women reporting recent hormone replacement therapy and in Hispanic women. In obese (BMI>30kg/m2) H women, the adjusted odds ratio for ADRB3 with breast cancer was 2.40 (1.51–3.89). These results support the hypothesis that ADRB3 modifies the association of BMI and weight gain with breast cancer risk.

L15

MEDITERRANEAN DIET AND DEPRESSION: THE SUN COHORT. *A Alonso, A Sánchez-Villegas, M A Martínez-González (University of Minnesota, Minneapolis, MN 55454)

Increasing evidence supports a beneficial role of the Mediterranean Dietary Pattern (MDP) on the risk of coronary heart disease (CHD). Because CHD and depression share some pathophysiologic mechanisms, it is plausible that a higher MDP adherence could reduce the risk of depression. Thus, we assessed the association between the MDP and the incidence of depression in the SUN study, a dynamic cohort of university graduates in Spain. We followed up 10,136 initially non-depressed individuals for a median of 4.4 years using biennial mailed questionnaires. Diet was assessed at baseline using a food frequency questionnaire (136 items) previously validated in Spain. We computed the Trichopoulou's MDP score including consumption of vegetables, fruits, nuts, cereals, legumes, fish, the monounsaturated/saturated fats ratio and moderate ethanol consumption (positively weighted), and meat/meat products and whole-fat dairy (negatively weighted). The outcome was a self-reported physician-made diagnosis of depression and/or the use of antidepressant medication during follow-up. A validation study showed a positive predictive value of 74% for the self-reported diagnosis of depression. The multivariate ORs (95% CI) of depression for increasing categories of MDP adherence were 1 (ref), 0.7 (0.5–1.0), 0.7 (0.5–0.9), 0.5 (0.4–0.7) and 0.6 (0.5–0.8) (p for trend = <0.001). Among individual components of the MDP, inverse dose-response relationships were found for fruits, nuts, legumes and fish, whereas a high whole-fat dairy consumption was associated with increased risk of depression. Our results support the hypothesis that the MDP might be also effective in preventing the occurrence of depressive disorders.

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L16

LOSS OF RESOURCES AND HURRICANE EXPERIENCE AS PREDICTORS OF POST-PARTUM DEPRESSION AMONG WOMEN IN SOUTHERN LOUISIANA. M Ehrlich, *E Harville, X Xiong, P Buekens, G Pridjian, K Elkind-Hirsch (Tulane University School of Public Health Department of Epidemiology, New Orleans, LA 70112)

After a natural disaster mental disorders are often a long-term public health concern. Previous studies suggest loss of psychosocial resources are associated with psychological distress. We examined the occurrence of depression six months post-partum among women residing in southern Louisiana who were pregnant during or immediately following hurricane Katrina's landfall. Based on the Conservation of Resources (COR) theory, we explored the contribution of both tangible and non-tangible losses on depression. We also investigated the influence on depression of individuals' hurricane experience through a Hurricane Experience Score (HES). Both tangible and non-tangible losses were associated with depression (relative risk RR = 1.78, 95% confidence interval (1.3–2.4) and 2.4(1.8 –3.3) respectively). Regression analysis showed loss-of-resource-associated depression was explained mainly by non-tangible factors (RR = 5.6(2.5–12.4, RR = 1.2(0.6–2.7) respectively). Hurricane exposure was also associated with depression (RR = 3.3(1. 8–5.9)). Consistent with COR theory, however, non-tangible loss-of-resources (LORnt) explained a majority of the association between severe hurricane exposure and depression in our models (LORnt RR = 2.9(1.7–5.1), HES RR = 2.2(1.2–4.1)). No additive or multiplicative interaction was present between non-tangible loss of resources and hurricane experience, indicating that these two factors had an independent, but not synergistic, effect on depression in the study population. These results suggest the need for preventive measures aimed at preserving psychosocial resources to reduce the long-term effects of disasters.

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