generalized estimation equation model for panel data.
Results: Partnership (OR 0.93; 95% CI 0.89, 0.97), higher income (>$50K 0.84; 0.77, 0.91), and White (0.95; 0.91, 1.10) or "other" race (0.84; 0.73, 0.97) were protective against food insecurity over a 5-year time frame post-disaster. Respondents who are female (1.05; 1.01, 1.10), with poor physical (1.08; 1.03, 1.13) or mental health (1.13; 1.09, 1.18), and low social support (1.14; 1.08, 1.20) were more likely to report food insecurity over time.
Conclusions: Improved policies and programs to ensure access to food supplies for vulnerable households are needed to reduce adverse health consequences following disaster.

P85. Trends in Severe Obesity Among 23 Million U.S. Children Aged 2–4 Years Who Enrolled in WIC — United States, 2000–2014

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Purpose: To examine trends in prevalence of severe obesity by age, sex, and race/ethnicity (non-Hispanic [NH] white, NH black, Hispanic, American Indian/Alaska Native [AIAN], and Asian/Pacific Islander [PI]) among U.S. children aged 2–4 years who enrolled in WIC during 2000–2014.
Methods: A cross-sectional study used data of 22.6 million young children enrolled in WIC from 50 states, DC, and 5 U.S. territories. Children's weights and heights were measured. Severe obesity was defined as sex-specific BMI-for-age≥120% of the 95th percentile. Children whose sex, weight, height, or BMI were missing or biologically implausible were excluded. Joinpoint regression was used to identify best fitting points where statistically significant changes in overall trend occurred. Log binomial regression adjusted for age, sex, and race/ethnicity was used to estimate prevalence ratios between two inflection years. Adjusted prevalence differences (APD) were calculated based on prevalence at beginning of period and prevalence ratios.
Results: During 2000–2004, prevalence of severe obesity increased significantly overall (from 1.80% to 2.11%, APD=0.26%) and among all the age, sex, and racial/ethnic groups except for Asian/PI (APD ranged from 0.05% to 0.54% across groups with increases). The largest increases occurred in AIANs and 4-year-olds. During 2004–2010, prevalence decreased significantly overall (APD= -0.05%), among boys, 2- and 3-year olds, NH blacks, and Asians/PIs (APD ranged from -0.05% to -0.18%). During 2010–2014, prevalence decreased significantly overall (from 2.12% to 1.96%, APD= -0.14) and among all demographic groups (APD ranged from -0.04% to -0.30%). The largest average relative annual decreases occurred in AIANs and Asians/PIs.
Conclusions: This study provides updated prevalence and trends of severe obesity among young children enrolled in WIC and reports recent modest declines in severe obesity in all subgroups. Ongoing surveillance is needed to assess whether declines continue into the future among low-income children.

Occupation

P86. Associations between Shiftwork and 25-hydroxy Vitamin D3 Levels among Police Officers

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Purpose: Policing is an occupation that requires shift work. Individuals working at night may develop vitamin D deficiency, which may lead to various health problems.
The aims of this cross-sectional study were to examine the association between shiftwork and 25-hydroxy vitamin D3 (25(OH)D3) levels among police officers and to assess whether seasons modified this relationship.
Methods: Participants were 222 police officers from the Buffalo Cardio-Metabolic Occupational Police Stress study (2011-2014). Shiftwork data were obtained from City of Buffalo, NY daily payroll records. Officers were assigned a dominant shift (day, afternoon, or night) based on the shift in which they worked the highest percentage of hours. The shift worked during the past month was used. 25(OH)D3 was measured by a liquid-phase radioimmunoassay technique. Analysis of variance/covariance were used to examine the mean levels of 25(OH)D3 across two categories of shiftwork, day and afternoon/night. Seasons specific to the Buffalo, NY climate were defined as Summer (June-August), Fall (September-October), Winter (November through March), and Spring (April-May).
Results: The mean age of officers was 46 years, 28% were female, 52% worked day and 9% worked the night shift. Associations were adjusted for age, sex, race/ethnicity, and multivitamin intake. Mean levels of 25(OH)D3 did not differ significantly across shifts before stratification by seasons. However, after stratification, levels of 25(OH)D3 were significantly higher among officers on the afternoon/night shift compared to those on the day shift (Mean[SE]: 28.5[2.3] vs. 21.8[1.8], respectively, p=0.033) for Spring only. During winter, 25(OH)D3 levels were higher among day shift officers compared to afternoon/night shift officers (Mean[SE]: 28.8[1.4] vs. 25.0[1.6], respectively, p=0.083). No significant associations were observed during the other seasons.
Conclusion: Results suggest that 25(OH)D3 levels differed significantly by shiftwork status only during the Spring. Future research may investigate the structural or, biological correlates which may explain these findings.

P87. Associations between Shiftwork and Biomarkers of Subclinical Cardiovascular Disease: The BCOPS Study

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Purpose: Police officers work shift schedules and are known to have a higher prevalence of cardiovascular disease (CVD) compared to the general population. Our objective was to investigate associations between shiftwork and select subclinical CVD biomarkers.
Methods: Participants were officers examined in the Buffalo Cardio-Metabolic Occupational Police Stress (BCOPS) study during 2004-2009. Daily electronic payroll records from the City of Buffalo, NY were used to assess dominant shift schedule as day, afternoon, or night. Dominant shift was the shift on which the highest percentage of hours was worked. Fasting blood specimens were collected and analyzed for white blood cell count (WBC), C-reactive protein (hsCRP), interleukin-6 (IL-6), and tumor necrosis factor-alpha (TNFα) using a standard protocol. Analysis of variance/covariance were used to examine mean levels of all biomarkers across categories of shiftwork. Results were adjusted for age, sex, race/ethnicity, smoking status, body mass index (BMI), total cholesterol, HDL cholesterol, and triglycerides.
Results: The mean age of officers (n=360; 74% male) was 41.4 years (SD=6.4); 50.3% worked day shift and 22.8% night shift. Among men only, officers on night shift had significantly higher mean WBC count compared with those on day shift [$5.90x10^9$/L (95% CI=5.62-6.19) vs. $5.45x10^9$/L (5.23-5.67)]; p=0.017. Among officers with BMI ≥25 kg/m^2, those on afternoon shift had significantly higher mean levels of IL-6 compared with those on day shift [2.01 ng/mL (1.77-2.27) vs. 1.54 ng/mL (1.39-1.71); p=0.002]. Also, officers on night shift had significantly higher mean levels of TNFα compared with those on day shift [5.23 pg/mL (4.80-5.70) vs. 4.52 pg/mL (4.25-4.81)]; p=0.010. Shiftwork was not significantly associated with hsCRP.
Conclusion: The higher WBC count, IL-6, and TNFα observed among officers working afternoon and night shifts may indicate that they are at increased risk for developing CVD. Further research is warranted.

P88. Influence of Work Characteristics on the Association Between Perceived Police Stress Severity and Sleep Quality

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Purpose: To investigate the role of work characteristics on the association of perceived police stress severity (PPSS) and sleep quality.
Methods: Data from 356 participants enrolled in the Buffalo Cardio-metabolic Occupational Police Stress Study (N=464) were used for the present analysis. PPSS was obtained through the Spielberger Police Stress Survey which assesses the perceived severity and frequency of occurrence of a broad spectrum of police work-related stressful events. Mean PPSS score was computed for each participant by dividing the total stress rating by the number of items rated. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI). Police work characteristics including work load, police rank, military experience, and shift work were considered as potential effect modifiers. Mean global PSQI scores were compared across tertiles of mean PPSS scores controlling for age, sex, race/ethnicity, and smoking status. Linear regression models relating global PSQI to PPSS were fit to assess linear trend.
Results: Among officers reporting high work load, the multivariable adjusted mean global PSQI scores (± standard error) were 5.78 ± 0.38, 6.05 ± 0.35, and 7.04 ± 0.37 across tertiles of mean PPSS scores (p-linear<0.001); among patrol officers, the mean PSQI scores were 6.12 ± 0.35, 6.04 ± 0.33, 7.16 ± 0.35 (p-linear=0.005); among those without military experience, the scores were 5.93 ± 0.37, 6.40 ± 0.33, 7.31 ± 0.34 (p-linear<0.001); and among those working night shift, the scores were 6.27 ± 0.50, 6.67 ± 0.62, 8.53 ± 0.67 (p-linear=0.005). These associations were not evident in participants reporting a low/moderate workload, holding a rank higher than patrol officer, having military experience, or working day or afternoon shifts.
Conclusions: Stress reduction or sleep promotion regimens may be more beneficial for police officers who have high workloads, hold lower ranks, do not have military experience, or work the night shift.

P89. Validity of Using O*NET Factors to Evaluate Job Strain: Results from the National Survey of Midlife in the United States

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Purposes: Job exposure matrices (JEM) may be useful to measure psychosocial work attributes and evaluate their health impacts in population-based cohort studies when limited occupational information was collected. But lack of information on the validity of psychosocial JEM measures has restricted its application. In this study, we examined the validity of using a job exposure matrix, Occupational Information Network (O*NET) derived-construct to assess exposure to job strain.
Methods: We utilized data from the second wave of the National Survey of Midlife in the United States (MIDUS 2) to study O*NET-derived measures of job strain (job demand and control) in terms of their agreement with self-reported psychosocial work characteristics and their predictive validity. The self-reported job demand and control was assessed via a validated questionnaire. The O*NET-derived job demand and control scores were linked to MIDUS 2 based on the 1990 Census Occupation Codes. We used linear mixed models to determine the shared variance partitioning between O*NET-derived and self-reported measures. To evaluate the predictive ability of the O*NET measures, we evaluated the associations with self-reported social economic status indicators and allostatic load (constructed from information on 24 biomarkers) using linear regression.
Results: The shared variance between O*NET and self-report measures was high for job demand (68%) and job control (58%). We observed similar associations between job demand and job control with education, income, and allostatic load for O*NET derived and self-reported measures.
Conclusions: The level of agreement between O*NET-derived assessment of job strain and the self-reported measure was adequate and the O*NET measures performed similarly to self-reported psychosocial exposures in relation to social economic status and allostatic load.

P90. Association between Blood Pressure and Retinal Vessel Diameters among Police Officers in the Northeastern U.S.

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Purpose: Elevated blood pressure (BP), a leading risk factor for cardiovascular disease (CVD) and mortality, may be a consequence of unpredictable, stressful, and strenuous working environments. Elevated BP has been shown to be significantly associated with narrowing in retinal microvasculature in population-based studies. We examined the relationship between blood pressure and retinal microvascular diameter among police officers in the northeastern US.
Methods: In the Buffalo Cardio-Metabolic Occupational Police Stress Study (2012-2016), retinal microvasculature was measured with two computerized retinal images of each eye. The central retinal arteriolar equivalents (CRAE) and central retinal venular equivalents (CRVE) are based on average values for each eye. The exposures were hypertension status (no hypertension, controlled hypertension with antihypertensive medication, and uncontrolled hypertension regardless of medication usage) and mean arterial blood pressure (MABP). Mean values of CRAE and CRVE were compared across categories of hypertension status using ANOVA and ANCOVA after adjustment for age, gender, race/ethnicity, smoking status, waist circumference, diabetes status, and white blood cell count. Associations of MABP with CRAE and with CRVE were obtained using multiple regression models.
Results: The average age of the 242 officers (73.1% men) who participated was 48.7 years and the prevalence of hypertension was 31.8%. Among officers with hypertension, 77.9% were taking medication. Mean CRAE was significantly narrower in police officers with uncontrolled hypertension (142.8±2.7 μm) as compared with those with controlled hypertension (153.6±2.7 μm, p=0.0013) and no hypertension (156.4±1.0 μm, p≤0.0001). CRAE decreased by 3.43 μm for each 5 mmHG increase in MABP (p≤0.0001). CRVE was not significantly associated with hypertension status or MABP.
Conclusion: Increased narrowing in retinal arteriolar diameter with uncontrolled hypertension and the inverse association of CRAE with MABP suggest that the high-stress work environment may contribute to subclinical CVD in this group of police officers.

P91. Carbon Nanotube and Nanofiber Exposure and Blood and Sputum Biomarkers of Effect Among U.S. workers

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Purpose: Carbon nanotubes and nanofibers (CNT/F) are increasing in use and applications. Although animal toxicological studies provide evidence that CNT/F exposure may cause deleterious health effects, human epidemiological studies have typically been small and confined to single workplaces. Therefore, we conducted an industrywide cross-sectional epidemiological study of 108 workers from 12 U.S. sites to evaluate associations between occupational exposure to CNT/F and blood and sputum biomarkers of effect.
Methods: We assessed CNT/F exposure via personal breathing zone, filter-based air sampling to measure background-corrected elemental carbon (a marker for CNT/F) mass concentrations, and microscopy-based CNT/F structure count concentrations. We measured 37 blood and 36 sputum biomarkers of fibrosis, inflammation, oxidative stress, and cardiovascular effects. We collected information on potential confounders via standardized in-person interviews. We used factor analyses with varimax rotation to derive factors among blood and sputum biomarkers separately. We used linear, Tobit, and logistic regression models to adjust for potential confounders and evaluate associations between CNT/F exposure and individual biomarkers and the derived factors.
Results: After exclusions for values below detection limits, 27 blood and 16 sputum biomarkers were included in the factor analyses, and 29 blood and 32 sputum biomarkers were included in the regression analyses. We derived nine blood biomarker and three sputum biomarker factors that explained 67% and 78%, respectively, of the variation in the data. After adjusting for potential confounders, CNT/F exposure was inversely associated with two blood factors (fibrinogen and von Willebrand Factor positively loaded on one factor and interleukin-1β and superoxide dismutase positively loaded on the other) and no sputum factors. Associations between CNT/F exposure and individual biomarkers varied.
Conclusions: Occupational CNT/F exposure was inversely associated with some blood factors derived from early biomarkers of effect. These results need replication among other exposed populations, but could have implications for clotting and inflammatory pathways.