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.