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CANCER RISKS OF POLICE OFFICERS: THE RETROSPECTIVE COHORT MORTALITY STUDY OF POLICE, BUFFALO, NY, 1950 TO 2005. *J E Vena , J Violanti, E Smith, J Burch, L E Charles, J K Gu, M E Andrew, D Fekedulegn, C M Burchfiel (University at Buffalo, Buffalo, NY 34215)

Little is known about the long term cancer risks police officers face. Police officers work long, irregular shifts which often include stressful situations. In 2007, the International Agency for Research on Cancer listed shift work that involves circadian disruption as a probable carcinogen to humans. The police cohort consisted of male officers (n = 3,049) who worked a minimum of 5 years for the Buffalo Police Department, New York, between January 1, 1950 and December 31, 2005. Female officers (n = 298), officers who did not have either birth data or hire date (n = 44), and officers who worked < 5 years (n = 33) were excluded from this analysis (N = 3,424). As of December 31, 2005, 50% of the population had died, 46% were alive, 4% were lost to follow-up. Mortality from all causes of death combined for police officers was significantly higher than expected (SMR = 1.20; 95% confidence interval (CI) = 1.14-1.26). Significantly increased mortality was also seen for all malignant neoplasms combined (SMR = 1.32; 1.19-1.46), all benign neoplasms combined (SMR = 2.48; 1.17-4.89), and all diseases of the circulatory system combined (SMR = 1.10; 1.02-1.19). The elevated mortality for all malignant neoplasms was primarily due to statistically significant excesses in cancers of the esophagus (SMR = 1.93; 1.08-3.18), colon (SMR = 1.83; 1.35-2.42), respiratory system (SMR = 1.24; 1.03-1.48), as well as Hodgkin's disease (SMR = 3.38; 1.23-7.36) and leukemia (SMR = 1.77; 1.08-2.73). Differences in cancer risk are noted for years employed and latency and other factors. Implications for future research on the effects of shift work and stress and prevention will be discussed.

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RISK OF LUNG CANCER AFTER EXPOSURE TO WELDING FUMES IN TWO POPULATION-BASED CASE-CONTROL STUDIES. *E Vallières, J Pintos, J Lavoué, M-E Parent, J Siemiatycki (CRCHUM, Université de Montréal, Montreal, QC, Canada)

Objective: To investigate the relationship between occupational exposure to gas and arc welding fumes and the risk of lung cancer among workers exposed to these agents at various concentrations and over a wide range of occupations. Methods: We conducted two population-based case-control studies in Montreal (1979-1986 and 1996-2001), including 857 and 736 cases respectively and frequency-matched controls. Detailed job histories were obtained by interview and evaluated by an expert team of chemist-hygienists to estimate intensity, duration and cumulative exposure to multiple substances for each job. Gas and arc welding fumes were among the agents evaluated, and we estimated odds ratios (ORs) and 95% confidence intervals (CIs) for lung cancer using logistic regression, adjusting for smoking history and other relevant covariates. Results: The results from both studies were similar, so a pooled analysis was conducted. No significant association was found between lung cancer and gas welding fumes (OR = 1.09, 95%CI = 0.86-1.37) or arc welding fumes (OR = 0.94, 95%CI = 0.74-1.18). However, when restricting attention to non-smokers, we found an increased risk of lung cancer in relation to gas welding fumes (OR = 2.28, 95%CI = 1.45-3.61) and arc welding fumes (OR = 1.83, 95%CI = 1.15-2.90). When we further narrowed attention to workers with the highest cumulative exposures, we found even higher risk of lung cancer for gas (OR = 3.35, 95%CI = 1.61-6.96) and arc welding fumes (OR = 2.75, 95%CI = 1.31-5.79). Discussion: There was no detectable excess risk due to welding fumes among smokers; but among non-smokers there were excess risks related to both types of welding fumes.

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OCCUPATIONAL LUNG CANCER MORTALITY SURVEILLANCE USING EMPIRICAL BAYES ADJUSTMENTS. *J M Symons, H Q Le, K H Kreckman, W M Lednar (DuPont Epidemiology Program, Newark, DE 19711)

PURPOSE: A cornerstone of occupational health programs is epidemiologic surveillance of employee cohorts. Workers encounter varying exposures to agents and physical conditions, therefore, a standard strategy to assess mortality outcomes potentially associated with multiple occupational factors is used. Moreover, occupational surveillance data rarely contains information on confounders (e.g., tobacco smoking) related to specific mortality risks such as lung cancer. Appropriate methods must be applied to adjust for numerous statistical comparisons and potential unmeasured confounders. METHODS: A longitudinal registry of 270,000 U.S.-based workers included more than 4,400 lung cancer deaths from 1960 through 2006. Standardized mortality ratios (SMRs) compare observed to expected lung cancer mortality during 5 time periods for 50 site-based cohorts. Empirical Bayes (EB) methods are applied to adjust the resultant 250 lung cancer SMRs. RESULTS: Site and period-specific excess estimates above and below an SMR of 1.0 with greater uncertainty (i.e., wider confidence intervals) were more influenced by EB adjustment. This typically resulted in attenuation towards the null of the unadjusted SMR estimate. EB adjustment reduced the proportion of statistically significant results by nearly 25%. CONCLUSION: Comprehensive mortality and morbidity surveillance programs are beneficial for identifying potential occupational health risks among large employee cohorts. Challenges exist when analyzing numerous mortality ratio statistics since multiple comparisons may include spurious false-positive results. Mortality analyses using EB adjustment provide a data-based inferential approach to assess the significance of surveillance risk estimates.

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MATERNAL OCCUPATIONAL EXPOSURE TO POLYCYCLIC AROMATIC HYDROCARBONS (PAHS) AND CONGENITAL HEART DEFECTS (CHDS) IN OFFSPRING. *P J Lupo, E Symanski, P H Langlois, S M Gilboa, S Malik, C C Lawson, A Agopian, A Correa, T Desrosiers, P A Romitti, G M Shaw, L E Mitchell and the National Birth Defects Prevention Study (University of Texas School of Public Health, Houston, TX 77030)

CHDs are a commonly occurring group of defects with a birth prevalence that approaches 1 per 100. In addition, CHDs have a major impact on pediatric morbidity and mortality. PAHs are a group of chemicals formed during the incomplete burning of organic substances (e.g. oil, coal); therefore exposure can occur in several occupational settings. PAHs may be reproductive toxicants, but there have been no studies assessing the association between PAHs and CHDs. We analyzed data from the National Birth Defects Prevention Study – a population-based, case-control study of birth defects – to assess maternal occupational exposure to PAHs and the risk of various CHDs (e.g. conotruncal defects, septal defects). Industrial hygienists assigned PAH exposure (yes/no) based on maternal report of occupation one month prior to pregnancy and during the first trimester. We used logistic regression to calculate odds ratios adjusted (aOR) for maternal age, race/ethnicity, education, smoking and folic acid supplementation. The prevalence of occupational PAH exposure was 3.9% in case mothers (n = 1,909) and 3.6% in control mothers (n = 2,857). Exposure was not associated with conotruncal defects (aOR = 1.04, 95% confidence interval [CI] = 0.61, 1.78) or septal defects (aOR = 1.15, 95% CI = 0.76, 1.73). In fact, there were no substantial increases in risk for any CHD subtype. Increases that were observed were imprecise. Our findings do not support an association between maternal occupational exposure to PAHs and various CHDs in a large, population-based study.

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

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