

Discussion Both those taking IHR and MS showed a slight improvement in this aspect of lung function during the course of their careers, generally supporting earlier findings of West Sussex and London firefighters.

Declaration of potential conflict of interest: Author was previously Medical Adviser to the Fire and Rescue Service whose data is the subject of this project.

Oral Presentation

Shift Work

0415 WORKING AROUND THE CLOCK: AN EXPOSURE RESPONSE RELATIONSHIP BETWEEN NIGHT WORK AND INCIDENT HYPERTENSION

¹Jacqueline Ferguson*, ¹Sadie Costello, ²Mark Cullen, ¹Ellen Eisen. ¹University of California, Berkeley, Berkeley, California, USA; ²Stanford University, Stanford, California, USA

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Night work, or work outside of 7am to 6pm, causes chronobiologic rhythm disruption which may cause an increase in hypertension risk. To study this question, we assessed the association between night work and incident hypertension using three exposure metrics.

A cohort of 2941 new hires at 9 aluminium smelter and fabrication facilities were followed from 2003 through 2013 for incident hypertension defined by insurance claim's ICD-9 codes. Night shifts were classified as shifts with ≥ 3 hours between 12am-5am using time-registry data. Night work exposure in the previous year was defined three ways; two binary metrics adapted from previous studies: 1) Ever/Never, 2) Working \geq or < 36 night shifts; and a quantitative metric 3) Percentage of night shifts.

The association between hypertension and each exposure metric was estimated in separate Cox proportional hazards models, adjusting for age, sex, gender, facility, smoking history, annual BMI, annual health claims based risk score, and duration of past night work.

The rate of incident hypertension among workers with night work in the previous year was 1.88 (95% CI [1.16–3.05]) and 1.40 (1.00–1.96) times the rate among workers with no recent night work using metric 1 and 2 respectively. Compared with workers with no recent night work exposure, the hazard ratio among workers with >0 - $<5\%$, 5 - $<25\%$, 25 - $<50\%$, and $\geq 50\%$ night shifts in the previous year were 1.62 (0.93–2.83), 1.83 (1.05–3.20), 2.20 (1.29–3.78) and 2.29 (1.24–4.20) respectively ($P_{Trend}=0.004$).

Our results suggest recent degree of night shift exposure may be associated with higher rates of hypertension.

Poster Presentation

Exposure Assessment

0416 RELATIONSHIP BETWEEN EXTRACELLULAR IRON AND CIRCULATING INFLAMMATION MARKERS IN PLASMA OF MINNESOTA TACONITE WORKERS

Shannon M Sullivan*, Bin Ma, Bruce H Alexander, Jeffrey H Mandel, Irina Stepanov. University of Minnesota, Minneapolis, Minnesota, USA

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Background Higher rates of mesothelioma, pneumoconiosis, lung cancer, and heart disease mortality have been reported in Minnesota taconite (iron ore) workers compared to the rest of the state population. Oxidative stress and inflammation are important underlying mechanisms in cancer and cardiovascular disease, and exposure to silica containing dust with a high iron content may play a key role in the observed elevated health risks.

Methods In this study, we compared ICP-MS-measured plasma iron concentrations to levels of circulating inflammatory markers (cytokines and chemokines) in 130 taconite workers using linear regression analysis adjusting for covariates.

Results Plasma iron levels varied substantially, ranging from 49 to 636 $\mu\text{g/dL}$, with a mean of 107 (± 60) $\mu\text{g/dL}$. After adjusting for age, body mass index, gender and smoking status, plasma iron levels were positively associated with the levels of chemokines RANTES ($p=0.06$), TARC ($p=0.04$), and MDC ($p=0.02$).

Discussion These findings lend some support to the hypothesis that exposure to iron in taconite dust may lead to elevated levels of extracellular iron both in the lung and in the general circulation, producing reactive oxygen species and catalysing oxidative stress. Given that TARC and MDC have been prospectively associated with lung cancer risk in other research, there is a need to better understand the relationship between extracellular iron levels and these biomarkers in taconite workers. Further analyses to assess other metrics of iron exposure from taconite dust components on plasma iron concentrations and measures of oxidative stress are warranted.

Poster Presentation

Injuries

0418 VIOLENCE IN HEALTHCARE: HOW DOES IT AFFECT RETURN-TO-WORK AFTER WORK INJURY?

Kelvin Choi*, Esther Maas, Mieke Koehoorn, Chris McLeod. University of British Columbia, Vancouver, British Columbia, Canada

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Objectives Research suggests an association between violence towards healthcare workers and poor return-to-work (RTW) outcomes. This association may be due to healthcare specific factors such as care setting and injury type. The aim of the study is to investigate RTW outcomes after injuries due to violence compared to other injuries in the British Columbia health and social services sector.

Methods The study used data on 42 080 time-loss workers' compensation claims from the health care and social services sector in British Columbia during 2009–2014. Cox regression and quantile regression were used for time-to-event analysis and final RTW status was assessed at one year.

Results The final cohort had 3173 violence-related claims (14.8%). Residential Social Services had the highest proportion of violence-related claims (34.2%). The effect of violence on RTW was greatest for counsellors and social workers, where 15.1% of workers with violence-related claims did not RTW compared to 8.0% with non-violent claims. For nurses, the largest occupation, 8.7% of workers with violence-related claims and 8.2% with non-violent claims did not RTW. Among injury types, violence is the strongest predictor for non-RTW for those with a mental illness. Among workers with a mental illness claim, 24.6% of those associated with violence did not RTW, whereas for those not associated with violence 15.0% did not RTW.

Conclusion Findings suggest that violence is associated with poorer RTW outcomes in certain care settings and injury types. Future work will use matched analysis and number of disability days paid to investigate this association in more detail.

Poster Presentation

Musculoskeletal

0419 ANXIETY AND DEPRESSIVE DIAGNOSES AMONG WORKERS WITH MUSCULOSKELETAL INJURY

¹Andrea Marie Jones*, ¹Mieke Koehoorn, ²Ute Bultmann, ¹Christopher McLeod. ¹University of British Columbia, Vancouver, Canada; ²University of Groningen, Groningen, The Netherlands

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Background Evidence suggests that the prevalence of mental disorders is elevated following work-related physical injury, and that these disorders may contribute to disability outcomes. The objective of this study was to examine the prevalence of anxiety and depressive disorders by gender and injury type before and after work-related musculoskeletal injury.

Methods Accepted workers' compensation lost time claims for back strain/sprain or upper body connective tissue injury were extracted for workers in the Canadian province of British Columbia from 2000 to 2013. One-year period prevalence was measured using diagnoses from physician and hospital data. Workers with at least two diagnoses for anxiety or depression, or one of each, within 365 days were considered a case.

Results The prevalence of anxiety and/or depression was 13.2% before and 14.9% after injury. The prevalence in

women was approximately twice that of men. Women with back strain/sprain had a slightly higher prevalence (19.0% before and 21.8% after injury) than women with connective tissue injuries (17.3% before and 18.5% after injury), while men had no difference in prevalence by injury.

Conclusion A greater difference in the prevalence before and after injury was expected. These findings indicate that many anxiety and depressive disorders may precede work-related musculoskeletal injury. The higher prevalence for women with back strain/sprain compared to women with connective tissue injury was surprising given that return-to-work outcomes are better for back strain/sprain. The next analysis will investigate associations between demographic, clinical, and workplace characteristics and new-onset anxiety and depressive disorders following work-related musculoskeletal injury.

Oral Presentation

Other

0420 THE "THIRD WAVE" OF ASBESTOS EXPOSURE IN OCCUPATIONAL SETTINGS

Tim Driscoll. Sydney School of Public Health, University of Sydney, NSW, Australia

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Exposure to asbestos in occupational circumstances has decreased considerably in most developed countries over the last three decades, with improved exposure control and monitoring in most work situations and the prohibition on the use of asbestos in most occupational circumstances. Unfortunately, occupational exposures do still occur through renovation, repair and demolition of buildings, either with asbestos removal being a specific focus of the work or asbestos exposure being incidental to the main purpose of the work. Focus has also increased in recent years on exposure in non-occupational circumstances to *in-situ* asbestos, particularly through "Do-It-Yourself" (DIY) home renovations. These occupational and non-occupational circumstances are the so-called "third wave" of exposure to asbestos.

Despite considerable efforts in terms of occupational education and training, and broader publicity, there appears to be a lack of awareness by many workers of the potential for asbestos exposure and the circumstances in which such exposures can be expected. This leads to potential exposures not being appropriately controlled and probably to workers being inadvertently exposed or exposed at levels higher than is necessary or considered acceptable. Although many of the high-risk situations are known or can be reasonably anticipated, there is a lack of information on the frequency and levels of exposures associated with many of these third wave exposure situations, making it difficult to develop appropriate guidance regarding preventing and controlling the exposures.

This presentation will consider these issues as part of the overall symposium on "In situ asbestos and the risks of exposure for workers".