

Background/Objectives We extended the mortality follow-up of a cohort of 25 460 workers employed at eight acrylonitrile-producing or using facilities in the U.S by 21 years. Based on 8124 deaths and 1,023,921 person-years of follow-up, we evaluated the relationship between occupational exposure to acrylonitrile and mortality.

Methods Standardised mortality ratios using deaths through December 31, 2012 were calculated. Personnel records, work histories, and monitoring data were used to develop quantitative estimates of exposure to acrylonitrile. Adjusted hazard ratios (HR) were estimated by Cox proportional hazards regression.

Results All-cause mortality and mortality from all cancer was significantly less than expected compared with the general population. Internal analyses by cumulative and average exposure revealed elevated risk of cancer of the lung and bronchus (n=808 deaths) and bladder (n=55 deaths). The HR for lung cancer was significantly elevated in the highest quintile of cumulative exposure (1.40, 95% CI 1.11–1.78, p-trend=0.09) compared to unexposed workers, peaking at ≥ 20 years since first exposure/hire HR=1.49, 95% CI 1.17–1.91; average exposure was associated with a small non-significant increased risk (HR=1.20, 95% CI 0.95–1.52). Average exposure was associated with a significantly elevated risk of bladder cancer; workers in the top tertile had an HR=2.89, 95% CI 1.35–6.18, p-trend= <0.01 compared to the unexposed, while there was non-significant increase between cumulative exposure and risk (HR=1.37, 95% CI 0.65–2.90). Significant HRs were not observed for other smoking-related outcomes.

Conclusions Extended mortality follow-up of the largest cohort of acrylonitrile exposed workers provides some evidence of a possible association between high exposure to acrylonitrile and lung and bladder cancer.

Oral Presentation

Cancer

0329

OCCUPATIONAL EXPOSURE TO METALS AND WELDING FUMES, AND RISK OF GLIOMA IN THE INTEROCC STUDY

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10.1136/oemed-2017-104636.269

Background Brain tumour aetiology is poorly understood. Based on their ability to pass through the blood-brain barrier, it has been hypothesised that exposure to metals may increase the

risk of brain cancer. Results from the few epidemiological studies on this issue are inconsistent.

Methods We investigated the relationship between glioma risk and occupational exposure to five metals - lead, cadmium, nickel, chromium and iron- as well as to welding fumes, using data from the seven-country INTEROCC study. A total of 1800 incident glioma cases and 5160 controls aged 30–69 years were included in the analysis. Lifetime occupational exposure to the agents was assessed using the INTEROCC JEM, a modified version of the Finnish job exposure matrix FINJEM.

Results In general, cases had a slightly higher prevalence of exposure to the various metals and welding fumes than did controls, with the prevalence of ever exposed ranging from 1.7% and 2.2% for cadmium up to 10.2% and 13.6% for iron among controls and cases, respectively. However, in multivariable logistic regression analyses, there was no association between ever exposure to any of the agents and risk of glioma with odds ratios (95% confidence intervals) ranging from 0.8 (0.7–1.0) for lead to 1.1 (0.7–1.6) for cadmium. Results were consistent across models considering cumulative exposure or duration, as well as in all sensitivity analyses conducted.

Conclusions Findings from this large-scale international study provide no evidence for an association between occupational exposure to any of the metals under scrutiny or welding fumes, and risk of glioma.

Oral Presentation

Other

0330

INCORPORATING PRE-EXISTING KNOWLEDGE OF WITHIN, BETWEEN-WORKER, AND BETWEEN-GROUP VARIABILITY INTO EXPOSURE ASSESSMENT USING A BAYESIAN APPROACH

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10.1136/oemed-2017-104636.270

Occupational exposures can vary substantially within- and between- workers in an exposure group, as well as between groups. In prospective studies, due to resource constraints, it can be difficult to estimate these sources of variation reliably through repeated measurements on individuals from all groups. In retrospective exposure reconstructions, measurements required for evaluation of these sources of variability may be highly imbalanced or missing. To help address these issues, we propose a Bayesian statistical modelling framework for incorporating historical information for occupational exposure assessment studies with repeated measurements. More specifically, we provide guidance for constructing informative prior distributions for the within- and between-worker, as well as between-group geometric standard deviations. These priors can be anchored in either historical data or expert judgments, are intuitive to specify, and transparent in their underlying assumptions. Our approach accommodates unequal numbers of samples per worker, varying numbers of workers per group, and situations where some workers do not have repeated measurements. In addition to yielding standard output such as posterior distributions of the variance components, our approach can yield posterior distributions of

quantities such as differences in contrasts to compare different grouping schemes for applications in epidemiology. We illustrate the approach via simulation study based on a representative range of settings found in occupational epidemiology.

Oral Presentation

Psychosocial

0331 PROLONGED PERCEIVED STRESS AND SALIVA CORTISOL IN A LARGE COHORT OF DANISH PUBLIC SERVICE EMPLOYEES: CROSS-SECTIONAL AND LONGITUDINAL ASSOCIATIONS

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10.1136/oemed-2017-104636.271

Objectives The effects of prolonged stress on cortisol secretion is uncertain. This study examines the cross-sectional and longitudinal associations between prolonged perceived stress and salivary cortisol.

Methods In 2007, 4,467 Danish public service employees participated in a study of stress and mental health, and 3,217 participated in a follow-up in 2009. Perceived stress during the past four weeks was assessed by Cohen's four item Perceived Stress Scale. Participants were asked to collect saliva 30 minutes after awakening and at approximately 20:00 in the evening. The cortisol dependence on perceived stress was examined in regression analyses adjusted for effects of potential confounders. We adjusted for a large variation in saliva sampling times by modelling the time trajectory of cortisol concentrations in the morning and in the evening and examined if they were influenced by perceived stress.

Results Perceived stress had no statistically significant effects on the level or time trajectory of morning or evening cortisol, neither cross-sectionally nor longitudinally. The one month prevalence of frequently perceived stress was low, approximately 2.5%.

Conclusions Our results did not support the hypothesis that prolonged perceived stress is associated with the level or time trajectory of morning or evening salivary cortisol.

Oral Presentation

Psychosocial

0332 THE IMPACT OF ORGANISATIONAL CHANGE ON SICKNESS ABSENCE: HOW MUCH OF THE EFFECTS ARE MEDIATED BY WORKPLACE SOCIAL CAPITAL?

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10.1136/oemed-2017-104636.272

Objective Organisational change may negatively affect employees' health and social capital. This study examined the magnitude of mediated effects from organisational change through social capital on long-term sickness absence (LSA) among public hospital workers.

Method In March 2014, 26,209 workers employed through January-December 2013 in the Capital Region of Denmark received a work-environment survey assessing social capital (84% responded). Social capital, measured using 8 self-reported items (collaboration, trust, and organisational justice) ranging 0-5/0-7 (low-high), was aggregated on work-unit level and categorised into quartiles. Organisational change (e.g., merger, layoff(s), and relocation) during July-December 2013 were recorded via surveys sent to all managers (58% responded). Monthly sickness-absence data of 2014 were obtained from regional salary registries (LSA:>28 days). Mediation was assessed using natural effects models nested on January-September 2014 and estimated the natural direct, indirect, and total effects from organisational change on LSA via social capital adjusting for age, gender, work-unit size, occupation, child- and health-proxies.

Results Exposure to merger or layoff(s) yielded significant adverse direct effects (OR 1.33, 95% CI 1.12–1.58 and OR 1.15, 95% CI 1.01–1.30, respectively) and adverse indirect effects via social capital (OR 1.04, 95% CI 1.02–1.06 and OR 1.04, 95% CI 1.03–1.05, respectively) on LSA (total effects: OR 1.38, 95% CI 1.17–1.64 and OR 1.19, 95% CI 1.05–1.36, respectively).

Surprisingly, exposure to relocation showed a *protective* direct effect (OR 0.73, 95% CI 0.58–0.91), but a significant adverse *indirect* effect (OR 1.01, 95% CI 1.00–1.03) on LSA (total effect: OR 0.74, 95% CI 0.52–0.92).

Conclusion Social capital potentially mediates adverse effects from organisational change on LSA.