

Poster Presentation

Exposure Assessment

0288 DEVELOPMENT OF QUANTITATIVE ESTIMATES OF WOOD DUST EXPOSURE IN A CANADIAN GENERAL POPULATION JOB-EXPOSURE MATRIX BASED ON PAST EXPERT ASSESSMENTS

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Objectives The CANJEM general population job-exposure matrix summarises expert evaluations of 31 673 jobs from four population-based case-control studies of cancer conducted in Montreal, Canada. Intensity in each CANJEM cell is represented as relative distributions of the ordinal (low, medium, high) ratings of jobs assigned by the experts. We aimed to estimate quantitative concentrations for CANJEM cells using Canadian historical measurements, taking exposure to wood dust as an example.

Methods Wood dust measurements came from the Canadian Workplace Exposure Database (CWED). We selected personal and area samples in occupations (2011 Canadian National Occupational Classification) with a non-zero exposure probability in CANJEM in period 1930–2005 (minimum 10 samples/occupation in CWED). Concentrations were modelled with sampling duration, year and type, source database and proportion of jobs at medium and high intensity in cells (fixed effects), and occupations (random effects).

Results 5170 samples from 31 occupations spanning 1981–2003 were retained. Estimated geometric mean (GM) concentrations for a cell with all jobs at medium or high intensity were respectively 1.3 and 2.3 times higher than a cell with all jobs at low intensity. An overall trend of –5%/year in exposure was observed. Predicted GMs for 8 hours, breathing zone and year 1989 for CANJEM cells associated with exposure ranged 0.49–1.67 mg/m³.

Conclusions The model provided estimates of wood dust concentrations for any CANJEM cell with exposure, even for those without measurements by using the calibrated intensity ratings. This framework could be implemented for other agents represented in both CANJEM and CWED.

Poster Presentation

Exposure Assessment

0289 "DAVID'S CHEESE BREAD" METHOD: WORKLOAD QUANTITATIVE EXPOSURE THRESHOLDS DETECTION USING ADJUSTED HAZARD MULTIVARIATE PARAMETRIC MODELLING, USEFUL IN CUMULATIVE-TRAUMA DISORDERS PREVENTION AND WITHIN THEIR CAUSAL ASSESSMENT

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Background Qualitative methods are frequently used for workload assessment due to their relative low-cost but their evidence lack, high subjectivity and inaccurate conclusions lead to develop quantitative evidence-based methods for Cumulative Trauma Disorders evaluation. This research aims to generate robust and reliable evidence useful in prevention systems and within workers' compensation processes (causal assessment) by measuring cumulative effective working time to define suitable exposure thresholds.

Methods A retrospective cohort study was assembled with workers from different positions. Inclusion/exclusion criteria were rigorously applied to finally accept 328 workers (656 shoulders). Entire clinic history was analysed towards obtaining important clinical variables. Each shoulder workload was assessed independently getting cumulative exposure time to movement angles, repetitive motions, load lifting, exertion and vibration, adjusting by rest/break periods and other important covariates, controlling confusing effects. The exposure thresholds were obtained using an adjusted multivariate Weibull regression modelling. Huber's M-estimator was used warranting robust estimators to correct both shoulders non-completely independent measures. Final model was built according with Hosmer-Lemeshow-May's covariates purposeful selection principles.

Findings/conclusions Within the adjusted multivariate final model, we could set hazard rate ratio (HRR) into five different clusters across cohort exposure time-line: "D" or baseline hazard zone; "a" zone (HRR≈1;p-value≥0.05); "v" or risk zone (HRR >1;p-value<0.05); "i" or survivors zone (HRR≈1;p-value≥0.05); and "d" or super-survivors zone (HRR <1;p-value<0.05). Shortest cumulative times within "v" zone were selected as exposure thresholds. For workload factors, we were able to clearly define zones and thresholds. We've also named "v" cluster as "cheese" zone and others as "no-cheese" areas.

Oral Presentation

Molecular epidemiology

0290 INVESTIGATING THE REPRODUCIBILITY OF METABOLOMICS PROFILES OF WASHINGTON STATE METAL WORKERS

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Manganese (Mn) is a known neurotoxicant, and given its health effects and ubiquitous nature in metal-working settings, identification of a valid and reproducible biomarker of exposure is of interest. Global metabolomics were previously utilised to determine metabolites that differ between occupational groups defined by Mn exposure status, in hopes of informing a biomarker of exposure. Nine metabolites were found to differ between exposure groups in urine samples collected October 2014. To test the reproducibility of these metabolites, these nine metabolites were investigated in a second set of urine samples collected January 2015 from the same workers.

Levels of the nine metabolites found in October 2014 were compared to the January 2015 data using principal components analysis and descriptive measures. Also, an elastic net regression was fit using the nine metabolites from the October 2014 data; this model was tested in the January 2015 data.

Four of the nine ions remained significantly different between exposed and unexposed workers in the January data, though levels of most ions also exhibited regression to the mean. The elastic net model was able to correctly classify exposure status in 66% of the January samples; slightly better than classification by chance alone.

Metabolomics is a novel technique for exposure assessment, but few studies have looked at the reproducibility of metabolomics data by collecting repeat samples from the same workers. This analysis found several ions that do seem to remain stable over time, and identification of these ions should be pursued as potential biomarkers of Mn exposure.

Oral Presentation

Musculoskeletal

0292 INTERNATIONAL JOB-EXPOSURE MATRIX ON PHYSICAL WORKLOAD: A SECOND STEP ABOUT AN UTOPIA?

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Introduction Job-exposure matrixes (JEM) approaches have been recently developed on physical workload in US, Denmark and France. A comparison between US and Danish JEMs revealed substantial reliability and concordance. We aimed to describe correlation between French, US and Danish

JEMs, in order to confirm that some variable of physical workload JEMs may be internationally generalizable.

Methods US "O*NET" variables, two Danish expert based JEMs (Lower Body and Shoulder), were compared to variables of "MADE", French expert based JEM. The Danish JEMs were based on occupational titles in the Danish version of the International Standard Classification of Occupations 1988 (ISCO88). Exposure estimates for Danish ISCO88 codes had been connected to "O*NET" exposure estimates through ISCO08 and Standard Occupational Classification (SOC) codes. "MADE" is available on French coding system (PCS03) and ISCO08. Crosswalk from ISCO08 to SOC and Danish ISCO 88 has been performed, to allow building a matrix of correlations based on Pearson correlation coefficients.

Results The cross-walk included 337 Danish ISCO 88 common used codes for upper extremity and 372 for lower upper extremity, O*Net, more than 800 occupational titles and "MADE JEM" 673 ISCO08 codes. Information was unique for 379 for "MADE"-O*NET couples, 333 for "MADE"-upper Danish JEM, and 165 for "MADE"-lower Danish JEM. Correlation of relevant variables found good associations ($\rho > 0.7$) for force, computer work, and kneeling, fair for repetitiveness and vibrations (ρ 0.5–0.6). Handling loads was heterogeneous.

Conclusion These results seem to confirm the possibility of international job-exposure matrixes on physical workload.

Poster Presentation

Other

0293 CURRENT RESEARCH PRIORITIES FOR UK OCCUPATIONAL PHYSICIANS AND OCCUPATIONAL HEALTH RESEARCHERS– A MODIFIED DELPHI STUDY

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Objectives Studies identifying occupational health (OH) research priorities have been conducted in several countries, to establish where OH research should be focusing and where funding should be targeted. The UK findings however, are now over 20 years old. OH practice is continuously evolving, with advances in technology, changes in work practices and customer/workforce needs.

Aims To identify the current research priorities for UK occupational physicians (OPs) and occupational health researchers (OHRs).

Methods A modified Delphi study of current research priorities for UK OPs and OHRs, is being undertaken. It will be