

0379 SHOULD WE TAKE MAJOR MACRO-ECONOMIC AND POLITICAL DEVELOPMENTS INTO ACCOUNT WHEN ASSESSING LONG-TERM OCCUPATIONAL EXPOSURES FOR EPIDEMIOLOGICAL RESEARCH?

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10.1136/oemed-2014-102362.148

Objectives Recent analyses of long-term trends in respirable dust and quartz concentrations from the long term monitoring program of the European Industrial Minerals Association (IMA-Europe) Dust Monitoring Program (covering the years 2000–2013) showed striking downward temporal trends in exposure which came to a halt at around the year 2009. Careful analyses and discussion with occupational health and safety representatives pointed at a direct detrimental effect of the current economic crisis on measured concentrations. This observation led us to hypothesise that similar disruptions of downward temporal trends in occupational exposures might also be visible in other large databases with longitudinal exposure measurements.

Method Temporal time trends were estimated in two additional databases (ExpoSYN and URALASBEST) each covering more than 50 years of occupational exposure monitoring. More flexible spline analyses rather than standard log linear (multiplicative) models were used to look for reversed trends.

Results In all three databases macro-economic and political developments seemed to influence downward trends in occupational exposure concentrations. Effects of economic crises like those of the early 1980s, early 1990s and the most recent one as well as the period of political and economic reform in Russia were clearly visible as reduced downward or even reversed temporal trends in occupational exposure concentrations.

Conclusions In exposure assessment for occupational epidemiological studies long term exposures are often modelled as log linear trends. Approaches allowing for disruptions of these trends by macro-economic and/or political developments are needed for more accurate and precise estimations of long-term exposure and will result in more reliable quantitative risk estimates.

0382 CANJEM: A GENERAL POPULATION JOB EXPOSURE MATRIX BASED ON PAST EXPERT ASSESSMENTS OF EXPOSURE TO OVER 250 AGENTS

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10.1136/oemed-2014-102362.149

Objectives To create a general population job-exposure matrix (JEM) from a database of expert assessments performed during four community-based case-control studies of cancer (lung, breast, brain, and multisite) conducted in Montreal since the 1980s.

Method The expert assessments were performed by the same team of chemists, who assigned exposure to a predefined list of agents to each job held by subjects based on job histories and

descriptions of tasks and work environment obtained through interview. The estimated metrics include measures of intensity, frequency and likelihood of exposure. The JEM dimensions include agent, occupation (Canadian, U.S., and international classifications) and era. For each cell, probability of exposure was computed as the proportion of individual jobs exposed. Among the exposed within a cell, CANJEM provides median frequency of exposure, the mode of exposure intensity categories and median time weighted intensity.

Results CANJEM includes information from 6222 men and 2563 women, totalling 31 780 individual jobs held between 1921 and 2005, representing approximately 50 expert-years of exposure assessment. Well known agents among the most frequently encountered include carbon monoxide (22% of individual jobs exposed), organic solvents (17.5%), and formaldehyde (10.6%). The JEM covers 303 occupations, 280 agents, and 4 eras (<1950, 1950–1969, 1970–1984, >1984). Overall, 20% of the cells have a non-null proportion of jobs exposed, 12% with a proportion greater than 5%.

Conclusions CANJEM constitutes one of the largest current sources of retrospective occupational exposure information in North America, useable to support exposure assessment efforts in epidemiology and estimate populations of workers exposed to harmful agents.

0383 USE OF AN O*NET BASED JOB EXPOSURE MATRIX TO PREDICT PREVALENCE OF CARPAL TUNNEL SYNDROME IN A LARGE POOLED COHORT

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10.1136/oemed-2014-102362.150

Objectives To determine if job title based physical exposure measures predicted prevalent carpal tunnel syndrome (CTS) in a large pooled cohort of workers.

Method We pooled baseline examination data from six prospective cohort studies, restricting analyses to those employed at least 1 year. CTS was defined as median neuropathy plus typical symptoms. Physical exposure estimates for static strength, dynamic strength, time spent making repetitive motions, and time handling objects were extracted from the Occupational Network (O*NET) database using Standard Occupational Classification codes based on reported job title. Three exposure categories of high force/high repetition, low force/low repetition, and mixed high and low exposures were entered into logistic regression models adjusting for age, gender, body mass index (BMI), diabetes, rheumatoid arthritis, employed time and study site.

Results Of 3562 in the pooled cohort, 7.6% met a prevalent CTS definition with mean employed time of 7.9 years (SD 8.2). Compared to subjects with low job requirements for dynamic strength and repetitive motion, those with mixed exposures or high exposures showed increased prevalence of CTS (OR 1.46; 95% CI: 1.01–2.11 and OR 2.32; 95% CI: 1.15–4.67, respectively). Similar dose dependent associations of combined exposures were shown for all exposure combinations tested, with high/high

combinations having the largest effect sizes (OR range 2.32–3.17) relative to the low force/low repetition exposure combinations.

Conclusions Use of job-title based exposures was useful for demonstrating associations with prevalent CTS. Jobs with combined high exposures of force and repetition showed consistently greater risk of CTS compared to jobs with lower exposure levels.

0385 BIAS IN EXPOSURE ASSESSMENT FROM WORST-CASE SELECTION OF WORKPLACES IN OSHA'S INTEGRATED MANAGEMENT INFORMATION SYSTEM DATABANK IMIS

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10.1136/oemed-2014-102362.151

Objectives The Integrated Management Information System (IMIS), with over 1M measurements taken by inspectors of the Occupational Safety and Health Administration, is an important source of information for occupational epidemiology. We assessed the association of the reason for conducting inspection with the reported levels of chemical exposure in IMIS.

Method Time weighted averaged measurements made during each of the un-programmed inspection types (employee complaint, referral by safety officer, follow-up, monitoring) were compared to those made during programmed inspections for 50 chemicals. Ratios of the median of detected results (dM), and the differences in the proportion of non-detects (dPr) for each category compared to the programmed inspections were calculated for each chemical.

Results The analysis included 218 916 measurement records. 32% were collected during programmed inspections, 48% – complaints, 13% – referral, 5% – follow-up, and 2% – monitoring. The detected concentrations were similar for complaint (dM=0.98, interquartile range across chemicals, IQR=[0.83;1.11]) and referral (dM=0.91, IQR=[0.76;1.08]) inspections and greater for follow-up (dM=2.18, IQR=[1.38;3.13]) and monitoring (dM=1.59, IQR=[1.24;2.44]) inspections relative to presumed representative inspections. Similarly, the proportion of non-detects were similar to programmed inspections during complaint-driven (dPr=3%, IQR=[-1;8]) and referrals (dPr=0%, IQR=[-6;5]) and lower during follow-up (dPr=-11%, IQR=[-19;-2]) and monitoring (dPr=-8%, IQR=[-12;3]) inspections.

Conclusions Despite the absence of consistent differences across chemicals for the most frequent categories, exposure levels during non-programmed surveys can be significantly higher than those obtained during presumably representative measurement campaigns. Great care has to be taken in determining typical exposure distributions from OSHA's IMIS data.

0386 EXPOSURE REGISTRIES AS A TOOL FOR EPIDEMIOLOGY

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10.1136/oemed-2014-102362.152

Objectives In Canada, there is growing interest in the use of registries for hazard and disease surveillance because they provide an opportunity for primary prevention. Registry data can

also be a valuable tool for epidemiology. Here we report the strengths and limitations of using exposure registry data for epidemiology.

Method Eight exposure registries were reviewed: five from Canada, two from the USA and one from Finland. They were compared based on overall goals, exposure information, registration, recruitment, and health information collected. The potential use of registry data in epidemiology was evaluated. Key considerations for designing a registry that facilitates secondary data use were identified.

Results The eight registries varied significantly. Data from four had been previously used in epidemiology. In three cases exposure measurements were available within the registry; in one, health information was also collected. Registries that have mandatory registration are more likely to contain sufficient data for use in epidemiological studies in contrast to voluntary registries that may fail to capture a large or representative portion of the exposed population. In order to permit later linkage of registry data with health information, consent must be obtained in advance and privacy legislation must be taken into consideration.

Conclusions Most exposure registries are not designed with secondary data uses in mind and, as a result, the use of exposure registry data in epidemiological studies can be problematic. Given the large investment involved in launching a new registry, opportunities to leverage the data for epidemiological purposes should be explored in the planning stages.

0389 SPONTANEOUS ABORTION IN FLIGHT ATTENDANTS

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10.1136/oemed-2014-102362.153

Objectives Flight attendant occupational exposures include cosmic ionising radiation and circadian disruption. We wanted to determine whether these and other occupational exposures were associated with spontaneous abortion among female flight attendants.

Method Female flight attendants from three US airlines in three cities were interviewed. Company records of over 1.9 million individual flights during the study period were assessed for exposure to galactic cosmic radiation, solar particle event radiation, and circadian disruption. Measures of physical job demands and other occupational factors were obtained from the interview. Cox proportional hazards regression models were adjusted for age, parity, and nonflying status.

Results Among 2273 women interviewed, 840 pregnancies among 673 women met inclusion criteria. There was evidence to suggest that cosmic radiation exposure of 0.1 mGy or more may be associated with increased risk of spontaneous abortion in weeks 9–13 of the first trimester (odds ratio (OR)=1.74; 95% confidence interval (CI) 0.95–3.20). The risk of a first trimester spontaneous abortion was significantly increased with 15 h or more of flying during home base normal sleep hours (OR=1.54; 95% CI 1.07–2.21) and with high physical job demands (OR=2.49; 95% CI 1.49–4.16).

Conclusions Spontaneous abortion was associated with several flight attendant occupational exposures. This is the first report of these associations based on a quantitative assessment of distinct exposures generated from individual flight records.