

Union. The original platform (developed for Microsoft Access) allowed for assignment of exposure proportions by 55 industry categories, but was a breakthrough at the time in terms of amalgamating exposure measurement data and occupational hygiene knowledge surrounding carcinogen exposure. Recognising the importance of CAREX in occupational cancer prevention, several other countries around the world have since adapted the original system for use in their own countries, with a few making large improvements to the model. A notable example is Costa Rica, with their TICAREX adaptation that estimated pesticide exposure for the first time, and considered sex as an exposure-defining feature in workplaces. In Canada, the system was expanded further to consider exposure by hundreds of detailed industry and occupation codes, sex, sub-geographical regions within a country, and level of exposure where possible. In addition, an entirely new system for considering community environmental carcinogen exposures was added. The Canadian team has been working with the Pan American Health Organisation and other partners to expand the use of the enhanced CAREX to other countries, in particular those of lower and middle income, where capacity for new research and data structures may be difficult. After 25 years, the CAREX model continues to evolve and improve to meet current needs.

## Oral Presentation Intervention Studies

### 0285 ASSESSING THE IMPACT OF A GROUP RANDOMISED CONTROLLED INTERVENTION STUDY IN SUPERMARKET BAKERIES WITH A HIGH BAKER'S ALLERGY AND ASTHMA BURDEN

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**Introduction** Previous studies of supermarket bakery workers in South Africa demonstrated a high prevalence (13%) of baker's allergy/asthma and a 50% decrease in mean flour dust levels after an intervention. This study reports on the incidence of baker's allergy/asthma one year after the intervention.

**Methods** A group-randomised design assigned 31 bakeries to two intervention groups (IG) (bakery mixer lid and training) (n=244) and a control group (CG) (n=93). Health data prior to and after the intervention included symptom questionnaires; serum wheat IgE; and FeNO during the work shift using NIOX MINO.

**Results** Overall, the prevalence of work-related chest symptoms in the pre (25%) and post (27%) IGs were similar, but a 13% increase in the CG. Wheat sensitisation prevalence in IG (2% decrease) compared to the CG (3% increase). FeNO (geometric mean) in the IG decreased from 17.7±2.3 ppb to 16.5±2.2 ppb. There was a lower incidence of chest symptoms in IG (16%) compared to CG (23%). IG also had

significantly higher (14%) conversion to negative wheat sensitisation status compared to CG (0%). The mean FeNO decline in IG (-2.2ppb) was similar to CG (-1.7ppb). FeNO decline was greater in IG (-25.2ppb) compared to CG (-13.6ppb) when baseline FeNO >25 ppb. In a multivariate model for >10% FeNO decline, significant predictors included FeNO >25 ppb (OR:2.9) and atopic status (OR:2.0).

**Conclusion** This study demonstrates some evidence of an intervention effect one year after the intervention. The lack of a demonstrably strong effect can be attributable to the short follow up period.

## Oral Presentation Cancer

### 0286 OCCUPATIONAL EXPOSURE TO GASOLINE AND DIESEL EXHAUSTS AND THE RISK OF KIDNEY CANCER IN CANADIAN MEN

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**Objectives** The objective of this study was to investigate whether occupational gasoline and/or diesel exhaust exposure contribute to kidney cancer risk.

**Methods** The National Enhanced Cancer Surveillance System is a population-based case-control study conducted from 1994–1997 in Canada. Incident kidney cancer cases were identified using provincial registries, while the control series were identified through random digit dialling, or provincial datasets. Self-reported questionnaires obtained information on lifetime occupational history and cancer risk factors. Hygienists coded occupational histories for diesel and gasoline exhaust exposures using concentration, frequency, duration and reliability. Logistic regression was used to estimate odds ratios (OR) and 95% confidence intervals separately by exhaust type. Models were adjusted for age, province, BMI, and cigarette smoking.

**Results** Complete occupational data were available for 652 cases and 2368 controls. The majority of workers had been exposed to diesel (53%) or gasoline (55%) exhausts, respectively; most exposures were at low concentrations. Workers who had ever been exposed were significantly more likely to have kidney cancer than those who were never exposed (OR diesel: 1.4;1.1–1.6, OR gasoline: 1.7;1.4–2.1). When examining duration of exposure and tertiles of cumulative exposure, diesel and gasoline exposures were both linked to a significantly increased risk of kidney cancer (p<0.05), but no exposure-response pattern was evident. Exposure to gasoline exhaust showed stronger positive relationships with kidney cancer than diesel.

**Conclusions** This study provides evidence that occupational gasoline and to a lesser extent, diesel exhaust exposure increases the risk of kidney cancer.

## 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/m<sup>3</sup>.

**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.