were done using STATA 13.1.

Results 669 variables were analysed, one of them is a compulsory field (occupation) and its completeness was very high ($\geq 97\%$) for all cities. Araraquara had 71.63% variables with excellent completeness, but the occupational dermatosis file had 34.29% variables classified as very poor. Piracicaba showed 56.24% variables classified as excellent, and the occupational dermatosis and cancer files had 41.46% and 55.07% filled very poorly, respectively. Campinas had 40.80% variables filled as excellent, and more than 30% of variables were classified as poor or very poor in all files.

Conclusion There are differences in the completeness among the cities. Routine quality data assessments are crucial to ensure information quality used by health surveillance agents.

Oral Presentation

Burden of Disease

0282 QUANTIFYING THE IMPACT OF SHIFT WORK ON BREAST CANCER: RESULTS FROM THE BURDEN OF OCCUPATIONAL CANCER IN CANADA STUDY

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10.1136/oemed-2017-104636.232

Objectives To estimate the proportion and number of annual incident female breast cancer cases in Canada attributed to shift work, a probable carcinogen.

Methods Levin's equation, which contains exposure and relative risk (RR) parameters, was used to calculate an attributable fraction (AF) range. The proportion of Canadian women who ever worked night or rotating shifts between 1961 and 2001 was retrospectively assessed based on data from the 1996 Survey of Labour and Income Dynamics. Low and high RR values, selected from a comprehensive review and quality assessment of recently published meta-analyses, were used to represent the probable association between shift work and breast cancer risk. The AF range calculated from these data were applied to 2011 Canadian breast cancer incidence statistics to obtain the number of attributable cases.

Results Approximately 11%, or 1.5 million, Canadian women ever worked night or rotating shifts during 1961–2001. Combined with low and high RR values of 1.15 and 1.40 from a high-quality meta-analysis published in 2013, the AF for breast cancer ranged from 2.04% to 5.23%. This corresponds to an estimated 460–1180 newly diagnosed breast cancers each year in Canada probably due to shift work. A large number, approximately 200–510, of these cancers occur among women in the health care and social assistance sector.

Conclusions The burden of occupational breast cancer in Canada could be substantial, reflecting the high prevalence of shift work and incidence of breast cancer. Although more research is needed on unravelling this probable association, preventive approaches should be widely considered.

Oral Presentation

Exposure Assessment

0283 EXAMINING EXPOSURE ASSESSMENT IN SHIFT WORK RESEARCH: A STUDY ON DEPRESSION AMONG NURSES

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10.1136/oemed-2017-104636.233

Objectives Exposure misclassification is a common challenge in shift-work epidemiology. This study used a large national survey of Canadian nurses to examine shift-work's effects on depression; multiple exposure definitions with varying levels of specificity were applied to illustrate the impacts of exposure assessment.

Methods The analytic sample (n=11,450) was obtained from the 2005 National Survey of the Work and Health of Nurses. Logistic regression was used to assess relationships between shift-work and depression for high, moderate, and low specificity definitions of shift-work exposure. The low and moderate specificity definitions described shift timing (day/shift and day/evening/night/rotating, respectively); the high specificity definition described both shift timing (day/evening/night/rotating) and frequency of rotation (slow/medium/rapid/undefined). All model estimates were bootstrapped and adjusted for the potential confounding effects of sociodemographic, health, and work variables.

Results The high specificity shift-work definition model showed the strongest relationships, with increased odds of depression in the rapid rotating shift group (OR=1.51, 95% CI=0.91–2.51) and in the undefined rotating group (OR=1.67, CI=0.92–3.02), relative to the regular day group. Odds of depression were decreased in the slow rotating group (OR=0.79, 95% CI=0.57–1.08). For the low and moderate specificity exposure definition models, weak relationships were observed for all shift categories (OR range 0.95 to 0.99).

Conclusions This study's findings support associations between shift-work and depression, and the need for specific and hypothesis-driven exposure assessment in future studies to correctly identify exposure-response relationships and to appropriately target health interventions.

Oral Presentation

Exposure Assessment

0284 CAREX: AN OCCUPATIONAL EXPOSURE SURVEILLANCE SYSTEM OVERVIEW

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10.1136/oemed-2017-104636.234

The CAREX system for occupational carcinogen exposure surveillance was developed by the Finnish Institute of Occupational Health in collaboration with IARC and European exposure experts in the early 1990s, and was shortly thereafter adapted for use in approximately 15 other countries in the European

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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10.1136/oemed-2017-104636.235

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 (-2.2 ppb) was similar to CG (-1.7 ppb). FeNO decline was greater in IG (-25.2 ppb) compared to CG (-13.6 ppb) 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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10.1136/oemed-2017-104636.236

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.