compounds that can interfere with sex hormone signalling and cause adverse health effects, including cancer. Exposure to EDCs is ubiquitous, but exposure in some workplaces occurs at much higher levels than in the general population.

**Objective** To determine whether occupational exposure to EDCs is associated with colorectal cancer risk.

**Material and Methods** A case-cohort study was nested in the Alberta’s Tomorrow Project (ATP) and in the Ontario Health Study (OHS). Incident cases of colorectal cancer were identified (NATP=202, NOHS=605); a sub-cohort of 3,464 participants was selected at baseline (NATP=565, NOHS=2,899).

Occupational exposure to 17 EDCs was estimated via linkage to CANJEM, a job-exposure matrix, for participants’ longest-held job. Specifically, CANJEM provides a frequency-weighted intensity metric of exposure and it was used to categorize participants into never exposed, exposed and substantially exposed to each individual EDC. Multivariable logistic regression models were used to estimate odds ratios (OR) and 95% confidence intervals (CI) for colorectal cancer associated with occupational exposure to EDCs while controlling for confounders identified using a directed acyclic graph.

**Results** In ATP, exposure to arsenic (OR=2.86, 95%CI: 1.06–7.63), copper (OR=0.53, 95%CI: 0.29–0.92), lead (OR=0.58, 95%CI: 0.34–0.97) and substantial exposure to arsenic (OR=2.87, 95%CI: 1.01–8.80), phenol (OR=0.25, 95%CI: 0.08–0.61), and trichloroethylene (OR=0.45, 95%CI: 0.21–0.90) were associated with colorectal cancer. In OHS, exposure to polychlorinated biphenyls (OR=3.95, 95%CI: 1.82–8.55), styrene (OR=0.47, 95%CI: 0.26–0.79), and substantial exposure to aluminum (OR=1.32, 95%CI: 1.03–1.68), cadmium (OR=0.59, 95%CI: 0.38–0.87), lead (OR=1.29, 95%CI: 1.03–1.60), phthalates (OR=0.52, 95%CI: 0.25–0.96), and trichloroethylene (OR=1.43, 95%CI: 1.08–1.88) were associated with colorectal cancer.

**Conclusion** Of the 17 EDCs, five were associated with an increased risk, and seven with a decreased colorectal cancer risk; however, none of the associations were consistent between the two cohorts.

**Risk assessment**

**Methods** The RoC handbook provides guidance to conduct systematic reviews and integrate evidence to identify cancer hazards. Evaluating the informativeness of epidemiological studies focuses on the direction, magnitude, and impact of biases and study sensitivity. Updates to the RoC handbook, which will be peer reviewed and published as a living document, are based on its application to 7 RoC and 3 OEHHA cancer hazard evaluations and methodological advancements in epidemiology and systematic review.

**Results** New features of the updated handbook are interactive evidence maps to inform the review approach for each exposure-outcome pair and enhanced guidance to evaluate exposure misclassification and integrate evidence across studies. Assessing exposure misclassification considers (1) how well the exposure proxy approximates the exposure of interest, (2) how accurately and precisely the exposure (or proxy) is measured, and (3) differential recall bias or observational bias. Because cancer epidemiology studies employ a wide range of methods to assess exposure, the handbook provides direction to evaluate specific methods (e.g., environmental measurement, job exposure matrices). Evidence integration includes triangulation and systematic approaches to explore the impact of biases and confounding, effect modifiers, exposure metrics, and other sources of heterogeneity.

**Conclusions** The revised RoC handbook strives to balance the advantages of systematic and narrative reviews and focus on key issues in environmental and occupational epidemiology. In addition to providing transparency for our evaluations, we hope it can serve as a resource to scientists who appraise the epidemiologic literature.

**Carcinogens/Cancer**

**0-59 INCREASED LUNG CANCER RISK AND OCCUPATIONAL BENZENE EXPOSURE: RESULTS FROM A POOLED CASE-CONTROL STUDY**

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**Introduction** Benzene is widely present in various industries and ubiquitous in the general environment. Benzene has been classified as a known human carcinogen, but there is limited evidence linking benzene exposure with lung cancer. However, if such an association exists, this could have large implications for occupational and environmental risk assessment. We aimed to systematically investigate the association between occupational benzene exposure and lung cancer.

**Material and Methods** Subjects from 14 case-control studies across Europe and Canada were pooled. We used a quantitative job-exposure matrix (BEN-JEM) to estimate benzene exposure based on occupation records. Logistic regression models were used to estimate lung cancer risk and various benzene exposure indices. We stratified analyses by smoking status and lung cancer subtypes, and rigorously adjusted for age, sex, smoking and other known occupational lung carcinogens.
Results and Conclusion Analyses included 28048 subjects (12329 cases, 15719 controls). Lung cancer odds ratios ranged from 1.12 (95% CI 1.03-1.22) to 1.32 (95% CI 1.18-1.48) for groups with the lowest and highest cumulative exposure, respectively. An increasing trend was observed with duration of exposure (P<0.001), while lung cancer risk decreased with increasing time since last exposure (P=0.02). These effects were seen for all lung cancer subtypes, in current, former and never smokers, and for both sexes, and were not unduly influenced by any particular occupational group or study. Based on our study in the general population, we found strong, consistent, and robust evidence linking occupational benzene exposure with lung cancer. By rigorously adjusting for smoking and other occupational exposures, our findings provide strong support for the association between benzene exposure and lung cancer. Such a link has a large implication for occupational and environmental risk assessment and reinforces the need to further reduce benzene exposure globally.

Methodology

**O-60** FAIR DATA MANAGEMENT IN EXPOSOME RESEARCH – A CASE STUDY FROM THE EU-FUNDED EXIMIOUS PROJECT

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EXIMIOUS is one of the nine H2020 exposome projects which is part of the European Human Exposome Network. As part of the EXIMIOUS project (Mapping Exposure-Induced Immune Effects: Connecting the Exposome and the Immune) mostly constituted of researchers, we navigated the complex landscape of data protection and security, ethics and making data FAIR through our data management plan. While all projects (H2020, Horizon Europe and beyond) are obligated to conform to many of these regulations, researchers often lack the right tools and/or accurate understanding of the ethical/legal framework to independently address such challenges. More than 2 years into the project, we have successfully addressed many of these challenges. Through this elaborate exercise, we have acquired tools which allow us to make our research data FAIR, while at the same time ensuring data privacy and security (GDPR compliant). Herein we share our experience of creating and managing the data workflow through an open research communication, with the aim of helping other researchers build their data management framework and projects. Additionally we provide a checklist ‘DMPCHECK’ which the researchers can use to make their project data FAIR.

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Healthcare workers

**O-61** ASSESSMENT OF VOLATILE ORGANIC COMPOUND EXPOSURES FROM CLEANING AND DISINFECTION PRODUCTS USE IN HEALTHCARE SETTINGS

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Methodology Healthcare workers are exposed to a complex mixture of chemicals from using cleaning and disinfection products. Cleaning tasks and products are associated with elevated prevalence of asthma and respiratory symptoms, however quantitative exposure estimates are lacking which hinders prevention.

The objectives of this study were to create a quantitative task exposure matrix (TEM) for cleaning and disinfection product-use for a set of 14 volatile organic compounds (VOCs) and compare exposure estimates by job, unit, and products used.

Material and Methods Quantitative VOC exposure estimates were obtained using data collected at four U.S. hospitals. Personal time-integrated VOC samples were collected and analyzed for 14 specific VOCs. All measurements included detailed information on tasks, products used, job, unit, and other workplace characteristics.

Bayesian multiple linear regression models accounting for measurements below the limit of detection (LOD) were used to assess exposures by job, unit, product, and the interaction of product with job and unit. Geometric mean (GM) exposure estimates in parts per billion generated from the multiple regression models were used to create a TEM and compared to identify differences between jobs, units, and products. Notable differences were identified using non-overlapping 95% credible intervals.

Results Total 14-VOC exposures (TVOC14) were highest among dental occupations (GM=1680) and lowest among laboratory technicians (GM=399). Nurses (GM=1541) had higher exposures than laboratory technicians. Similarly, laboratory settings (GM=389) had lower TVOC14 exposures than operating rooms (GM=1440). Of products studied, exposures were highest for high-level disinfectants (GM=2000) and lowest for enzyme products (GM=322).

Conclusion A TEM was successfully created using the GM for product-job, product-unit and product, and assigned to participants in an epidemiologic study. The quantitative estimates for the 14 VOCs will be used in multi-pollutant models to explore respiratory health outcomes associated with mixed VOC exposures.