Discussion Two general classes of biological agents could be recognized. The first comprised infectious diseases, including but not limited to zoonotic infections. The second class comprised organisms resulting in the production of bioaerosols, thus increasing the occupational risk of immune-related and respiratory conditions. Some occupations (e.g. mine work and welding) might increase susceptibility of workers to infection, without increasing the exposure to this pathogen.

S-85

SEX AND GENDER INEQUALITIES: SEGREGATION OF OHS EXPOSURES AND PREVENTIVE AVENUES FOR A POPULATION OF LOW-EDUCATED TEENAGERS ENTERING THE LABOUR FORCE

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10.1136/OEM-2021-EPI.404

As men and women hold different jobs, have different social roles and different power influence in societal strata, they are exposed to different physical and psychosocial hazards at work. Adolescents with lower levels of education who start working are particularly vulnerable to sex/gender segregation of tasks and exposure to different work hazards.

In Quebec, adolescents who have experienced significant academic delays are referred to the Work-Oriented Training Program (WOTP). In this program, they learn semi-skilled trades by doing practicums, through Co-operative Education. These placements involve many occupational health and safety risks. For example, students may be exposed to various toxic substances in cleaning jobs, to wood or metal dust in processing plants or garages, to allergens in pet care businesses, hair salons, or child care centers. As jobs are segregated by gender, prevention approaches must take this into account. Occupational health and safety (OHS) risk factors may differ by sex and/or gender (e.g. when a small girl uses tools designed for tall men; or when manual handling training only considers 'boxes' as potential loads rather than a variety of situations, such as angry children or objects). Accordingly, occupational safety and health programs and prevention strategies should consider sex and gender-related factors. Our team is developing educational tools and resources to help these students improve and maintain their health as they enter the workforce, through an equity perspective. This presentation will discuss the differentiated hazards faced by low-educated male and female adolescents, as well as promising prevention avenues, including specific consideration for 'invisible risks' often encountered by young women. The WOTP examples that will be given can be applicable to other contexts of vocational training and work integration in low-skilled jobs for young workers.

S-89

RESPIRATORY HEALTH IMPACTS OF CLEANING AND DISINFECTING EXPOSURES: DOES EVIDENCE SUPPORT A LINK WITH COPD?

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10.1136/OEM-2021-EPI.405

Introduction Concerns regarding the respiratory health effects of disinfectants and cleaning products (DCP) have been growing in the last two decades. Studies have shown associations

between exposure to DCP and asthma. The irritant properties of many chemicals contained in DCP have prompted research on respiratory effects beyond asthma.

Objective to review the current evidence for an association between exposure to DCP and Chronic Obstructive Pulmonary Disease (COPD).

Methods We will present an overview of the recent epidemiological literature on the association between exposure to DCP at the workplace or at home and COPD. We will discuss challenges and opportunities for future research on this question.

Results Increased risk of chronic bronchitis or COPD have been reported among workers regularly exposed to DCP, such as cleaners or healthcare workers in both European and US populations. In a large cohort study of US female nurses, occupational exposure to DCP was significantly associated with an increased risk of developing COPD, independent of asthma. High-level exposure, evaluated by a job-task exposure matrix, to several specific disinfectants (e.g., glutaraldehyde, bleach, hydrogen peroxide) was associated with COPD incidence. An impact of exposure to DCP on lung function outcomes has also been reported in a European population-based study. Exposure to cleaning activities either at work or at home was associated with accelerated FEV1 and FVC decline.

Conclusion Despite accumulating evidence for adverse effects of DCP on COPD, specific tasks and substances at risk still need to be elucidated. Exposure assessment methods need to be improved in epidemiological studies. Novel statistical approaches, such as the ones developed in the context of exposome research, may help disentangling the mutual effect of the numerous chemicals contained in DCP, as well as their mixture. The mechanisms underlying the association between DCP and respiratory health outcomes need to be clarified.

S-92

GENDER/SEX DIFFERENCES IN WORKERS' COMPENSATION FOR HEARING LOSS, CONCUSSIONS AND ACTIVITY-RELATED SOFT TISSUE DISORDER (ASTDS) IN BRITISH COLUMBIA, CANADA

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10.1136/OEM-2021-EPI.406

Introduction Novel access to workers' compensation claims data, in particular disallowed claims and claim eligibility status decisions, was used to inform an evidence need on sex/gender differences in experiences of the workers' compensation process in British Columbia, Canada.

Objectives To conduct a sex/gender stratified analyses of the risk of work-related acute injuries and cumulative disorders, and of the adjudication of the work-relatedness of these injuries and disorders.

Methods Compensation claims for ASTDs, concussions and noise-induced hearing loss (2003–17) were analysed for differences between women and men by age-adjusted rates of accepted claims within occupations (ASTDs and concussions only), for ratios of disallowed to accepted claims (ASTDs and hearing loss only), and for time to final claim eligibility decision (ASTDs, concussions and hearing loss).

Results We observed higher rates and rates of increase for women compared to men in the same occupations for ASTDs

(e.g. 65 versus 43 claims per 1,000 workers for women and men respectively in labourer occupations in processing/manufacturing), and for concussions (e.g. increase from 13 to 25 claims versus from 12 to 16 claims per 1,000 workers for women and men respectively in transportation/equipment operation occupations over the study period). We observed higher ratios of disallowed to accepted claims for women compared to men for ASTDs (1.4 versus 0.5) and hearing loss (4.1 versus 0.4). We observed longer durations to final accepted claim eligibility decisions for women compared to men for ASTDs (e.g. 49 versus 43 days at the 50th percentile) and hearing loss (238 versus 204 days), but not concussions (7 days each).

Conclusion The findings warrant further investigation to understand the increased risks of ASTDs and concussions among women compared to men, especially in occupations that have been traditionally male-dominated; and for potential gender/sex biases in the adjudication and recognition of work-related cumulative injuries and disorders among women.

S-95

CHANGES IN RESPIRATORY SYMPTOMS, SPIROMETRY, AND EXHALED NITRIC OXIDE AMONG HOME CARE AIDES PERFORMING CLEANING AND DISINFECTING USING DIFFERENT PRODUCTS: A LONGITUDINAL REPEATED MEASURES STUDY

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10.1136/OEM-2021-EPI.407

Objectives Occupational and population-based studies show that cleaning and disinfecting (C&D) tasks can increase the risk of adverse respiratory symptoms. However, quantitative evaluation of specific C&D products and practices and their impacts on respiratory health are limited. Previously, we found that 80% of home care (HC) aide visits to clients' homes involve C&D. Increasingly, C&D ingredients are combined in single products that often contain bleach, quaternary ammonium compounds (QACs) or other respiratory irritants. So-called 'green' C&D products might be better alternatives but have not been evaluated for respiratory health. This study evaluated the relationship between the use of conventional and 'green' C&D products on respiratory outcomes.

Methods A longitudinal repeated measures study design was used. Twenty HC aides each participated in four sessions in an environmental assessment laboratory where a simulated bathroom with fixtures (toilet, tub/shower, sink) was built according to residential construction specifications. During each 40-minute session, aides performed typical C&D tasks. Three multi-purpose spray C&D products - one bleach-based (1–5% by weight sodium hypochlorite), one QACs-based (including benzyldimethyldodecylammonium chloride, benzyldimethyltetradecylammonium chloride, and benzyldimethylhexadecylammonium chloride) and one 'green' (plant-based thymol, active disinfecting ingredient) - and distilled water in a spray bottle were randomized among the aides' sessions. Respiratory symptoms, spirometry, and exhaled nitric oxide (eNO, a biomarker of airway response) were measured pre-and post-session.

Results Aides reported more respiratory symptoms following use of the bleach-based product (eye, nose, throat irritation, cough, and difficulty breathing) and experienced a reduction in FEV1 (-4.3%, 95%CI: -7.4 to -1.1), compared to the other products and to distilled water. Mean eNO decreased by 10 ppb (95% CI: -8 to -13ppb) following bleach-based product use compared to the other products and to distilled water.

Conclusions Bleach-based C&D products may cause acute adverse respiratory changes after a relatively short exposure representative of C&D in HC.

S-106

RISK OF EXPOSURE TO A SARS-COV-2 INFECTION AT WORK: DEVELOPMENT OF A JOB EXPOSURE MATRIX (COVID-19-JEM) FOR DENMARK, THE NETHERLANDS AND THE UNITED KINGDOM

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10.1136/OEM-2021-EPI.408

Introduction As workplaces may be one of the key settings in the spread of SARS-COV-2 infections, among both essential and non-essential workers, it is important to assess the occupations at increased risk of exposure to SARS-COV-2 in large study populations.

Objectives This study aimed to construct a job-exposure matrix (JEM) for the risk of becoming infected with SARS-COV-2 in an occupational setting.

Methods Experts in occupational epidemiology from three European countries (Denmark, the Netherlands and United Kingdom) defined relevant exposure and workplace characteristics with regard to possible exposure to SARS-COV-2. Within an iterative qualitative process, experts rated the different dimensions of the COVID-19-JEM for each job title within the International Standard Classification of Occupations 2008 (ISCO-08). The agreement scores including confidence intervals, weighted kappas, and explained variances were estimated.

Results The COVID-19-JEM contains four determinants of transmission risk (number of people, type of contacts, indirect contact and location), two mitigation measures (social distancing and face covering), and two social factors (income insecurity and migrant workers). Agreement scores ranged from 0.58 (95%CI 0.55;0.61) for 'number of people' to 0.76 (95%CI 0.74;0.78) for 'type of contacts'. Agreement scores ranged from 0.58 (95%CI 0.55;0.61) for 'number of people' to 0.76 (95%CI 0.74;0.78) for 'type of contacts'. Weighted kappas ranged from 0.60 for 'face covering' to 0.80 for 'indirect contact'. Due to some between-country differences, COVID-19-JEMs are separately presented for Denmark, the Netherlands and the United Kingdom.

Conclusions The COVID-19-JEM provides risk estimates at population level of the eight dimensions related to a SARS-COV-2 infection at the workplace, and is a valuable tool for epidemiological studies. Additionally, the eight dimensions of the COVID-19-JEM could also be used for other communicable diseases at worksites.