Occupational Cancer Research Centre

National Occupational Disease and Exposure Surveillance

WORKSHOP SUMMARY AND OBSERVATIONS
NOVEMBER 7 AND 8, 2019

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This report is published by the Occupational Cancer Research Centre

This workshop was funded by the Public Health Agency of Canada and hosted by the Occupational Cancer Research Centre (OCRC) based at Ontario Health (Cancer Care Ontario), located in Toronto. The OCRC is funded by the Ontario Ministry of Labour, Training and Skills Development (MLTSD), Ontario Health (Cancer Care Ontario), and the Canadian Cancer Society (CCS), as well as through competitive grants and contracts. The OCRC's Occupational Disease Surveillance Program (ODSP) is funded by the Ontario Ministry of Health and the Ontario MLTSD, with additional support from the Public Health Agency of Canada.

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Table of Contents

1.0 Executive Summary

Occupational diseases remain largely invisible in comparison to workplace injuries. Although Canadian occupational health and safety stakeholders have expressed interest in prevention of occupational disease, the absence of effective surveillance across jurisdictions has been a barrier to assessing the magnitude of the problem, identifying high risk groups and targeting prevention efforts. In November 2019, the Occupational Cancer Research Centre (OCRC), with funding from the Public Health Agency of Canada, hosted a National Occupational Disease and Exposure Surveillance Workshop in Toronto to share experiences across jurisdictions, identify new and effective models and promote collaboration. The purpose of this report is to provide an overview of current occupational disease and exposure surveillance efforts in Canada, as presented at the workshop, and identify opportunities for future work.

The meeting was attended by 45 researchers and representatives of provincial and federal agencies, compensation boards, unions and other stakeholders from across Canada. Speakers presented their work on surveillance of both occupational disease and exposures. The meeting began with an overview of options for occupational surveillance initiatives in Canada. This was followed by presentations on recent surveillance and potential new projects by OCRC (Ontario), Partnership for Work, Health and Safety (BC), Institut national de santé publique du Québec, Saskatchewan Workers' Compensation Board, Centre for Research Expertise in Occupational Disease (Ontario), Veterans Affairs Canada, CAREX Canada, Canadian Workplace Exposure Database (CWED), and Safe Work Manitoba. A broad range of projects were presented, including direct analysis of routinely collected data, targeted collection of new data, large data-linkage projects, and clinic-based efforts. Many strong projects were presented, but significant gaps were identified. In particular, few projects are truly national, with the exception of CAREX Canada and the National Dose Registry, although some could be expanded to more provinces, such as CWED and the OCRC's Occupational Disease Surveillance System (ODSS).

Each presentation was followed by discussion. Several themes emerged. There are important gaps in knowledge on occupational diseases and exposures in Canada. Second, resourcing and harmonization of existing efforts across the country is essential. Third, current surveillance efforts are very useful, although there are several limitations, such as the lack of data on vulnerable workers and the need for more complete occupational history. Lastly, a need was identified for multidisciplinary expertise and engagement to interpret and translate results and set priorities for occupational disease prevention.

On the second day of the workshop, attended by 25 participants, four topics for advancing occupational disease and exposure surveillance in Canada were identified for discussion:

1. Ways to increase and/or improve exposure surveillance
2. Early identification of health issues in clinical or other settings
3. Improving knowledge translation/mobilization
4. Facilitating national collaboration

Many of the potential next steps identified in the workshop are immediately feasible with relatively modest funding/resources. Concluding the workshop was a discussion on prioritizing next steps to make progress on occupational disease and exposure surveillance. The establishment of a working group is needed to move the agenda forward and develop recommendations based on the workshop discussions.

2.0 The Vision for National Occupational Disease and Exposure Surveillance

Occupational diseases remain largely invisible in comparison to workplace injuries, despite enormous costs related to productivity, compensation, and healthcare. Although Canadian occupational health and safety stakeholders have expressed interest in primary prevention of occupational disease, the absence of a national occupational disease prevention framework and related funding opportunities makes it challenging to assess the magnitude of the problem, identify high-risk groups, and target prevention efforts. A specific gap is the inability to monitor trends in occupational diseases and exposure across the country, which could be used to design and implement prevention strategies appropriate for different contexts and worker-groups, and evaluate their effectiveness. There is a need for resourcing and harmonization of occupational disease and exposure surveillance systems and strategies across the country to allow valid cross-jurisdictional comparisons and implementation of a national strategy.

Disease surveillance is defined by the World Health Organization as “the continuous, systematic collection, analysis and interpretation of health-related data needed for the planning, implementation, and evaluation of public health practice.” Creating occupational disease and exposure surveillance registries can create opportunities to intervene early in the exposure-disease pathway before any disease occurs (primary prevention) or identify health problems early in order to prevent the occurrence of a debilitating disease (secondary prevention). Another data collection approach involves linked population-based administrative and/or exposure databases, which are effective tools for monitoring outcomes in precariously employed workers who may not be captured in conventional injury and disease surveillance systems. Investing in a national occupational disease and exposure surveillance system and enhancing linked population-based administrative and/or exposure databases would increase data availability and accessibility, foster more policy-relevant research, and enable targeted prevention programs to be developed and implemented nationally.

The Occupational Disease Surveillance System (ODSS) was created to identify and monitor trends in work-related disease in Ontario with a long-term goal of providing a model that could be expanded nationally to fill an existing gap in Canada's chronic disease surveillance framework. The ODSS provides a means of examining existing patterns and emerging trends in work-related diseases by linking data from Ontario workers’ compensation claims to tumour registry and other administrative health databases. The ODSS model for surveillance can be adapted for other Canadian jurisdictions, since similar data sources exist in each province and territory. While the focus of the ODSS project is Ontario, it was envisioned as a model for a national occupational disease and exposure surveillance system.

2.1 Workshop Agenda and Participation

The National Occupational Disease and Exposure Surveillance workshop was intended to enhance interprovincial communication and collaboration across a broader and more diverse audience by inviting participants from various Canadian jurisdictions to learn about the surveillance efforts in Ontario as well as share their relevant experiences and expertise. The workshop was structured to allow for significant interaction and effective roundtable discussions about ways to facilitate national collaboration for occupational disease and exposure surveillance.

This 2-day meeting was held in November 2019 in Toronto, and included approximately 45 attendees on day 1 and 25 participants on day 2. Day 1 involved presentations on different occupational disease surveillance efforts recently or currently being undertaken across Canada (summarized in Section 3) and roundtable discussions. The main observations from the roundtable discussions, which focused on knowledge gaps, challenges, and future directions for occupational disease and exposure surveillance, are included in Section 4. Day 2 of the workshop consisted of more focused discussions on priority topics including 1) ways to improve exposure surveillance, 2) early identification of health issues, 3) improving knowledge translation to communicate research findings effectively, and 4) facilitating national collaboration. A synthesis of these breakout sessions is provided in Section 5.

Participants from different organizations (i.e. provincial and federal government agencies, academic institutions, unions, and non-profit private research organizations) and different provinces (i.e. Alberta, British Columbia, Manitoba, Nova Scotia, Ontario, Prince Edward Island, and Quebec) attended the workshop. Representation across a range of jurisdictions and institutions created the opportunity to share information across Canada, and foster relationships for continued engagement.

The workshop provided an opportunity to discuss available data sources on work history information and how these could be incorporated into a national collaboration for occupational disease and exposure surveillance. It also enabled the establishment of networks across interested groups. Additional follow-up with those expressing interest in adopting similar surveillance systems in the future is possible. The OCRC is open to sharing detailed information on its surveillance projects that would facilitate the creation of a similar model for other jurisdictions.

3.0 Presentations at the Workshop

Speakers from across Canada were invited to present their current efforts in occupational disease and exposure surveillance. The objective of Day 1 was to learn about surveillance-focused projects in different jurisdictions and enable the speakers to share their relevant experiences and expertise.

3.1 Overview of Options for Occupational Exposure and Disease Surveillance in Canada

Dr. Nathan De Bono, Scientist, OCRC, Ontario Health (Cancer Care Ontario)

There has been limited progress in developing a national strategy for occupational exposure and disease surveillance in Canada over the past 30 years. Options for expanding disease surveillance efforts involve the use of death certificates, patient registries, and physician-based case reporting programs, as well as the continued development of linked administrative data sources. Greater exposure surveillance efforts are crucial for intervening early on the pathway from exposure to disease onset. Exposure surveillance efforts could involve the use of exposed worker registries for hazardous or emerging exposures of concern, the collection of regulatory exposure measurements, and laboratory-based reporting systems. Successful programs for case reporting and prevention oriented follow-up have been demonstrated in the U.S. and U.K, but have been limited in Canada. Increasing the recognition and reporting of occupational disease, particularly by medical practitioners, is a crucial step for improving surveillance at the local, provincial/territorial and federal levels. A detailed report describing options for tracking occupational exposure and disease in Canada is available at Options for tracking occupational disease and exposure in Ontario.

3.2 Occupational Cancer Research Centre's Surveillance: Occupational Disease and Exposure Efforts (Ontario)

Dr. Paul Demers, Director, OCRC, Ontario Health (Cancer Care Ontario)

The Occupational Cancer Research Centre was established in 2009 and the main research programs focus on studies of the causes of workplace cancer, surveillance of cancer and carcinogens, and prevention. Although the primary focus is cancer, the Centre also studies other occupational diseases.

The OCRC has conducted studies using both census and workers' compensation records linked with administrative health records. The Canadian Census Health and Environment Cohort (CanCHEC) was created by Statistics Canada by linking the long-form census with cancer, mortality, and place of residence data, creating a cohort of 2.5 million Canadians that could be followed for a 20–year period. Census linkages create a national representative sample, have a large number of both men and women, and enable adjustment for non-occupational determinants of health such as income and education. However, their ability to examine Ontario-specific groups is limited, and their automated coding of job titles may introduce error.

To overcome some of these limitations, we created the Occupational Disease Surveillance System (ODSS), which used workers' compensation claimant data (1983-2014) from the Workplace Safety and Insurance Board (WSIB) to establish a cohort of 2.2 million workers. This cohort is a skewed sample of the general working population (workers compensation coverage is only mandatory for 70-75% of

Ontario's labour force), but includes large numbers of workers from the great majority of hazardous, high-risk industries. To identify disease cases, the cohort was linked to cancer (Ontario Cancer Registry), hospital (Canadian Institute for Health Information's Discharge Abstract Database), ambulatory care (National Ambulatory Care Reporting System, NACRS), and physician billing (Ontario Health Insurance Plan OHIP eClaims Database) records. The ODSS is a robust surveillance system capable of identifying trends in many different work-related diseases including cancer, asbestosis, asthma, dermatitis, and others. There are some limitations; for instance, we are not able to capture data on mental health and hearing loss based on hospital and outpatient billing files. Future directions for the ODSS include linking occupation and industry information to exposure data through CAREX Canada, Canadian Job Exposure Matrix (CANJEM) and other datasets, examining trends in cancer and other diseases over time in target groups, adjusting for the potential impact of smoking, and disseminating results in collaboration with Canadian Centre for Occupational Health and Safety (CCOHS). The ODSS is part of the Occupational Disease Surveillance Program (ODSP), an initiative funded but the Ontario Ministry of Health and Ministry of Labour, Training and Skills development, which also includes mesothelioma surveillance and an exposure surveillance project based on the Toxics Reduction Act.

The OCRC's other current exposure surveillance efforts include tracking asbestos imports and exports, using data from Ontario's Toxics Reduction Act, and analyzing exposure databases, such as the Ontario Mining Exposure Database and Ontario Ministry of Labour's Medical Surveillance (MESU) database. We have proposed to the Public Health Agency of Canada (PHAC) to use the National Pollutant Research Inventory (NPRI) to track occupational exposure and use of medical lab data for biomarker surveillance.

3.3 Occupational Disease Surveillance in British Columbia

Dr. Mieke Koehoorn, Professor, School of Population and Public Health, University of British Columbia, and Co-Director, Partnership for Work, Health and Safety

Dr. Chris McLeod, Associate Professor, School of Population and Public Health, University of British Columbia, and Co-Director, Partnership for Work, Health and Safety

Dr. Koehoorn and Dr. McLeod co-lead an innovative research partnership between WorkSafeBC (provincial workers' compensation system) and the University of British Columbia called the Partnership for Work, Health and Safety. The Partnership brings together researchers and policy makers to undertake research of operational and policy significance for occupational health in British Columbia. Over the past 15 years, research projects conducted as part of the research agreement included the surveillance of occupational cancers, respiratory disease, and injuries.

The surveillance projects undertaken as part of the Partnership rely on access to linked, administrative health databases via Population Data BC (https://www.popdata.bc.ca). Population Data BC holds and facilitates access to linked health databases for research purposes under agreements with data stewards. This includes data from WorkSafeBC, Ministry of Health, and BC Cancer. Data access and use is governed by established protocols, as well as data sharing agreements between the researchers and the data stewards.

In British Columbia, surveillance projects highlighted several issues, including an unrecognized burden of work-aggravated asthma; high-risk asthma groups were identified in warehousing, wood/paper

products, teaching, health-care and waste management. Projects also indicated an under-reporting of asbestos- and silica-related diseases including mesothelioma, asbestosis and silicosis. There are higher rates of pneumoconiosis in mining regions of the province; and gender differences in rates of occupational exposures such as heat and chemical burns, and in occupational diseases such as mental disorders and infections. Further information and publications can be accessed from http://pwhs.ubc.ca/research/injury-and-disease-surveillance/.

Advocates have long argued for improved occupational surveillance in Canada, including the use of existing data sources to link work-related identifiers with health data, and to use multiple data sources for improved ascertainment of health outcomes beyond accepted claims. Projects conducted by Koehoorn and McLeod in BC, and by Demers, McLeod, Peters and colleagues in Ontario demonstrate the utility of using linked health data for occupational injury and disease surveillance in Canada. Work is underway to try to develop an advanced occupational disease surveillance database for British Columbia, building upon the methods/work highlighted above, with an initial focus on investigating cancer rates among high-risk occupation and industry groups, as part of an occupational disease surveillance network across Canada.

3.4 Quebec's Occupational Exposure and Disease Surveillance Efforts

Mr. Georges Adib, Scientific Advisor, Institut national de santé publique du Québec (INSPQ)

The legal basis for surveillance in Québec is the Public Health Act of 2001 which identifies the Minister of Health as being responsible for population surveillance, in conjunction with the Regional Directors of Public Health. The Minister may delegate, in whole or in part, certain surveillance activities to Québec's National Institute of Public Health (*INSPQ*). By law, the Minister and the Regional Directors of Public Health are required to develop a National Surveillance Plan, which includes indicators for a variety of surveillance purposes, including the surveillance of occupational exposures and diseases.

Mr. Adib presented two initiatives undertaken as part of the National Surveillance Plan. First, the Occupational Health Information System (*SISAT*) compiles the results of contaminants sampling and measurements of noise levels carried out by the public health occupational health teams in regulated industrial sectors. Once validated, data from the information system are used to construct a series of indicators that show the evolution of exposure over time. This information helps to identify industries or occupations at risk and to prioritize preventive interventions. The other initiative is based on the information system on reportable diseases (*Système-MADO*) that aggregates data from investigations carried out following a reportable occupational disease. These data are then centralized, validated, and used to construct occupational diseases surveillance indicators.

The indicators from *SISAT* and *Système-MADO* are used to ensure that preventative activities are put in place to reduce the occurrence of occupational diseases in the future. The examples presented show that occupational health surveillance is on the right track in Québec. In order to optimize this surveillance, some avenues for action are proposed: facilitate database pairing, include information on the occupation and industry in socio-administrative databases, include questions on exposure circumstances in population-based surveys, and increase occupational disease reporting.

3.5 Occupational Disease Claims in Saskatchewan

Dr. Sean Tucker, Associate Professor, University of Regina, and Associate Director of Research, Saskatchewan Workers' Compensation Board

Saskatchewan was the first jurisdiction to declare asbestos a dangerous substance in Occupational Health and Safety legislation (1972), and the first province to adopt public registry of asbestos in public buildings (2013).

The Saskatchewan Asbestos Disease Awareness Organization, an independent not-for-profit group, was formed to create awareness about asbestos through outreach, research and advocacy.

Saskatchewan's new Serious Injuries and Fatalities Strategy (WorkSafe Saskatchewan, 2019) includes the following goals:

1. Improve general asbestos hazard awareness and abatement controls through education and partnerships by 2021.

2. Improve firefighter cancer prevention controls by 50% in the province through complete firefighting cancer audits and improve awareness to reduce risk of future firefighter cancer exposures by 2021.

The Saskatchewan's Workers' Compensation Board (WCB) covers 49,500 employers and 410,600 full-time employees (2018). Seventy-four percent of the workforce is covered. There is no formal registry of asbestos injury claims but the WCB logs capture reported unplanned work-related asbestos exposures.

The Saskatchewan Cancer Registry reports 44 mesothelioma cases between 2014 and 2017. Over this period the WCB reported 31 accepted asbestos-related claims. Plumbers, labourers, and electricians are the most commonly cited occupations in accepted asbestos-related fatality claims.

3.6 Patch Test Surveillance in Ontario

Dr. Linn Holness, Occupational medicine physician, St. Michael's Hospital and Professor Emeritus, University of Toronto – Occupational Medicine

Occupational skin diseases are one of the most common occupational diseases. Contact dermatitis (CD) is the most common occupational skin disease. The main types of contact dermatitis are irritant and allergic. In the diagnostic process, patch testing is often used to identify the causative allergen. Clinics may pool their patch test results and there are a number of these groups that routinely review their patch test experience. Examples include the European Surveillance System for Contact Allergies, the North American Contact Dermatitis Group, and the Information Network of Department of Dermatology based in Germany (IVDK). The objectives of the IVDK include the current importance of known allergens, which new allergens are emerging, which exposure conditions are associated with contact allergy to specific allergens and which sensitizations are associated with a specific exposure. These groups all report demographic and clinical information as well as patch test results. They have demonstrated changes over time (e.g. increasing sensitization to epoxy and decreasing sensitization to chromium with the introduction of legislation to limit chrome in cement in construction workers). Additional information can also be systematically collected such as workplace characteristics and prevention activities and health care utilization.

In Ontario, the St Michael's Hospital patch test database includes information including demographics, clinical history, healthcare utilization and workplace characteristics and prevention practices in addition to patch test results from consenting patients. The patch test data from 2012 to 2018 were analyzed. There were 1130 cases of occupational contact dermatitis identified out of a total of 3269 consented participants. The characteristics of 1130 cases include: 53% male, 26% atopic dermatitis history, 87% hand involvement, 24% leg involvement, 26% face involvement and 60% over the age of 40 (mean age 43.7). 47% had lost time from work because of their dermatitis and 50% had filed a workers' compensation claim. The diagnoses and percentage sensitized to the common work-related allergens by industry sector are presented in Table 1. There are significant differences between sectors for both diagnosis and common occupational allergens.

Table 1: Diagnosis and percent positive to the common occupational allergens by industry sector.

	Auto N=119	Construction N=62	Health N=267	Manufacturing N=236	Services N=292
Allergic CD	49%	65%	35%	57%	57%
Irritant CD	77%	61%	89%	64%	78%
Thiuram[a]	8%	13%	7%	4%	8%
PPD[b]	2%	2%	0	1%	9%
Epoxy[c]	5%	24%	<1%	17%	1%
Chromium[d]	5%	18%	0	5%	3%
MI[e]	14%	9%	9%	7%	23%
HEMA[f]	2%	0	1%	3%	10%

[a] Thiuram mix (rubber accelerator) [b] Paraphenylenediamine
[c] Epoxy resin, Bisphenol A [d] Potassium dichromate
[e] Methylisothiazolinone [f] 2-hydroxyethyl methacrylate

These results identify the key occupational allergens by sector and demonstrate differences between the sectors both with respect to diagnosis and also the common occupational allergens. This information can be used to target the key risk exposures by sector. With ongoing data collection, trends over time can be analyzed as well as additional information about workplace characteristics and practices to provide insight into prevention in the workplace.

3.7 Observing Health and Illness in Canada's Veteran Population

Dr. Amy Hall, Senior Researcher, Veterans Affairs Canada

Veterans Affairs Canada (VAC)'s Research Directorate, established in 2001, supports Departmental decision makers and planners by supplying scientific evidence related to military and Veteran well-being. The team conducts and contributes to research projects, monitors and interprets international research, provides methodological expertise to help guide strategic decisions, and engages in knowledge transfer. This work occurs through exchange within the Department and with various partners and collaborators in government, academia, and research organizations within Canada and internationally.

Although VAC has a mandate to support all those who have served in the Canadian military, Veterans officially known to this Department account for less than 20% of all Veterans in Canada. The total

estimated number of Canadian Veterans in 2019 was 650,000; this is expected to decrease to 600,000 and remain steady in future.

VAC Research has partnered with the Department of National Defense and Statistics Canada to jointly investigate topics of mutual interest, and to develop new insights into health and disease in the Veteran population. Research initiatives such as the Life After Service Studies and the Veteran Suicide Mortality Study have shown that Veterans are at increased risk of suicide and various chronic conditions when compared with the Canadian general population. This evidence has served to guide prevention strategies, to inform Parliament on Veteran health and well-being, and to support collaborative work with external researchers and administrations.

VAC Research recognizes a continuing need for joint initiatives to collect and combine data on active military members, Veterans, and the Canadian general population. Efforts are underway to expand the scope of current data sources, and to address new and timely research questions focused on the well-being of Veterans and their families.

3.8 CAREX: An Occupational Exposure Surveillance System

Dr. Cheryl Peters, Research Scientist, University of Calgary – Cancer Epidemiology and Prevention Research, and Co-Principal Investigator, CAREX Canada

CAREX (which stands for CARcinogen EXposure) is an exposure surveillance system originally started in the early 1990s in the European Union (EU). The system was created as an awareness-building tool, since occupational causes of cancer were not generally recognized outside of small, well-informed circles. The system allows for the generation of estimates of the prevalence of exposure to a list of carcinogens. The original system was set up to include estimates of exposure for 85 known and suspected carcinogens in 55 broad industry categories.

The original EU system has since been adapted for use in a number of other countries around the world, including Latin America and the Caribbean. Notably, CAREX Canada began as a pilot project in 2003, and was funded as a fully-functioning system in 2008 by the Canadian Partnership Against Cancer. In the first 5 years of funding, the CAREX Canada team generated estimates for more than 40 occupational carcinogens and greatly increased the resolution of the European system. CAREX Canada used Canadian industry codes, increasing the resolution from 55 to 323 industries considered, and added the dimension of occupation, with 520 separate jobs considered. Levels of exposure were also added (where possible), generally in 3 semi-quantitative groups (low, moderate, and high), usually based on exposure monitoring data contained in the Canadian Workplace Exposure Database. CAREX Canada also includes an environmental estimates program, the first of its kind.

Since the first mandate, CAREX has been tasked with making sure the estimates of exposure are accessible and useful to stakeholders working in occupational and environmental cancer prevention (i.e. focus has shifted to knowledge mobilization and engagement with policy makers). Challenges to be tackled in the coming years include improving access to exposure data, addressing differences in occupational and industrial coding systems, changes over time in the exposure landscape, and how to handle emerging issues (for example, new workplace hazards and new technologies).

3.9 The Canadian Workplace Exposure Database

Dr. Hugh Davies, Associate Professor, School of Population and Public Health, University of British Columbia

Occupational Exposure Databases (OEDB) can play an important role in occupational exposure surveillance, and thus prevention of occupational disease. OEDB enable the sustainable collection of systematized and codified exposure measurements that support surveillance activities such as: (1) identifying substance use, (2) targeting prevention efforts, (3) monitoring trends in substance use, (4) exposure assessment for epidemiology, and (5) estimating burden of disease, among other objectives.

The Canadian Workplace Exposure Database (CWED) is a national Canadian resource that has its roots in the CAREX Canada project. It contains over 480,000 individual exposure measurements representing over 300 substances. Data comes from six Province and Territories as well as Federal agencies. The bulk of the data in CWED is from the 1980's and 1990's. Currently, efforts are underway to ensure the long-term retention of the CWED data holdings and an increase in the availability of data to a wider range of knowledge users. WorkSafeBC has funded a one-year project with the objectives of: securing the existing Canadian Work Exposure Database; making data more widely available to researchers and knowledge users; improving data management; improving stakeholder knowledge of the database; and exploring database potential and sustaining funding models. To that end the CWED investigator team are: reviewing and updating aspects of Governance & Data Stewardship, including (i) new data sharing agreements (memoranda of understanding, MOU) and (ii) new Steering and Data Management committees. They are also developing Data Storage, Security, and Access Policy and Procedures, and undertaking knowledge translation activities around website development, webinars, and workshops.

More information can be found at http://cwed.spph.ubc.ca/. Beyond the current project it is hoped that many more knowledge users from every area of Occupational Health will find use from the CWED, and that it may become a central repository for future occupational exposure data collection across Canada.

3.10 SAFE Work Manitoba's Occupational Disease and Illness Prevention Strategy

Mr. Michael Boileau, Prevention Consultant – Occupational Hygiene, SAFE Work Manitoba

Thousands of Manitoba workers come into close contact with hazards that can cause occupational diseases and illnesses. However, we lack current information that tells us specifically how much workers are being exposed to these physical and chemical hazards. This lack of information can make it difficult to identify where exposure levels are dangerous, and to prevent any overexposures that are happening.

Current illness statistics also suggest that we do not have a full picture of the workplace exposure problem. For example, the World Health Organization estimates that up to 19% of all cancers worldwide are caused by workplace or environmental exposures, and the Canadian Cancer Society estimates that 18 cases of cancer will be diagnosed every day in Manitoba in 2017. In one year, that's over 6,000 cancer cases in Manitoba alone. However, only 150 cancer cases in Manitoba were linked to workplace exposures in the six-year span of 2010-15. It can be challenging to link workplace hazards to illnesses, because many illnesses do not present themselves until years after an overexposure occurred.

SAFE Work Manitoba's Occupational Disease and Illness Prevention Strategy (ODIPS) aims to tackle some of these challenges. ODIPS' four tactics to strengthen occupational disease and illness prevention in Manitoba workplaces include:

1) Monitor workers' exposures to physical and chemical hazards.
2) Identify exposure levels and effective safety controls based on evidence from the monitoring.
3) Educate and build awareness among all Manitobans about occupational disease and illness prevention.
4) Strengthen partnerships to prevent occupational disease and illness.

SAFE Work Manitoba has monitored nearly 150 workers from construction, vehicle maintenance and logistics and collected unique, longitudinal data on engine emission exposures. By monitoring a worker's exposure level in a longitudinal fashion, we can provide evidence that shows where overexposure risks exist. This will help target SAFE Work Manitoba's and our partners' prevention initiatives where they are needed most. With the help of SAFE Work Manitoba, multiple companies have identified, isolated and are creating new ways to reduce workplace exposure profiles.

4.0 Themes from the Roundtable Discussions

The workshop was structured to allow for significant interaction and constructive open discussions. Notes were taken throughout, with special emphasis given to questions and comments of the participants. A thematic summary of the discussion was compiled, which identified the gaps and challenges as well as some suggestions for solutions and future efforts. The following are some of the major themes that emerged from the conversation.

1. **There are gaps in knowledge on occupational diseases and exposures in Canada.**

Although research efforts have been dedicated to identifying occupational diseases and exposures in some provinces, there are gaps in knowledge regarding the association between workplace exposures and diseases across the country. There is a need for a central national repository for existing provincial data because there is a lack of occupational disease and exposure surveillance data, especially on early indicators of health outcomes. Statistics Canada has developed its Social Data Linkage Environment to link many of their datasets, but they lack exposure data. The lack of robust exposure data make it difficult to understand the impact of workplace exposures on disease. There is also a need to collect more data on early indicators, such as sentinel events. Workers' compensation adjudication processes and planning of prevention programs at provincial and national levels would benefit from strong evidence on workplace exposures that lead to development of certain diseases and surveillance could help fill these gaps.

2. **Resourcing and harmonization of existing efforts across the country is essential.**

There is a need to identify the relevant and appropriate data sources and other resources (i.e. expertise in the field, adaptable models or frameworks) that are currently available to allow valid cross-jurisdictional comparisons and implementation of national surveillance and prevention efforts. Because collection and sharing of occupational health data vary across the country, the methods of data collection and quality assurance should be standardized to ensure high quality and complete information before creating a central national repository. Good data that are accurate, trustworthy, comparable, and timely are critical to the success of an effective surveillance system, both within and across jurisdictions. The data should have well-defined entities, including diagnostic criteria for occupational diseases, and criteria for exposure definition and measurement. The data collection tools should use comparable methods, for example, the measurement of asbestos by transmission electron microscopy (TEM). The central database will potentially maximize numbers (regardless of provincial borders) and allow us to observe trends in occupational diseases across the country, identify health issues early as well as avoid duplication of efforts across the provinces.

3. **While the current surveillance efforts are useful, there are several acknowledged limitations.**

Many of the current occupational surveillance efforts are based on compensation claims data, which fail to capture all workers because some workers never file a claim or do not report all workplace-related diseases. Some vulnerable groups, including migrant workers or other workers in marginal jobs, are not covered by workers' compensation boards. In addition, workers may work under multiple employers at a time or change the type and place of employment over their lifetime, which makes it difficult to track and collect exposure information. Some surveillance efforts have relied on active sentinel reporting of occupational disease by physicians, but increased effort is needed to identify the full range of cases. Although one's job is a significant determinant of health, occupational history is usually missing from

electronic medical records, even in cases where there is a mandatory field to capture the patient's job-title. Both physicians and workers need to be engaged in occupational health and safety discussions so that they understand the effect of relevant workplace exposures and ways to prevent associated occupational diseases.

4. **Multidisciplinary expertise and engagement is crucial to prevent occupational diseases.**

Aside from access to robust data, occupational health and safety outcomes are influenced by a constellation of factors, including regulatory frameworks, empowerment of health and safety associations, and worker involvement. There is a need to identify the end-users of the information generated by the surveillance system and engage them in multi-stakeholder groups (i.e. including employers, regulators, unions, workers, etc.) to identify their priorities and develop knowledge translation materials and activities accordingly. Once the surveillance data on occupational diseases and exposures have been analyzed and interpreted, the results should be disseminated through effective communication to target audiences to increase uptake of this information.

Data-informed priority setting can help channel resources to where help is needed most and will have the greatest impact. The information generated from the surveillance system can be used to advocate for policy change at any level. Government agencies should be engaged in discussions regarding the economic burden of occupational diseases to encourage allocation of resources to surveillance efforts. Additionally, sharing the findings with unions, employers and health, and safety associations, will support prevention efforts at the workplace.

5.0 Potential Next Steps from the Breakout Sessions

Four focus areas were identified following the first day of the workshop and morning of the second day. Participants self-assigned to one of these four groups, who were given 40 minutes to brainstorm ideas. Each group then had 10 minutes to present their ideas back to the larger group. Each presentation was followed by a short discussion, and the end of this session concluded with a final group discussion.

5.1 Increasing/Improving Workplace Exposure Surveillance

- We should continue to develop the infrastructure of the Canadian Workplace Exposure Database (CWED) and identify ways to add value to existing information/tools.
- We should create an inventory of existing exposure databases by jurisdiction (including information such as the quality of the data, who owns the data, the list of variables collected). This would ideally be done by an individual from each province who understands the challenges and mechanisms specific to their home province.
- While each province is conducting distinct projects, we should explore methods for data to be shared nationally. We need to work together with legislators to overcome barriers to accessing data.
- We need to improve the mechanisms for collecting exposure measures data. This includes developing ways for workplace exposure data, which are routinely collected by the employer, to be accessible and used for surveillance purposes. We should explore and discuss this topic at a provincial level, but the application should occur nationally. The short-term focus would be to explore and discuss mechanisms through which we can get data and identify any barriers. For example, ministries of labour may be able to compel workplaces to share their exposure data for surveillance purposes.
- We should consider the use of advanced technology as a long-term, national way to measure occupational exposures, particularly physical hazards.

5.2 Early Identification of Health Issues (Existing or Emerging) in Clinical or Other Settings

- We should take advantage of existing databases for occupational disease surveillance.
- A jurisdictional scan of mandatory reporting of occupational disease is necessary to understand the differences and similarities among the provinces.
- We need to synthesize the published case report literature and set up a biobank for more specific case ascertainment relevant to occupational diseases. Case ascertainment can be improved through the use of ICD-11 diagnostic coding.
- We also need to identify and develop resources for different stakeholders based on their needs (e.g. a portal that could be accessed by physicians across Canada through provincial workers' compensation websites, self-identification tools for workers, tools for employers to do in-house surveillance, and tools for industry to evaluate emerging hazards).
- Collaboration between physicians and regulators is needed to strengthen feedback loops that can support early identification of health issues in clinical or other settings.

5.3 Improving Knowledge Translation/Mobilization

- We need to identify the goals and end-users of the national collaboration for occupational disease and exposure surveillance, and consider the intervention that might arise from the findings.
- We need to engage with knowledge translation experts to convey the message from the system's findings in a simple and concise manner.
- We also need to create stronger feedback loops between those working on the surveillance system, those engaged in knowledge translation and the end-users to ensure effective communication and uptake of the findings.
- We should find creative ways to communicate surveillance findings (i.e. beyond journals and conferences). Some suggestions include infographics, social media, and establishing a more proactive media presence.
- Contextualizing results and providing a narrative that is more meaningful to the end-users, particularly employers and workers, can facilitate the uptake of information.
- The Canadian Center for Occupational Health and Safety (CCOHS) could play an important role bridging the gaps between surveillance work and disseminating the findings.

5.4 Facilitating National Collaboration

- We need representatives from each of the provinces, who will be responsible for identifying their occupational disease and exposure priorities.
- A short-term goal for this collaboration would be to complete an environmental scan to identify any surveillance efforts, data, knowledge translation materials and activities related to occupational diseases and exposures that are available in each province.
- We need to standardize data collection methods, data quality assurance and data sharing agreements to facilitate data linkage among the provinces and create the NODES system.
- The information generated from this surveillance system could be used to guide knowledge translation activities and sustainable occupational disease prevention programs across the provinces.
- The national collaborating organization should allocate resources according to each province's needs and allow data sharing among the provinces through the national surveillance system.
- Instead of creating a new group, we can work in partnership with any national organization, such as Canadian Centre for Occupational Health and Safety (CCOHS), Health Canada, Canadian Association of Administration of Labour Legislation – Occupational Safety and Health (CAALL-OSH), Association of Workers Compensation Boards of Canada (AWCBC), Canadian Labour Congress (CLC), Occupational Medicine Specialists of Canada (OMSOC) or Statistics Canada. For example, Statistics Canada is using the Canadian Health Measures Survey, in partnership with Health Canada and the Public Health Agency of Canada, to collected detailed information on the health of Canadians aged 3 to 79. Although they do not collect information on workplace exposure, this health data can be linked to occupational data and potentially create a national surveillance system for occupational diseases.
- We can raise awareness about this initiative at the 2020 World Congress on Safety and Health at Work, EPICOH 2020 (28th International Symposium on Epidemiology in Occupational Health) and Canadian Association for Research on Work and Health (CARWH) conference 2021.

6.0 Conclusions

At the end of the workshop, there was a discussion of how to make progress on occupational disease and exposure surveillance in Canada. The need for a working group to move the agenda forward and develop recommendations based on the workshop discussions was identified. The OCRC will search for resources to support such an effort. Many of the conclusions reached by the breakout session groups are immediately feasible next steps with relatively modest funding and resources. For example:

- **Conduct an environmental scan** to identify the existing occupational disease and exposure surveillance efforts across the country. Also, identify occupational health surveillance efforts that have been successful in other countries and that could be adapted for Canada.
- **Conduct a jurisdictional scan** of mandatory reporting of occupational disease to understand the differences and similarities among the provinces.
- **Explore standardizing** data collection and management methods, data quality assurance and data sharing agreement to facilitate data linkage among the provinces.
- **Explore collaborating with Health Canada** (Chemical Management Plan) to create a multi-sourced Canadian framework, including comprehensive data collection/management, knowledge translation/ dissemination, and decision-making/evaluation schemes, that will initiate and sustain the NODES system.
- **Engage multi-stakeholder groups** (i.e. including employers, regulators, unions, workers etc.) to identify their OHS priorities and develop knowledge translation materials and activities about the NODES project and surveillance findings accordingly.
- **Open discussions with Canadian Center for Occupational Health and Safety** on playing a role in disseminating findings with target audiences.
- **Seek national funding sources** to support the provincial components of a national surveillance system.

7.0 Acknowledgements

The National Occupational Disease and Exposure Surveillance workshop was funded by the Public Health Agency of Canada through the Enhanced Surveillance for Chronic Disease Program's extension for funding for the ODSS (2019-20). Information about the ODSS project is available at https://www.odsp-ocrc.ca/projects/odss/.

We also wish to acknowledge the Occupational Cancer Research Centre's funders: the Ontario Ministry of Labour, Training and Skills Development, Ontario Health (Cancer Care Ontario), and the Canadian Cancer Society. The OCRC was created in 2009 through the efforts of Ontario's WSIB, Canadian Cancer Society, Cancer Care Ontario, and the United Steelworkers.

We would like to thank our workshop moderator Mr. Andrew King (Chair of the OCRC Surveillance Advisory Council) and our speakers:

- Dr. Nathan DeBono, OCRC, Ontario Health (Cancer Care Ontario) (Scientist and Team Lead of the ODSS)
- Dr. Paul Demers, OCRC, Ontario Health (Cancer Care Ontario) (Director)
- Dr. Mieke Koehoorn, Partnership for Work, Health and Safety (Co-Director), School of Population and Public Health, University of British Columbia (Professor)
- Dr. Chris McLeod, Partnership for Work, Health and Safety (Co-Director), School of Population and Public Health, University of British Columbia (Associate Professor)
- Mr. Georges Adib, Institut national de santé publique du Québec (Scientific Advisor)
- Dr. Sean Tucker, University of Regina (Associate Professor), Saskatchewan Workers' Compensation Board (Associate Director of Research)
- Dr. Linn Holness, St. Michael's Hospital (Occupational medicine physician), University of Toronto – Occupational Medicine (Professor Emeritus)
- Dr. Amy Hall, Veteran Affairs Canada (Senior Researcher)
- Dr. Hugh Davies, University of British Columbia School of Population and Public Health (Associate Professor)
- Dr. Cheryl Peters, University of Calgary – Cancer Epidemiology and Prevention Research (Research Scientist), CAREX Canada (Co-Principal Investigator)
- Mr. Michael Boileau, SAFE Work Manitoba (Prevention Consultant – Occupational Hygiene)

Finally, thank you to Ms. Kate Jardine and the ODSS team for support with planning and meeting facilitation and to all the attendees for their enthusiastic participation!

8.0 Appendix

8.1 List of Resources

Occupational Disease Surveillance Program (ODSP)
Occupational Cancer Research Centre, Ontario Health (Cancer Care Ontario)
https://www.odsp-ocrc.ca
The ODSP aims to develop systems to monitor patterns and trends in occupational diseases in Ontario.
Find information about:

- The Occupational Disease Surveillance System (ODSS)
- Ontario's Toxics Reduction Act (TRA)
- The Mesothelioma Surveillance Project

Occupational Disease Action Plan (Ontario)
https://www.preventoccdisease.ca/en/occupations.html
This website contains information and resources on occupational diseases in Ontario.

Partnership for Work, Health and Safety (PWHS)
University of British Columbia, School of Population and Public Health
WorkSafeBC
http://pwhs.ubc.ca/research/data-development/
The PWHS between WorkSafeBC and University of BC is an innovative research unit that combines rigorous work and health research with effective knowledge translation.
Find information about:

- Injury and disease surveillance
- Policy and program evaluation
- Determinants of work injury and illness
- Data development

Occupational Disease and Illness Prevention Strategy (ODIPS)
SAFE Work Manitoba
https://www.safemanitoba.com/Resources/Pages/Occupational-Disease-and-Illness-Prevention-Strategy.aspx
The five-year ODIPS represents SAFE Work Manitoba's commitment to addressing the illnesses that are having the greatest impact on Manitoba workers.

CAREX Canada
Canadian Partnership Against Cancer and Simon Fraser University
https://www.carexcanada.ca/
The purpose of CAREX Canada is to provide knowledge about Canadian's exposure to known and suspected carcinogens to support development of targeted exposure reduction policies and programs.

National Dose Registry
Health Canada
https://www.canada.ca/en/health-canada/services/health-risks-safety/radiation/national-dose-registry.html
The National Dose Registry contains the dose records of individuals who are monitored for occupational exposures to ionizing radiation.

Ontario Mining Exposure Database
Occupational Cancer Research Centre, Ontario Health (Cancer Care Ontario)
https://www.occupationalcancer.ca/2013/creation-of-an-ontario-mining-exposure-database/
The Ontario Mining Exposure Database contains records of historical exposure measurements collected in mines in Ontario.

Institut national de santé publique du Québec (INSPQ)
https://www.inspq.qc.ca/
The INSPQ is a center of expertise and reference in matters of public health in Québec.

Publications by Georges Adib
https://www.inspq.qc.ca/en/publications/auteurs/georges-adib
Occupational Silicosis cases from the compulsory disease declaration system, Quebec, 2006-2017
https://www.inspq.qc.ca/publications/2607
Asbestos: knowledge acquired on exposure and diseases of workers and the general population of Quebec
https://www.inspq.qc.ca/publications/1213
Incident asbestosis cases related to occupational exposure from the MADO-Chimique System, 2006-2015
https://www.inspq.qc.ca/publications/2370
The epidemiology of asbestos-related diseases in Quebec
https://www.inspq.qc.ca/node/2208

Institut de recherche Robert-Sauvé en santé et en sécurité du travail (IRSST)
https://www.irsst.qc.ca
The IRSST is a private, non-profit scientific research organization in occupational health and safety in Québec.

A comparative study of the IMIS (OSHA) and LIMS (IRSST) exposure databanks
https://www.irsst.qc.ca/en/publications-tools/publication/i/101009/n/imis-lims
Occupational exposure to carcinogens in Québec: Industries and occupational groups
https://www.irsst.qc.ca/en/publications-tools/publication/i/100931/n/exposition-cancerogenes-industries-groupes-professionnels
Construction workers' exposure to crystalline silica: Use of a database taken from the literature
https://www.irsst.qc.ca/en/publications-tools/publication/i/100693/n/workers-crystalline-silica-exposure-r-801
Results of chemical analyses produced at the IRSST, 2001-2008
https://www.irsst.qc.ca/en/publications-tools/publication/i/100641/n/results-of-chemical-analyses-produced-at-the-irsst-for-each-administrative-region-of-the-ministere-de-la-sante-des-services-sociaux-for-the-2001-2008-period-r-731
Preliminary study on the utilization of data on the occupational exposure to chemical substances measured by the Quebec public occupational health network teams since 1980
https://www.irsst.qc.ca/en/publications-tools/publication/i/100630/n/preliminary-study-promotion-of-data-occupational-exposure-to-chemical-substances-measured-quebec-public-occupational-health-network-teams-since-1980-r-723

Occupational Health Statistics by IRSST
http://comm.irsst.qc.ca/blogs/statistiques/
This website contains newly published documents, papers, reports on occupational health statistics.

Employment and Social Development Canada (ESDC)
https://www.canada.ca/en/employment-social-development/services/health-safety/reports.html
The ESDC works to improve the standard of living and quality of life for all Canadians by promoting highly skilled labour force. They also have reports and publications on workplace health and safety.

Veterans Affairs Canada
https://www.veterans.gc.ca/eng/about-vac/research/research-directorate/publications/reports
This website contains publications and reports by the Veterans Affairs Canada.

Article: Options for tracking occupational disease and exposure in Ontario
http://www.odsp-ocrc.ca/wp-content/uploads/2019/06/Options-Tracking-2019.pdf
Demers PA, DeBono NL, Arrandale VH, Keefe AR.

Article: A Smarter National Surveillance System for Occupational Safety and Health in the 21st century
https://www.nap.edu/catalog/24835/a-smarter-national-surveillance-system-for-occupational-safety-and-health-in-the-21st-century
US National Academies consensus report (2018).

Article: A review of occupational disease surveillance systems in Modernet countries
https://academic.oup.com/occmed/article/65/8/615/2750621
Carder M, Bensefa-Colas L, Mattioli S, Noone P, Stikova E, Valenty M, Telle-Lamberton M. Occupational Medicine. 2015 Oct 7;65(8):615-25.

European Centre for Disease Prevention and Control (ECDC)
https://www.ecdc.europa.eu/sites/default/files/media/en/publications/Publications/Data-quality-monitoring-surveillance-system-evaluation-Sept-2014.pdf
Data quality monitoring and surveillance system evaluation handbook.

Centers for Disease Control and Prevention (CDC)
https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5013a1.htm
USA CDC updated guidelines for evaluating public health surveillance systems.

Canadian Workplace Exposure Database (CWED)

http://cwed.spph.ubc.ca/

CWED's goal is to collect workplace government agencies, researchers, and other sources and to create a large centralized database that will house both current and historical exposure measurements from workplaces across Canada.

Centre for Research Expertise in Occupational Disease (CREOD)

https://creod.on.ca/

The CREOD website includes research and resources on occupational diseases, including occupational skin disease, occupational lung disease, hand-arm vibration syndrome and more.

Chemicals Management Plan

https://www.canada.ca/en/health-canada/services/chemical-substances/chemicals-management-plan.html

The Chemicals Management Plan (CMP) is a Government of Canada initiative aimed at reducing the risks posed by chemicals to Canadians and their environment.
