

Exposed! Or Not? The Diminishing Record of Workplace Exposure in Canada

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Conflict of Interest Statement

The authors have no conflicts of interest to declare.

ABSTRACT

The Canadian Workplace Exposure Database (CWED) is the first of its kind in Canada. It was originally developed in 2008 by the Canadian Carcinogen Exposure project (CAREX Canada) to assist in estimating worker exposures to carcinogens across the country.

Following the CWED's initial establishment, all Canadian federal and provincial agencies responsible for administering occupational health and safety regulation were surveyed to obtain a clearer picture of the quantity and quality of regulatory exposure data available. This revealed troubling reductions in exposure measurement collection, retention, and centralization by these agencies in recent years.

Such trends will limit access to workplace exposure measurements for federal and provincial regulatory agencies as well as health researchers. Workplace exposure databases are used around the world for a variety of important purposes, such as identifying hazardous workplaces and workers at risk, assessing temporal-spatial trends, setting priorities for prevention, and informing epidemiological research.

Efforts are underway to preserve historical data and promote prospective collection, however future success of the CWED will require collaboration and long-term vision on the part of those responsible for collecting workplace exposure measurements in Canada.

MeSH KEY WORDS

Occupational exposure, database, hazard control, surveillance

Background

Workplace exposure databases provide a benchmark of current and past exposures, and highlight data gaps that may be crucial in future research or policy-making agendas. They can also be used to identify workers at risk of higher exposure, set priorities for prevention, assess impacts of exposure control regulations, and inform epidemiological research.

Since 2007, the Canadian Carcinogen Exposure project (CAREX Canada) has been working to characterize Canadians' exposure to known and suspected carcinogens in workplace and community environments. The project estimates location, prevalence, and levels of exposure. A critical component of CAREX Canada has been the creation of a Canadian "Workplace Exposure Database" (the CWED).

The CWED, novel in Canada, is similar to other large-scale exposure databases developed by governments and organizations in Europe¹⁻³ and the United States.^{4,5} It has already been used by CAREX Canada to develop estimates of the numbers of workers exposed to various carcinogens, by identifying workplaces and occupations with potential exposures to certain carcinogens, and exposure at levels of concern by province/territory, industry, and occupation.⁶ The CWED is also being used in an ongoing occupational cancer burden project funded by the Canadian Cancer Society Research Institute.⁷

The CWED was originally created in 2008 through negotiated access to existing electronic occupational exposure databases held by WorkSafeBC, the Ontario Ministry of Labour, the National Dose Registry, and Quebec's Institut de recherche Robert-Sauvé en santé et en sécurité du travail. Since we believed that the centralization of exposure data was crucial to

supporting various disease prevention activities in Canada, a feasibility survey of other potential data holders (consisting primarily of agencies responsible for workplace enforcement) was conducted to obtain a clearer picture of the quantity and quality of regulatory exposure data available. This survey identified a trend toward decreased exposure measurement of workplaces by occupational health and safety (OHS) regulatory agencies. We believe that this trend in decreased data collection and centralization endangers many important uses of such information.

Data holders' survey

In Canada, responsibility for labour affairs and workplace exposure measurement is distributed among 14 federal and provincial agencies, with additional regulatory divisions in some provinces (e.g. mining in British Columbia) (Figure 1). All relevant agencies were contacted in 2009 for CAREX Canada's data holders' survey, and voluntarily responded to questions covering: Responsibility for workplace compliance and exposure monitoring, data collection, use, and destruction practices, number of measurements collected annually (current and historical), and data retention formats (e.g., paper filing, electronic databases).

Results showed that since the 1990s, there has been a significant decrease in workplace exposure measurement and related data collection performed by regulatory agencies across Canada. Current legislation in many provinces permits OHS regulators to request that employers conduct their own exposure measurement surveys, internally or via consultants. Data obtained in this manner are often viewed but not retained by the regulatory agency. The Commission de la santé et de la sécurité de travail (CSST) – with an extensive history of

occupational exposure monitoring in Quebec and continuing collection of thousands of measurements across the province each year - is a notable exception.

The survey also found significant variability in record retention and archiving policies across the country. Some agencies had already experienced substantial loss of exposure data; for example, two provincial regulators had destroyed nearly all exposure measurements collected prior to 1990. In contrast, the BC Ministry of Energy and Mines and the Saskatchewan Ministry of Labour had maintained data integrity over time by continuing to store exposure data records (in hard copy format) dating back to the 1950s and 1970s, respectively.

Our survey also found that data accessibility varied widely according to the types of storage formats used. Out of the 14 agencies contacted, only the National Dose Registry and Human Resources and Skills Development Canada were currently maintaining large computerized exposure databases. Others, such as the BC Ministry of Energy and Mines and Manitoba's Workplace Health and Safety Division, stored their data in hard copy or individual electronic file formats (e.g. PDF). Although some agencies without electronic exposure databases planned to create such files in the future, most reported that they are budgeting only for prospective data entry, potentially leaving large gaps in the overall historical Canadian data archive.

Implications

The shift in responsibility for exposure measurement surveys, combined with current retention and archival practices, is limiting access to important data for federal and provincial regulatory agencies, as well as researchers. This is an important issue, since despite limitations associated

with databases composed of measurements obtained for compliance reasons, they are useful for a variety of purposes.^{4,8}

Centralized, accessible occupational exposure data provides baseline information for evaluation. It can be used for comparisons across jurisdictions, industries, and occupations, to identify high exposure situations and to target prevention activities. Its use in extrapolating relative time trends in exposures is important for understanding policy impacts. Such data can also be applied in claims adjudications, and as a tool for the identification of gaps and research priorities.

The examination of workplace measurements also plays an important part of exposure estimation in epidemiologic studies.⁹ More accurate exposure characterizations to hazardous workplace substances across occupation, industry, sex and geography allows for better estimates of the burden of disease associated with past exposures. Estimates of current disease burden are based on historical exposure levels (which have been collected and centralized in the CWED), however continuing assessments will require the prospective centralization of exposure data.

Some alternative strategies have been implemented to address reductions in exposure measurement. These include the use of generic techniques for risk assessment and management (such as control banding),¹⁰ and targeted inspections (such as frequent visits to “high risk” sectors or employers). (8) Although useful in some areas, such strategies tend to focus on workplace enforcement and cannot serve as a replacement for other uses of such data.

Continuing CWED development

CAREX Canada's data-holder survey findings emphasized the need for a national database of Canadian workplace exposure measurements to: (A) preserve what remains of historical data, (B) standardize this information for ease of analysis, such as comparisons across jurisdictions, and (C) encourage and enable prospective collection and input of measurements.

Following the survey, funding was sought by CAREX Canada to undertake the transfer of some paper-based exposure measurements into searchable electronic databases. This resulted in the abstraction of data held by The BC Ministry of Energy and Mines, The Government of Saskatchewan, the Yukon Workers' Compensation, Health and Safety Board, and The Manitoba Ministry of Labour's Workplace Safety and Health Division. These 60,000 additional data points increased CWED holdings to over 460,000 discrete workplace exposure measurements across six provincial and territorial jurisdictions. This work also produced a flexible database format adaptable to suit individual agency needs, providing a new means of consistent exposure data input and storage across Canada. Information on the CWED is available online;¹¹ findings will be reported in future publications.

Engaging with industry groups and large companies in Canada is an option that could greatly improve this national database. However beyond major data holders (e.g., governmental regulatory agencies, large corporations) identifying and retrieving data from other sources could be an expensive proposition. In a UK feasibility study, researchers identified and tested 5 strategies for retrieving data, including contact with trade associations, users of hazardous substances, occupational hygiene consultants, and government organizations. Over 800

organizations were contacted; fewer than 10% had data. Per measurement retrieval costs were estimated to range from £7 to nearly £400, depending on the strategy.¹²

Exposure data can be gleaned from the scientific literature, but because of a wide variation in how exposures are reported, much is inappropriate for exposure database use. For example, an American study retrieved 350 papers documenting hydrocarbon solvent exposure, but only 99 papers met the authors' criteria for quantitative analysis, and of these, twenty percent were deficient with respect to the summary statistics reported.¹³

Moving forward, we aim to identify and acquire further data from OHS regulators and other sources in Canada. The digitization and centralization of historic exposure data has been a key focus and will continue; we are hopeful that with digital systems established, regulators will begin to retain all exposure data submitted by employers for enforcement activities. Partnerships have also been sought with regulators considering prospective data collection, including short-term specialized exposure measurement campaigns.

Conclusions

Bringing together occupational data from across Canada on sources and levels of exposure allows for a variety of important research and policy questions to be addressed: identifying industry and occupational populations at risk for developing disease, informing possible intervention strategies, and permitting quantitative evaluations.

The recent establishment of the Canadian Workplace Exposure Database (CWED) has centralized nearly half a million measurements, primarily obtained from workplace enforcement agencies across the country. These agencies have reduced their rates of

workplace exposure measurement and recording in recent years, which carries troubling implications for prospective CWED development and use of this data source. For instance, current practices do not allow us to assess whether workplace conditions are improving across the country, and our future ability to predict disease burden will be limited.

Our long-term vision includes partnerships with regulatory agencies and other exposure data owners and users to encourage prospective data collection and coordinated efforts to centralize this information. The CWED could continue to inform various primary prevention, exposure and disease surveillance, and research activities for carcinogens as well as other disease-causing agents, but will be forced to rely on new mechanisms for data collection and retention.

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Figure 1: Participants in CAREX Canada’s 2009 data holders’ survey

