Indoor and geographic patterns of use of carcinogens in Ontario

Cathy Slavik 1, 2, Sheila Kalenge 1, Paul A Demers 1, 3, 4
1. Occupational Cancer Research Centre, Toronto, ON; 2. McMaster University, Hamilton, ON; 3. Dalla Lana School of Public Health, University of Toronto, Toronto, ON; 4. CAREX Canada, Vancouver, BC

Background

About one out of every two Canadians will be diagnosed with cancer in their lifetime (1), however many of these cancers can be prevented. In Ontario, it is estimated that over 3,000 cancer cases could be prevented each year if exposures to carcinogens in the workplace were reduced (2). The goal of this study was to leverage data from two environmental regulatory initiatives, Ontario’s Toxics Reduction Act (TRA) and Canada’s National Pollutant Release Inventory (NPRI), which require industrial facilities in the manufacturing and mineral processing sectors to track and report their use and release of various toxic substances to the federal and provincial governments (3). Our study assessed trends in the use and emission of cancer-causing chemicals, or carcinogens, by industry sector in Ontario. In addition, we used the data to examine the geographic location of industrial facilities reporting carcinogen use and emission in the province.

Methods

- Annual datasets from the TRA and NPRI were obtained online from the Ontario Ministry of the Environment and Climate Change and from Environment Canada, respectively.
- Industrial facilities reporting carcinogen use and emissions in both datasets were geocoded based on their geographic coordinates.
- The number of industrial facilities that reported the use and emission of carcinogens in 2015, the most recent dataset available at the time of this study, were identified for each of the 36 Public Health Units in Ontario and mapped using ArcGIS 10.5.1 (ESRI, 2017).
- The industrial facilities reporting to the TRA and NPRI were also analysed by industrial sector to quantify the use and emission of 26 known and suspected cancer-causing chemicals in Ontario by sector.
- The top 10 industry sectors were ranked by the amount of known and suspected carcinogens used and emitted, which were summed for all years from 2011 to 2015.

Conclusions

- The City of Toronto and Peel Region contained the largest number of industrial facilities reporting the use of carcinogens (n=34) as well as the largest number of facilities reporting the emission of carcinogens (n=56; n=52) (Fig. 1 & 2).
- Industrial facilities in the chemical manufacturing and primary metal manufacturing sectors used about 84% of all carcinogens reported by industries during the period 2011-2015 (Fig. 3).
- The primary metal manufacturing and paper manufacturing sectors were the top emitters of carcinogens, accounting for about 46% of all reported emissions during 2011-2015 (Fig. 4).
- Over time, between 2011 and 2015, the use of carcinogens across all sectors appeared to decrease by 8%, while emissions increased by about 2%.

Fig. 1 The geographic distribution of industrial facilities reporting carcinogen use in Ontario, by Public Health Unit. (TRA, 2015)

Fig. 2 The geographic distribution of industrial facilities reporting carcinogen emissions in Ontario, by Public Health Unit. (NPRI, 2015)

Fig. 3 Proportion of total carcinogen use by industry sector in Ontario. (TRA 2011-2015)

Fig. 4 Proportion of total carcinogen emissions by industry sector in Ontario. (NPRI 2011-2015)

References