Cancer and the Use of Chemicals at Work

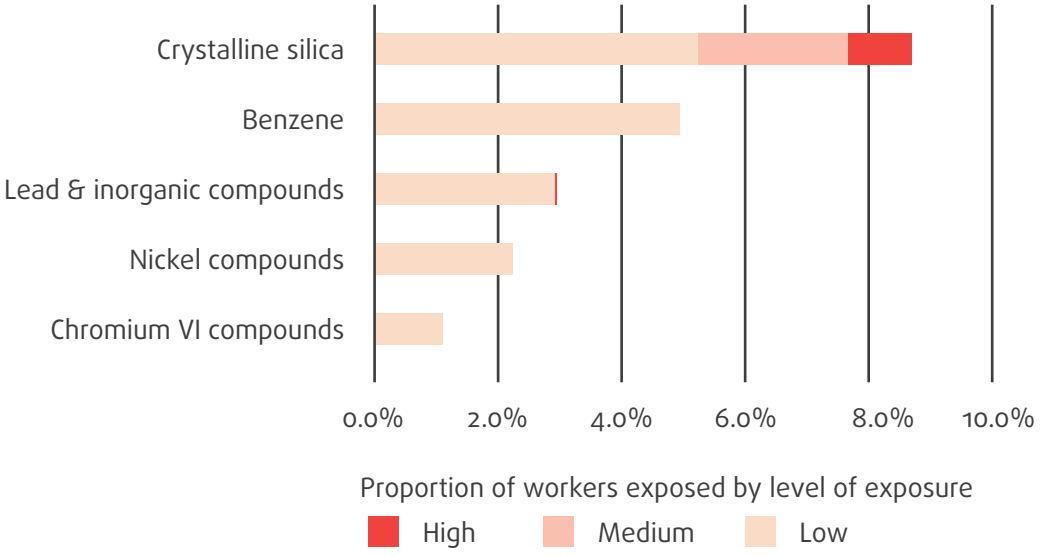
What is a chemical?

A "chemical" is a broad term that can refer to any element or compound and their mixtures, whether natural or synthetic (1). Liquids, gases, mists and vapours that are used or produced by large scale industrial processes are considered to be chemicals, as well as dusts and fibres such as asbestos and crystalline silica. Chemicals are used for many applications, in a wide variety of industries, and in everyday life. They are important for manufacturing and technology, healthcare, and food production, to name just a few. However, chemical exposures can be hazardous to workers' health and mitigating occupational exposure is important for preventing disease and protecting health.

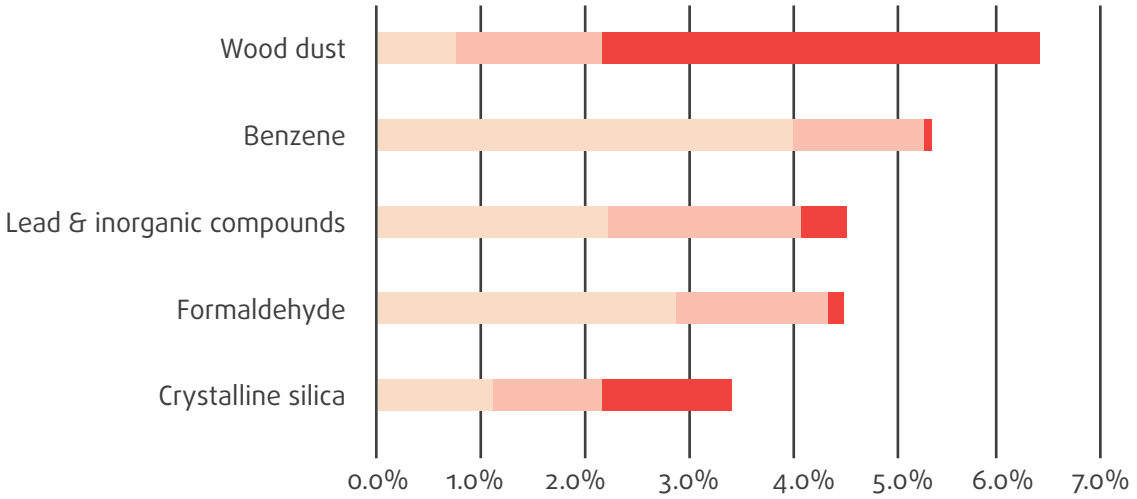
Who is exposed to chemicals at work?

Workers in many major industries in the Americas are exposed to chemicals. To help track the prevalence and levels of exposure in Canada, CAREX Canada was established in 2007 as a national program focused on the surveillance of occupational and environmental carcinogens (2). The graphs below show the proportions of people in the Canadian mining, manufacturing, and construction industries who are exposed to different chemicals, according to estimates from CAREX Canada. For example, exposure to crystalline silica is prevalent in both the mining and construction sectors, with over one third of these workers exposed to moderate or high levels. In the manufacturing industry, the majority of workers who are exposed to wood dust are exposed at high levels. This data helps to inform prevention initiatives to the most highly exposed workers. These Canadian examples are likely representative of North America, but the types, proportions, and levels of chemical exposures may differ in Latin America and the Caribbean.

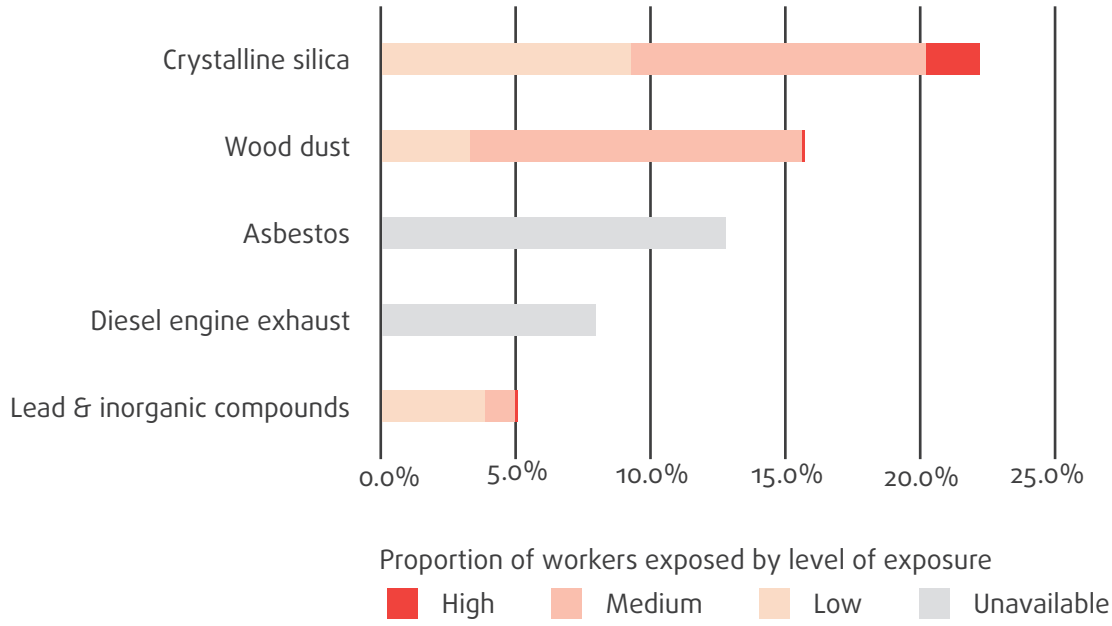
Top five chemical exposures in the mining and oil and gas extraction industry in Canada



Top five chemical exposures in the manufacturing industry in Canada



Top five chemical exposures in the construction industry in Canada



Occupational exposure

Workers who are exposed to chemicals on the job may experience a variety of health effects such as allergic reactions, sensitization, reproductive toxicity and cancer. Some of these health effects are acute and happen shortly following exposure, while others, such as cancer, may occur decades after exposure. For instance, short-term exposure to high levels of crystalline silica, which is a naturally occurring substance in the earth's crust, has been associated with a fibrotic lung disease called silicosis among workers. In Brazil, more than 4,500 workers with silicosis have been cumulatively reported in the state of Minas Gerais alone (3). Chronic or long-term exposure to crystalline silica is also associated with silicosis, as well as lung cancer (4). Ongoing evaluations of human and animal evidence by the International Agency for Research on Cancer (5), a specialized agency of the World Health Organization, have resulted in the classification of approximately 60 substances commonly found in workplaces as known or probable (Group 1 and 2A) carcinogens.

Many of these cancer-causing agents are chemicals found in Latin American and Caribbean workplaces, such as asbestos, diesel engine exhaust, and crystalline silica. Over 100 additional workplace exposures have been classified as possible carcinogens (Group 2B), such as lead and the pesticides DDT, lindane, and 2,4-D. There are other workplace chemicals with a suspicion of human carcinogenicity, and still more that have not yet received formal evaluation.

The impact of workplace chemical exposures on cancer rates worldwide is sizeable. In 2005, the World Health Organization estimated that approximately five per cent of lung cancer deaths globally in men, and ten per cent in women, were due to occupational exposure to crystalline silica, cadmium, nickel, arsenic, chromium, beryllium, diesel fumes, and asbestos (6). However, occupational exposure data from Latin America and the Caribbean was unavailable at the time of these estimates. This remains an important gap in our knowledge of who is exposed to carcinogenic chemicals in Latin American and Caribbean workplaces. Given the large size of the Latin American and Caribbean workforce and the numbers of people employed in high hazard industries (e.g. manufacturing, construction), exposure information from this region would help generate more precise estimates of the global burden of occupational cancer.

How can occupational exposure to chemicals be prevented?

Occupational exposure to chemicals can be prevented and reduced to prevent diseases, such as cancer, and to protect workers' health. Surveillance programs like CAREX Canada help to identify the industries and occupations where workers encounter exposures to hazardous substances. This informs the development of prevention programs where they are most needed, and where the greatest number of workers will benefit from reducing exposure.

Once these industries and occupations are identified, there are many steps that governments, employers, and workers can take to minimize exposure to chemicals in the workplace. At the government level, policies such as setting and enforcing rigorous occupational exposure levels can effectively lower risk. These regulations set the maximum level of exposure to hazardous substances in the workplace, taking acute and chronic health effects into consideration. An integrated approach to prevention can be taken by Ministries of Health, Labour, and Environment. Toxics use reduction that eliminates the use of hazardous chemicals, substitutes for less hazardous chemicals, or lowers the amount of chemicals used, is beneficial for both workers' health and the environment. Individual workplaces can implement containment, ventilation, and work practices to minimize exposure, and as a last resort, provide personal protective equipment for workers (7).

References

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Prepared by the Occupational Cancer Research Centre and CAREX Canada. Visit our websites:
http://occupationalcancer.ca/
http://www.carexcanada.ca/en/