

Environmental & Occupational-Related Cancer Prevention in Toronto: Public Health Actions

Date: March 18, 2025

To: Board of Health

From: Acting Medical Officer of Health

Wards: All

SUMMARY

Cancer-causing agents in the environment, or environmental carcinogens, contribute to some of the most common cancers in Ontario. Some carcinogens are in the environment from human activities (for example, pollution from cars or industry) while others are part of the natural environment (for example, radon and solar radiation). The severity and frequency of exposures to environmental cancer-causing agents are potentially modifiable. Some environmental exposures can be outside the control of individuals.

The burden of environmental cancers is felt across the city. As a public health unit, Toronto Public Health (TPH) has a role in environmental cancer prevention and in reducing exposures at the community level. TPH contributes to community cancer prevention and exposure reduction by working with other levels of government and partners, and by taking action within local public health's scope and mandate. Toronto Public Health's prevention activities include increasing public awareness of primary cancer prevention, responding to public complaints, participating in research studies, enforcing existing laws, and advocating for laws to prevent exposures to environmental carcinogens.

Occupational cancers are related to workplace exposures. The hierarchy of hazard controls is a framework for actions to help protect worker health and safety in workplaces. Many provincial laws exist to protect workers from occupational exposures to hazards.

This report highlights TPH's participation in existing strategies to prevent cancer. The report also identifies opportunities to enhance multi-level government efforts to reduce the burden of cancer from environmental and occupational carcinogens in Toronto.

RECOMMENDATIONS

The Acting Medical Officer of Health recommends that:

1. The Board of Health request the Acting Medical Officer of Health to continue to collaborate with Divisions, public health agencies, academic institutions, and community researchers as appropriate, on initiatives to better understand environmental exposure risks in Toronto such as:

a. Exploring collaborative research opportunities to update information on the air pollution burden of illness, including cancer.

b. Continuing participation as a knowledge user in the Study of Winter Air Pollution in Toronto (SWAPIT) and other air quality studies to inform local policies and action.

c. Undertaking an assessment of the quality improvement options for optimizing the ChemTRAC program's operations and effectiveness.

2. The Board of Health request the Acting Medical Officer of Health to continue contributing to environmental carcinogen risk reduction through provision of public health technical expertise to the City of Toronto or other levels of government on relevant initiatives.

3. The Board of Health request the Acting Medical Officer of Health to continue amplifying messages about relevant environmental carcinogens through participation in initiatives of other agencies or City divisions to reduce public health risks of environmental cancers.

FINANCIAL IMPACT

There are no financial impacts associated with this report. The Chief Financial Officer and Treasurer has reviewed this report and agrees with the information as presented in the Financial Impact Section.

DECISION HISTORY

On October 21, 2024, the Board of Health adopted item [2024.HL17.1 Toronto Public Health Initiatives to Prevent Cancer](#) and directed the Medical Officer of Health to report to the April 1, 2025 Board of Health meeting with recommendations and strategies to reduce occupational and environmental related cancers in Toronto.

On April 29, 2024, the Board of Health adopted item [2024.HL12.6 Toronto Public Health's Role in Preventing and Addressing Cancer in Toronto](#), requesting the Medical

Officer of Health to report back to the October 21, 2024 meeting of the Board of Health on Toronto Public Health’s role and actions to prevent and address cancer in Toronto.

COMMENTS

Environmental Exposures are an Important Cause of Cancer in Ontario

The World Health Organization has estimated that environmental exposures can account for about 19 per cent of all cancers.¹ According to Public Health Ontario, an estimated 3,540 to 6,510 cancer cases each year in Ontario are attributed to environmental exposures to 23 known cancer-causing substances.^{2 3 4 5} Environmental causes of cancer exist in air, water, soil, dust and food that Toronto residents are exposed to in their daily lives by breathing, eating, drinking and being in the sun. Some of these exposures are under our direct control although many of them are not.⁵ Therefore some environmental exposures are potentially avoidable cancer risk factors.²

Based on available data, of the 23 known environmental cancer-causing agents, three account for over 90 per cent of the total estimated environmental burden of cancer in Ontario: solar UV radiation (UVR), radon, and fine particulate matter (PM2.5).² UVR is estimated to cause approximately 80 per cent of malignant melanoma (a type of skin cancer); radon is estimated to cause about ten per cent of lung cancers; and PM 2.5 is estimated to cause six per cent of lung cancers.² The other twenty agents contribute to less than ten per cent of the environmental burden of cancer.

Table 1: Major Contributors to Environmental Cancers in Ontario (2016)

| Environmental Carcinogens | Exposure Source | Impact: Mean cases/year ² (site) |
|---|---|---|
| Ultraviolet radiation (UVR) | Sunlight | 2,540 (melanoma) |
| Radon | Radioactive gas in indoor air An estimated 7% of Toronto buildings have radon levels that may pose a health risk | 1,310 (lung) |
| PM2.5 (fine particulate matter including from diesel) | Motor vehicles, industrial emissions, forest fires, fireplaces, wood stoves | 560 (lung) |

Reducing Risks - Roles and Responsibilities

The risk factors for exposure to environmental cancer-causing agents can be modified through interventions such as public policies or technological change that address both individual behaviours and the environment.⁵

Toronto Public Health's (TPH) environmental cancer prevention activities, determined by Ontario's [Health Protection and Promotion Act](#) (HPPA), focus on community-level exposure sources. Two sections of the [Ontario Public Health Standards](#) (OPHS) describe public health's roles and responsibilities related to environmental-related cancer. The Chronic Disease Prevention and Well-Being Program Standard focuses on cancer prevention. The Healthy Environments Program Standard outlines public health's role in reducing exposures to health hazards that includes exposure to cancer-causing substances. Both standards emphasize collaboration.

Toronto Public Health's role in investigating occupational health complaints is also determined by the HPPA. While the [Occupational Health and Safety Act of Ontario](#) takes precedence over the HPPA, Section 11 of the HPPA describes the expectations for TPH when investigating complaints about health hazards related to occupational or environmental health. The health unit receives the complaint and in consultation with the relevant provincial ministry, the local health unit investigates to determine if a health hazard exists.

Within public health's limited mandate, TPH supports efforts to reduce environmental exposures by working with other levels of government that have clearer legislated responsibilities in this area. TPH collaborates to create, influence, and enforce relevant rules and policies. TPH also provides advice and shares health education messages to the communities of Toronto to raise awareness about reducing exposures and risks (Table 2).

Table 2: Government Responsibilities Related to Environmental and Occupational Carcinogen Exposure

| Level of Government | Examples of TPH Activities |
|--|--|
| <p><i>City of Toronto</i> May pass by-laws respecting the health, safety and well-being of persons (City of Toronto Act 2006)</p> <p>Provide and maintain safe and healthy working conditions for all City employees in keeping with legislative requirements (City of Toronto, Corporate Occupational Health and Safety Policy)</p> | <p>Toronto Municipal Code Chapter 423, Environmental Reporting and Disclosure (ERD) describes the duty to annually report the use or release of priority substances to the ChemTRAC program administered by TPH.</p> <p>Toronto Municipal Code Chapter 517, Idling of Vehicles and Boats limits idling to no more than one minute in a sixty-minute period. TPH will work with the lead City divisions to update the anti-idling by-law (IE19.2)</p> <p>City of Toronto Official Plan (Chapter 2) TPH provided comments about the health benefits of active transportation and air quality (HL16.1)</p> |
| <p><i>Government of Ontario</i> Creates legislation</p> <p>Sets standards for acceptable limits in various media (e.g. air, soil, water), monitors and tests</p> <p>Responds to releases and can enforce clean up or compliance with standards for emitters</p> <p>Outlines occupational exposure limits to chemical and biological substances for workers in Ontario and requires employers to protect workers from exposures exceeding legislated limits (Reg. 833: Control of Exposure to Biological or Chemical Agent)</p> | <p>TPH advocated for reducing skin cancer risks from indoor tanning (HL20.2) by the provincial government.</p> <p>TPH enforces the provincial Skin Cancer Prevention Act (Tanning Beds) (2013) prohibiting the sale of tanning services to youth under 18 years of age, among other actions.</p> <p>TPH provided comments on multiple Ministry of Environment, Conservation and Parks (MECP) policy proposals including the Cumulative Effects Assessment in Air Approvals policy and the Air Zone Management Framework that are aimed at reducing the impacts of industrial emissions in Ontario.</p> <p>TPH worked collaboratively on the Ontario Ministry of Health's first Wildfire Smoke and Air Quality Reference Document</p> |

| Level of Government | Examples of TPH Activities |
|---|--|
| <p><i>Government of Canada</i> Manages chemical substances to help protect human health and the environment through strategies ranging from regulations to information sharing (e.g., Canadian Environmental Protection Act, 1999 CEPA)</p> <p>Operates the National Pollutant Release Inventory (NPRI) that requires large industrial facilities to report their emissions annually</p> <p>Shares responsibility to create standards for pollutants in the environment</p> <p>Partners, conducts and funds research on cancer</p> | <p>Along with other public health units, TPH participated in Federal development work on the national health-based Air Quality Health Index (AQHI), including by piloting the tool in 2007 (HL4.2)</p> <p>TPH amplifies messages to increase awareness of reducing risks from environmental exposures (for example, radon and air quality)</p> |

Strategies to Address Common Environmental Carcinogen Exposures

Cancer, like other chronic diseases, is an important public health issue because of its common occurrence in the population and potential for severe health outcomes including death. The cancer burden is distributed unevenly across the population in incidence, prevalence, and mortality. Public health strategies to reduce exposures require ongoing collective action to address the underlying risk factors. These actions include increasing public awareness of primary cancer prevention, responding to public complaints, and advocating for laws to prevent exposures to environmental carcinogens. Some of these actions are within local public health’s scope and mandate, with a focus on the three environmental exposures that are responsible for 90 per cent of the cancer burden.

Environmental Solar Ultraviolet Radiation

Among environmental causes of cancer in Ontario, ultra-violet radiation (UVR) is responsible for the highest number of new cancer cases each year (Table 1).^{Error!} Bookmark not defined. Most cases of skin cancer are preventable by reducing environmental UVR exposure. Solar UVR-related cancer prevention was discussed in the cancer report considered by the Board of Health in October 2024 [HL17.1](#).

TPH strategies to reduce UVR exposures

In this era of climate change and the expanding heat season, protecting Torontonians from heat and UVR while supporting population resilience is increasingly important.^{6 7} Expanding on past work on the Toronto Shade Policy and Shade Guidelines, TPH participated with the technical advisory group to inform City Planning’s development of

the recently City Council-endorsed [Thermal Comfort Guidelines](#). The guidelines provide updated metrics for creating a high quality and safe outdoor realm that supports seasonal shade for new developments in Toronto.

Environmental Radon

Radon is a colourless, odourless radioactive gas that forms when the uranium found naturally in rock, soil, and groundwater decays. The radiation from radon gas causes cell damage in lung tissue. Long-term exposure to radon can cause lung cancer (Table 1). Radon exposure in indoor air is the leading cause of lung cancer in non-smokers and the second leading cause among smokers. Children, smokers, and people exposed to radon for a long period of time are most at risk of developing lung cancer.

TPH strategies to reduce radon exposures

Toronto Public Health provides information about radon and how households can test for it on its [website](#) and directs residents to resources from other stakeholders such as Health Canada and the Ontario Lung Association. Toronto Public Health is also a member of the Canadian Partnership for Children's Health and Environment (CPCHE), and contributed to the development of several [resources](#) for families and childcare professionals to help identify and reduce exposure to radon among children.

Outdoor Air Pollution

In 2016, the International Agency for Research on Cancer ([IARC](#)) classified outdoor air pollution and one of its major components, fine particulate matter (PM2.5), as carcinogenic to humans. Fine particulate matter (PM2.5) is an air pollutant that arises from combustion sources and includes diesel particulate matter (DPM) (Table 1).²

There are many sources of PM2.5 including from vehicles, industrial facilities, fireplaces, wood stoves, and forest fires. Since 2013, ambient levels of PM2.5 in Toronto have decreased by 20 to 26 percent at monitoring sites operated by the Ontario Ministry of Environment, Conservation and Parks (MECP), largely due to the adoption of more stringent vehicle emission control technologies and improved vehicle standards adopted across Canada. Other policies implemented in Ontario such as the closure of coal-fired power plants and reduced emissions from industrial sources also contributed to broader reductions in ambient PM2.5 levels across the province.⁸

TPH strategies to reduce exposure to outdoor air pollution

TPH activities have focused on advocating for policies at the federal and provincial levels that can reduce ambient levels of PM2.5, identifying major sources of PM2.5 within Toronto's boundaries, and developing policy aimed at reducing local sources and population exposure.

Toronto Public Health's ChemTRAC program aims to protect public health by reducing [25 priority toxic chemicals](#) in Toronto's air, including PM2.5. Businesses and facilities that report to the ChemTRAC program often do not have any federal or provincial reporting requirements due to the size or the scope of their operations. One of the key features of the program is to encourage responding businesses to reduce their use and release of chemicals through pollution prevention activities.⁹

The ChemTRAC program was re-activated in early 2024 after a four-year pause during the COVID-19 pandemic. For 2025, the focus of the program is on re-engaging with and supporting facilities required to report under the Environmental Reporting and Disclosure bylaw, updating data collection databases and refreshing online tools and guidance documents. Another priority focus during the program restart is assessing program quality improvement options to enhance operations and effectiveness.

The [Wildfire Smoke Response Strategy](#) is TPH's protocol for responding to deteriorations in air quality due to wildfire smoke. Protocol strategies include stakeholder collaboration and coordination and providing public risk reduction guidance on the TPH website. In 2024, a network of Cleaner Air Spaces was added to the strategy; they function as accessible places for people who face barriers accessing cleaner air and air filtration at home.

Toronto Public Health monitors research findings on traffic-related air pollution (TRAP), a major contributor to PM_{2.5} and DPM, to inform policy and local action.¹⁰ Toronto Public Health also reviews and comments on development proposals near highways and busy roadways to consider exposures to air pollutants and provide recommendations on exposure reduction measures.

Toronto Public Health collaboration with agencies and research partners is a key strategy informing our understanding of air pollution exposure and health impacts in Toronto that assists in prioritizing efforts in prevention and exposure reduction. Recently, TPH participated in the Bathurst Quay Neighborhood Air Quality Study to help the community better understand population exposure to air pollution and the contribution of different sources. Additionally, TPH is currently a knowledge user for research led by Environment and Climate Change Canada focused on improving the state of knowledge about air pollution conditions during the winter (The Study of Winter Air Pollution in Toronto – [SWAPIT, 2024](#)).

Most Common Known or Suspected Occupational Carcinogens

Occupational exposures can be a significant source of cancer risks for those exposed in workplace settings.¹¹ Ontarians spend 33 per cent of their waking time at work.¹¹ The risk of exposure to workplace carcinogens varies by industry and role. The time between exposure to occupational carcinogens and the occurrence of cancer can be up to several decades. The [Hierarchy of Controls](#) is a hazard prevention strategy that is employed by the employer and frontline supervisors to protect workers from hazards and ensure workplace safety. TPH works with other levels of government when investigating reported health hazards related to occupational or environmental health (Table 2).

Occupational cancer risk factors are constantly evolving. Surveillance data contributes to identifying occupational risks. In 2023, Ontario identified recommendations to improve the province's occupational health and safety system.¹² Provincial data indicated that the four occupational carcinogens with the highest number of Ontario workers exposed and the largest impact on cancer burden were (in descending order) - solar radiation, asbestos, diesel engine exhaust, and crystalline silica.¹¹

Cancer and Equity

From 2010 to 2016, the incidence rate for all cancers combined in Ontario was higher in regions with higher material deprivation than in the least materially deprived neighbourhoods.¹³

Inequities in cancer outcomes exist in Canada, due to a higher prevalence of cancer risk factors, and barriers in accessing early diagnosis, consistent treatment, and supportive care.¹⁴ Specifically in Ontario neighbourhoods, access to initial screening, follow-up and retention in screening programs decreases as material deprivation and ethnic diversity increases.¹⁵ Similarly, while environmental factors influence overall cancer risk, exposure to cancer-causing agents, or to healthier environments that mitigate exposure, are not equitably distributed in communities.¹⁶ Available research indicates that exposures to these agents are generally greater among socially and/or economically disadvantaged populations.¹⁶

Assessing exposure to cancer-causing agents and cancer impacts is challenging. As a result, studies assessing inequitable environmental exposures and impacts on equity-deserving communities have focused largely on air pollution to the exclusion of other cancer causing agents exposures or environments.¹⁶

Toronto Public Health applies strategies consistent with the Toronto Public Health Strategic Plan priority to advance health equity. This includes monitoring evidence and data and collaborating to better understand the distribution of environmental cancer-causing agents in the city.

Local Prevention of Environment-Related Cancers

Addressing upstream exposures and preventing subsequent environmental cancers requires collective efforts from multiple levels of government and industry.

Environmental cancer prevention requires a population level approach. This means that environmental cancer risk reduction involves the use of strategies that were previously presented to the Board of Health ([2024.HL17.1](#)) such as health promotion, advocacy, monitoring of data and evidence, and enforcement. TPH strategies to reduce exposures to environmental substances that increase the risk of cancer include three main activities:

- 1) understanding the evidence of exposures and harms for Toronto residents,
- 2) applying evidence to identify ways to mitigate or reduce risks within the role and mandate of local public health and in collaboration with others, and
- 3) facilitating access to well-researched, clear information for the general public, equity-deserving populations, and stakeholders, to raise awareness of primary prevention measures.

Toronto Public Health Strategic Impact

This report provides an update on actions related to environment-related cancers and advances the following priorities of the [Toronto Public Health Strategic Plan 2024-2028](#):

- #2 Promote health and well-being across the lifespan.

- (a) Reduce the burden of chronic and infectious diseases across the lifespan.
- (d) Advocate for healthy social, natural, and built environments and collaborate with partners on initiatives that advance these goals.
- #4 Advocate to advance health equity.
 - (a) Assess and report on health inequities and population health needs.
 - (c) Share evidence, advocate, and collaborate to influence actions that impact population health.

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SIGNATURE

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