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Cancer Care Ontario

Prevention System Quality Index 2020

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Prevention System Quality Index 2020

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Data sources

- Alcohol and Gaming Commission of Ontario
- Centre for Addiction and Mental Health
- Liquor Control Board of Ontario
- Ontario Ministry of Education
- Ontario Ministry of the Environment, Conservation and Parks
- Ontario Ministry of Health
- Ontario Sun Safety Working Group
- Ontario Tobacco Research Unit
- Statistics Canada
- Local housing corporations: CityHousing Hamilton, Greater Sudbury Housing Corporation, Halton Community Housing Corporation, Housing York Inc., London & Middlesex Community Housing, Niagara Regional Housing, Ottawa Community Housing Corporation, Peel Living, Simcoe County Housing Corporation, The District of Thunder Bay Social Services Administration Board, Toronto Community Housing Corporation, Waterloo Region Housing and Windsor Essex Community Housing Corporation
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Foreword

The Prevention System Quality Index series monitors Ontario's progress on policies and programs that can reduce the prevalence of cancer risk factors and exposures in the population. The series is produced to inform the cancer prevention efforts of a wide range of stakeholders, including policy-makers, policy-influencers and program planners. *Prevention System Quality Index 2020* is the fourth report in the series. The first was released in 2015.

About half of all cancers can be prevented by reducing exposures to carcinogens in the environment and at work, and adopting healthy behaviours, such as not smoking, drinking less, eating healthier and being physically active. Targeting the major cancer risk factors may also reduce the burden of other chronic diseases, including diabetes, cardiovascular disease and chronic respiratory disease. This is because these major chronic diseases share the same risk factors as cancer. Chronic diseases are the leading cause of death in Ontario and cost the healthcare system $10.5 billion per year.[1]

The Prevention System Quality Index focuses on system-level policies and programs rather than on individual behaviour change. The policies and programs described in this report are from a variety of sectors, including health, education, manufacturing, transportation and the environment. To advance chronic disease prevention in Ontario, governments and their partners are encouraged to take a health in all policies approach by collaborating across different departments and ministries, and across different levels of government.

We look forward to working with our partners to advance chronic disease prevention in Ontario.

Linda Rabeneck, MD MPH FRCPC
Vice-President, Prevention and Cancer Control, Ontario Health (Cancer Care Ontario)

Table of Contents

Figures

Tables

Key findings

The Prevention System Quality Index reports on indicators of effective policies and programs for cancer prevention in Ontario. It identifies achievements and gaps in efforts to reduce cancer risk factors and exposures. *Prevention System Quality Index 2020* includes the following cancer risk factors and exposure domains: tobacco, alcohol, healthy eating, physical activity, ultraviolet radiation, environmental carcinogens, occupational carcinogens and infectious agents.

A limited number of indicators in *Prevention System Quality Index 2020* show improvements from previous reports in the Prevention System Quality Index series. Comprehensive strategies implemented across sectors and multiple levels of government can help achieve broader improvements in cancer prevention in Ontario.

Tobacco smoking

Tobacco taxation

The World Health Organization recommends that tobacco taxes make up 75 percent or more of the total retail price of tobacco.

- In 2018, taxes made up 65.3 percent of the average total retail price of cigarettes in Ontario.
- Opportunity: Increase tobacco taxes to at least 75 percent of the retail price.

Second-hand smoke exposure

There is no safe level of second-hand smoke exposure. Smoke-free laws and policies can protect people from second-hand smoke.

- During 2015–2016, 14.6 percent of adults and 29.7 percent of adolescents reported exposure to second-hand smoke every day or almost every day in public places in the past month.
- Opportunity: Increase awareness and enforcement of the Smoke-Free Ontario Act, and promote broader implementation of smoke-free policies.

Smoke-free policies in social housing

People who live in multi-unit housing (in particular, social housing) may be more likely to be exposed to second-hand smoke than people who live in single detached homes.

- As of January 2020, eight out of 13 social housing providers with 1,500 or more residential units had a smoke-free policy, providing protection for about 96,600 out of 225,200 residents.
- Opportunity: Increase the number of social and other multi-unit housing properties that have smoke-free policies.

Smoking cessation

A provincial-level focus on increasing the number of people who currently smoke and try to quit and their number of quit attempts may help increase the smoking cessation rate.

- In 2017, 48.1 percent of adults who smoke made one or more quit attempts in the past 12 months.
- During 2015–2017, 51.5 percent of adults reporting past daily or occasional smoking stopped smoking completely at least one year ago.
- Opportunity: Increase mass media campaigns to support quit attempts and expand funding for smoking cessation programs to ensure free access to counselling supports and pharmacotherapy.

Alcohol

Minimum price of alcohol

To achieve substantial reductions in drinking in Ontario, it is estimated that the minimum price for alcohol sold in retail stores should be $1.75 per standard drink (2019 dollars).

- As of March 2019, the minimum prices per standard drink for alcohol sold in retail stores ranged from $1.06 for beer to $1.55 for spirits.
- Opportunity: Increase the minimum price of alcohol sold in retail stores to $1.75 per standard drink (2019 dollars).

Alcohol availability

Privatization of alcohol retail stores and increasing the number of alcohol retail stores faster than the growth of a population in a given area may result in increased alcohol drinking.

- In 2019, 79.3 percent of alcohol retail stores were privately owned, which was an increase from 75.9 percent in 2015.
- In 2019, there were 2.5 alcohol retail stores for every 10,000 people age 15 and older, compared to 2.3 in 2015.
- Opportunity: Identify an appropriate limit for privatized alcohol retail stores and the number of alcohol retail stores based on the size of the population.

Healthy eating

Household food insecurity

Food insecurity reduces a household's ability to afford adequate food. Households with the lowest income are much more likely to experience food insecurity than households with the highest income.

- In 2017, 15.0 percent of households experienced some level of food insecurity.
- Opportunity: Implement provincial poverty reduction policies, including increasing the minimum wage and income supports to reduce household food insecurity.

Food literacy development in secondary schools

Food literacy development in schools – including learning how to choose and prepare healthy foods – can increase healthy eating among children and youth, shaping lifelong health.

- From 2005/06 to 2012/13, only about a third of students who started Grade 9 in each of these school years completed one or more credits that included food literacy during their secondary school education.
- Opportunity: Include at least one required credit that has a food literacy component as part of the Ontario secondary school curriculum.

Physical activity

Active transportation in adults and adolescents

People who regularly walk, bicycle or use other forms of active transportation report higher levels of overall physical activity.

- During 2015–2017, 48.0 percent of adults and 78.7 percent of adolescents ages 12 to 17 reported using active transportation in the previous week.

- Opportunity: Continue to develop provincial and municipal infrastructure, policies and plans that support active transportation.

Health and physical education specialist teachers in schools

Physical education specialists can improve the quality of physical education classes and increase the time students spend being physically active during class time.

- In the 2016/17 school year, 21.7 percent of elementary schools and 20.3 percent of secondary schools reported having at least one health and physical education specialist teacher.
- Opportunity: Increase the percentage of schools that have a health and physical education specialist teacher.

Enrolment in health and physical education courses

Physical education classes can increase overall physical activity in children and adolescents, and address a decrease in physical activity that occurs during adolescence.

- In the 2016/17 school year, 86.3 percent of students in Grade 9 earned a health and physical education credit, compared to 28.2 percent of students in Grade 12.
- Opportunity: Require health and physical education credits in every grade of secondary school.

Ultraviolet radiation

Shade policies

Most skin cancers are caused by exposure to ultraviolet radiation (UVR) from the sun or other sources, such as tanning beds. Built structures and dense tree canopies can provide shade and protect people from UVR exposure more reliably than sunscreen. Local municipalities in Ontario may require new developments or redevelopments provide shade.

- As of 2019, three local municipalities with a population of 100,000 or more have strong shade policies in their planning policy documents, which state that shade should be provided for a broad range of sites in new developments or redevelopments. The number of municipalities with a strong shade policy is unchanged from 2016.
- From 2016 to 2019, five municipalities added moderate shade policies to their planning policy documents, which state that shade should be provided for only a few types of sites.
- Opportunity: Strengthen municipal shade policies, and monitor the implementation and impact of these policies.

Tanning bed use in Ontario students in Grades 7 to 12

In 2014, the Ontario government enacted the Skin Cancer Prevention Act (Tanning Beds), 2013 to ban the sale and marketing of tanning services to youth under age 18.

- The results of a survey conducted one year after the Skin Cancer Prevention Act (Tanning Beds), 2013 came into effect showed no changes in tanning bed use for students in Grades 7 to 12, compared to the results of a similar survey conducted before the act came into effect (7.9 percent in 2015 versus 6.9 percent in 2014).
- Opportunity: Monitor tanning bed use in youth and increase enforcement of the Skin Cancer Prevention Act (Tanning Beds), 2013.

Environmental carcinogens

$PM_{2.5}$ concentrations in outdoor air

Fine particulate matter ($PM_{2.5}$) in outdoor air pollution increases the risk of lung cancer. There is no known safe level of exposure to $PM_{2.5}$.

- In 2017, annual average $PM_{2.5}$ concentrations ranged from 4.1 to 8.5 µg/m^3 at monitoring stations in Ontario. All average $PM_{2.5}$ concentrations were lower than the current Canadian Ambient Air Quality Standard of 8.8 µg/m^3.
- Opportunity: Continue to reduce $PM_{2.5}$ emissions from homes, transportation and industry.

Occupational carcinogens

Industrial nickel use and employment

Nickel compounds are a known cause of lung, nasal and sinus cancers. Nickel compounds are commonly found in fumes from welding.

- The number of facilities reporting nickel use and the total amount of nickel used decreased from 2013 to 2016. However, the total number of employees working at industrial facilities that reported using nickel increased during this same time period.
- Opportunity: Introduce ventilation requirements in Ontario's occupational health and safety legislation for welding activities.

Industrial formaldehyde use and employment

Formaldehyde is a widely used chemical. Formaldehyde exposure can cause cancer of the nasopharynx (a type of head and neck cancer) and leukemia, and may be a cause of sinus cancer.

- The amount of formaldehyde use reported in Ontario was lower in 2016 than the previous three years.
- The number of employees and the number of facilities reporting formaldehyde use were about the same from 2013 to 2016.
- Opportunity: Reduce the occupational exposure limit for formaldehyde to the level recommended by the Canadian Labour Code and American Conference of Governmental Industrial Hygienists.

Infectious agents

School-based human papillomavirus (HPV) and hepatitis B vaccination coverage

Human papillomavirus (HPV) and the hepatitis B virus are two infectious agents (viruses, bacteria and parasites) that are known to cause cancer. Publicly funded school-based vaccination programs for HPV and the hepatitis B virus are offered to students in Grade 7 in Ontario.

- At the end of the 2017/18 school year:
    - 59.9 percent of 12-year-old students received two doses of the HPV vaccine through the school-based program.
    - 69.2 percent of 12-year-old students received two doses of the hepatitis B vaccine through the school-based program.
- Opportunity: Support local public health agencies in increasing education for parents and students on the benefits and safety of vaccinations.

Introduction

Prevention System Quality Index 2020 is the fourth report of its kind from Cancer Care Ontario, a business unit of Ontario Health. The chapters in this report cover the eight cancer risk factors and exposure domains that make up the Prevention System Quality Index:

- tobacco;
- alcohol;
- unhealthy eating;
- physical inactivity;
- ultraviolet radiation;
- environmental carcinogens;
- occupational carcinogens; and
- infectious agents.

The Prevention System Quality Index provides evidence and data that can help policy-makers, policy-influencers and program planners in governments, non-governmental organizations and local public health agencies implement policies and programs to prevent cancer in Ontario. Chapters on each risk factor or exposure:

- provide a brief overview of the risk factor or exposure's link to cancer and burden in Ontario, such as its prevalence, economic cost and estimated number of cancers that it causes each year;
- examine policies and programs that can reduce the prevalence of the risk factor or exposure;
- report on indicators of policy and program implementation if data for Ontario are available; and
- highlight opportunities to reduce the risk factor or exposure in Ontario.

A new section, in the report called "Cancer prevention and Indigenous people" builds on the 2018 Prevention System Quality Index companion report that focused on health equity and Indigenous populations. The new section provides an overview of the health disparities that exist in Indigenous populations and shares information about prevention efforts taken by the Indigenous Cancer Care Unit at Ontario Health (Cancer Care Ontario) to address these inequities. It also highlights resources that provide more in-depth information about health inequities facing Indigenous populations.

Previous Prevention System Quality Index reports provide detailed descriptions of the approach and evidence that informs the indicators in *Prevention System Quality Index 2020* and can be referred to for further information. As with past reports, only significant indicator findings are described in *Prevention System Quality 2020*, but all findings are in the supplementary tables available online.

Policies and programs that are described in each chapter do not all have a corresponding indicator, because data to monitor these policies and programs in Ontario are not available. Data that are available and used for the indicators in the report have built-in limitations. These limitations include using administrative databases that do not provide a complete picture of what the indicators in this report aim to measure, such as the Ministry of Education's course enrolment data, or survey data that rely on self-reported behaviours such as Statistics Canada's Canadian Community Health Survey. Additional details on data limitations, indicator definitions and updated methodology are available online in the *Prevention System Quality Index 2020: Technical Appendix*.

The indicators in *Prevention System Quality Index 2020* show improvements in some domains. However, there are still many opportunities to improve cancer prevention in Ontario. Working with partners to implement comprehensive strategies across sectors and multiple levels of government can help achieve broader improvements in cancer prevention in Ontario.

Cancer prevention and Indigenous people

Cancer in Indigenous populations

Indigenous people in Ontario suffer disproportionately from chronic diseases. Research has shown they are more likely to have risk factors for cancer and other chronic diseases, including commercial tobacco use, alcohol use, unhealthy eating and physical inactivity than non-Indigenous people in Ontario. These health inequities are direct and indirect results of colonialism, colonial policies and other impacts on Indigenous people's social determinants of health.

- First Nations, Inuit and Métis populations have higher smoking rates, and Inuit and Métis people are more likely to be exposed to second-hand smoke than non-Indigenous people in Ontario.
- On-reserve First Nations adults and Inuit adults living in Inuit Nunangat (traditional Inuit homeland) are more likely to abstain from alcohol than non-Indigenous people in Ontario; however, First Nations, Inuit living in Inuit Nunangat and Métis populations have higher rates of binge drinking than non-Indigenous people in Ontario.
- First Nations adults on- and off-reserve have higher rates of inadequate vegetable and fruit consumption than non-Indigenous people in Ontario. First Nations adults are more likely to live in a food insecure household than non-Indigenous people in Ontario. Métis households also have higher rates of food insecurity. Inuit have lower rates of food security than non-Indigenous people in Ontario.
- On-reserve First Nations adults have higher rates of physical inactivity than non-Indigenous people in Ontario.
- The 2018 *Prevention System Quality Index: Health Equity* report highlighted the disproportionate burden of several cancer risk factors, higher cancer mortality rates, rising rates of cancer incidence and poorer cancer survival in Indigenous populations. Detailed information about cancer, cancer risk factors and screening for Indigenous people is available in the additional resources list on the next page.

Indigenous cancer prevention efforts

The Indigenous Cancer Care Unit at Ontario Health (Cancer Care Ontario) works to prevent cancer and other chronic diseases among Indigenous people through research and practice, and by partnering with Indigenous communities and organizations. Some examples of this work are highlighted below.

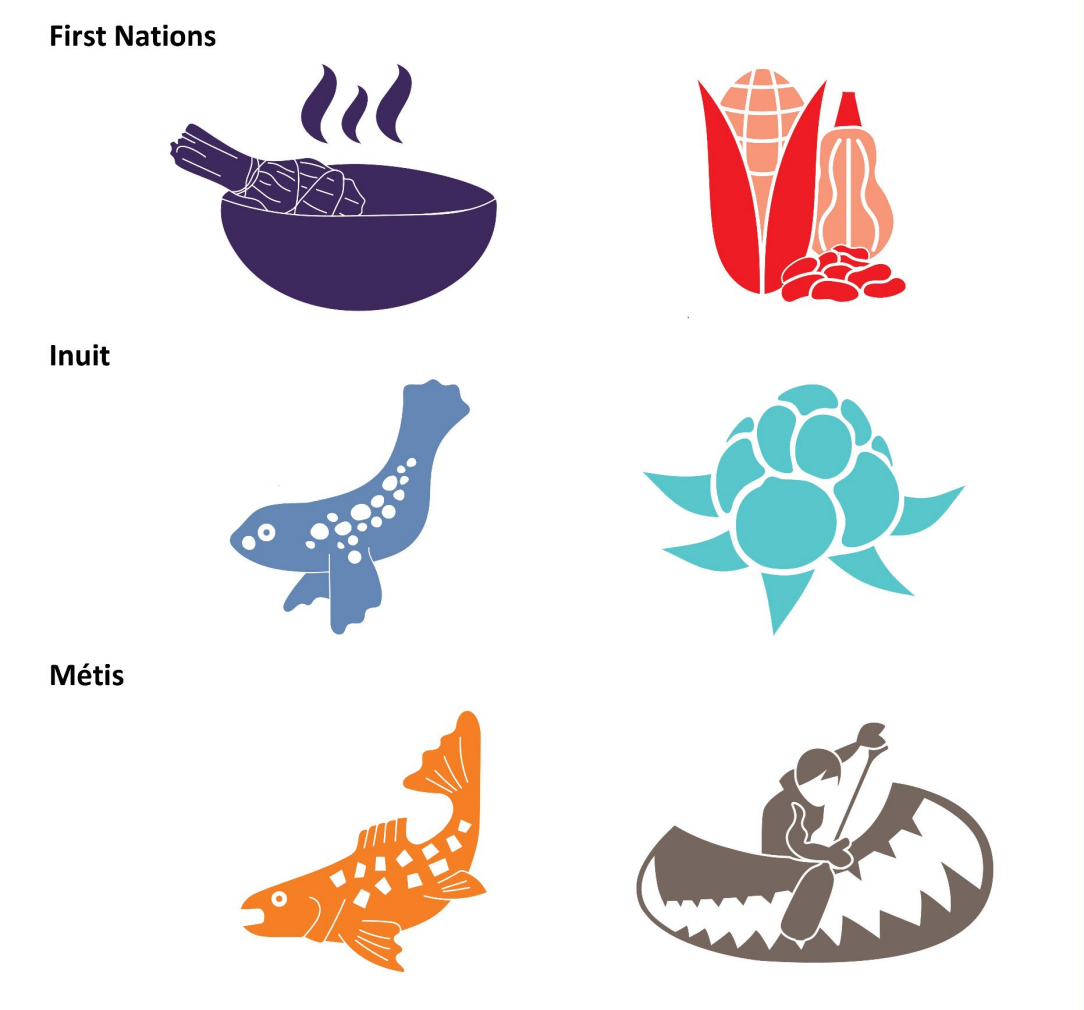
- **First Nations, Inuit, Métis and Urban Indigenous Cancer Strategy (2019–2023)**
  Ontario's fourth Indigenous Cancer Strategy is guided by the *Ontario Cancer Plan 5 (2019–2023)*, the Indigenous Cancer Care Unit, the Joint Ontario Indigenous Cancer Committee, Indigenous partners and the Regional Cancer Programs. Together, these groups will use the plan to reduce the risk of First Nations, Inuit, Métis and urban Indigenous people developing cancer, while improving their quality of care now and into the future.
- **Path to Prevention – Recommendations for Reducing Chronic Disease in First Nations, Inuit and Métis**
  The Path to Prevention report, published in 2016, provides the Ontario government with 22 evidence-based policy recommendations on reducing the prevalence of four key chronic disease risk factors in First Nations, Inuit and Métis communities: commercial tobacco use, alcohol consumption, physical inactivity and unhealthy eating.

- **Impact Assessment**
  In 2002, an Indigenous Cancer Care Unit needs assessment study suggested that cancer services did not meet the needs of Indigenous people in Ontario. A follow-up impact assessment is being conducted throughout the province to understand the changes that have been made in the cancer system, and the strengths and barriers that exist for First Nations, Inuit, Métis and urban Indigenous people. For more details or to provide comments on this project, please contact the Indigenous Cancer Care Unit at iccu@ontariohealth.ca.
- **Indigenous Relationship and Cultural Safety Courses**
  There are 13 Indigenous Relationship and Cultural Safety courses that are designed to empower those working with First Nations, Inuit and Métis peoples with the knowledge needed to provide culturally appropriate, person-centred care. The information is relevant to all Canadians because the courses promote greater awareness of First Nations, Inuit and Métis history, culture and the health landscape.
- **The Indigenous Tobacco Program**
  The Indigenous Tobacco Program is delivered through the Indigenous Cancer Care Unit. The program works with First Nations, Inuit, Métis and urban Indigenous partners to reduce and prevent commercial tobacco use and addiction. It aims to increase knowledge, build capacity and empower communities with the skills and tools needed to address commercial tobacco cessation, protection and prevention.
- **Educational infographics**
  The Indigenous Cancer Care Unit has worked with Indigenous partners to create educational infographics for First Nations, Inuit and Métis peoples, and healthcare providers. These infographics are found on the web pages in the resources listed below. They aim to increase cancer awareness and promote cancer prevention and screening using more relevant information and visual designs. Figure 1 shows a selection of icons that were developed for the infographics. These icons are related to specific Indigenous traditions and cultural activities.

Additional resources on cancer, cancer risk factors and screening for Indigenous people

- *Cancer in First Nations People in Ontario: Incidence, Mortality, Survival and Prevalence*
- *Cancer in First Nations in Ontario: Risk Factors and Screening*
- *Cancer in the Métis People of Ontario: Risk Factors and Screening Behaviours*
- *Cancer Risk Factors and Screening Among Inuit in Ontario and Other Canadian Regions*

Figure 1: Indigenous Cancer Care Unit icons used in educational infographics for cancer prevention



Source: Ontario Health (Cancer Care Ontario), Prevention and Cancer Control (Indigenous Cancer Care Unit)

Notes: First Nations traditional tobacco and Three Sisters (corn, squash and beans) icons: For many First Nations people, tobacco is a sacred plant that has spiritual and medicinal purposes. The recreational use of commercial tobacco (e.g., cigarettes) has no connection to First Nations spirituality. In many First Nations communities, the Three Sisters are traditional and central to maintaining a healthy diet.
Inuit seal and berries icons: Country food, including seal and berries, is an important source of healthy food for Inuit.
Métis fish and canoeing icons: Métis people traditionally consume fish for a healthy diet. Canoeing has played a central role in Métis cultural identity since the fur trade. It continues to be an important part of contemporary Métis culture and is an excellent way to be physically active.

Tobacco smoking

Tobacco smoking and cancer risk

Smoking tobacco increases the risk of lung cancer and almost 20 other types of cancer.[2] Exposure to second-hand tobacco smoke also increases the risk of lung cancer.[3] Someone's cancer risk increases with the number of years they have smoked, the number of cigarettes they smoked on average each day (starting at as little as one cigarette a day or with non-daily smoking) and how much they have been exposed to second-hand smoke.[2,3] In addition, chewing tobacco and other tobacco products are known to cause oral, esophageal and pancreatic cancers.[2]

Tobacco smoking in Ontario

During 2015–2017, 17.7 percent of adults age 20 and older in Ontario reported that they currently smoke tobacco every day or occasionally (Supplementary Table S1). Current smoking is more common in adults with lower household income (Supplementary Table S1) and in men than in women (Supplementary Table S1).

Direct healthcare costs of tobacco smoking in Ontario are estimated at $2.7 billion per year in 2018 dollars, and indirect health costs, such as lost productivity, are estimated at $4.2 billion.[1]

> Vaping and risk of cancer and other chronic diseases
>
> There are growing concerns about vaping's health impacts, which include nicotine dependence, exposure to toxic chemicals and risk of serious lung illnesses. The risks of developing cancer, cardiovascular disease and other chronic health issues from vaping are unknown or emerging.
>
> Vaping risks and policies and programs that address vaping are out of scope for this Prevention System Quality Index. More information on the health impacts of vaping and vaping policies in Ontario can be found in *Vaping products including e-cigarettes*, which is available from the Guidelines and Advice section of the Ontario Health (Cancer Care Ontario) website.

Policies and programs to reduce tobacco smoking

Policies and programs to reduce tobacco smoking are more effective when they are part of a comprehensive program for tobacco control.[4,5] A comprehensive tobacco control program includes policies and programs that:

- tax tobacco products;
- restrict how tobacco products may be sold;
- protect people from second-hand smoke exposure;
- help people quit smoking;
- prevent youth from starting to smoke;
- increase public awareness of the harms of tobacco products; and
- monitor tobacco use and evaluate tobacco control policies and programs.[4,5]

Many of the above policies are currently being implemented under the province's comprehensive strategy on tobacco control, Smoke-Free Ontario.[6]

Tobacco taxation

EVIDENCE FOR INCREASING TOBACCO TAXES

Increasing taxes on tobacco to raise its overall price is the most effective policy for reducing tobacco use.[7] In high-income countries, when tobacco prices increase, tobacco use decreases most among people with lower socio-economic status and may therefore reduce health inequities.[8-11]

The World Health Organization recommends that tobacco taxes make up 75 percent or more of the total retail price of tobacco.[12] For tax rates that are set according to the amount of tobacco, such as per cigarette, tax increases should follow the rate of inflation to remain effective.[12]

TOBACCO TAXES IN ONTARIO

Tobacco taxes in Ontario include federal and provincial excise and sales taxes. Excise taxes are added to the price from the manufacturer, and for tobacco products, they are set according to the amount of tobacco being sold. The last increase in excise tobacco taxes at the federal level took effect on April 1, 2019, and the tax rate was set at about 12¢ a cigarette.[13] At the provincial level, the last increase in the excise tax took effect on March 29, 2018, and the tax rate was set at about 18¢ a cigarette.[14]

INDICATOR FINDINGS: TAX AS A PERCENTAGE OF TOBACCO RETAIL PRICE

This indicator is based on the World Health Organization's recommendation that tobacco taxes make up at least 75 percent of its retail price. It looks at the average total retail price of tobacco in Ontario, and the percentage that is made up by provincial and federal taxes (Table 1, Supplementary Table S2). This indicator uses the annual average price at the provincial level for 2018 from Statistics Canada. It also compares Ontario's percentage to the percentage in the other provinces and the three territories in Canada.

- In 2018, provincial and federal taxes made up 65.3 percent of the annual average total retail price of tobacco in Ontario (Table 1, Supplementary Table S2), which is the fifth lowest in Canada out of the 10 provinces and three territories.
- Taxes would need to rise by $43.80 per carton of 200 cigarettes from 2018 levels to make up 75 percent of the retail price.
- The average total retail price of tobacco in Ontario is the second lowest in Canada after Quebec (Table 1, Supplementary Table S2).

Table 1: Tobacco taxes as a percentage of average total retail price per carton of 200 cigarettes, by province or territory, 2018

Province or territory	Pre-tax price ($)	Total taxes ($)	Average total retail price ($)	Tax as a percentage of total retail price (%)
British Columbia	36.31	92.67	128.97	71.9
Manitoba	40.74	98.92	139.66	70.8
Nova Scotia	41.66	96.97	138.64	69.9
Saskatchewan	39.79	90.79	130.58	69.5
Quebec	29.28	66.07	95.35	69.3
Newfoundland and Labrador	39.79	89.75	129.53	69.3
Prince Edward Island	42.08	91.24	133.32	68.4
New Brunswick	45.60	92.96	138.56	67.1
Ontario	39.20	73.80	113.01	65.3
Alberta	43.52	79.72	123.24	64.7
Yukon	49.68	90.53	140.21	64.6
Nunavut	54.42	90.76	145.18	62.5
Northwest Territories	57.73	91.77	149.50	61.4

Sources: Total taxes retrieved from provincial and territorial government websites for the tobacco taxes in effect or announced in 2018.
Average Annual Retail Price (after tax) of Cigarette Cartons, custom report (Statistics Canada).

Notes: Data are presented in Supplementary Table S2. Download supplementary tables at cancercareontario.ca/PSQI. Total retail price data represent a simple standardized unit price of cigarette cartons across geographies recorded by the Consumer Price Index. Users are advised to exercise caution when comparing to the official (weighted) average prices table released by Statistics Canada because the calculation methods are different. Average prices should not be used as a measure of pure price change through time because the product and outlet sample can vary from month to month.

Tobacco availability

EVIDENCE FOR LIMITING TOBACCO AVAILABILITY

Quitting smoking may be more difficult among people who live close to a store that sells tobacco (e.g., convenience stores) and in neighbourhoods that have a higher number of these stores.[15,16] When youth live in neighbourhoods with a higher number of stores that sell tobacco, they are more likely to smoke.[17] The Institute of Medicine in the United States and the World Health Organization recommend policies limiting access to stores that sell tobacco.[5,18] Requiring permits or licenses to sell tobacco may prevent illegal sales, and increasing permit and license fees could reduce the overall number of stores that sell tobacco.[19]

TOBACCO AVAILABILITY IN ONTARIO

A study examining the number of retail stores that sell tobacco in Ontario estimated that there were 9,725 stores in June 2017.[19] A previous Ontario study, using data from June 2011, found neighbourhoods with low socio-economic status in urban and rural areas were more likely to have stores selling tobacco.[20]

The Smoke-Free Ontario Act prohibits the sale of tobacco products in pharmacies, healthcare and residential care facilities, university and college campuses, and vending machines.[21]

In addition, tobacco retailers require a provincial permit to sell tobacco in Ontario.[22] The provincial permit is issued without a fee or the need for renewal.[23] A small number of cities in Ontario charge retailers a licensing and renewal fee to sell tobacco.[24] As of February 2018, the fees range from about $30 in Hearst to $893 in Ottawa.[24]

Second-hand smoke exposure

EVIDENCE FOR POLICIES AND PROGRAMS TO REDUCE SECOND-HAND SMOKE EXPOSURE

There is no safe level of second-hand smoke exposure.[3] Smoke-free laws and policies protect people from second-hand smoke and can reduce overall smoking rates.[25-27]

POLICIES AND PROGRAMS TO REDUCE SECOND-HAND SMOKE EXPOSURE IN ONTARIO

The Smoke-Free Ontario Act, 2017 bans smoking in a number of places, such as:

- enclosed workplaces and public places that are covered by a roof;
- indoor common areas of apartment and condominium buildings, such as hallways, parking garages and party rooms;
- in vehicles when children under 16 are present; and
- several types of outdoor areas, such as bar and restaurant patios, playgrounds, sports fields and hospital grounds, as well as public areas that are within nine metres of patios and hospital entrances and exits and 20 metres of playgrounds and schools.[21]

Many cities in Ontario have bylaws that ban smoking in more types of places, particularly property owned by the city, such as public parks.[28] As of 2017, 65 municipalities had smoke-free municipal by-laws that go beyond the Smoke Free Ontario Act requirements.[19]

INDICATOR FINDINGS: SECOND-HAND SMOKE EXPOSURE IN ADULTS

- During 2015–2016, adults in Ontario were more likely to report being exposed to second-hand smoke every day or almost every day in public places (14.6 percent) than in private vehicles (3.7 percent) or at home (2.9 percent) (Supplementary Table S3).

- Adults in the highest income quintile were less likely to be exposed to second-hand smoke every day or almost every day in public places, vehicles and at home than adults in the lowest income quintile (Supplementary Table S3).

INDICATOR FINDINGS: SECOND-HAND SMOKE EXPOSURE IN ADOLESCENTS

- During 2015–2016, adolescents most commonly reported being exposed to second-hand smoke every day or almost every day in public places (29.7 percent), followed by at home (9.0 percent) and in private vehicles (6.0 percent) (Supplementary Table S4).
- Adolescents from the highest income quintile were less likely to be exposed to second-hand smoke every day or almost every day at home and in public places than adolescents in the lowest income quintile (Supplementary Table S4).

INDICATOR FINDINGS: SMOKE-FREE POLICIES IN SOCIAL HOUSING

This indicator looks at the number of social housing providers or local housing corporations in Ontario that have implemented a smoke-free policy across all of their properties. Only local housing corporations that have 1,500 or more residential units were assessed.

Social housing in Ontario is primarily multi-unit housing, such as apartment buildings. The Smoke-Free Ontario Act does not ban smoking in private units or outdoor areas of multi-unit housing.[21]

People who live in multi-unit housing may be more likely to be exposed to second-hand smoke than people who live in single detached homes.[29] Tobacco smoke may come from other units and outdoor areas into their unit and common areas.[29] People who live in social housing are especially vulnerable because they are less able to find new housing when experiencing second-hand smoke exposure at home.

- As of January 2020, eight out of 13 local housing corporations with 1,500 or more residential units had a smoke-free policy that applied to all of their properties (Table 2, Supplementary Table S5).
- Three local housing corporations have introduced smoke-free policies since the Prevention System Quality Index 2018 report, increasing the number of people covered by smoke-free policies by about 31,800.

Table 2: Smoke-free policies in local housing corporations with 1,500 or more residential units, Ontario, 2020

Local housing corporation (approximate number of units)	Approximate number of residents	Has the local housing corporation implemented a smoke-free policy for all properties?
Toronto Community Housing Corporation (60,000)	**110,000**	No
Ottawa Community Housing Corporation (15,000)	**32,000**	Yes: Ottawa Community Housing No-Smoking Policy. Effective May 31, 2014.
Peel Living (6,900)	**15,600**	Yes: Peel Living Smoke-Free Living Policy. Effective November 1, 2018.
CityHousing Hamilton (7,100)	**14,000**	Yes: CityHousing Hamilton Corporation Smoke-Free Living Policy. Effective January 1, 2020.
Windsor Essex Community Housing Corporation (4,700)	**12,000**	Yes: Smoke-free policy Windsor Essex Community Housing Corporation**.** Effective January 1, 2018.
Waterloo Region Housing (2,720)	**11,800**	Yes: Waterloo Region Housing Smoke-Free Policy. Effective April 1, 2010.
London & Middlesex Community Housing (3,280)	**5,000**	No
Niagara Regional Housing (2,840)	**5,000**	No
The District of Thunder Bay Social Services Administration Board (2,480)	**5,000**	Yes: The District of Thunder Bay Social Services Administration Board Housing Services Smoke-Free Policy. Effective September 1, 2015.
Greater Sudbury Housing Corporation (1,850)	**4,500**	No
Halton Community Housing Corporation (2,190)	**4,100**	No
Housing York Inc. (2,600)	**4,000**	Yes: Smoke-Free Policy for Housing York Inc. Effective November 1, 2014.
Simcoe County Housing Corporation (1,600)	**2,200**	Yes: Simcoe County Housing Corporation Non-Smoking Policy. Effective November 13, 2018.

Sources: Local housing corporations

Notes: Details about the smoke-free policies are presented in Supplementary Table S5. Download supplementary tables at cancercareontario.ca/PSQI. The presence of a smoke-free policy at each local housing corporation was determined by reviewing their websites and contacting the corporation to verify what was found.

Smoking cessation

EVIDENCE FOR SMOKING CESSATION INTERVENTIONS

Many people who smoke make 30 or more attempts to quit before they successfully stop smoking.[30] A provincial-level focus on increasing the number of people who smoke who try to quit and their number of quit attempts may help increase the smoking cessation rate.[31]

Smoking cessation services include counselling and pharmacotherapy, such as nicotine replacement therapy (NRT) or prescription medications (i.e., bupropion and varenicline). Fully covering the costs of services may increase the likelihood that people who smoke try to quit, use smoking cessation treatments and succeed in quitting.[32] Financial supports could help people with lower incomes, which is especially important because smoking is more common among people with lower incomes in Ontario (Supplementary Table S1).

Tobacco taxes, smoke-free laws and mass media campaigns may also increase or support the success of quit attempts.[33-37] However, mass media campaigns may be less effective for people with low socio-economic status,[38] so other efforts should be implemented alongside mass media campaigns to prevent increased health inequities.

SMOKING CESSATION PROGRAMS IN ONTARIO

Ontario funds many provincial-level smoking cessation programs, including:

- a free quitline or telephone support service, through Telehealth Ontario;[39]
- free digital support services, through the Canadian Cancer Society's Smokers' Helpline;[40]
- the Pharmacy Smoking Cessation Program, which provides pharmacist-assisted counselling for Ontario Drug Benefit Program recipients,[41] and coverage for 12 weeks of bupropion and varenicline;[42]
- the Smoking Treatment for Ontario Patients (STOP) Program, which provides free NRT combined with counselling support through participating organizations;[43]
- the Ottawa Model for Smoking Cessation, which is a program that supports implementing systematic and coordinated smoking cessation services in healthcare settings;[44] and
- smoking cessation initiatives for new cancer patients in the Regional Cancer Programs, supported by Ontario Health (Cancer Care Ontario).[45]

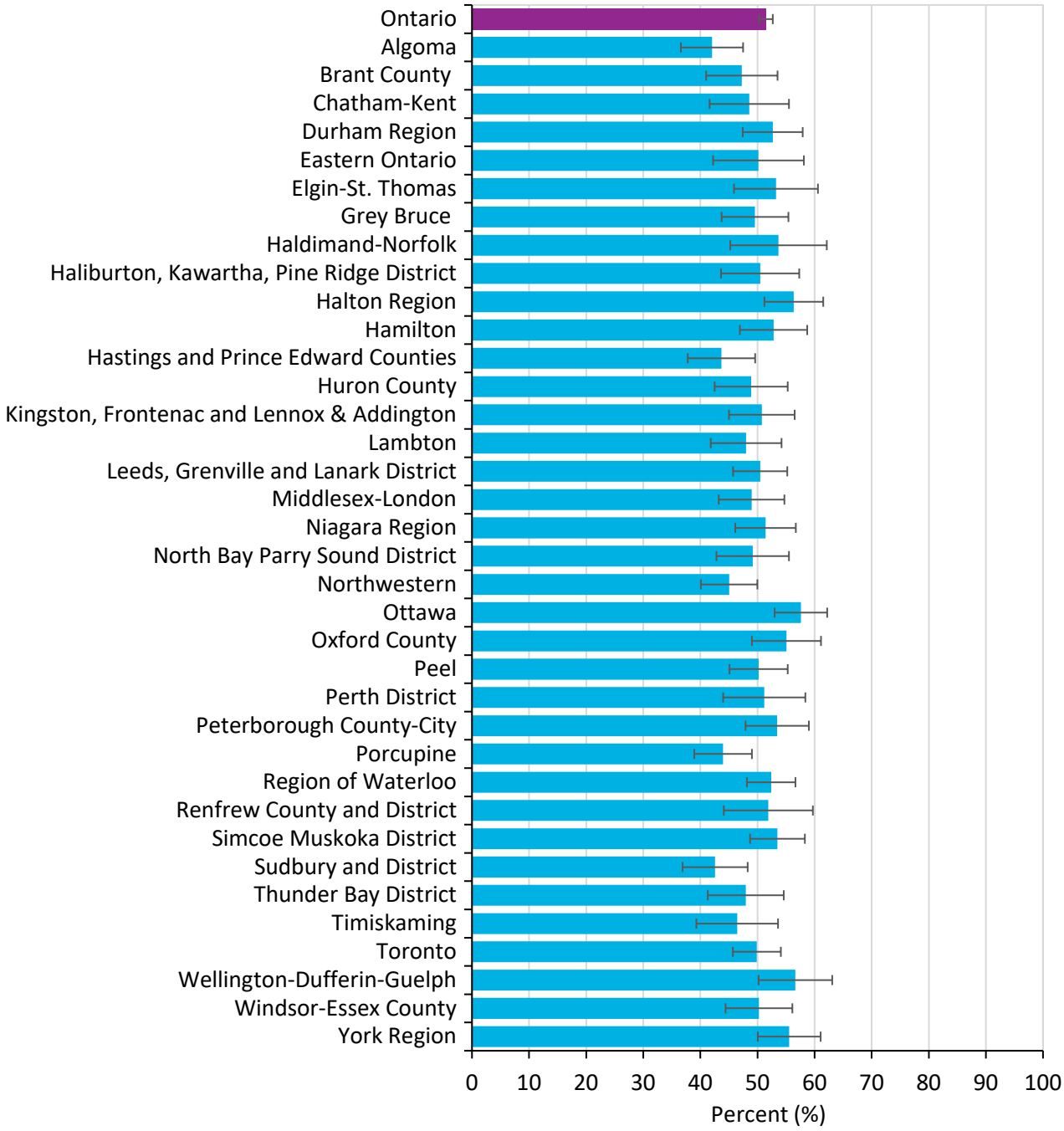
About 18 percent of adults who smoke in Ontario make use of provincial cessation support services each year.[19] Mass media campaigns could help promote and increase the use of these services. Some programs have eligibility criteria that limit their use. Additional investments in these services could increase access for all people who smoke in Ontario.

INDICATOR FINDINGS: QUIT ATTEMPTS

- In 2017, 48.1 percent of adults who smoke made one or more attempts to quit smoking in the past 12 months (Supplementary Table S6). This percentage remained stable from 2000 to 2017.[19] Additional analyses by age, income, education level, region in Ontario, residence, immigration status and sexual orientation are provided in Supplementary Table S6.

- During 2015–2017, 51.5 percent of adults reporting past daily or occasional smoking reported that they quit smoking completely at least one year ago (Figure 2, Supplementary Table S7).
- Ottawa (57.6 percent), Wellington-Dufferin-Guelph (56.6 percent) and York Region (55.6 percent) public health units had the highest rates of long-term smoking cessation (Figure 2, Supplementary Table S7). The lowest long-term smoking cessation rates were in the public health units of Algoma (42.0 percent), Sudbury and District (42.6 percent), and Hastings and Prince Edward Counties (43.7 percent).
- The likelihood of long-term cessation varied across income levels (Supplementary Table S8). Adults in the highest income quintile were significantly more likely to report long-term smoking cessation (60.8 percent) than adults in the lowest income quintile, who were the least likely to report long-term smoking cessation (37.0 percent) (Supplementary Table S8). Using income as a measure of socio-economic status may therefore help in understanding differences in achieving long-term smoking cessation.

Figure 2: Percentage of adults (age 20 and older) reporting past daily or occasional smoking, who stopped smoking completely at least 1 year ago, by public health unit, Ontario, 2015–2017 combined



Source: Canadian Community Health Survey, 2015–2017 (Statistics Canada)

Notes: Data are presented in Supplementary Table S7. Download supplementary tables at cancercareontario.ca/PSQI. Estimates are adjusted to the age distribution of the 2011 Canadian population.

Opportunities to reduce tobacco smoking

- Increase tobacco prices through taxation so that taxes make up at least 75 percent of the retail price.
- Implement policies that reduce the availability of tobacco in Ontario, such as requiring fees and renewals for permits and licenses to sell tobacco.
- Increase public awareness and enforcement of the Smoke-Free Ontario Act, and promote broader implementation of smoke-free policies.
- Increase the number of social and other multi-unit housing properties that have smoke-free policies.
- Increase mass media campaigns, alongside other efforts, to support quit attempts.
- Expand funding for smoking cessation programs to ensure free access to counselling supports and pharmacotherapy.

Alcohol

Alcohol drinking and cancer risk

Drinking alcohol increases the risk of oral, pharyngeal, esophageal, laryngeal, colorectal, liver, pre- and post-menopausal breast, and stomach cancers.[46] The more people drink, the greater their cancer risk.[46] For some cancers, any amount of alcohol increases risk.[46]

Cancer prevention guidelines

Recommendations from the World Cancer Research Fund and the American Institute for Cancer Research state that not drinking any alcohol is best for cancer prevention.[47] Several cancer organizations in Canada, including the Canadian Partnership Against Cancer, the Canadian Cancer Society and Ontario Health (Cancer Care Ontario), use a limit of no more than two drinks a day for men and no more than one drink a day for women when measuring cancer risk due to alcohol intake at the population level.[48-50]

Alcohol drinking in Ontario

During 2015–2017, 8.5 percent of adults in Ontario age 19 and older reported drinking more alcohol than the limits identified for cancer prevention (Supplementary Table S9). People in Ontario who live in higher income households are more likely than those who live in lower income households to exceed the limits (Supplementary Table S9). However, at similar and lower levels of drinking, groups with low socio-economic status experience more alcohol-related harms, such as hospitalizations, than those with high socio-economic status.[51-53]

Direct healthcare costs of alcohol drinking in Ontario are estimated at $1.6 billion per year in 2018 dollars, and indirect health costs, such as lost productivity, are estimated at $2.9 billion.[1]

Policies to reduce alcohol drinking

International, national and provincial organizations recommend a cross-sectoral strategy that includes a broad set of policies aimed at reducing alcohol drinking.[54-56] Policies should increase the price, reduce the availability and restrict the marketing of alcohol, and increase access to treatment for people who drink at moderate risk and high risk levels.[54-56] These types of policies were highlighted in the findings of federal government consultations for the Canadian Drugs and Substances Strategy that were published in July 2019.[57]

Alcohol pricing

EVIDENCE FOR INCREASING THE PRICE OF ALCOHOL

Raising the price of alcohol through taxes and setting minimum prices reduces alcohol drinking.[58-60] Estimates suggest that low-income heavy drinkers experience the largest reduction in drinking as a result of setting minimum prices.[61-63] Based on an internationally cited modelling study, the minimum price needed to see substantial reductions in drinking in Ontario would be $1.75 in 2019 dollars per standard drink or 17.05 millilitres of pure alcohol, which is equal to about 43 millilitres (1.5 fluid ounces) of spirits, 142 millilitres (5 fluid ounces) of wine or 341 millilitres (12 fluid ounces) of beer.[64]

ALCOHOL PRICING IN ONTARIO

Each year, the Liquor Control Board of Ontario (LCBO) publishes minimum prices at which alcohol may be sold in retail stores authorized to sell alcohol.[65] Legislation requires annual adjustments to the

minimum prices based on Statistics Canada's Consumer Price Index for Ontario, which measures changes in prices for all items in the province.[65]

However, in 2018, the Ontario government reduced the minimum price of beer with less than 5.6 percent alcohol by volume from $1.35 per standard drink to $1.06 (Supplementary Table S10). Further increases in the basic beer tax were also cancelled at that time and legislation was passed to no longer require annual adjustments to this tax.[66] Increasing the minimum prices of alcoholic beverages sold in alcohol retail stores to $1.75 (2019 dollars) and reinstating increases on the basic beer tax could support a decrease in drinking alcohol.

INDICATOR FINDINGS: MINIMUM PRICE OF ALCOHOL

- Based on prices published by the Liquor Control Board of Ontario (LCBO) in March 2019, the minimum prices for alcohol sold in alcohol retail stores in Ontario, calculated per standard drink, ranged from $1.06 (calculated per standard drink) for lower alcohol-content beer to $1.55 for spirits (Supplementary Table S10).
- None of these prices reached the estimated minimum price needed to see substantial reductions in drinking in the population ($1.75 per standard drink in 2019 dollars).
- The minimum prices per standard drink have had small increases, but have remained under the recommended amount since at least 2013 (Supplementary Table S10).

Alcohol availability

EVIDENCE FOR LIMITING ALCOHOL AVAILABILITY

Privatization of alcohol retail stores may result in increased alcohol drinking.[67] In addition, increasing the density of alcohol retail stores (the number of alcohol retail stores relative to the size of a population) in a neighbourhood or geographic area may result in more drinking in that neighbourhood or geographic area.[68-71] An increase in the density of alcohol retail stores has been associated with increases in heavier drinking or alcohol-related harms in Ontario, the United States, Scotland, Wales, New Zealand and Australia, with greater increases in neighbourhoods with lower socio-economic status than in neighbourhoods with higher socio-economic status.[53,72-80]

ALCOHOL RETAIL STORE PRIVATIZATION AND DENSITY IN ONTARIO

The provincial government owns a portion of the retail stores that sell alcohol in Ontario through its network of Liquor Control Board of Ontario (LCBO) stores. Most alcohol retail stores in Ontario are privately owned.

Beginning in December 2015, the Ontario government expanded the sale of beer, cider and wine to grocery stores.[81] Before December 2015, alcohol retail sales were only available in dedicated retail stores, except for a limited number of stores in rural areas and small wine kiosks in grocery stores. One study that assessed data from 2014 to 2017 suggested that neighbourhoods in Ontario that introduced alcohol sales in grocery stores saw a greater increase in visits to hospital emergency departments due to alcohol use than neighbourhoods that did not.[82]

As of December 2019, 450 grocery stores have licenses to sell beer and cider, and 150 of these stores can sell wine.[83] In addition, the Ontario government has committed to expanding the number of retail stores where alcohol can be sold, which will likely further increase privatization and the density of stores.[83] Ontario does not have provincially set limits on the density (per capita or geographic) of places where alcohol may be sold, including retail stores and bars and restaurants.[54]

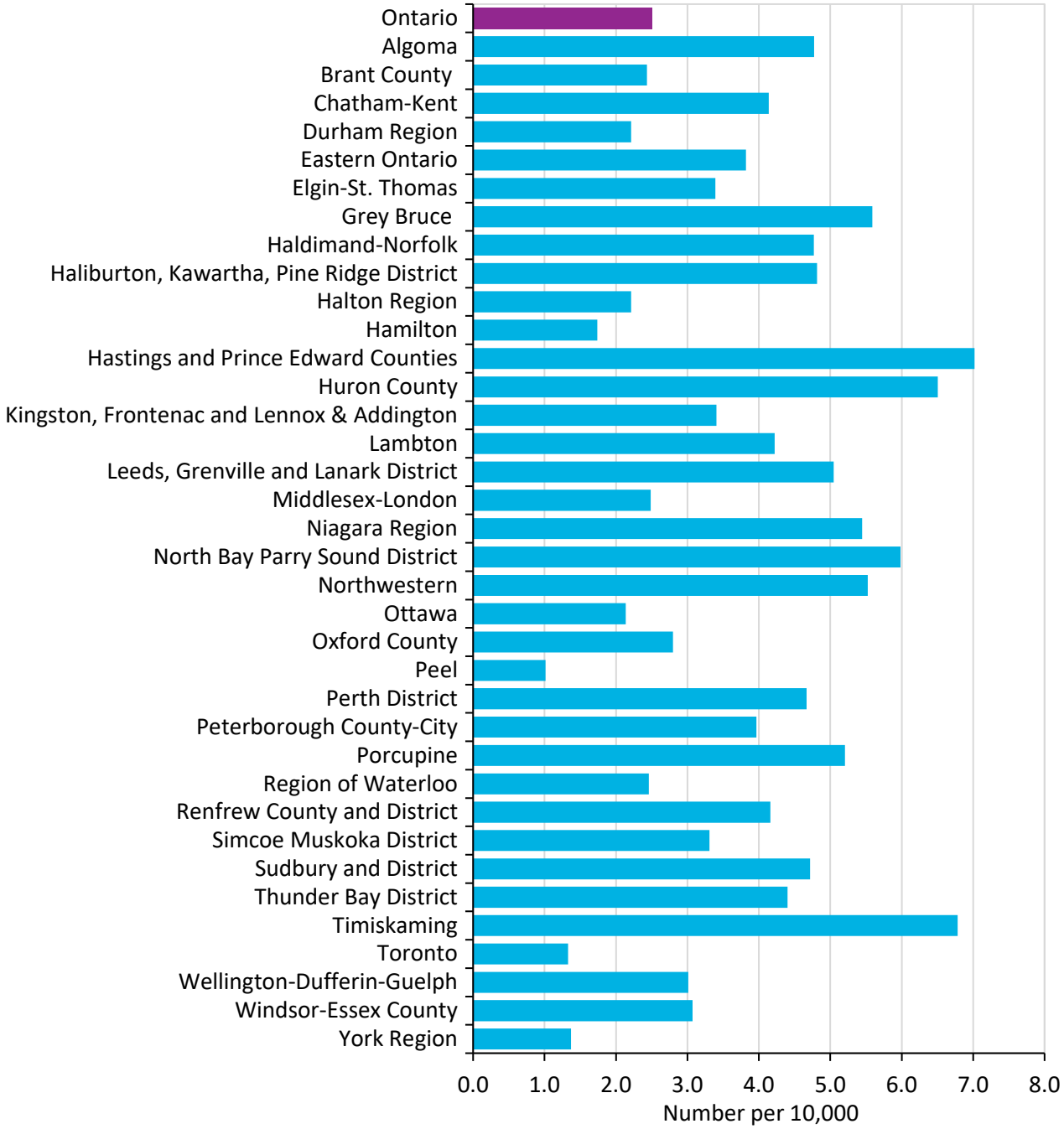
INDICATOR FINDINGS: PRIVATE ALCOHOL RETAIL STORES

- In 2019, 79.3 percent of alcohol retail stores in Ontario were privately owned (Supplementary Table S11). This is an increase of 3.4 percentage points from 75.9 percent in December 2015.
- The percentage of alcohol retail stores that were private varied across public health units in the province (Supplementary Table S11). From December 2015 to January 2019, the percentage of private alcohol retail stores increased in all public health units except for Hastings and Prince Edward Counties, Timiskaming and Northwestern.

INDICATOR FINDINGS: ALCOHOL RETAIL STORE DENSITY

- In January 2019, the density of alcohol retail stores in Ontario was 2.5 stores for every 10,000 people age 15 and older (Figure 3), compared to 2.3 stores for every 10,000 people age 15 and older in December 2015 (Prevention System Quality Index 2016 data).
- From December 2015 to January 2019, there were changes in the density of alcohol retail stores for a number of public health units (Figure 3, Supplementary Table S12 and Prevention System Quality Index 2016 data). However, additional years of data are required to assess trends in the density of alcohol retail stores.

Figure 3: Number of alcohol retail stores per 10,000 people (age 15 and older), by public health unit, Ontario, January 2019



Sources: The Beer Store, Alcohol and Gaming Commission of Ontario, Liquor Control Board of Ontario. Population estimates, Ministry of Finance, 2019 (Statistics Canada).

Notes: Data are presented in Supplementary Table S12. Download supplementary tables at cancercareontario.ca/PSQI. Alcohol retail stores are also called off-premises alcohol outlets and are places where people buy alcohol to drink elsewhere. Alcohol retail stores include publicly and privately owned stores.

Alcohol marketing, promotion and advertising

EVIDENCE FOR REGULATING ALCOHOL MARKETING, PROMOTION AND ADVERTISING

Alcohol marketing, promotion and advertising have been associated with increased alcohol drinking in youth.[84-87] The World Health Organization recommends that governments regulate the content and volume of alcohol marketing, and regulate direct and indirect marketing in all media and sponsorship activities.[88] In addition, governments should establish independent public agencies and systems to monitor alcohol marketing and enforce restrictions.[88]

ALCOHOL MARKETING, PROMOTION AND ADVERTISING IN ONTARIO

In Ontario, alcohol advertising regulations are overseen by the Canadian Radio-television and Telecommunications Commission and the Alcohol and Gaming Commission of Ontario.[54] Current regulations do not align with the World Health Organization's recommendations. For example, there are few restrictions on the volume of alcohol advertising, online promotion and sponsorships that may target youth and young adults.[89] Increasing regulations would help meet international recommendations.

Treating moderate risk and high risk drinking

EVIDENCE FOR TREATING MODERATE RISK AND HIGH RISK DRINKING

Screening for moderate risk and high risk alcohol drinking in primary care and providing brief counselling or intervention and referrals to appropriate alcohol treatment can be a cost-effective strategy for lowering alcohol use in adults with moderate to high risk drinking.[90-92] Hospitals may also be an important setting for screening and brief interventions.[93] However, brief interventions for populations facing health inequities may result in less successful outcomes because they are more likely to experience barriers to accessing appropriate supports.[94]

TREATING MODERATE RISK AND HIGH RISK DRINKING IN ONTARIO

Many Canadians with moderate risk drinking, high risk drinking or alcohol use disorders experience barriers in accessing appropriate treatment because of the limited availability of services, stigma towards alcohol use disorders and financial barriers.[95,96] To help address these barriers, the Ontario government has committed to investing in mental health and addictions services and treatment.[97] Increasing the delivery of screening, brief interventions and referrals in healthcare settings and access to government-funded alcohol treatment services could help reduce alcohol drinking in Ontario.

Opportunities to reduce alcohol drinking

- Increase the minimum price of alcoholic beverages in alcohol retail stores to $1.75 per standard drink (2019 dollars) and reinstate taxes on beer.
- Identify an appropriate limit for privatized alcohol retail stores and density of alcohol retail stores in Ontario.
- Monitor the effects of increased alcohol retail store privatization and density on levels of alcohol drinking.
- Enforce existing and increase alcohol advertising regulations so they align with the recommendations of the World Health Organization.
- Increase delivery of screening, brief interventions and referrals in healthcare settings.
- Increase access to government-funded alcohol treatment services for the population, with additional resources tailored to people facing health inequities.

Healthy eating

Foods and cancer risk

Healthy eating can protect against several cancers:

- Non-starchy vegetables and fruit likely reduce the risk of upper respiratory and digestive tract cancers.[98]
- Whole grains and foods high in dietary fibre likely reduce the risk of colorectal cancer.[98]
- Processed meat is known to increase the risk of colorectal cancer and it is likely that red meat increases the risk of colorectal cancer.[99]
- Foods preserved with salt increase the risk of stomach cancer.[100]

Healthy eating recommendations

The World Cancer Research Fund recommends eating at least five servings of non-starchy vegetables and fruit every day, and having whole grains and legumes in most meals.[101] Canada's Food Guide recommends limiting highly processed foods and eating mostly plant-based foods, specifically vegetables, fruit, whole grains and protein from plants.[102] It states that adults and adolescents should try to eat vegetables and fruit at every meal and snack.[103,104] Eating vegetables and fruit more often is a marker of a better overall diet.[105]

Healthy eating in Ontario

During 2015–2017, 77.1 percent of adults in Ontario age 18 and older reported that they ate vegetables and fruit fewer than five times a day (Supplementary Table S13). Eating vegetables and fruit five times a day is the frequency used by Statistics Canada to measure healthy eating.[106]

More adults in lower income households in Ontario (82.0 percent) reported eating vegetables and fruit fewer than five times a day than adults in higher income households (74.7 percent) (Supplementary Table S13).

Also during 2015–2017, 79.4 percent of adolescents in Ontario ages 12 to 17 reported eating vegetables and fruit fewer than five times a day (Supplementary Table S14).

More adolescents in lower income households in Ontario (82.7 percent) reported eating vegetables and fruit fewer than five times a day than adolescents in higher income households (72.8 percent) (Supplementary Table S14).

Direct healthcare costs of unhealthy eating in Ontario are estimated at $1.9 billion a year in 2018 dollars. Indirect health costs, such as lost productivity, are estimated at $3.7 billion.[1] Direct healthcare costs of low vegetable and fruit intake are estimated at $584 million a year in 2018 dollars, and indirect healthcare costs are estimated at $1.2 billion per year.[1]

Policies to improve healthy eating

Organizations from many sectors, including health, agriculture, non-profit, academia and government, recommended in the Ontario Food and Nutrition Strategy that the Ontario government create a comprehensive healthy eating strategy.[107] The Healthy Food Environment Policy Index produced by a panel of researchers in Canada also outlines a number of recommendations for Ontario.[108,109] Among a number of evidence-based policies, the strategy and index recommendations include policies to:

- address food insecurity;[107]
- support food literacy;[107-109]
- increase the availability and visibility of healthy foods, such as through food displays and signs or environmental cues;[107-109] and
- apply taxes and other pricing tools to increase healthy eating.[107-109]

These policies are examined in the following sections.

Household food insecurity

EVIDENCE FOR REDUCING HOUSEHOLD FOOD INSECURITY

Household food insecurity occurs when a household does not have or is uncertain that it has enough money to buy adequate food.[110,111] Populations that are more likely to have lower incomes, such as immigrants and people with a mental illness, are much more likely to experience food insecurity.[110,112,113]

People in food insecure households may eat less food or less nutritious food. During 2012–2014, adults in Ontario who experienced food insecurity ate vegetables and fruit less often than adults who were food secure.[114]

Poverty reduction policies linked to reduced food insecurity in some Canadian provinces include:

- raising the minimum wage;
- social assistance benefits; and
- a basic income guarantee.[115-119]

HOUSEHOLD FOOD INSECURITY IN ONTARIO

Households in Ontario in the lowest income quintile were almost 19 times more likely to experience food insecurity than households in the highest income quintile.[114]

Ontario Works and the Ontario Disability Support Program are the main income support programs in Ontario.[120,121] Beginning in 2018, the Ontario government introduced policy changes that affect low-income people in Ontario, including:

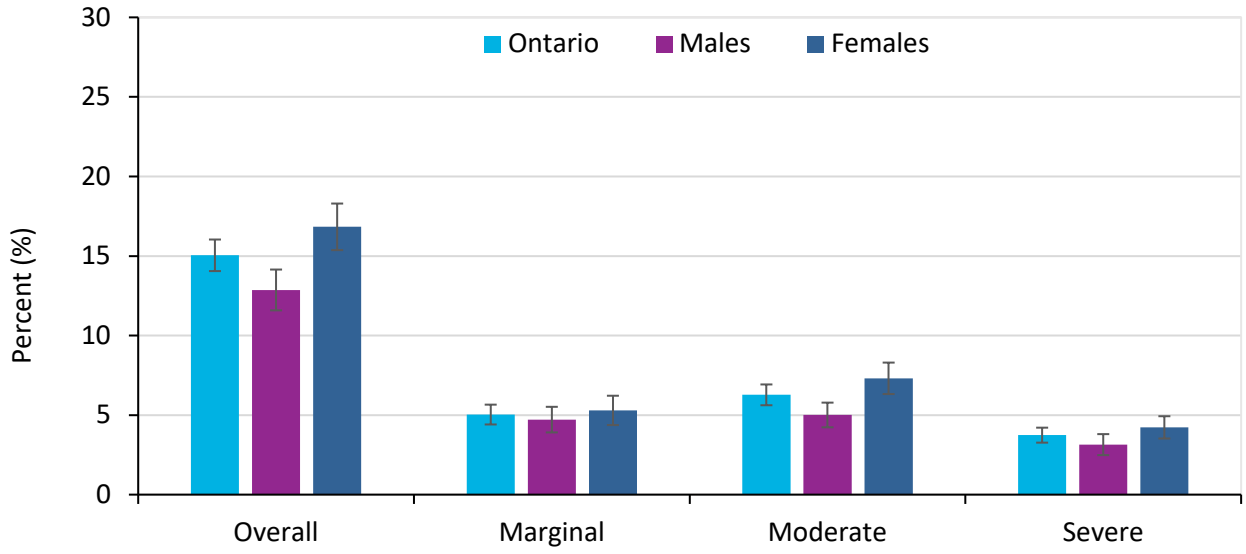
- freezing minimum wage increases;[122]
- cancelling the Ontario Basic Income Pilot project;[123] and
- suspending Ontario Works and Ontario Disability Support Program rate increases.[124]

Reducing household food insecurity could be achieved through additional provincial poverty reduction policies, including increasing the minimum wage and income supports to reflect the cost of living.

This indicator looks at the percentage of households in Ontario reporting food insecurity in 2017 with additional analyses by level of food insecurity and by sex. Because Ontario did not participate in the Household Food Security Survey Module of the Canadian Community Health Survey in 2015 and 2016, additional analyses, such as by public health unit and income level, could not be performed. Ontario will need to participate in the module each year to regularly monitor household food insecurity and patterns of food insecurity in different populations.

- In 2017, 15.0 percent of households in Ontario experienced food insecurity in the past 12 months (Figure 4, Supplementary Table S15).
- Women were more likely to report food insecurity in their households (16.8 percent) than men (12.9 percent).
- The percentage of households that worried about running out of food, had limited food options or both (marginal food insecurity) was 5.0 percent.
- The percentage of households that reduced the quality or amount of the food that they ate (moderate food insecurity) was 6.3 percent.
- The percentage of households that missed meals or went one or more days without eating (severe food insecurity) was 3.7 percent.

Figure 4: Percentage of households that were food insecure in the past year, overall (marginal, moderate and severe combined), by level of food insecurity and by sex, Ontario, 2017



Source: Canadian Community Health Survey, 2017 (Statistics Canada)

Notes: Data are presented in Supplementary Table S15. Download supplementary tables at cancercareontario.ca/PSQI. Estimates are adjusted to the age distribution of the 2011 Canadian population.

Food literacy

EVIDENCE FOR INCREASING FOOD LITERACY

A number of connected factors shape food literacy, which includes knowledge of different foods and nutrition, the ability to make healthy food choices, the ability to prepare food (i.e., food skills), and the confidence to purchase and prepare food.[125] Societal factors, such as the food system and the social determinants of health, are also key to shaping food literacy.[125] Children and youth who help prepare food may be more likely to have a healthier diet.[126,127] School-based courses that teach food skills can promote healthy eating.[128,129] The World Cancer Research Fund recommends nutrition education and food skills programs to promote healthy diets.[130]

FOOD LITERACY PROGRAMS IN ONTARIO

In Ontario, many food literacy programs are offered through local public health agencies, community health centres and community-based organizations.[131] These programs often offer classes on cooking and food skills, presentations or a combination of both.[125,131] The Ontario secondary school curriculum offers 13 optional courses with a focus on food literacy or with food literacy components.[132]

INDICATOR FINDINGS: FOOD LITERACY DEVELOPMENT IN SECONDARY SCHOOLS

- During their secondary school education in Ontario, only about a third of students who started Grade 9 in each of the school years from 2005/06 to 2012/13 earned one or more credits in courses that include a food literacy component (Supplementary Table S16).
- The proportion of students that earned one or more credits was similar among each of the eight cohorts of students who started Grade 9 from 2005/06 to 2012/13.
- None of the courses considered for this indicator are required, and they may not be offered at every school. Requiring students to earn at least one credit that includes food literacy in the Ontario secondary school curriculum could help improve food literacy and, in turn, healthy eating.

Food environment

The consumer food environment influences what people eat. Some policies that can improve the food environment include:

- increasing the availability of healthy food retail stores and services;
- improving healthy eating prompts through mandatory nutrition labelling standards and restricting food advertising; and
- improving the affordability of food using tools that influence prices, such as taxes and subsidies.[107-109,130]

EVIDENCE FOR INCREASING HEALTHY FOOD AVAILABILITY AND CURRENT POLICIES

Healthy food stores

The location, affordability and type of food stores in a neighbourhood affects people's food purchases.[133,134] Grocery stores, supermarkets and farmers' markets are considered healthier stores because they usually sell more fresh vegetables and fruit than fast food restaurants and convenience stores.[133] Some neighbourhoods – often those with lower incomes – have higher ratios of fast food restaurants and convenience stores to healthier food stores. This pattern of store availability is associated with poorer health outcomes.[133,135]

Ontario does not have any financial incentives or zoning policies to influence the location of supermarkets and fast food restaurants. These types of policies could increase healthy food stores in neighbourhoods.

Healthy food procurement policies

The types of foods ordered and sold in different settings, such as retail stores and public facilities, can be influenced by healthy food procurement policies. These policies can increase the availability of healthy food and healthy eating behaviours.[136-138] Recommendations have been made to implement these policies in publicly funded institutions, such as childcare settings, healthcare centres, schools and recreational facilities.[136] Procurement policies may include restricting the sale of sugar-sweetened drinks, limiting sodium and saturated fat content, and requiring healthy options to make up a certain percentage of foods and drinks offered.[136]

In 2010, Ontario established guidelines for foods and drinks sold in schools through the province's School Food and Beverage Policy.[139] However, a 2014 evaluation of the policy found that the majority of secondary schools still sold drinks that were not permitted under the policy.[140] The Ministry of Children, Community and Social Services also provides nutrition guidelines for food provided to students through the Student Nutrition Program.[141]

Similarly, a limited number of hospitals in Ontario have voluntarily implemented procurement policies to improve the availability of healthy food and drink options.[142,143] Provincial procurement policies can help support schools and healthcare facilities in creating healthier food environments.

Community food programs

The Ontario government funds student nutrition programs that are led by partner organizations at the local level to help improve access to healthy breakfasts, snacks or lunches in schools with students who are at-risk for poor nutrition.[144] Many community-based organizations across the province also deliver programs to improve food accessibility and skills in their neighbourhoods. These organizations include community food centres, community health centres, local public health agencies and local non-governmental organizations.[131]

EVIDENCE FOR SHIFTING ENVIRONMENTAL CUES AND CURRENT POLICIES

Menu and food labelling

Experts have recommended using standardized nutrition information labels for menus, store shelves and the front of food packages.[145] Displaying the calories of foods on menus may lead people to buy food and drinks with lower calories.[146,147] As of 2017, the Healthy Menu Choices Act, 2015 requires restaurants and other food service operators in Ontario with 20 or more locations to display the calorie content of food and drinks on their menus.[148] Labels on the front of food packages, such as symbols and rating systems, can also help consumers choose healthier foods.[149,150] The federal government is developing a labelling system to help consumers identify packaged foods high in sodium, saturated fat and sugars.[151]

Food and beverage advertising

Food and drink advertising influences children's food preferences and may influence the quantity of food that they eat.[152,153] Regulations that restrict advertising foods high in salt, sugar and fat can reduce how often children view these ads and may reduce how much of these foods they eat.[154] Several health organizations in Canada have formed a coalition to support restrictions on food and drink marketing.[155] Restricting commercially marketing food and drinks to children is a priority for the federal government.[156]

Taxing unhealthy foods and subsidizing the cost of healthy foods can increase healthy eating in a population.[157-159] A systematic review found that taxes on sugar-sweetened drinks result in reduced bodyweights at the population level and in all socio-economic groups.[160] Some studies showed greater effects in groups with lower socio-economic status.[160] In 2016, the federal Standing Senate Committee on Social Affairs, Science and Technology recommended a new tax on sugar-sweetened and artificially sweetened drinks. This tax has not yet been put in place.[161]

Opportunities to increase healthy eating

- Reduce food insecurity by implementing provincial poverty reduction policies, including increasing the minimum wage and income supports.
- Participate in the Household Food Security Survey Module of the Canadian Community Health Survey each year so food insecurity can be regularly monitored.
- Modify the Ontario secondary school curriculum to require at least one credit with a food literacy component.
- Implement tax incentives and re-zoning strategies to influence the location of supermarkets and fast food restaurants.
- Help schools comply with the School Food and Beverage Policy.
- Help healthcare facilities put in place healthy food procurement policies.
- Evaluate and publish findings on the effectiveness of the Healthy Menu Choices Act, 2015.
- Ban marketing unhealthy food and drinks to children.
- Implement a new federal tax on sugar-sweetened and artificially sweetened drinks.

Physical activity

Physical activity and cancer risk

Physical activity is associated with a reduced risk of colon cancer, and is likely associated with a reduced risk of post-menopausal breast cancer and endometrial cancer.[162] The intensity of physical activity may also have an impact on cancer risk – vigorous physical activity, such as jogging, likely reduces the risk of pre- and post-menopausal breast cancer.[162]

Cancer prevention recommendations

The Canadian Physical Activity Guidelines recommend 150 minutes of moderate to vigorous physical activity per week for adults and 60 minutes or more of moderate to vigorous physical activity a day for children and adolescents ages 5 to 17.[163] These recommendations are consistent with cancer prevention recommendations from the World Cancer Research Fund.[162]

Physical inactivity in Ontario

During 2015–2017, 42.3 percent of adults age 18 and older in Ontario did not report moderate to vigorous physical activity levels that are recommended by the Canadian Physical Activity Guidelines (Supplementary Table S17). During the same period, 72.9 percent of adolescents in Ontario did not achieve moderate to vigorous physical activity levels recommended for their age group (Supplementary Table S18). Activities that cause a person to sweat at least a little, to breathe harder and that last at least 10 minutes, as well as using active transportation are counted in this analysis as moderate to vigorous physical activity.[164]

Adults in households in the lowest income quintile (50.1 percent) were more likely to report low physical activity levels than those in the highest income quintile (33.3 percent) (Supplementary Table S17). More women in Ontario (44.8 percent) reported inadequate moderate to vigorous physical activity than men (39.7 percent) (Supplementary Table S17).

Direct healthcare costs of physical inactivity in Ontario are estimated at $0.98 billion per year in 2018 dollars, and indirect health costs, such as lost productivity, are estimated at $1.65 billion.[1]

Policies and programs to increase physical activity

Policies and programs that support active transportation,[165-168] physical education in schools[169-171] and community recreational programs are effective at increasing physical activity in a population.[172-174]

Active transportation

EVIDENCE FOR INCREASING ACTIVE TRANSPORTATION

Active transportation is human-powered travel, such as walking and bicycling, to move between destinations. People who use active transportation report higher levels of overall physical activity.[165-168] A study found that Canadians who lived in walkable neighbourhoods were more physically active.[175] Features in the built environment that increase active transportation include schools, workplaces, stores and other destinations that are within walking or biking distance; roads, sidewalks and bike lanes that connect to these destinations and that are safe and easy to navigate; and access to public transportation.[168,176]

ACTIVE TRANSPORTATION IN ONTARIO

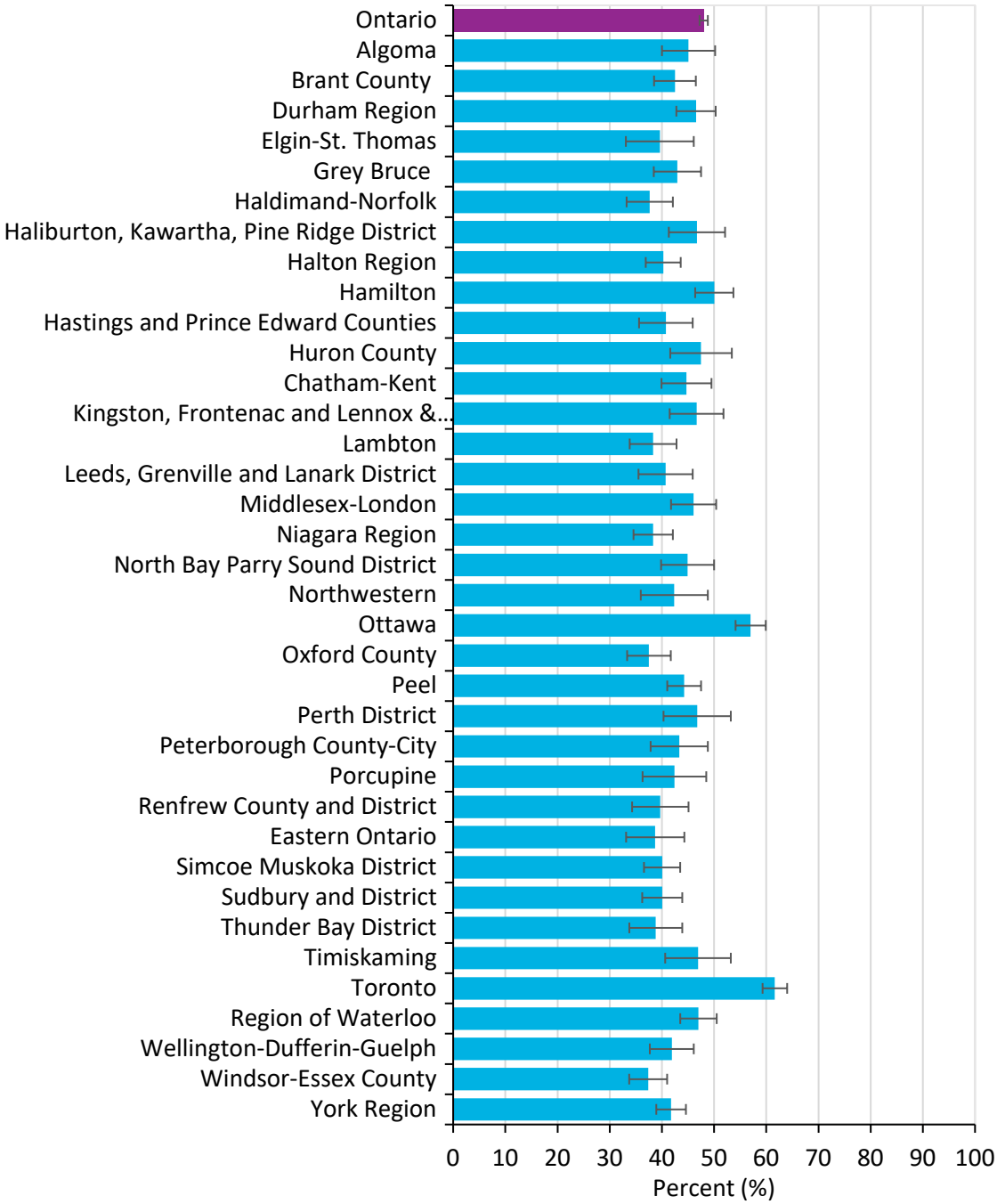
As of 2014, Ontario's Provincial Policy Statement requires that municipalities include active transportation and public transit as part of their land use planning policies in their official plans.[177] As a result of this update, access to active transportation infrastructure and public transit is more likely to increase in Ontario with the construction of new developments and redevelopments.

INDICATOR FINDINGS: ACTIVE TRANSPORTATION USE IN ADULTS

This indicator measures the percentage of adults age 18 and older reporting the use of active transportation in the previous week. It combines Canadian Community Health Survey (CCHS) data for the 2015 to 2017 survey years.

- During 2015–2017, 48.0 percent of adults in Ontario reported using active transportation in the previous week (Figure 5, Supplementary table S19) and 19.2 percent reported using active transportation on most (i.e., four or more) days of the week (Supplementary Table S20).
- An analysis by public health unit showed that use of active transportation was most common in Toronto, Ottawa and Hamilton (Supplementary Table S19). The Windsor Essex County, Oxford County and Haldimand-Norfolk public health units had the lowest percentages of adults reporting use of active transportation in the previous week (Supplementary Table S19).
- Women were more likely to report using active transportation (49.6 percent) than men (46.3 percent) (Supplementary Table S21). When assessed by income, adults in the lowest quintile (52.9 percent) were more likely than adults in the highest quintile (46.7 percent) to report using active transportation (Supplementary Table S21).

Figure 5: Percentage of adults (age 18 and older) who reported use of active transportation in the previous week, by public health unit, 2015–2017 combined



Source: Canadian Community Health Survey, 2015–2017 (Statistics Canada)

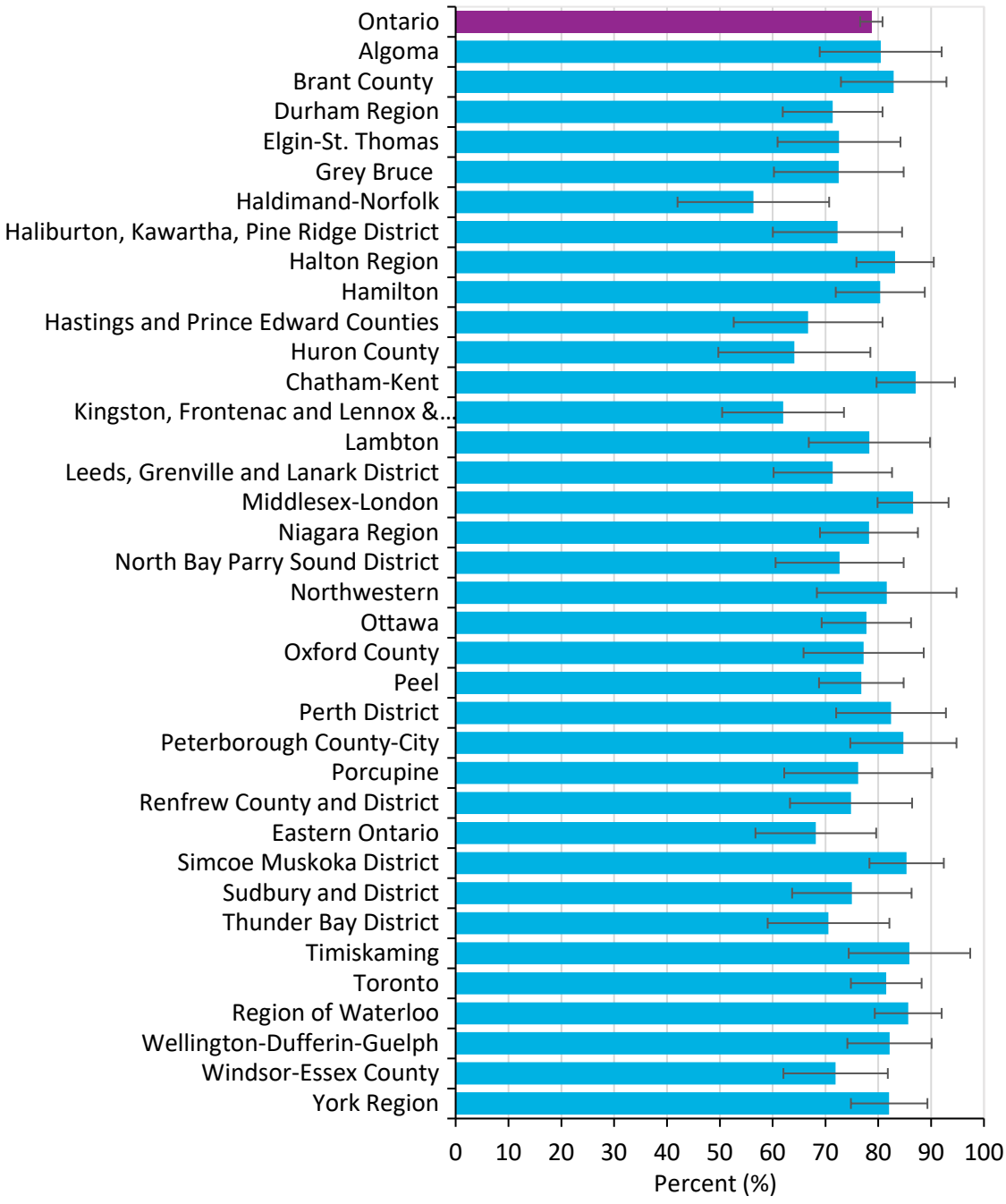
Notes: Data are presented in Supplementary Table S19. Download supplementary tables at cancercareontario.ca/PSQI. Estimates are adjusted to the age distribution of the 2011 Canadian population. Active transportation: active ways, like walking or cycling, to get to places such as school, the bus stop, the shopping centre, work or to visit friends.

INDICATOR FINDINGS: ACTIVE TRANSPORTATION USE IN ADOLESCENTS

This indicator measures the percentage of adolescents ages 12 to 17 reporting the use of active transportation in the previous week. It combines 2015 to 2017 Canadian Community Health Survey data.

- In Ontario, 78.7 percent of adolescents ages 12 to 17 reported using active transportation in the previous week (Figure 6, Supplementary Table S22).
- An analysis by public health unit showed that Chatham-Kent, Middlesex-London and Timiskaming had the highest percentages of adolescents using active transportation in the previous week. Haldimand-Norfolk, Kingston, Frontenac and Lennox & Addington, and Huron County public health units had the lowest percentages (Supplementary Table S22).
- Similar levels of using active transportation were reported across income levels and sex (Supplementary Table S23).

Figure 6: Percentage of adolescents (ages 12 to 17) who reported use of active transportation in the previous week, by frequency of use and by public health unit, 2015–2017 combined



Source: Canadian Community Health Survey, 2015–2017 (Statistics Canada)

Notes: Data are presented in Supplementary Table S22. Download supplementary tables at cancercareontario.ca/PSQI. Estimates are adjusted to the age distribution of the 2011 Canadian population. Active transportation: active ways, like walking or cycling, to get to places such as school, the bus stop, the shopping centre, work or to visit friends.

Physical activity in schools

EVIDENCE FOR INCREASING PHYSICAL ACTIVITY IN SCHOOLS

Public schools are an equitable setting for promoting physical activity and creating an environment where children and adolescents can be physically active.[178] Physical education classes can increase overall physical activity in children and adolescents.[169-171]

Physical education specialists have training in physical activity, which can improve the quality of physical education classes and increase the time students spend being physically active during class time.[179] A number of national and provincial organizations and bodies, including the Ontario Society of Physical Activity Promoters in Public Health and Ontario's Chief Medical Officer of Health, have recommended that specialist teachers deliver health and physical education in Ontario schools.[180,181]

PHYSICAL ACTIVITY IN ONTARIO SCHOOLS

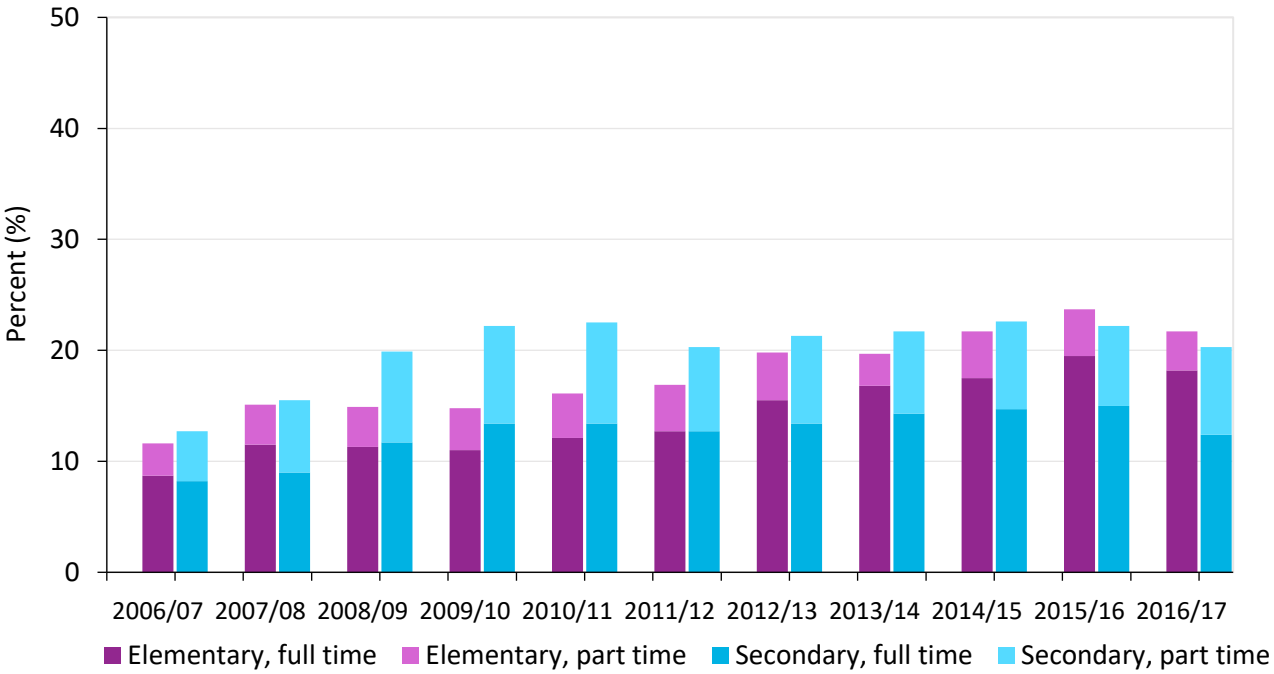
In Ontario, elementary schools (Grades 1 to 8) are required to integrate a minimum of 20 minutes of moderate to vigorous physical activity into each school day during instructional time, which is referred to as Daily Physical Activity (DPA).[182] A 2014 evaluation of DPA policy implementation found that 60 percent of school administrators and 50 percent of teachers who responded to a survey reported implementing the policy.[183] In Ontario secondary schools, students are required to take one credit in health and physical education to graduate.

INDICATOR FINDINGS: HEALTH AND PHYSICAL EDUCATION SPECIALIST TEACHERS IN SCHOOLS

This indicator measures the percentage of publicly funded elementary and secondary schools in Ontario with at least one full or part-time health and physical education specialist teacher from the 2006/07 to 2016/17 school years.

- In the 2016/17 school year, 21.7 percent of elementary schools and 20.3 percent of secondary schools reported having at least one full or part-time health and physical education specialist teacher (Figure 7, Supplementary Table S24).
- For the 2006/07 to 2016/17 school years, the percentages of secondary schools with at least one specialist teacher show an increasing trend (Supplementary Table S24). The increase in the percentage of elementary schools with a specialist teacher is not statistically significant.
- For elementary and secondary schools with at least one full or part-time specialist teacher, the trend of the overall provincial ratio of students to specialist teachers did not significantly change from 2006/07 to 2016/17 (Supplementary Table S25). Therefore, the increased percentage of secondary schools with a specialist teacher reflects additional specialist teachers in the province, rather than a redistribution of existing teachers to more schools. This ratio describes the overall provincial ratio and not the average of ratios for each school that was reported in the Prevention System Quality Index in 2016.

Figure 7: Percentage of publicly funded elementary and secondary schools in Ontario with at least 1 full or part-time specialist teacher assigned to teach health and physical education, 2006/07 to 2016/17 school years



Source: Ontario School Information System, 2006/07 to 2016/17 (Ministry of Education)

Notes: Data are presented in Supplementary Table S24. Download supplementary tables at cancercareontario.ca/PSQI. Full time means ≥1.0 full-time equivalent (FTE). Note that ≥1.0 FTE does not necessarily mean there are one or more full-time specialist teachers because two or more part-time specialist teachers may account for ≥1.0 FTE. Part time means >0 and <1.0 FTE.

INDICATOR FINDINGS: ENROLMENT IN HEALTH AND PHYSICAL EDUCATION

Physical activity has been shown to decrease throughout adolescence.[184] Requiring a health and physical education credit in each grade could be one way to help improve physical activity levels.

- In the 2016/17 school year, 86.3 percent of Ontario students earned the one mandatory health and physical education credit in Grade 9.
- Enrolment in health and physical education courses tends to decrease in higher grades. In the 2016/17 school year, 28.2 percent of students earned a health and physical education credit in Grade 12 (Supplementary Table S26).

Community programs

EVIDENCE FOR COMMUNITY-BASED PHYSICAL ACTIVITY PROGRAMS

Community-based physical activity programs, facilities and infrastructure can increase physical activity levels.[172-174] Group health or exercise classes,[185] information resources, fitness assessments and lifestyle advice have been shown to be effective ways to increase physical activity in adults in socio-economically disadvantaged communities.[186,187]

COMMUNITY-BASED PHYSICAL ACTIVITY PROGRAMS IN ONTARIO

Healthy active communities are promoted in the Provincial Policy Statement, which encourages municipalities to develop a range of equitably distributed recreational settings, including parks, trails and facilities.[177] Municipalities in Ontario often provide a range of recreational programs and facilities based on their community's needs. For example, the Region of Peel and the City of Toronto provide free or discounted recreational programming to residents with low incomes.[188-190]

The Healthy Kids Community Challenge, and the Ontario Sports and Recreation Communities Fund previously provided financial support for municipalities and organizations to improve physical activity in their communities.[191,192] Provincial financial support ended in 2018 for the Healthy Kids Community Challenge and in 2019 for the Ontario Sports and Recreation Communities Fund.[191-194]

Opportunities to increase physical activity

- Continue to develop infrastructure, policies and plans in municipalities to support active transportation.
- Increase access to health and physical education specialists across the province.
- Require health and physical education credits in every grade of secondary school.
- Create provincial funding and guidelines to help municipalities develop and implement policies that make organized and informal sport and recreation activities accessible to residents with low incomes.

Ultraviolet radiation

Ultraviolet radiation and cancer risk

Most skin cancers are caused by exposure to ultraviolet radiation (UVR) from the sun or other sources, such as tanning beds.[195] Melanoma skin cancer is the most deadly type of skin cancer, while basal and squamous cell carcinomas, which are non-melanoma skin cancers, are the most common types.[195] UVR may also cause cancer in and around the eye.[195]

Ultraviolet radiation protection recommendations

Recommendations to reduce personal UVR exposure were published for Canada in 2016.[196] These recommendations state that Canadians should use shade, clothing, hats, protective eyewear and sunscreen with a sun protection factor (SPF) of 30 or higher to protect themselves from UVR exposure from the sun and that they should avoid using tanning beds.[196]

Ultraviolet radiation exposure in Ontario

UVR from the sun causes an estimated 2,090 to 2,990 new cases of melanoma in Ontario each year and as many as 12 times more non-melanoma skin cancers, which are not reported in the Ontario Cancer Registry.[197] Solar UVR exposure also results in the highest number of environmental and occupational cancers each year in Ontario.[197,198]

During 2015–2016, 70.1 percent of adults in Ontario age 18 and older who reported spending more than 30 minutes in the sun on a typical summer day during non-working hours reported using at least one type of sun protection measure for the skin (shade, clothing or sunscreen of SPF 30 or higher) (Supplementary Table S27). Using at least one type of protection was less common in adolescents ages 12 to 17 (62.9 percent) (Supplementary Table S27). Eye protection, such as wearing sunglasses, is also important for sun protection, but is not included in this analysis, which focuses on measures that can protect most areas of the skin.

During the same time period, 31.2 percent of adults reported one or more sunburns (Supplementary Table S28) and of this group, 64.7 percent reported using at least one type of skin protection (Supplementary Table S29). These data suggest that further policy and program supports, such as increasing shade and public education on effective use of sun protection, may be needed. To date, the 2015–2016 Canadian Community Health Survey has been the only cycle to include the Sun Safety Behaviours section in the survey questions asked of people in Ontario. Regularly including the Sun Safety Behaviours section would support efforts to reduce UVR exposure in Ontario.

Policies and programs to reduce ultraviolet radiation exposure

Implementing two or more policies or programs in two or more settings (e.g., schools, child care settings) in a community, city or region can help to reduce UVR exposure.[199] Policies could include scheduling outdoor activities to avoid peak UVR exposure, and programs could include on site educational workshops.[199] In addition, mass media campaigns to improve sun safety knowledge, attitudes and behaviours are often part of initiatives associated with reduced UVR exposure.[199] Interventions for reducing UVR exposure include establishing policies to create shade areas,[199,200] and a combination of sun safety policies and educational programs in settings for children, youth[199,201,202] and outdoor workers.[198,203-205]

Shade

EVIDENCE FOR INCREASING SHADE

Built structures and dense tree canopies can provide shade and protect people from UVR exposure.[200,206] Shade can protect from UVR exposure more reliably than sunscreen.[206] Policies focusing on shade can help increase the availability of effective shade structures and trees in places where people spend time outdoors, such as public parks, bus stops and children's play areas.[200]

SHADE POLICIES IN ONTARIO

Municipalities in Ontario have planning policy documents, such as official plans and urban design guidelines for municipally and privately owned sites. These documents guide the evaluation of designs for new developments and renewal projects, and may contain statements on shade. Statements on shade in planning policy documents can help increase shade in new developments and renewal projects.

INDICATOR FINDINGS: SHADE POLICIES IN LOCAL MUNICIPALITIES

In this indicator, statements on shade in planning policy documents are called shade policies. This indicator examines the shade policies of local municipalities with populations of 100,000 or more (as of the 2016 census). Regional municipalities were excluded so that local municipalities were not counted more than once. As of May 2019, all 26 local municipalities in Ontario with populations of 100,000 or more included a shade policy in their planning policy documents. In the planning policy documents of 26 local municipalities (Table 3, Supplementary Table S30):

- Three local municipalities stated that shade should be provided for a broad range of municipally and privately owned sites (called strong shade policies). The number of municipalities with a strong shade policy is unchanged from 2016.
- Nineteen local municipalities did not have strong shade policies, but stated in their planning policy documents that shade should be provided for only a few types of municipally or privately owned sites (called moderate shade policies). The number of municipalities with moderate shade policies increased from 14 in 2016.
- Four local municipalities stated that shade should be considered, but is not required, for one or more types of municipally or privately owned sites (called limited shade policies).

Periodic updates to official plans and design guidelines provide an opportunity for local municipalities in Ontario to increase the strength of their shade policies. Supplementary Table S30 provides the detailed findings for this indicator by municipality.

Table 3: Strength of shade policies in the planning policy documents of local municipalities in Ontario with populations of 100,000 or more, 2016 and 2019

Strength of shade policies	March 2016	May 2019
Strong shade policies	Ajax Kitchener Waterloo	Ajax Kitchener Waterloo
Moderate shade policies	Barrie Greater Sudbury Guelph Hamilton Kingston London Markham Milton Oakville Richmond Hill St. Catharines Thunder Bay Toronto Windsor	Barrie **Cambridge*** Greater Sudbury Guelph Hamilton Kingston London Markham Milton Oakville **Oshawa*** **Ottawa*** Richmond Hill St. Catharines Thunder Bay Toronto **Vaughan*** **Whitby**** Windsor
Limited shade policies	Brampton Burlington Cambridge Chatham-Kent Mississauga Oshawa Ottawa Vaughan	Brampton Burlington Chatham-Kent Mississauga
Shade policies not included	Whitby	None

Sources: Municipal planning policy documents (e.g., official plans, urban design guidelines, site plan control bylaws) posted on the web or in additional documents sent by email from the municipality for each of the 26 Ontario local municipalities with populations of 100,000 or greater.

Note: The shade policies assessed and information about whether they were verified by the municipality can be found in Supplementary Table S30. Download supplementary tables at cancercareontario.ca/PSQI.

*Shade policy of the municipality improved from limited to moderate since the 2016 review.

**Shade policy of the municipality was added and assessed as moderate since the 2016 review.

Policies and programs for children, youth and outdoor workers

EVIDENCE FOR POLICIES AND PROGRAMS FOR CHILDREN AND YOUTH

Children and youth report spending more time in the sun than adults in Ontario.[207] Sun exposure and sunburns in childhood have been shown to increase the risk of developing skin cancer in adulthood, making it a priority to reduce UVR exposure in children.[208]

Sun safety policies combined with educational programs in childcare centres, schools and recreational facilities can reduce UVR exposure in children and youth, and improve protective habits.[201,202] These policies and programs can include reducing time outdoors during peak sun hours, ensuring access to shade in outdoor settings where children and youth play, and teaching children and caregivers sun safety practices.[201,202]

Jurisdictions that also have a ban on selling tanning services to youth have fewer youth reporting the use of tanning devices, including tanning beds, than jurisdictions without a ban.[209]

ULTRAVIOLET RADIATION POLICIES AND PROGRAMS FOR CHILDREN AND YOUTH IN ONTARIO

In Ontario, there is currently no provincial legislation mandating that schools or childcare centres have UVR exposure reduction policies.[210] Local public health agencies in Ontario are mandated to assist schools and school boards with health needs, which may include reducing UVR exposure if it is identified as a priority.[211,212]

In 2014, the Ontario government enacted the Skin Cancer Prevention Act (Tanning Beds), 2013 to ban the sale and marketing of tanning services to youth under age 18.[213] Local public health agencies are responsible for inspections and enforcing the act.[214]

INDICATOR FINDINGS: TANNING BED USE IN ONTARIO STUDENTS IN GRADES 7 TO 12

- The results of a survey conducted one year after the Skin Cancer Prevention Act (Tanning Beds), 2013 came into effect found no statistically significant change in tanning bed use for students in Grades 7 to 12, compared to the results of a similar survey conducted before the act came into effect (7.9 percent in 2015 versus 6.9 percent in 2014) (Supplementary Table S31).[215]
- In 2015, rates of reported tanning bed use in the previous 12 months ranged from about 2.7 percent of Grade 7 students to 13.0 percent of Grade 12 students.[215]

A 2018 survey of local public health agencies in Ontario suggested that the legislation's main means of enforcement through complaints-initiated inspections, instead of routine inspections, may limit its effectiveness.[216] Only eight of 242 infractions recorded since the ban came into effect were the result of a complaint, whereas 234 infractions were found through non-mandatory routine inspections.[216] More public health inspections or requiring inspections would likely uncover additional infractions.[216]

The limited time since Ontario's ban came into effect may also be a factor in its impact on tanning bed use among youth. States in the United States with longer standing bans have lower rates of use than those that implemented their ban more recently.[217]

Repeated surveys of youth tanning bed use in Ontario are needed to assess the effectiveness of the Skin Cancer Prevention Act. A school-based survey conducted in Ontario in 2015 included a question on whether students have ever used a tanning bed,[218] and there are plans to repeat this survey in the future.[219] However, the survey was not conducted before the ban and its data are therefore not included in this indicator. Additional years of data from this survey may help assess change over time.

EVIDENCE FOR POLICIES AND PROGRAMS FOR OUTDOOR WORKERS

In Ontario, about 449,000 workers are exposed to UVR from the sun while at work.[220] The majority of these workers (58 percent) are exposed to high levels of UVR, meaning more than 75 percent of their workday is spent outdoors.[198,220] A UVR measurement study of 154 utilities and municipal workers in Ontario measured an average of five-and-half times the daily limit for UVR that is recommended by the American Conference of Governmental Industrial Hygienists.[221]

Comprehensive sun safety policies and programs for work sites can reduce worker exposure to UVR.[203-205,222] These policies and programs can include policies that reduce time working in the sun during peak UVR hours and that provide personal sun protection, shade and programs to educate workers on effective sun protection.[198,203-205,222]

ULTRAVIOLET RADIATION POLICIES AND PROGRAMS FOR OUTDOOR WORKERS IN ONTARIO

The Occupational Health and Safety Act in Ontario requires employers to take reasonable safety measures to protect workers from workplace hazards. The Ministry of Labour, Training and Skills Development identifies UVR as a hazard, and it provides guidelines on exposure limits and ways to prevent exposure.[223] Sun Safety at Work Canada provides resources to help small and large workplaces develop and implement sun safety programs.[224]

Opportunities to reduce ultraviolet radiation exposure

- Monitor the prevalence of sun exposure in Ontario.
- Strengthen municipal shade policies, and monitor the implementation and impact of these policies.
- Develop targeted policies and invest in programs for outdoor workers, schools, recreation centres, and children and youth in childcare.
- Monitor tanning bed use in youth and the enforcement of the Skin Cancer Prevention Act (Tanning Beds), 2013.

Environmental carcinogens

Environmental carcinogens and cancer risk

Environmental carcinogens refer to cancer-causing agents (e.g., chemicals, radiation, substances) that people are exposed to in their daily lives, such as agents that are found in the air that they breathe, the water that they drink and the land that produces the food they eat.[197] This section focuses on radon in indoor air and fine particulate matter found in outdoor air pollution. Radon and fine particulate matter are known causes of lung cancer.[195,225] They have no known safe level of exposure and the risk of cancer increases the more someone is exposed to them.[195,225] Radon and fine particulate matter are common exposures in Ontario that may be reduced through various policies and programs.

Environmental carcinogens in Ontario

In Ontario, after ultraviolet radiation from the sun, radon and fine particulate matter were the second and third leading causes of cancer due to environmental carcinogens.[197] Each year in Ontario, radon causes an estimated 1,080 to 1,550 new cases of lung cancer, and fine particulate matter causes an estimated 290 to 900 new cases.[197] Radon is the leading cause of lung cancer in people who do not smoke and it increases the risk of lung cancer in people who do smoke.[197,226]

Policies and programs to reduce exposure to radon

Evidence for policies and programs

Radon is a radioactive gas produced by the breakdown of naturally occurring uranium in soil and rocks.[227] Radon is invisible, odourless and requires equipment to test for it.[226,228] Radon concentrations are measured in units of becquerels per cubic metre (Bq/m^3).

Radon can reach harmful levels inside homes and other buildings, especially in basements and on lower floors if a foundation is not fully sealed from the ground and the gas is not directed outdoors.[226,228] Installing an exhaust system in the foundation is a common way to direct radon outdoors.[226] Outdoor air reduces radon to levels that are generally considered safe.[226,228]

The World Health Organization recommends that national programs promote testing for radon to homeowners, reducing radon levels when they are found to be high and implementing building codes to minimize radon levels.[228] Programs may include financial aid or incentives that encourage home and business owners to take steps to reduce the levels of radon indoors.[228]

The World Health Organization recommends using 100 Bq/m^3 as a guideline for identifying when changes to a home should be made to reduce its radon levels.[228] In areas where keeping average levels under 100 Bq/m^3 is challenging, such as in areas where there are high levels of uranium in the ground, the guideline should be no higher than 300 Bq/m^3.[228] The current Canadian guideline for radon is 200 Bq/m^3.[226] A study done in Ontario suggests that if all homes with radon concentrations above 200 Bq/m^3 reduced radon levels to levels found outdoors, an estimated 91 lung cancer deaths could be prevented, and at levels below 100 Bq/m^3, 233 lung cancer deaths could be prevented.[229]

Policies and programs in Ontario

Except for three municipalities in Ontario with a history of mining operations, Ontario's Building Code does not require new homes or renovations across the province to prevent radon from entering the home.[230] The province's home warranty program for new homes covers costs to reduce radon levels if a home is found to exceed the Canadian guideline of 200 Bq/m³ in the first seven years of ownership.[231]

From 2009 to 2013, Health Canada conducted a national survey of radon levels in homes.[232] In Ontario, three-quarters of homes had radon concentrations below the World Health Organization guideline of 100 Bq/m^3, 17.0 percent of homes tested had radon concentrations between 100 and 199 Bq/m³, and 8.2 percent had radon concentrations greater than or equal to 200 Bq/m³.

To address radon in Ontario workplaces, the Occupational Cancer Research Centre has been leading a study that measures the level of radon exposure in small businesses and public workplaces.[233] Data on radon in workplaces in Ontario are otherwise limited.

As part of the Healthy Environments and Climate Change Guideline in the 2018 Ontario Public Health Standards, local boards of health are encouraged to increase public awareness of radon.[211] Public resources on radon are available from organizations such as Health Canada,[226] the Canadian Cancer Society,[234] the Lung Health Foundation,[235] CAREX Canada[236] and Take Action on Radon Canada,[237] a national initiative funded by Health Canada led by radon stakeholders to raise awareness on radon. The Ministry of Labour, Training and Skills Development has published a resource on radon in the workplace, which describes requirements for employers when annual average radon levels in a work setting are above the Canadian guideline.[238]

Policies and programs to reduce exposure to fine particulate matter

Evidence for policies and programs

Fine particulate matter ($PM_{2.5}$) refers to any solid particles or liquid droplets that measure 2.5 micrometres (or microns) in diameter or smaller.[239] $PM_{2.5}$ concentrations are measured in units of micrograms per cubic metre of air (µg/m^3).

$PM_{2.5}$ remains in the air longer than larger particles, and can be breathed into the lungs and enter the blood system.[239] It is a major part of outdoor air pollution.[239] In urban areas in Ontario, home firewood burning, automobiles and industrial facilities are major sources of $PM_{2.5}$.[240] Depending on the location in the province, 30 percent to over 80 percent of $PM_{2.5}$ comes from the United States annually.[239,240]

The World Health Organization states that policies should support lower emissions in transportation, industry, waste management, and energy use and generation.[239] It has set an air quality guideline value for $PM_{2.5}$ at an annual average of 10 µg/m^3.[239] The Canadian Ambient Air Quality Standard for $PM_{2.5}$set an annual average of 8.8 µg/m^3 effective in 2020.[241]

The Canadian Council of Ministers of the Environment developed a code of practice to help municipal governments introduce by-laws and programs that reduce emissions from home firewood burning, such as standards for wood-burning appliances and banning wood burning during days with poor air quality.[242]

Policies and programs in Ontario

Many policies and programs have likely contributed to improved air quality in Ontario, including:

- closure of coal-fired electricity generation plants;[240]
- emissions testing for passenger vehicles up until April 1, 2019;[240]
- regulating industrial sites to reduce emissions and improve local air quality;[240]
- requiring municipal land-use planning to reduce single-occupancy vehicle use and increase active transportation;[177] and
- investments in public transit.[240]

Diesel emission standards have been set by the federal government for off-road engines and by the provincial government for heavy commercial and on-road vehicles.[243]

INDICATOR FINDINGS: $PM_{2.5}$ CONCENTRATIONS IN OUTDOOR AIR

This indicator looks at the annual average $PM_{2.5}$ concentrations in Ontario that are measured by outdoor air monitoring stations. Data were collected by the Ministry of the Environment, Conservation and Parks through the Ontario Continuous Ambient Air Monitoring Network of 40 monitoring stations and were presented in the *Air Quality in Ontario 2017 Report*.[240]

- In 2017, the annual average $PM_{2.5}$ concentrations ranged from 4.1 µg/m^3 at the station in Petawawa to 8.5 µg/m^3 at Hamilton Downtown and Windsor West (Table 4, Supplementary Table S32).
- $PM_{2.5}$ concentrations were lower than the Canadian Ambient Air Quality Standard of 8.8 µg/m^3 for $PM_{2.5}$ at all monitoring stations.

Table 4: Annual average ambient fine particulate matter ($PM_{2.5}$) concentrations (µg/m3) in Ontario, by monitoring station, 2013 to 2017

Monitoring station	2013	2014	2015	2016	2017
Barrie	7.5	7.6	7.6	6.5	7.0
Belleville	6.9	6.8	6.6	5.5	5.8
Brampton	8.5	**8.9**	8.4	6.8	7.0
Brantford	8.5	**9.2**	8.7	7.3	7.2
Burlington	8.7	**9.6**	**9.4**	7.6	7.0
Chatham	8.1	8.6	8.1	6.6	6.4
Cornwall	7.7	7.0	6.9	6.4	5.9
Dorset	5.4	5.3	5.6	4.6	4.6
Grand Bend	7.3	8.1	7.7	6.0	5.1
Guelph	8.1	**8.9**	8.4	6.9	6.8
Hamilton Downtown	**10.1**	**10.8**	**10.2**	8.2	8.5
Hamilton Mountain	**9.2**	**9.4**	**9.0**	7.2	7.4
Hamilton West	**9.6**	**9.9**	**9.9**	7.9	7.5
Kingston	6.5	6.8	6.3	5.8	5.3
Kitchener	8.7	**9.3**	8.8	7.3	7.0
London	**9.1**	8.8	8.3	7.1	7.0
Mississauga	7.9	8.7	8.5	7.2	6.8
Morrisburg	6.7	7.0	**N/A**	**N/A**	**N/A**
Newmarket	7.3	7.3	7.1	6.0	5.9
North Bay	5.2	5.3	5.3	4.6	4.6
Oakville	8.0	8.5	8.3	7.0	6.9
Oshawa	7.4	7.7	7.5	5.9	5.9
Ottawa Central	7.1	6.8	6.9	5.6	5.8
Ottawa Downtown	7.0	7.0	6.9	5.9	5.9
Parry Sound	5.8	5.8	5.7	4.8	4.6
Petawawa	4.8	4.7	4.8	4.4	4.1

Monitoring station	2013	2014	2015	2016	2017
Peterborough	7.4	6.9	6.8	5.8	5.8
Port Stanley	7.4	8.2	8.0	6.5	6.3
Sarnia	8.5	**9.0**	8.4	**INS**	7.0
Sault Ste. Marie	5.6	6.0	5.9	4.9	5.0
St. Catharines	8.5	8.8	8.4	6.9	7.0
Sudbury	5.7	6.0	6.3	5.4	5.0
Thunder Bay	6.3	6.6	6.5	5.8	5.1
Tiverton	5.8	6.5	6.4	5.1	5.1
Toronto Downtown	8.3	8.7	8.4	7.0	7.4
Toronto East	8.2	**8.9**	8.5	7.0	7.4
Toronto North	8.3	**9.2**	**9.4**	7.3	7.4
Toronto West	8.8	**9.1**	8.5	7.0	7.4
Windsor Downtown	**9.2**	**10.1**	**9.3**	8.1	7.8
Windsor West	**10.0**	**10.7**	**9.9**	8.5	8.5

Source: Air Quality in Ontario, 2013 to 2017 (Ministry of the Environment, Conservation and Parks)

Notes: Data are presented in Supplementary Table S32. Download supplementary tables at cancercareontario.ca/PSQI. Bolded values exceed 8.8 µg/m^3, the $PM_{2.5}$ reference level set by the Canadian Ambient Air Quality Standards, effective in 2020.
INS: insufficient data in any one quarter to calculate a valid average ambient concentration.
N/A: $PM_{2.5}$ not monitored in that year.

Opportunities to reduce environmental carcinogens

- Promote radon testing and reduction, which may include financial aid and incentives to home and business owners when high concentrations are found.
- Consider setting the Canadian radon guideline at 100 Bq/m^3.
- Monitor radon concentrations in Ontario homes and workplaces.
- Amend the Ontario Building Code to require measures that reduce or prevent radon in new construction and renovations.
- Continue to reduce $PM_{2.5}$ emissions from transportation, industry, and energy use and generation.
- Adopt standards on wood-burning appliances to reduce emissions from homes.

Occupational carcinogens

Occupational carcinogens and cancer risk

An estimated 47 workplace hazards are known causes of cancer[244] and many others are likely causes. These occupational carcinogens include asbestos in building materials, diesel engine exhaust from trucks and solar ultraviolet radiation (UVR) among outdoor workers.[198] UVR is described in the section on ultraviolet radiation in this report. This section on occupational carcinogens focuses on asbestos, diesel engine exhaust, nickel and formaldehyde because a large proportion of workers in Ontario are exposed to them and opportunities exist to reduce or eliminate exposure to these carcinogens in the workplace.

Occupational carcinogens in Ontario

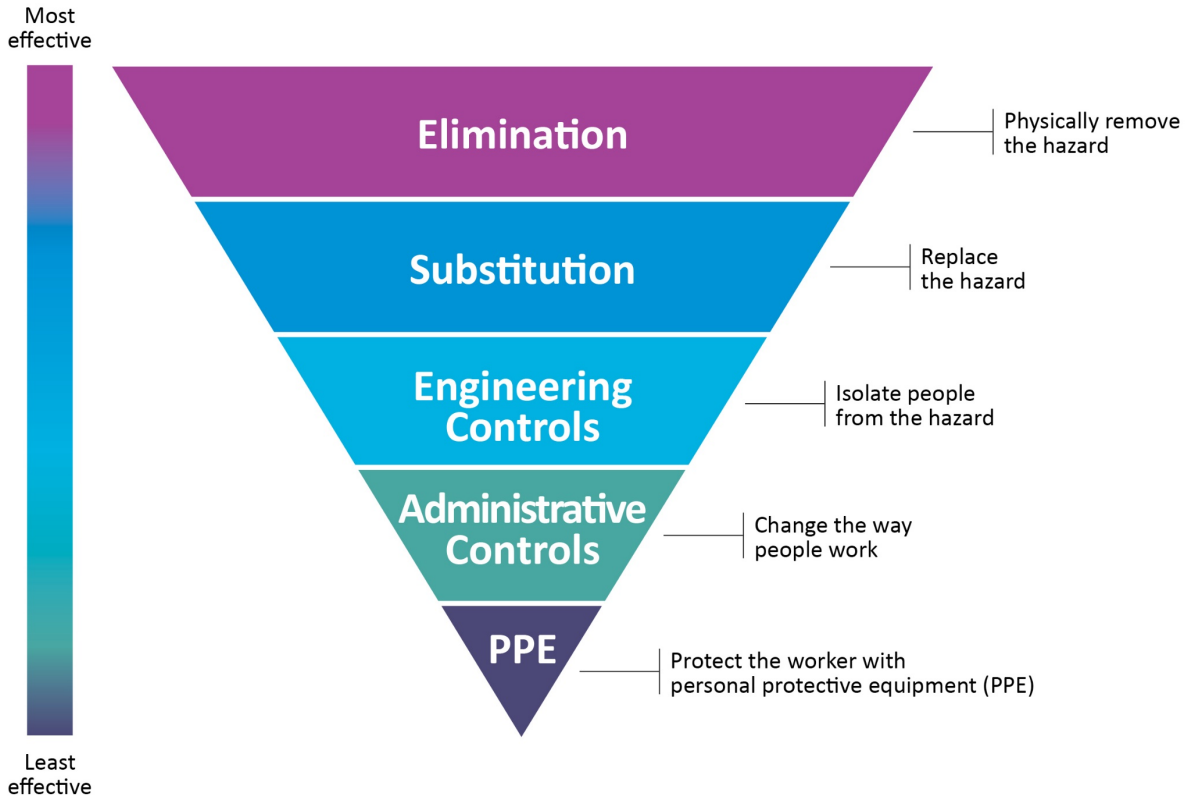
Occupational cancer is the leading cause of work-related deaths in Ontario.[198,245] In a 2017 report, the Occupational Cancer Research Centre provided detailed estimates on the burden of occupational cancer in Ontario.[198] The report found that over 3,000 occupational cancers are diagnosed in Ontario every year.[198] It also found that the most common occupational cancers in Ontario include non-melanoma skin cancers caused by solar UVR and lung cancers from breathing in asbestos, diesel engine exhaust, nickel and a number of other carcinogens.[198]

Policies and programs to reduce exposure to occupational carcinogens

The Hierarchy of Controls (Figure 8) is a widely recognized occupational health and safety framework for protecting workers from workplace hazards.[246] The framework identifies the most to least effective controls for hazards, which are:

- removing the hazard (elimination);
- replacing the hazard with a safer substitute (substitution);
- creating physical separations between workers and the hazard (engineering controls);
- changing the way people work to limit exposure to the hazard (administrative controls); and
- using personal protective equipment (PPE) when working with the hazard.

Figure 8: Hierarchy of Controls



Source: Available for public use without permission from cdc.gov/niosh/topics/hierarchy/

Ontario's Occupational Health and Safety Act regulates exposure limits for chemical substances. It also requires employers to find out whether these substances are present on a work site. If they are present, regulations require employers to follow a specific set of measures and procedures that protect workers from these substances.[247]

Ontario's Toxics Reduction Act directs industrial production facilities to develop plans that protect the environment by reducing the use of specific toxic substances. This elimination or reduction of toxic substances in industrial processes or substituting toxic substances with less hazardous ones helps reduce worker exposure to occupational carcinogens.[248] On December 31, 2021, this act will no longer be in effect.[248] Canada's National Pollutant Release Inventory also tracks the industrial release of toxic substances into the environment. However, unlike the Toxics Reduction Act, it does not require tracking the use of substances inside industrial facilities before they are released into the environment.[249]

Asbestos

Asbestos is a term for six fibrous minerals that are found in some rocks and soil.[250] Because of its durability and heat resistance, asbestos was widely used in building materials, and in industrial and consumer products.[250] When asbestos or materials containing asbestos are disturbed or damaged, fibres can be released into the air and breathed into the lungs.[250] Asbestos is a known cause of lung

cancer, laryngeal cancer, ovarian cancer and mesothelioma (a cancer affecting the protective lining of the lungs and other organs).[251]

In Canada, asbestos use peaked in the 1960s and 1970s.[252] In 2012, asbestos mining ended when the last asbestos mines closed in Quebec.[253] As of December 2018, asbestos was banned in Canada.[254] Asbestos and products that contain asbestos can no longer be manufactured, sold, imported, exported or used in Canada, with some exceptions.[254]

ASBESTOS AND CANCERS IN ONTARIO

Each year in Ontario, almost 800 cancers are caused by a history of exposure to occupational asbestos.[198] Three-quarters of these cases are lung cancers, which make up about 7.8 percent of all lung cancer cases diagnosed each year in the province.[198] Every year, asbestos also leads to the diagnosis of about 140 cases of mesothelioma, which make up just over 80 percent of all mesothelioma cases.[198] Data from 2006 suggest that about 52,000 people in Ontario are exposed to asbestos in their workplace, and of this number, about 92 percent work in the construction industry.[252]

EVIDENCE TO REDUCE EXPOSURE TO ASBESTOS

A ban on asbestos, like Canada's ban, is key to reducing exposure. However, even with an enforced ban in place, construction and maintenance workers must continue to be protected from asbestos that was used in past construction.

At the provincial level, British Columbia and Saskatchewan have made efforts to reduce exposure to asbestos. In British Columbia, the provincial government set up a cross-ministry working group to develop policies that protect against asbestos in a number of sectors, including public health, the construction industry and waste management.[255] The working group's report included recommendations requiring licensing and standards for asbestos removal services, addressing regulatory gaps and increasing public awareness.[255] Saskatchewan has created an online public registry of buildings owned by the provincial government that have asbestos. The registry lets workers know if they need to use protection when working on construction and maintenance projects.[256]

POLICIES AND PROGRAMS TO REDUCE ASBESTOS EXPOSURE IN ONTARIO

Under Ontario's Occupational Health and Safety Act, asbestos is a designated substance with an occupational exposure limit, although research has not identified a known safe limit.[257] In addition to the requirements for designated substances, the act requires employers to submit an asbestos work report describing whether any materials that are likely to be handled or disturbed on a project site contain asbestos.[257] The Ministry of Labour, Training and Skills Development maintains an Asbestos Worker Register that lists workers who are exposed to asbestos.[258] When a worker has had 2,000 hours of exposure, they are notified and advised to undergo a medical examination.[258] The Occupational Cancer Research Centre has linked the Asbestos Worker Register to the Ontario Cancer Registry and other health data to identify asbestos-related disease.[259]

Diesel engine exhaust

The exhaust from diesel engines contains a complex mixture of gases and fine diesel particulate matter small enough to be breathed deep into the lungs.[260] These particulates can damage the lungs and cause lung cancer.[261] People who are frequently exposed to diesel engine exhaust, such as underground miners, truckers, railway workers, heavy equipment mechanics and construction workers, have an increased risk of lung cancer.[260]

DIESEL ENGINE EXHAUST AND CANCERS IN ONTARIO

Estimates reported in 2017 suggest that about 2.1 percent of lung cancer cases (about 170 cases) and possibly 2.3 percent of bladder cancer cases (about 45 cases) diagnosed each year in Ontario are from occupational exposure to diesel engine exhaust.[198] Data from 2006 suggest that about 301,000 people in Ontario are exposed to diesel engine exhaust at work.[260]

EVIDENCE FOR REDUCING EXPOSURE TO DIESEL ENGINE EXHAUST

The best measure for protecting workers is combining occupational exposure limits with policies that eliminate the use of diesel and require using a safer fuel, such as natural gas. The Finnish Institute of Occupational Health has suggested a limit of 5 µg/m^3 elemental carbon for most workplaces and a limit of 20 µg/m^3 elemental carbon for mines and underground sites.[262] These limits are based on the likelihood of meeting them through simple engineering and administrative controls, such as fitting an exhaust removal system onto exhaust pipes, regularly servicing engines and minimizing idling.[262]

The Health Council of the Netherlands has proposed more ambitious limits for elemental carbon of 0.011 µg/m^3 as a target limit and 1.03 µg/m^3 as a prohibited limit.[263] It estimates that every 1.03 µg/m^3 of occupational exposure to diesel over 40 years leads to an additional four lung cancer deaths per 1,000 workers and 0.011 µg/m^3 leads to an additional four lung cancer deaths per 100,000 workers.[263]

POLICIES TO REDUCE DIESEL ENGINE EXHAUST EXPOSURE IN ONTARIO

In 2018, the Ontario Ministry of Labour, Training and Skills Development proposed a new occupational exposure limit for diesel particulate matter of 160 µg/m^3 total carbon,[264] which is about 126 µg/m^3 elemental carbon.[265] A limit of 400 µg/m^3 total carbon is in effect for the mining industry,[266] but workers in other industries are not protected by any limits.[264] The proposed limit would apply to all workers.[264]

Nickel

Nickel is a naturally occurring metal commonly used to form alloys, such as stainless steel, and in applications such as batteries, electroplating, ceramics and chemical reactions.[251] Nickel compounds are a known cause of lung, nasal and sinus cancers.[251]

Nickel compounds are commonly found in fumes from welding.[198] More welders are exposed to nickel than other types of workers in Ontario.[198] Other workers in Ontario who are exposed to nickel include metalworkers, machine tool operators, dental technologists and metal plating operators.[198]

NICKEL AND CANCERS IN ONTARIO

About 80 lung cancer cases diagnosed each year in Ontario are from occupational exposure to nickel, excluding welding fumes.[198] These cases make up about 1.0 percent of all lung cancer cases diagnosed each year in Ontario.[198] Occupational exposure to welding fumes (which contain nickel and other metals) also causes about 100 lung cancer cases each year in Ontario.[198]

EVIDENCE FOR POLICIES AND PROGRAMS

In the United States, state and federal legislation have set ventilation standards for welding, such as requiring a local exhaust system and specifying a minimum airflow.[267,268]

The Canada Labour Code sets an occupational exposure limit of 1.5 mg/m^3 for elemental nickel.[269] British Columbia's occupational exposure limits for nickel, such as 0.05 mg/m^3 for elemental nickel, are much lower than limits for the rest of the country.[269]

POLICIES AND PROGRAMS IN ONTARIO

Ontario has set an occupational exposure limit for elemental nickel and nickel metals of 1 mg/m^3 and additional limits for nickel compounds.[270] The Toxics Reduction Act, which will no longer be in effect as of December 31, 2021,[248] requires facilities in the manufacturing and mineral processing sectors in Ontario to report the amount of nickel they use, the number of employees in the facility and on existing plans for reducing the use of nickel.[248] Requirements to create new plans ended in 2018.[248]

INDICATOR FINDINGS: INDUSTRIAL NICKEL USE AND EMPLOYMENT

- The number of facilities that reported using nickel to the Toxics Reduction Program in Ontario and the total amount of nickel used decreased from 2013 to 2016 (Table 5).
- The number of employees working at industrial facilities increased from 2013 to 2016.
- In 2016, 123 facilities reported using 864,027 tonnes of nickel.
- Primary metal manufacturing and mining and quarrying reported 98.5 percent of the nickel used in 2016 (Supplementary Table S33).

Table 5: Amount of nickel used (in tonnes) and number of employees working at facilities using nickel in Ontario, 2013 to 2016

Year	Use (tonnes)	Number of employees	Number of facilities
2013	869,915	40,890	131
2014	870,027	40,889	125
2015	869,235	43,358	125
2016	864,027	44,147	123

Source: Ontario Toxics Reduction Program, 2013 to 2016 (Ministry of the Environment, Conservation and Parks)

Notes: Data are presented in Supplementary Table S33. Download supplementary tables at cancercareontario.ca/PSQI. Excludes facilities that are exempt from the Ontario Toxics Reduction Program (i.e., that use or release nickel in quantities below the legislated thresholds). Nickel use (tonnes) is estimated by selecting the mid-point value for each facility's reported range of use and summing these values across all facilities for each sector.

Formaldehyde

Formaldehyde is a widely used chemical. It is used as a preservative and disinfectant, as well as in glues and resins for manufacturing paper and wood.[271] Formaldehyde exposure can cause cancer of the nasopharynx and leukemia, and may be a cause of sinus cancer.[271]

FORMALDEHYDE AND CANCERS IN ONTARIO

Each year in Ontario, a history of workplace exposure to formaldehyde causes less than five leukemia cases, less than five cases of cancer of the nasopharynx and possibly less than five sinus cancer cases.[198] Risks of leukemia and cancers of the nasopharynx and sinuses due to occupational exposure to formaldehyde are highest in the manufacturing industry, followed by healthcare.[198]

EVIDENCE FOR POLICIES AND PROGRAMS

The Canada Labour Code and the American Conference of Governmental Industrial Hygienists (ACGIH) have set an occupational exposure limit of 0.3 parts per million (ppm) for formaldehyde that should not be exceeded for more than 15 minutes.[272] Seven provinces and two territories in Canada have adopted this limit.[272] This limit is recommended based on studies suggesting that it would minimize eye, nose and throat irritation for about 80 to 90 percent of workers.[273] ACGIH first reviewed a limit of 0.3 ppm in 1977, reducing it from a previous limit of 1.0 ppm.[273]

POLICIES AND PROGRAMS IN ONTARIO

Ontario has set a short-term exposure limit for formaldehyde of 1 ppm and a limit that should not be exceeded at any time of 1.5 ppm.[270] The Toxics Reduction Act requires facilities in the manufacturing and mineral processing sectors in Ontario to report the amount of formaldehyde they use, the number of employees in the facility and on existing plans to reduce the use of formaldehyde.[248] Requirements to create new plans ended in 2018.[248]

INDICATOR FINDINGS: INDUSTRIAL FORMALDEHYDE USE AND EMPLOYMENT

- The amount of formaldehyde use reported in Ontario was lower in 2016 than in the previous three years (Table 6, Supplementary Table S34).
- One chemical manufacturer reported a 10-fold increase in formaldehyde use in 2014 and 2015.
- The number of employees and the number of facilities reporting formaldehyde use were about the same from 2013 to 2016.
- Over half of Ontario's reported formaldehyde use is by paper manufacturers (Supplementary Table S34). Manufacturers of paper, chemicals and wood products combined reported 96.3 percent of the formaldehyde used in 2016 (Supplementary Table S34).

Table 6: Amount of formaldehyde used (in tonnes) and number of employees working at facilities using formaldehyde in Ontario, 2013 to 2016

Year	Formaldehyde used (tonnes)	Number of employees	Number of facilities
2013	10,330	28,544	32
2014	20,246	30,382	29
2015	18,897	29,242	31
2016	9,054	30,925	32

Source: Ontario Toxics Reduction Program, 2013 to 2016 (Ministry of the Environment, Conservation and Parks)

Notes: Data are presented in Supplementary Table S34. Download supplementary tables at cancercareontario.ca/PSQI. Excludes facilities that are exempt from the Ontario Toxics Reduction Program (i.e., they use or release formaldehyde in quantities below the legislated thresholds). Formaldehyde use (tonnes) is estimated by selecting the mid-point value for each facility's reported range of use and summing these values across all facilities for each sector.

Opportunities to reduce occupational carcinogens

- Create a public registry of all public buildings and workplaces that contain asbestos.
- Establish an inter-ministerial working group to address occupational asbestos exposure.
- Adopt occupational exposure limits for diesel engine exhaust of 20 µg/m^3 elemental carbon for the mining industry and 5 µg/m^3 elemental carbon for other workplaces.
- Upgrade or replace old on-road and off-road trucks and diesel engines.
- Introduce ventilation requirements in Ontario Occupational Health and Safety legislation for welding activities.
- Amend Ontario's Regulation 833 to reduce the occupational exposure limit for formaldehyde to the level recommended by the Canada Labour Code and American Conference of Governmental Industrial Hygienists.
- Encourage the substitution of formaldehyde with less toxic alternatives in manufacturing processes whenever possible.

Infectious agents

Infectious agents and cancer risk

Certain infectious agents (viruses, bacteria and parasites) are known to cause cancer.[274] About 9.2 percent of cancers in high-income countries are due to infectious agents.[274] Human papillomavirus (HPV) and the hepatitis B virus are two infectious agents that can be prevented through vaccination and other public health initiatives.

The HPV family of viruses includes many different strands and are most commonly transmitted through skin-to-skin sexual contact. Twelve types of HPV are considered high risk. Chronic infections from high risk HPV types can cause cancers of the cervix, head, neck, penis, vulva, vagina and anus.[275] The risk of contracting HPV increases with the number of sexual partners.[275] Adolescents and young adults have the highest incidence of infection.[275,276]

Chronic hepatitis B virus infections can cause liver cancer, specifically hepatocellular carcinoma (the most common type of primary liver cancer).[275] Hepatitis B is transmitted through sexual contact, needlestick injuries, birth, blood transfusions and household contacts.[275,277] People who are at higher risk of a hepatitis B infection include healthcare workers and injection drug users, as well as gay, bisexual and other men who have sex with men.[275]

Infectious agents and cancer burden in Ontario

Infectious agents that cause the most cancers each year in Ontario are:

- the HPV family of viruses (about 1,360 cases);
- Helicobacter pylori (about 1,070 cases);
- hepatitis C virus (about 290 cases);
- Epstein-Barr virus (about 180 cases); and
- hepatitis B virus (about 140 cases).[278]

Policies and programs to prevent infections that cause cancer

The World Health Organization recommends that population-wide vaccination programs form a core part of prevention efforts for HPV and hepatitis B virus infections.[279-281] Community-wide sexual health promotion programs, such as distributing free condoms and providing comprehensive sexual health education, are additional strategies to prevent HPV and hepatitis B virus infections.[282,283]

HPV DNA testing is recommended as part of population-based cervical cancer screening programs for people who have a cervix and are age 30 and older.[284] Although a screening program does not prevent HPV infections, it allows for early detection and follow-up of HPV infections. Given the benefits of HPV testing for cervical screening, Ontario Health (Cancer Care Ontario) is working with the Ministry of Health to plan to implement HPV testing in cervical screening and colposcopy. Until then, cytology remains the recommended test for cervical screening.[285]

Policies and programs specific to preventing hepatitis B virus infections that the World Health Organization recommends include prenatal screening, sterilizing needles used in piercings and tattoos, needle exchange and harm reduction programs for injection drug users, screening and vaccinating children and adults from countries with a high prevalence of hepatitis B virus infections and mitigating occupational exposures in healthcare settings through disinfection and safe handling of needles.[282,286] Local public health agencies in Ontario implement many of these strategies to reduce hepatitis B virus infections.[287]

Human papillomavirus

EVIDENCE FOR POLICIES AND PROGRAMS TO PREVENT HPV INFECTIONS

HPV vaccination programs have been shown to be effective in reducing HPV infections and anogenital warts.[280] Three HPV vaccines have been developed to protect against certain high risk and low risk HPV types. In high-income countries where 50 percent or more of girls received the HPV vaccine, there was a significant reduction in HPV infections and pre-malignant lesions in adolescent girls and women, as well as a significant reduction in anogenital warts in girls, women, boys and men.[280] The World Health Organization recommends that HPV vaccinations be included in national vaccination schedules.[279] The population target for these programs is all children 9 to 14 years old in an effort to immunize them before their first sexual experiences, but it is still recommended that people older than 14 who are sexually active get the vaccine.[279] Two doses of the HPV vaccine are recommended for children ages 9 to 15, and three doses for people age 15 and older.[279,288,289]

PREVENTION OF HPV INFECTIONS IN ONTARIO

In Ontario, a publicly-funded school-based HPV vaccination program is offered to all students in Grade 7 in a two-dose schedule.[290] If a student misses one or both doses in Grade 7, they are eligible to receive the vaccination up until the end of Grade 12. As of September 5, 2017, the HPV vaccination protects against 9 HPV types that can cause cancer and/or anogenital warts: HPV 6, 11, 16, 18, 31, 33, 45, 52 and 58. Previously, vaccination protected against four HPV types and was only offered to girls. The national target is to have 90 percent vaccination coverage of young people by the time they are age 17.[291]

The HPV vaccine is also publicly available in Ontario for gay, bisexual and other men who have sex with men, including some people who identify as trans, if they are age 26 or younger and if they did not start their HPV vaccine series before September 5, 2017.[292,293]

INDICATOR FINDINGS: SCHOOL-BASED HPV VACCINATION COVERAGE

This indicator measures vaccination coverage for the school-based HPV vaccination program in Grade 7 students for the 2017/18 school year. Public Health Ontario collected the data, which record coverage by age, from local public health agencies. Students who were 12 years old in 2017/18 and received two doses of the vaccine are counted towards vaccination coverage.[291]

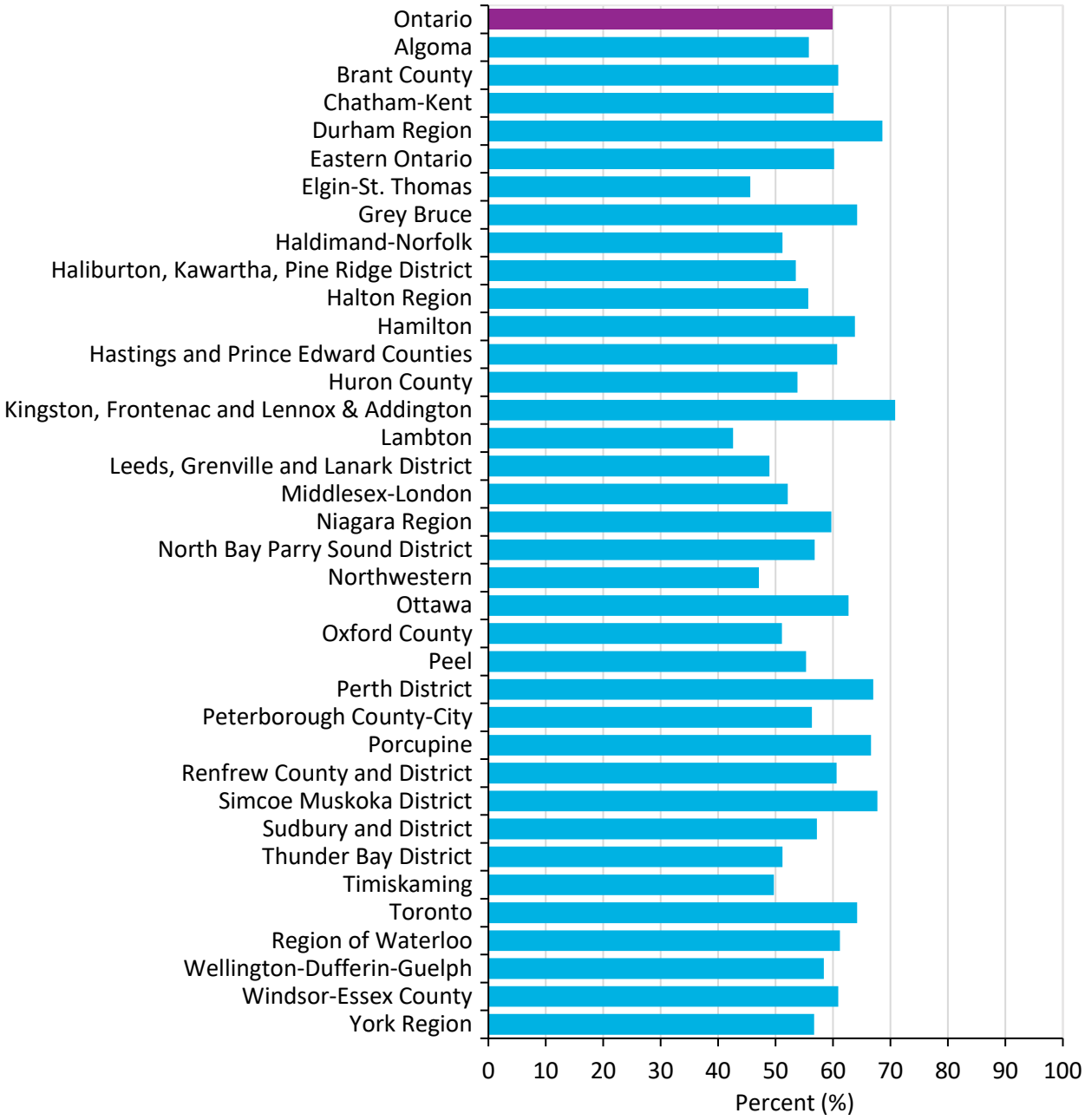
- At the end of the 2017/18 school year, 59.9 percent of 12-year-old students in Ontario received two doses of the HPV vaccine through the school-based program (Figure 9, Supplementary Table S35).
- The highest coverage was found in the public health units of Kingston, Frontenac and Lennox & Addington (70.8 percent), Durham Region (68.6 percent) and Simcoe Muskoka District (67.7 percent).
- The lowest coverage was found in Lambton (42.6 percent), Elgin St. Thomas (45.6 percent) and Northwestern (47.1 percent).
- HPV vaccination coverage in Ontario was higher among girls (62.4 percent) than boys (57.5 percent).[291]

Vaccination of Grade 7 boys, in addition to girls, started in the 2016/17 school year, when 56.3 percent of students received two doses of the vaccine. HPV vaccination rates have remained relatively stable in Ontario (Supplementary Table S35).

This indicator does not reflect doses of the vaccine received outside the school-based program. A population-based registry, that captures at the point of care all administered doses of the vaccine, would provide a better understanding of overall vaccination rates in Ontario.

To increase vaccination uptake, the Canadian Pediatric Society recommends providing education to students and parents on the safety and benefits of vaccination and the importance of community immunity, accessible, quick appointments for people who want to get vaccinated outside of the school program, and improved registries that can be used to prompt and remind parents when vaccines are overdue.[294] The Canadian Vaccination Evidence Resource and Exchange Centre conducted a literature review on strategies for increasing vaccination uptake. Strong evidence was not found so specific strategies could not be recommended.[295] However, mass vaccine promotion campaigns may support positive attitudes towards vaccination and ultimately vaccination coverage.[295]

Figure 9: Up-to-date human papillomavirus vaccination coverage (%) in 12-year-old students in Ontario, by public health unit, 2017/18 school year



Source: Digital Health Immunization Repository, 2017/2018 (Ministry of Health and Long-Term Care) in: Ontario Agency for Health Protection and Promotion (Public Health Ontario). Immunization coverage report for school pupils in Ontario: 2016–17 school year. Toronto, ON: Queen's Printer for Ontario; 2018.

Notes: Data are presented in Supplementary Table S35. Download supplementary tables at cancercareontario.ca/PSQI.

Hepatitis B

EVIDENCE FOR POLICIES AND PROGRAMS TO PREVENT HEPATITIS B VIRUS INFECTIONS

The hepatitis B vaccine protects against infection, which in turn reduces the risk of liver cancer.[296,297] The World Health Organization recommends that all babies begin hepatitis B vaccination at birth.[281] Hepatitis B virus infections in babies under the age of 1 are more likely to become chronic infections than in adults who become infected.[298] The Canadian Collaboration for Immigrant and Refugee Health recommends screening adults and children from countries with a chronic hepatitis B virus infection prevalence of two percent or higher, as well as vaccinating adults and children who do not have a chronic infection and are not yet immunized.[299]

PREVENTING HEPATITIS B VIRUS INFECTIONS IN ONTARIO

In Ontario, hepatitis B vaccinations are publicly funded in schools for students in Grade 7, who receive two doses of the vaccine. If one or both doses are missed in Grade 7, students are eligible to receive the hepatitis B vaccine until the end of Grade 8. The national target is to have 90 percent vaccination coverage (one or more doses of hepatitis B vaccination) of young people by the time they are age 17.[291]

Hepatitis B vaccination is also publicly funded in Ontario for high risk groups, which include:

- children under age 7 who have immigrated from countries with a high prevalence of hepatitis B virus infections;
- babies born to mothers who carry the hepatitis B virus;
- gay, bisexual and other men who have sex with men; and
- people who:
    - have had household or sexual contact with someone with hepatitis B virus (chronic carrier or acute case);
    - have a history of sexually transmitted infections;
    - have multiple sex partners;
    - use intravenous drugs;
    - have chronic liver disease, including hepatitis C, or are waiting for a liver transplant;
    - receive dialysis; and
    - have a disease that requires frequently receiving blood products.[293]

New immigrants age 7 and older are not currently eligible for the publicly funded hepatitis B vaccine. Hepatitis B vaccination coverage is not systematically tracked outside of the school-based program. Implementing a tracking-system could help improve coverage.

INDICATOR FINDINGS: SCHOOL-BASED HEPATITIS B VACCINATION COVERAGE

This indicator measures the coverage of the school-based hepatitis B vaccination program for Grade 7 students in the 2017/18 school year. Public Health Ontario collected the data from local public health agencies.

- At the end of the 2017/18 school year, 69.2 percent of 12-year-old students had received two doses of the hepatitis B vaccine.
- The highest vaccination rates were found in the public health units of Perth District (82.3 percent), Kingston, Frontenac and Lennox & Addington (80.5 percent), and Chatham-Kent (77.9 percent).
- The lowest vaccination rates were found in Lambton (51.4 percent), Northwestern (56.5 percent) and Thunder Bay District (57.8 percent).

A full list of hepatitis B vaccination rates by public health unit from the 2013/14 school year to the 2017/18 school year can be found in Supplementary Table S36.

Ongoing education for students and parents by public health professionals and healthcare providers will increase knowledge of the benefits and safety of vaccinations, and increase hepatitis B vaccination.[294] Mass health promotion campaigns may also support positive attitudes towards hepatitis B vaccination.[295]

Opportunities to prevent infections that cause cancer

- Publicly fund HPV DNA testing for people who have a cervix and are age 30 and older.
- Publicly fund hepatitis B vaccination for high risk groups, including adults and children who immigrate to Ontario from countries with a high prevalence of hepatitis B virus infections and their household contacts.
- Develop a province-wide registry that captures at the point of care all HPV and hepatitis B vaccine doses administered.
- Support local public health agencies in increasing education for parents and students on the benefits and safety of vaccinations.
- Develop mass vaccine promotion campaigns to support positive attitudes towards vaccination.

Conclusion

The findings of *Prevention System Quality Index 2020* suggest that Ontario has had some limited improvements in system-level policy and programs aimed at reducing cancer risk factors and exposures. However, there are still many opportunities to improve cancer prevention in Ontario.

Indicator findings that are encouraging show that:

- three local housing corporations have introduced a smoke-free policy across all of their properties since the *Prevention System Quality Index 2018* report;
- the percentage of secondary schools with health and physical education specialist teachers increased from the 2006/07 to 2016/17 school year;
- all 26 local municipalities with populations of 100,000 or more have a shade policy and four have strengthened their shade policy as of May 2019; and
- average $PM_{2.5}$ concentrations were lower than the Canadian Ambient Air Quality Standard of 8.8 $\mu g/m^3$ at all monitoring stations in Ontario in 2017.

The indicators suggest focusing efforts for improvement on:

- tobacco taxes in Ontario, which continue to fall well below the level recommended by the World Health Organization;
- minimum alcohol prices, which continue to fall below the amount needed to see substantial reductions in drinking in Ontario;
- privatization of alcohol retail stores and identifying limits for the percentage of stores that are privately owned;
- household food insecurity, which shows that 15.0 percent of Ontario households in 2017 experienced some level of food insecurity in the past 12 months; and
- HPV and hepatitis B vaccination rates, which have not shown an increase in the school-based programs from the 2013/14 to 2017/18 school years, and therefore, limit progress towards national targets.

Analyses by income in the report show inequities for tobacco indicators. Lower income groups are more likely to experience second-hand smoke exposure and less likely to achieve long-term smoking cessation, yet report quit attempts at rates similar to other income groups.

Prevention System Quality Index 2020 builds on past reports and highlights the best available data for Ontario to help reduce risk factors and exposures linked to cancer. Comprehensive work with partners across sectors and multiple levels of government is needed to achieve broader improvements for cancer prevention in Ontario.

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