



Cancer Risk Factors in Ontario

Foreword, highlights, table of contents, table and figures, context

FOREWORD



Cancer Risk Factors in Ontario: Tobacco is the second in our Cancer Risk Factors in Ontario series. It follows the March 2013 release of *Cancer Risk Factors in Ontario: Evidence Summary*, which summarized the epidemiologic evidence for a wide range of cancer risk factors, including tobacco. This report series supports one of Cancer Care Ontario's key strategic priorities to reduce chronic disease through prevention.

Tobacco control is important for preventing and controlling cancer and other chronic diseases in Ontario because tobacco use is a well-established cause of lung and several other cancers, and is a leading cause of cancer death worldwide. It also causes other chronic conditions, such as cardiovascular diseases and chronic respiratory diseases.

This report extends the work of *Cancer Risk Factors in Ontario: Evidence Summary* by providing information on the prevalence and distribution of tobacco use and cessation in Ontario. It uniquely examines tobacco smoking, smoking cessation and second-hand smoke exposure from a cancer perspective, including estimates of the tobacco smoking-associated cancer burden in the Ontario population.

In addition to its cancer focus, the report offers a detailed examination of socio-demographic variation in smoking, smoking cessation and second-hand smoke exposure, plus a special section on off-reserve Aboriginal Peoples.

The intent of this report is to complement and supplement other publications on tobacco use in Ontario and serve as a resource for public health and health professionals, as well as policy-makers. The next report in this series will focus on alcohol and cancer in Ontario.

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HIGHLIGHTS

- Approximately 9,800 new cases of cancer diagnosed in Ontario during 2009 are estimated to be attributable to tobacco smoking, specifically to cigarettes.
- Smoking is responsible for the majority of lung and laryngeal cancers, accounting for nearly three-quarters of these cancers diagnosed in males and two-thirds in females.

ADULTS

- In 2011, 20.6% of Ontario adults aged 20 years and older (roughly 2 million) were current daily or occasional smokers, a significant decline from 23.0% in 2003.
- Tobacco use and exposure is generally higher in males than females in Ontario:
 - In 2011, the prevalence of current smoking was significantly higher in males (24.2%) than females (17.1%); the current smoking rate in males has remained stable since 2003, while the rate in females has declined from 20.3% in 2003.
 - Male daily smokers, on average, smoked more cigarettes per day than females (median consumption 14.2 and 10.0, respectively).
 - Males more commonly used other tobacco products, such as cigars, pipes, snuff and chewing tobacco (8.9%, compared to 0.95% of females).
 - A lower proportion of male ever-smokers had successfully quit for at least one year (48.6%) than females (53.4%).
 - A higher proportion of non-smoking males were exposed to second-hand smoke in public places (13.0%) and in vehicles (6.5%); second-hand smoke exposure at home was similar for males and females.
- The prevalence of tobacco use and exposure to second-hand smoke is generally higher among younger adults, although younger adult smokers report fewer cigarettes per day than older adults.
 - Current smoking rates in 2011 were highest among adults aged 20–29 and 30–44 years, and lowest among those aged 65 years and older.
 - The use of other tobacco products was also most common among adults aged 20–29 years, and generally decreased with increasing age.
 - On average, adult daily smokers aged 20–29 and 30–44 years had slightly lower cigarette consumption (9.6 and 11.6 cigarettes per day, respectively) than older adults.
 - The proportion of ever-smoking adults who had quit smoking for at least one year was lowest in the 20–29 year age group and increased across older age groups.
 - Adults aged 20–29 years had a significantly higher prevalence of second-hand smoke

exposure at home, in a vehicle and in public places than all other age groups; with the exception of exposure at home, second-hand smoke exposure generally declined across older age groups.

- Significant inequalities in tobacco use, cessation and exposure exist across levels of several socio-demographic factors in Ontario.
 - Adults with less than a secondary school education and those in the lowest income quintile had significantly higher rates of current smoking and exposure to second-hand smoke, but significantly lower rates of long-term quitting, compared to post-secondary school graduates and adults in the highest income quintile.
 - Adults living in rural areas had significantly higher smoking rates than those in urban areas, but had lower prevalence of exposure to second-hand smoke in public places; no differences were seen for smoking cessation or exposure to second-hand smoke at home.
- Current smoking varies significantly across the province; among Local Health Integration Networks (LHINs), current smoking rates range from 16.7%–28.4%.

YOUTH

- Current smoking among Ontario teens aged 12–19 years declined significantly between 2003 and 2011, from 13.6% to 7.9% in males and from 13.8% to 4.0% in females. Significant declines in second-hand smoke exposure at home and in a vehicle were also observed since 2003, likely due to a combination of greater awareness of the hazards of second-hand smoke, smoke-free bylaws in several municipalities and the implementation of the *Smoke-Free Ontario Act*.
- Unlike the pattern seen in adults, males and females aged 12–19 years have a similar prevalence of current smoking. Male and female non-smoking teens also had a similar prevalence of exposure to second-hand smoke at home, in a vehicle and in public places.
- Current smoking was significantly more common among older teens aged 16–19 years (10.0%) than teens aged 12–15 years (1.7%).

ABORIGINES (OFF-RESERVE)

- Off-reserve Aboriginal populations in Ontario experience a substantially greater burden of tobacco exposure, including a significantly higher prevalence of current smoking, significantly higher median cigarette consumption, and significantly higher prevalence of exposure to second-hand smoke at home and in a vehicle, than the non-Aboriginal population. Both First Nations and Métis males and females had significantly higher current smoking rates than the non-Aboriginal population.



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ABOUT THIS REPORT



- This report presents the distribution of tobacco use in Ontario and features
 - tobacco-associated cancer risk in the population
 - socio-demographic inequalities in exposure to tobacco and cessation
 - tobacco use and exposure reported by Local Health Integration Networks and public health units
 - the tobacco burden in off-reserve Aboriginal populations in Ontario
- The report follows the March 2013 release of Cancer Care Ontario's *Cancer Risk Factors in Ontario: Evidence Summary*, which summarized the epidemiologic evidence for a wide range of cancer risk factors, including tobacco. We hope this report, with its focus on tobacco as it relates to cancer, will supplement other reports on tobacco use in Ontario as a resource for public health and health professionals, policy-makers, and planners involved in both cancer control and tobacco control in the province.
- The primary source of data for this report is the Canadian Community Health Survey (CCHS), Ontario Share files. The CCHS is a national cross-sectional survey conducted by Statistics Canada, with a large sample size considered representative of 98% of the Canadian population aged 12 years and older (individuals living on First Nation Reserves and other Aboriginal settlements, institutional residents, full-time members of the Canadian Forces, and residents of certain remote regions are excluded).
- Figures included in this report and their associated data tables are available online, separate from the main contents of this report and prepared as slides for presentation. Selected supplementary tables are also available online, including estimates of tobacco use, cessation and second-hand smoke exposure unadjusted for age. Methods and indicator definitions are included in the appendices.



1. CONTEXT

WHY IS TOBACCO CONTROL IMPORTANT FOR CANCER AND CHRONIC DISEASE PREVENTION?

- Tobacco smoking is a major preventable cause of morbidity and mortality. Smoking tobacco is a cause of many chronic conditions, including several types of cancer, cardiovascular disease, chronic respiratory diseases (chronic obstructive pulmonary disease, respiratory symptoms) and possibly diabetes.^{1,2} It is also known to cause acute respiratory diseases, such as pneumonia, have adverse effects in pregnancy and its outcomes, reduce bone density in postmenopausal females, cause periodontitis and cataracts, and negatively impact post-surgical wound healing.¹
- Tobacco use is a major preventable cause of several cancer types:
 - Actively smoking tobacco causes cancer of the oral cavity, pharynx, naso-pharynx, nasal cavity, para-nasal sinuses, esophagus, stomach, colon and rectum, liver, pancreas, larynx, lung, cervix (as a co-factor with human papillomavirus), ovary, kidney, bladder and other urinary system (including ureter), and bone marrow (acute myeloid leukemia).^{3,4} There is limited evidence that tobacco smoke causes breast cancer, although this association is controversial and research is ongoing in this area.
 - Exposure to second-hand smoke causes lung cancer and probably increases the risk of cancers of the larynx and pharynx.^{3,4}
 - Smokeless tobacco products (e.g., chewing tobacco, snuff, snus) cause cancer of the oral cavity, esophagus and pancreas.^{3,4}
- Cigarettes are the main form of tobacco smoked worldwide; other types of smoked tobacco products, including cigars and pipes, are also causally associated with a higher risk of several cancers (e.g., oral cavity, pharynx, larynx).^{3,4}
- Quitting smoking markedly reduces the risk of tobacco-related cancers, with risk generally decreasing with increasing time since cessation and decreasing age at cessation. For some cancers (e.g., lung), the risk declines rapidly (generally in the first five years), but remains elevated compared to never-smokers for many years.^{5,6} For other cancers (e.g., oral), the risk reduces to become nearly the same as for never-smokers around 10 years after cessation.³

TOBACCO CONTROL IN ONTARIO

- Ontario is a leader in comprehensive tobacco control programming. Through the introduction of the Ontario Tobacco Strategy (OTS) in 1992 and the Smoke-Free Ontario Strategy in 2004–2005, Ontario has implemented innovative tobacco control measures.
- The Smoke-Free Ontario Strategy combines public education with programs, policies and legislation to help smokers quit, protect the public from exposure to second-hand smoke and prevent young people from starting to smoke. The *Smoke-Free Ontario Act* (SFOA) bans smoking in workplaces, enclosed public spaces (e.g., bars, restaurants, casinos), patios covered by a rooftop and in vehicles when children under age 16 are present (as of January

2009). It also bans public display of tobacco products and prohibits the sale of youth-targeted tobacco products (e.g., flavoured cigarillos).⁷

- The Ontario government is committed to achieving the lowest smoking rates in Canada, and is continuing to expand prevention and cessation efforts to achieve this goal.⁸ To advance its objective, the government has renewed and strengthened its commitment to a smoke-free Ontario, including an additional \$5 million investment to the Smoke-Free Ontario Strategy in 2011/2012. This renewed commitment focuses on smoking cessation, including hospital-based programs, regulatory action to reduce the supply of contraband tobacco, including enforcement of tougher fines for the possession of illegal tobacco products, and strategies to protect youth and keep them smoke free.⁹
- *Taking Action to Prevent Chronic Disease: Recommendations for a Healthier Ontario*, prepared by Cancer Care Ontario and Public Health Ontario, includes four population-level recommendations for preventing chronic disease in Ontario that are specific to tobacco control. These recommendations highlight the need for action to address program and policy gaps in tobacco control in the province, build on and extend existing strategy achievements (e.g., extending protection from second-hand smoke exposure to bar and restaurant patios), and reinforce activities that deserve further development.²
- Cancer Care Ontario's Aboriginal Tobacco Program (ATP) aligns with the Smoke-Free Ontario Strategy tobacco control objectives and aims to reduce smoking rates among the First Nation, Inuit and Métis (FNIM) populations. The ATP strives to enhance the Aboriginal community's knowledge, skills, capacity and behaviour. The primary goal is to build capacity toward Tobacco-Wise FNIM communities among FNIM and non-FNIM policy-makers, healthcare administrators, and social and healthcare practitioners.¹⁰

WHAT PROPORTION OF CANCERS IN ONTARIO CAN BE ATTRIBUTED TO SMOKING?

- In 2009, approximately 9,800 new cases of cancer diagnosed in Ontario (equivalent to 15% of all new cancer cases) are estimated to be attributable to tobacco smoking, specifically cigarette smoking (Figure 1 and Table 1).
- A larger number of cancer cases in males are attributable to smoking (approximately 6,000) than females (approximately 3,800), primarily because smoking prevalence has historically been much higher among men.
- Among the cancer types associated with active cigarette smoking, cancers of the lung and larynx have the largest smoking-attributable burden in Ontario. In 2009, smoking accounted for roughly 76% of lung and 74% of laryngeal cancers diagnosed in males, and 66% of lung and 67% of laryngeal cancers in females (Figure 1 and Table 1).
- The proportion of Ontario lung cancer cases attributed to cigarette smoking in this report is lower than estimates for lung cancer incidence and mortality previously reported in Canada and other countries.^{1,11,12} This discrepancy exists because more conservative estimates of the relative risk associated with current and former smoking obtained primarily from a

large meta-analysis¹³ were used for this report. If relative risk estimates from the frequently cited Cancer Prevention Study II (CPS II) had been used,¹⁴ estimates of the proportion of Ontario's lung cancer cases attributable to tobacco would have increased to 88% in males and 75% in females (see Appendix C).

- A large proportion ($\geq 33\%$) of cancers of the lip, oral cavity, pharynx and esophagus in Ontario can be attributed to tobacco smoking. This is true for males and females.
- The estimated burden of tobacco smoking in this report is likely conservative, albeit still large, because it does not include tobacco products other than cigarettes (e.g., cigars, pipes), it does not account for the synergistic relationship between tobacco and alcohol for certain cancers, and it relies on self-reported smoking behaviour, which likely underestimates true prevalence.

TABLE 1.

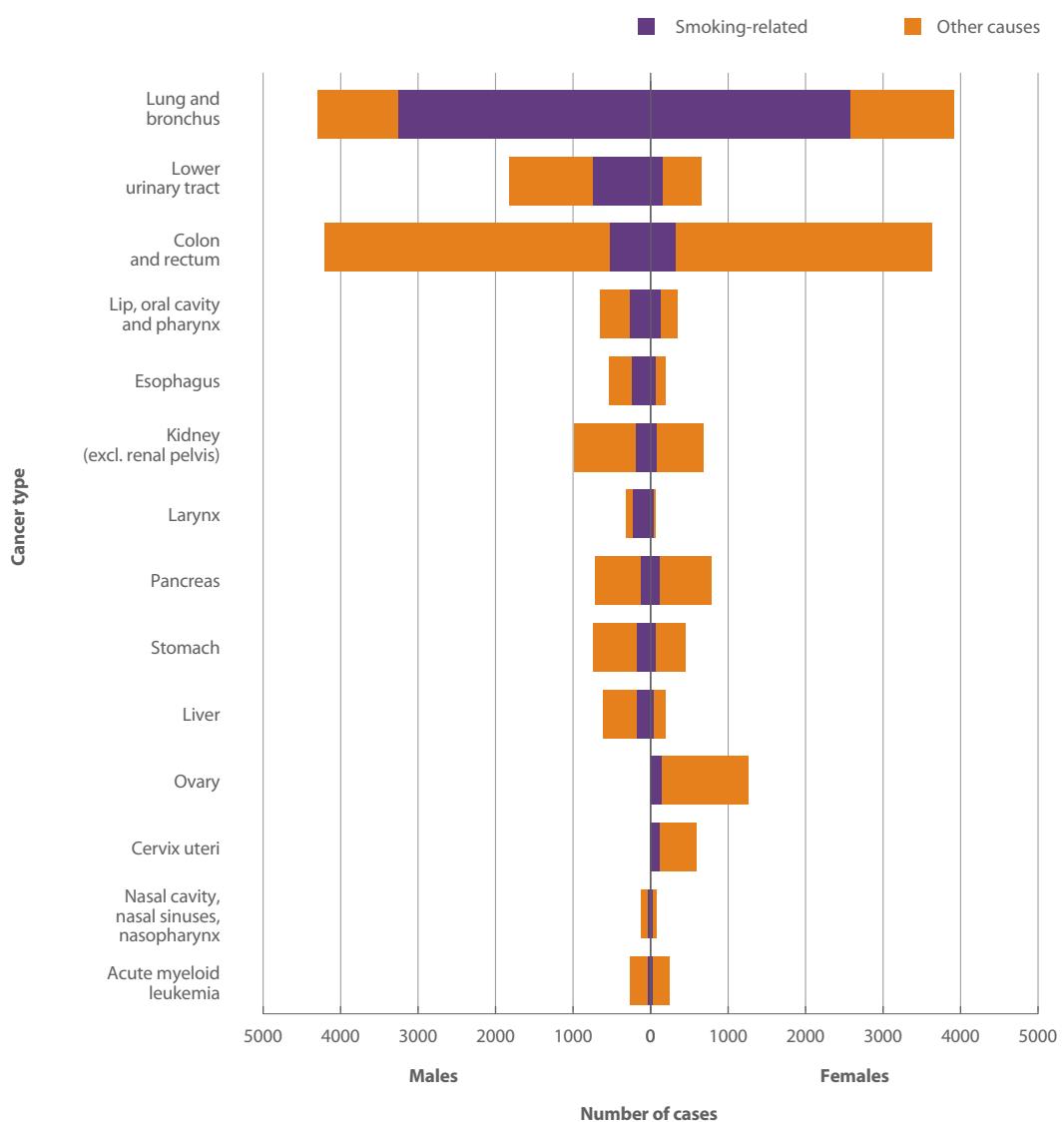
Total number of cancer cases and proportion attributable to smoking, Ontario, 2009, by sex

CANCER TYPE	BOTH SEXES		MALE		FEMALE	
	TOTAL CASES	% SMOKING RELATED	TOTAL CASES	% SMOKING RELATED	TOTAL CASES	% SMOKING RELATED
Lung and bronchus	8205	71.0	4294	75.9	3911	65.6
Lower urinary tract	2473	36.4	1818	41.0	655	23.6
Colon and rectum	7828	10.7	4201	12.4	3627	8.7
Lip, oral cavity and pharynx	1005	39.4	656	41.2	349	36.2
Esophagus	725	41.0	537	43.7	188	33.2
Kidney (excl. renal pelvis)	1659	16.3	980	19.6	679	11.7
Larynx	370	73.2	310	74.3	60	67.3
Pancreas	1498	16.1	710	17.9	788	14.5
Stomach	1197	19.4	750	22.8	447	13.6
Liver	805	26.0	616	28.6	189	17.7
Ovary (mucinous)	1255	10.6	—	—	1255	10.6
Cervix uteri	586	20.0	—	—	586	20.0
Nasal cavity, nasal sinuses, nasopharynx	196	25.8	118	27.9	78	22.5
Acute myeloid leukemia	510	9.6	263	11.3	247	7.7
TOTAL	28312	34.7	15253	39.2	13059	29.4

Sources: Cancer Care Ontario (Ontario Cancer Registry, 2012); see Appendix A for complete data sources

FIGURE 1.

Total number of cancer cases attributable to smoking, Ontario, 2009, by sex



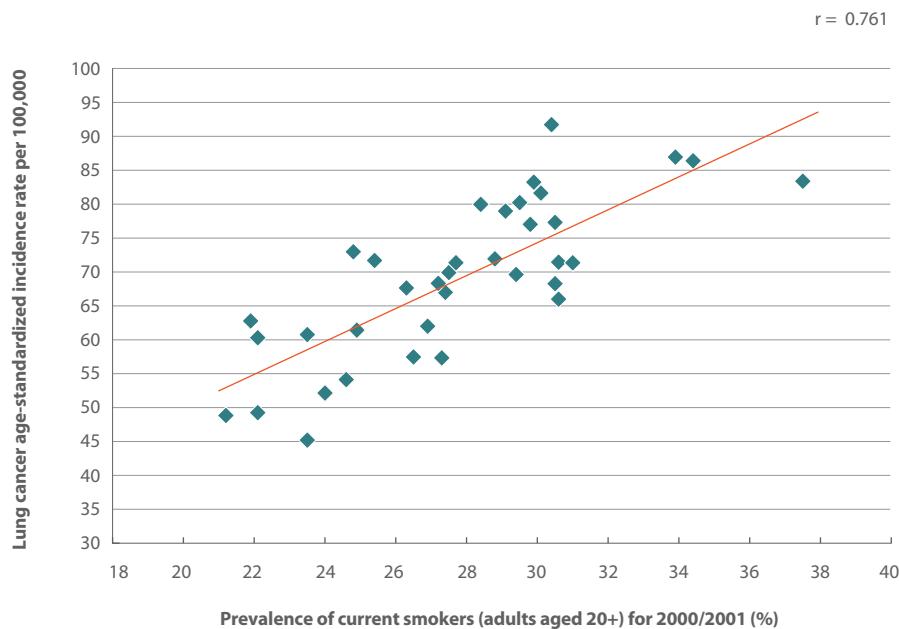
Sources: Cancer Care Ontario (Ontario Cancer Registry, 2012); see Appendix A for complete data sources

REGIONAL SMOKING PREVALENCE CORRELATES WITH LUNG CANCER INCIDENCE

- Lung cancer incidence rates in Ontario's health regions are strongly correlated with past estimates of daily and occasional cigarette smoking. Figure 2 shows the strong positive correlation ($r=0.761$) between the prevalence of current smoking in 2000/2001—the earliest period for which data could be readily obtained—and age-standardized incidence rates for lung cancer in the 2007–2009 period for Ontario's 36 public health units (PHUs).
- Given that the vast majority of lung cancer cases can be attributed to tobacco smoking, higher rates of lung cancer are expected in PHUs with higher rates of smoking in the past. The wide range in age-standardized incidence rates of lung cancer across Ontario's 36 PHUs (36.9 to 76.1 per 100,000 in 2007–2009; Ontario average is 50.4 per 100,000) highlights a continuing need for tobacco control efforts to reduce the burden of lung cancer and other tobacco-related cancers throughout Ontario, and particularly in some regions of the province. Figure 9 shows more recent smoking rates by PHU.

FIGURE 2.

Lung cancer incidence rates (2007–2009) and adult current smoking prevalence (2000/2001), Ontario, by public health unit, both sexes



Notes: Lung cancer incidence rates and current smoking estimates are age-standardized to the 2006 Canadian population.

Sources: Cancer Care Ontario (Ontario Cancer Registry, 2012); Canadian Community Health Survey, 2000/2001 (Statistics Canada)