TORONTO

STAFF REPORT
INFORMATION ONLY

The Burden of Illness from Tobacco in Toronto, 2012

Date:	September 24, 2012
To:	Board of Health
From:	Medical Officer of Health
Wards:	All

SUMMARY

The tobacco control actions taken by public health agencies in Canada are among the key achievements contributing to improved health outcomes and life expectancy of Canadians. In Toronto, there have been impressive reductions in second-hand smoke (SHS) exposure and in youth smoking prevalence in recent years since tobacco control actions were taken by the City of Toronto in 1999 and since the 2006 implementation of the Smoke-Free Ontario Act (SFOA) and associated strategy.

Despite historical health gains, adult smoking rates in Toronto have seen a slowed decline since 2001 with about one in five young adults still smoking. In addition, reported exposure to second-hand smoke (SHS) persists for a substantial portion of the population. Experts agree that tobacco use remains the leading cause of preventable morbidity and mortality worldwide, including in Canada and that tobacco use and SHS exposure remain important public health concerns.

The purpose of this report is to provide a brief summary of Toronto trends in health indicators and the estimated burden of illness associated with tobacco use, a major cause of lung cancer, cardiovascular diseases and respiratory diseases. This report also aims to update the Board of Health on adult smoking rates, youth smoking initiation and SHS exposure in the context of tobacco policy work in Toronto and Ontario.

This report complements two other reports being considered by the Board: Toronto Public Health Tobacco Control Plan- An Update, and Toward a Smoke-Free Toronto: New Frontiers to Improve Protection.

Financial Impact

There are no direct financial impacts arising from this report.

DECISION HISTORY

On May 10, 2004, the Board of Health considered the report Toronto's Health Status: Focus on Tobacco and Toronto Public Health's Tobacco Control Program

(http://www.toronto.ca/legdocs/2004/agendas/committees/hl/hl040510/it002.pdf). This report provided information regarding the effects of tobacco use and second-hand smoke exposure on the health status of Toronto residents, as well as data on tobacco use and smoking prevalence in Toronto.

ISSUE BACKGROUND

Recognition of the health hazards of tobacco use and related tobacco control actions are identified by the Canadian Public Health Association as among a dozen great public health achievements contributing to improved life expectancy and health in the first one hundred years of public health in Canada.[1] Tobacco use however, remains Canada's leading preventable cause of morbidity and mortality.[2] The World Health Organization identifies tobacco use as a public health epidemic, killing more than 6 million people a year, including more than 600,000 non-smokers who die from second-hand smoke (SHS) exposure.[3]

Toronto has been among the leaders in tobacco control action in Canada beginning in the 1970s.[4] The former City of Toronto passed its no-smoking bylaw in 1979 and also implemented a smoking bylaw for workplaces in 1988.[5] The amalgamated City of Toronto passed a harmonized smoking bylaw in 1999.[4] Alongside this policy work, Toronto Public Health (TPH) has also had a long history of programming aimed at preventing young people from starting to smoke, encouraging smoking cessation and protecting non-smokers from SHS exposure.

In Ontario tobacco control programming has included the 1992 Ontario Tobacco Strategy and the 2004 Smoke-Free Ontario Strategy (SFOS). The SFOS combines programs, policies and legislation that address the "three pillars" of cessation, prevention and protection. Enacted in 2006, the Smoke-Free Ontario Act (SFOA) prohibits smoking in enclosed workplaces, enclosed public spaces, anywhere on school property, near entrances of health care facilities and in motor vehicles when children under 16 are present. It also bans the public display of tobacco products prior to purchase and prohibits youth-targeted tobacco products such as flavoured cigarillos. Public health units enforce the SFOA and deliver tobacco control programs that are funded through the SFOS. TPH's current Tobacco Control program is discussed in detail in the report titled, Toronto Public Health Tobacco Control Plan- An Update.

The Ontario Public Health Standards (OPHS) require Ontario Boards of Health to engage in ongoing population health assessment and surveillance using a range of provincial and local indicators. Among other areas, the analysis should include specific information on demographics, burden of disease, including mortality and morbidity rates, environmental conditions and hazards and risk factor prevalence. The Chronic Disease and Injuries Program Standards of the OPHS require Ontario Boards of Health to conduct epidemiological analysis of surveillance data related to comprehensive tobacco control, including preventing tobacco use initiation, promoting smoking cessation, eliminating

SHS exposure and identifying and eliminating disparities related to tobacco use and its societal outcomes among different population groups.[6]

COMMENTS

Health Impacts of Tobacco Use and Exposure to SHS Remain a Serious Public Health Concern

Several respected scientific bodies have concluded that both active smoking and SHS exposure cause death and disease. Cigarette smoke contains over 4,000 chemicals: hundreds are toxic[7], and at least 70 are known carcinogens.[8] In addition to lung cancer, for which smokers have 12-23 times the risk of non-smokers, smokers are at an increased risk of contracting cancer in at least 18 other sites.[9] Smokers also have 12-23 times the risk of non-smokers of contracting chronic obstructive pulmonary diseases including emphysema and chronic bronchitis,[9] as the chemicals in tobacco smoke can cause permanent damage to the lining of the lungs.[7] Tobacco smoke exposure also causes blood vessel damage and inflammation, which can lead to blood clots that cause heart attack and stroke.[7] Smokers have two to four times the risk of non-smokers of developing these conditions.[9] The chemicals in cigarette smoke also cause inflammation and cell damage, which can weaken the immune system. They can raise blood sugar levels, exacerbating the health issues related to diabetes.[7] Smoking has also been linked to low physical activity levels, another modifiable risk factor for chronic disease.[10]

Quitting smoking significantly reduces the elevated risks associated with smoking. Within one year of quitting smoking, the risk for a heart attack drops sharply. Within two to five years, stroke risk can drop to that of a non-smoker. After five years, risks for cancer of the throat, mouth, esophagus and bladder are cut in half. Risks for dying of lung cancer are cut in half after 10 years.[7]

In addition to the risks associated with direct smoking, scientific evidence has established that there is no risk-free level of exposure to SHS. Also known as involuntary smoking or passive smoking[11], SHS refers to the combination of smoke emitted from a lit cigarette or other tobacco product and the smoke exhaled by an active smoker.[12] The health consequences of SHS exposure include immediate cardiovascular effects that are almost as severe as those associated with firsthand smoking[13], and an increased risk of ischemic heart disease, lung cancer and respiratory illnesses and symptoms.[12] Research indicates for example, that the risk of coronary heart disease is increased by 25 to 30% with exposure to SHS.[14]

SHS exposure is particularly harmful to infants and children, as it increases their risk of acute respiratory infections and ear infections and it slows lung growth.[15] In children with asthma, SHS exposure increases the frequency and severity of asthma attacks.[15] Infants whose mothers smoked during pregnancy, or who are exposed to SHS in the home, are more likely than unexposed babies to have weakened lungs or to die of sudden infant death syndrome.[15]

Data and Trends in Burden of Illness from Tobacco Use in Toronto, Ontario and Canada

Tobacco use causes an estimated 13,000 deaths each year in Ontario, and is the number one cause of preventable death and disease in the province. In 2011, tobacco use cost the province of Ontario 7.5 billion dollars in direct and indirect health care costs.[16]

Since both smoking and SHS exposure are major causes for lung cancer, ischemic heart disease and chronic obstructive pulmonary disease, the incidence and mortality rates of these illnesses are useful indicators for measuring the burden of illness from tobacco use.

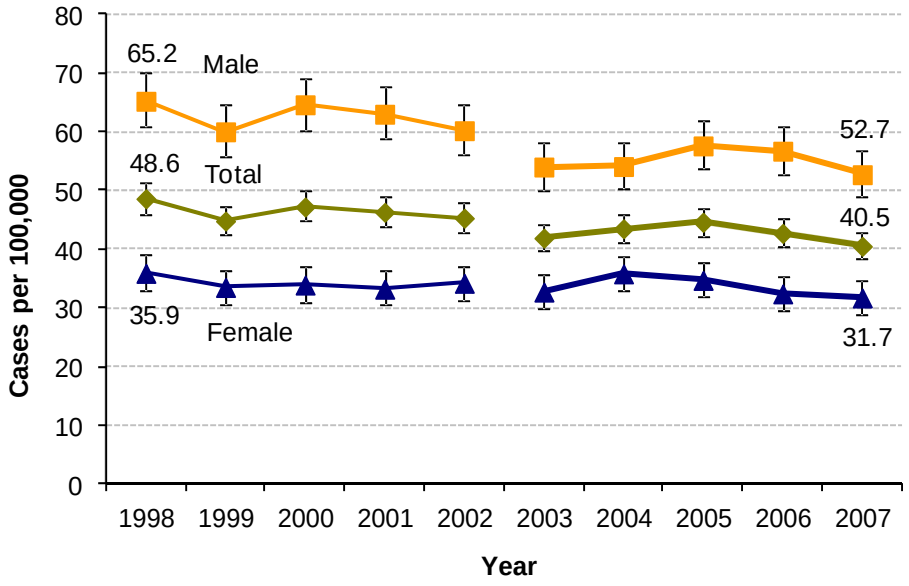
Lung Cancer

Lung cancer is the leading cause of cancer mortality among both men and women, accounting for over 25% of all cancer deaths in Canada.[17] Tobacco use is the primary cause of lung cancer incidence.[18] Compared to people who have never smoked, current smokers have 9-20 times the risk of contracting lung cancer. Second-hand smoke exposure is also causally linked to lung cancer for non-smokers.

Using mortality data for the Canadian population, a 2007 study by University of Toronto and the Centre for Addiction and Mental Health determined that 13,401 lung cancer deaths were attributable to smoking in 2002 (the most recent year for which this type of analysis has been conducted).[19]

Lung cancer incidence in Toronto remained relatively stable at just over 40 cases per 100,000 people from 1998 to 2007. Throughout this period, lung cancer incidence was significantly higher among males compared to females (Figure 1).

Figure 1: Age-Standardized Lung Cancer Incidence by Sex, Toronto, 1998 to 2007



Notes: (1) Error bars (I) denote 95% confidence intervals. (2) Data standardized to the 1991 Canadian population. (3) Gap between 2002 and 2003 indicates the switch from using ICD-9 coding system to ICD-10. Comparing data before and after this gap must be done with caution.

Data Source: Cancer Care Ontario, Ontario Cancer Registry, 1998-2007, April 2011.

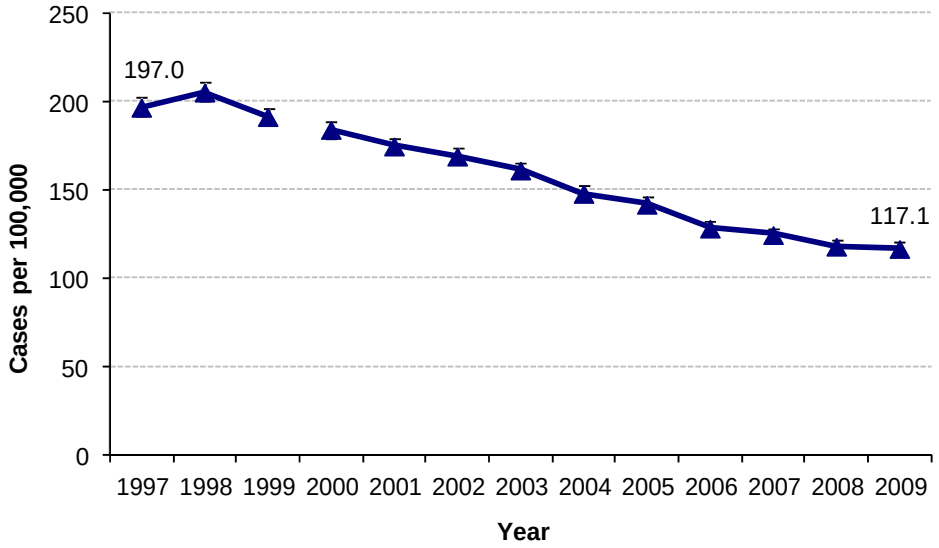
Cardiovascular Disease

Cardiovascular diseases (CVD) are one of the leading causes of adult mortality in Canada. In 2004, 32% of all Canadian deaths, or 72,338 deaths, were due to CVD. The most common type of CVD in Canada is ischemic heart disease (IHD). IHD affects circulation of blood to the heart muscle, which can lead to a heart attack.[20] Both smoking and SHS exposure can cause ischemic heart disease and other types of cardiovascular diseases. For example, studies show increased risks of having coronary heart disease, even for persons who smoke less than five cigarettes daily.[7] Furthermore, the risk of CVD goes up significantly even with brief SHS exposure.[7] Recent research from the World Health Organization has found that almost half of Canadian smokers do not recognize how their smoking can endanger the heart health of those exposed to SHS.[21]

An estimated 10,275 CVD deaths were attributable to smoking in 2002. Of these smoking-related CVD deaths in Canada, over half (n =5,343) were caused by IHD.[19] The proportion of hospital days related to IHD that can be attributed to smoking vary from over 30% in men under age 45 years to about 1% of passive smokers.[23]

Toronto's general rate of death from cardiovascular disease dropped from 197 cases per 100,000 people in 1997 to 117 cases per 100,000 people in 2009 (Figure 2). Similarly, Toronto's ischemic heart disease mortality rate has decreased significantly, from 104 cases per 100,000 people in 1997 to 61 cases per 100,000 people in 2009 (Figure 3).

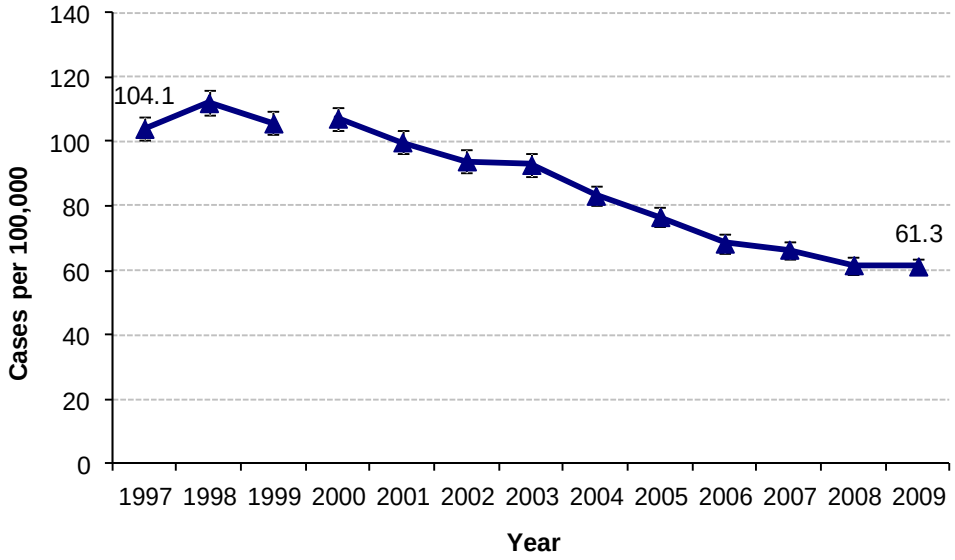
Figure 2: Age-Standardized Cardiovascular Disease Mortality Rate, Toronto, 1997 to 2009



Notes: (1) Error bars (I) denote 95% confidence intervals. (2) Data standardized to the 1991 Canadian population. (3) Gap between 1999 and 2000 indicates the switch from using ICD-9 coding system to ICD-10. Comparing data before and after this gap must be done with caution.

Data Source: Vital Statistics 1997 - 2009, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: August 2012.

Figure 3: Age-Standardized Ischemic Heart Disease Mortality Rate, Toronto, 1997 to 2009



Notes: (1) Error bars (I) denote 95% confidence intervals. (2) Data standardized to the 1991 Canadian population. (3) Gap between 1999 and 2000 indicates the switch from using ICD-9 coding system to ICD-10. Comparing data before and after this gap must be done with caution.

Data Source: Vital Statistics 1997 - 2009, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: August 2012.

Tobacco control actions may account in part for the decreases in CVD and IHD mortality. Research by the Institute for Clinical Evaluative Sciences on hospitalization rates for three cardiovascular conditions (acute myocardial infarction, angina and ischemic stroke) prior to and following the three phases of Toronto's smoking bylaw found a 39% decrease in admissions to hospital following the ban affecting restaurants (implemented in June 2001).[22] These findings may be due to reduced exposure to SHS or may be from people quitting as a result of the smoking bylaw.

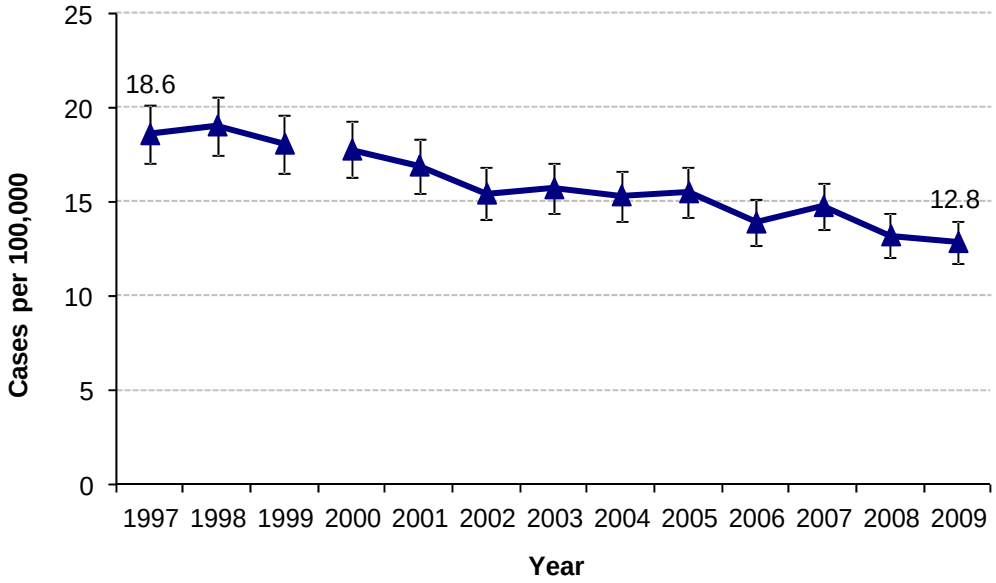
Respiratory Disease

Diseases of the respiratory system that are affected by tobacco use range from acute, short-term illnesses such as the common cold, flu and pneumonia, to longer term illnesses, such as chronic obstructive pulmonary disease (COPD), which includes conditions such as emphysema and bronchitis. Smoking is a preventable risk factor for respiratory diseases, particularly for COPD. In 2002, respiratory disease accounted for 8,282 (22.3%) of smoking attributable deaths in Canada. A large portion of these smoking-related respiratory deaths (n= 7,533) were from COPD.[19] Similarly, smoking accounts for about half of all hospital days for men and women that are related to COPD.[23]

According to the Public Health Agency of Canada's 2011 Survey on Living with Chronic Diseases in Canada, 57% of those with COPD reported having smoked since their diagnosis, 36 % were current smokers, 47 % were former smokers and 82 % had quit or cut down on smoking to help control breathing problems associated with their COPD. Twenty percent of those with COPD reported being exposed to SHS in their home.[24]

In Toronto the mortality rate for COPD has declined significantly, by just over 31 percent between 1997 (19 cases per 100,000 people) and 2009 (13 cases per 100,000 people) (Figure 4).

Figure 4: Age-Standardized Mortality Rate for Chronic Obstructive Pulmonary Disease, Toronto, 1997 to 2009

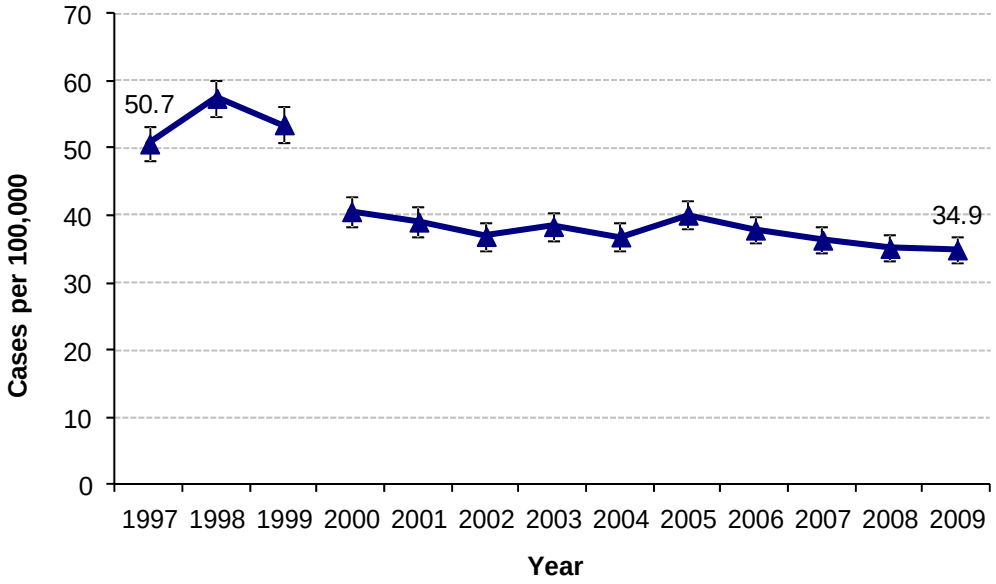


Notes: (1) Error bars (I) denote 95% confidence intervals. (2) Data standardized to the 1991 Canadian population. (3) Gap between 1999 and 2000 indicates the switch from using ICD-9 coding system to ICD-10. Comparing data before and after this gap must be done with caution.

Source: Vital Statistics 1997 - 2009, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: August 2012.

Overall respiratory disease mortality in Toronto has also significantly decreased since 1997, with a similar plateauing since about 2000 (Figure 5). There is incomplete understanding of the reasons for earlier decreases in mortality from COPD or from respiratory disease in general. Research by ICES mentioned previously on the relationship between Toronto's phased-in smoking bans and hospitalization rates for select conditions found a 33 percent decrease for respiratory conditions following the ban affecting restaurant settings in June 2001.

Figure 5: Age-Standardized Respiratory Disease Mortality Rate, Toronto, 1997 to 2009



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Data Source: Vital Statistics 1997 - 2009, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: August 2012.

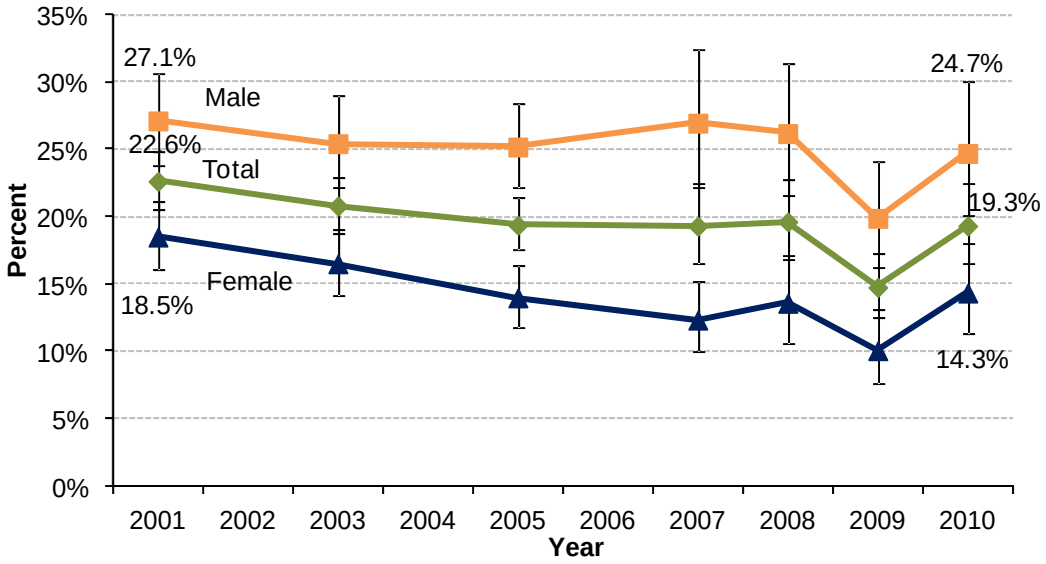
Tobacco Use in Toronto

TPH does not have data to show the long-term historical change in rates of smoking in Toronto. Smoking prevalence data for Canada released in 2012 however, shows that there has been a substantial decline in the proportion of Canadians who smoke, from about 50% of the population in 1965 to fewer than 2 out of 10 people in 2010.[25] The decline has been steady over those 45 years, however, as this report will show for Toronto, the authors of the 2012 report note that the declines in Canadian smoking rates have levelled off in recent years.

Adult Smoking

According to data from Statistics Canada's Canadian Community Health Survey (CCHS), nearly 20 percent of Toronto adults aged 20 and older were current smokers in 2010. This percentage has remained relatively stable since 2001, the first year for which CCHS data is available. Furthermore, the smoking rate among males was significantly higher than that of females: 25 percent of males smoked in 2010, compared to 14 percent of females (Figure 6).

Figure 6: Current Smokers, Adults 20 and Older, Toronto, 2001 to 2010



Notes: (1) Error bars (I) denote 95% confidence intervals. (2) Current smokers includes people who are daily smokers or occasional smokers.

Data Source: Canadian Community Health Survey, 2001, 2003, 2005, 2007, 2008, 2009 and 2010. Statistics Canada, Share File, Knowledge Management and Reporting Branch, Ontario Ministry of Health and Long-Term Care.

It is possible that the dip in smoking prevalence in 2009 is a statistical anomaly.

Smoking prevalence was highest among young adults. In 2009/10, just over 26 percent of Toronto adults aged 18-24 were current smokers, a percentage that has also remained consistent since 2001 (data not shown).

Compared to people who have never smoked, current smokers are significantly more likely to be male, 20-39 years of age, have a high school level education, earn a middle level income, be Canadian-born and identify as white (Table 1).

Table 1: Current and Non-Smokers, Adults 20 and Older, Select Socio-demographic Characteristics, Toronto, 2009/10

	Current Smoker (Daily or Occasional)		Never Smoked	
	Percent	**95% CI**	**Percent**	**95% CI**
Sex				
Male	62.8	56.8, 68.3	40.1	36.8, 43.6
Female	37.3	31.7, 43.2	59.9	56.4, 63.2
Age				
20-39	52.0	45.9, 58.1	41.4	38.1, 44.8
40-64	39.4	33.6, 45.5	43.2	39.7, 46.8
65+	8.6	6.3, 11.7	15.4	13.6, 17.5
Education Level				
Less than high school	13.1	9.6, 17.6	10.4	8.6, 12.6
High school graduate	24.6	18.9, 31.4	13.4	11.2, 15.9
Post-secondary graduate	62.4	55.8, 68.5	76.2	73.2, 79.0
Income Level				
Lower	27.8	22.6, 33.7	31.5	28.0, 35.2
Middle	49.0	42.3, 55.7	37.6	33.9, 41.5
Higher	23.2	18.4, 28.8	30.9	27.4, 34.6
Immigrant Status				
Recent immigrants (<11 yrs)	11.6[E]	8.0, 16.5	24.3	21.3, 27.7
Established immigrants (11+ yrs)	31.6	26.0, 37.9	39.4	36.0, 42.9
Canadian-born	56.8	50.5, 62.9	36.3	33.1, 39.6
Ethno-racial Identity				
White	64.9	58.3, 71.0	45.2	41.7, 48.6
Racialized Group	35.1	29.0, 41.7	54.9	51.4, 58.3

Notes: (1) Current smokers includes people who are daily smokers or occasional smokers. (2) Income Level is based on the ratio of each survey respondent's annual household income to the low income cut-off corresponding to their household size, divided by the highest such ratio in Toronto. The lower level is the lowest 30% of income ratios, the middle level is the 31st to 70th percent, and the higher level is the top 30%. (3) Racialized is used to define groups that do not identify themselves as white, recognizing that 'races' or 'visible minorities' are socially constructed but have real consequences for individuals and communities. (4) 95% Confidence intervals are used on response estimates, which means that the estimate is within the range 19 times out of 20. E – Moderately high sampling variability; interpret with caution.

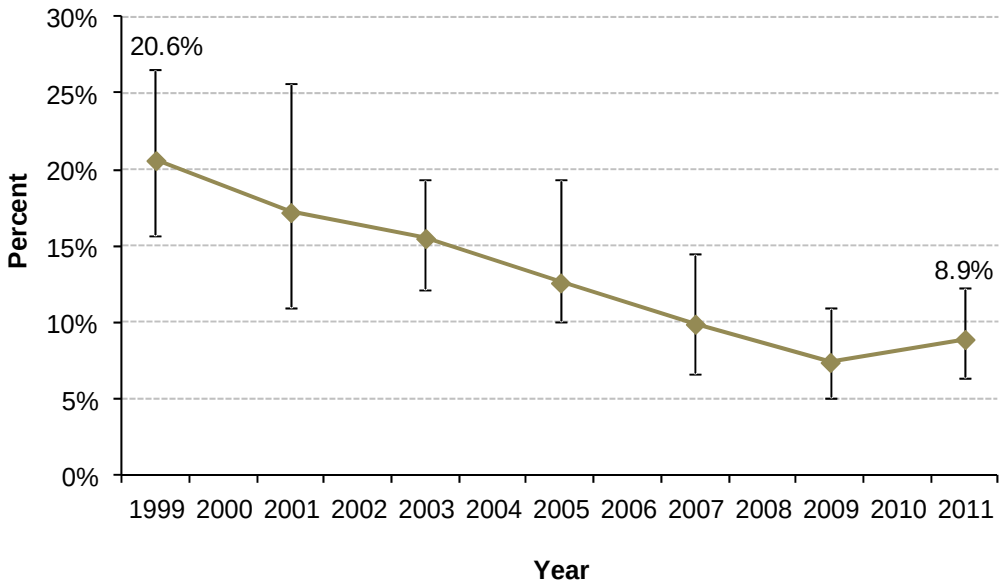
Data Source: Canadian Community Health Survey, 2009/10. Statistics Canada, Share File, Knowledge Management and Reporting Branch, Ontario Ministry of Health and Long-Term Care.

Youth Smoking

Toronto Public Health's tobacco control work in the area of smoking prevention prioritizes programs for youth aged 12-17, as this group is vulnerable to tobacco use initiation and habituation. Most adult smokers began the habit as adolescents or even earlier. Youth smokers are at increased risk for both immediate and long-term health consequences including reduced lung function, chronic obstructive pulmonary disease and nicotine addiction.[26]

According to the 2011 Ontario Student Drug Use and Health Survey (OSDUHS), almost 9 percent of Toronto students in grades 7 to 12 had smoked cigarettes in the past year. This percentage has decreased significantly since 1999, when just over 20 percent of students had smoked over the past year (Figure 7). Ontario-wide data from OSDUHS suggests that males and females are equally likely to smoke cigarettes.[27]

Figure 7: Past Year Cigarette Smoking, Students Grades 7 to 12, Toronto, 1999 to 2011



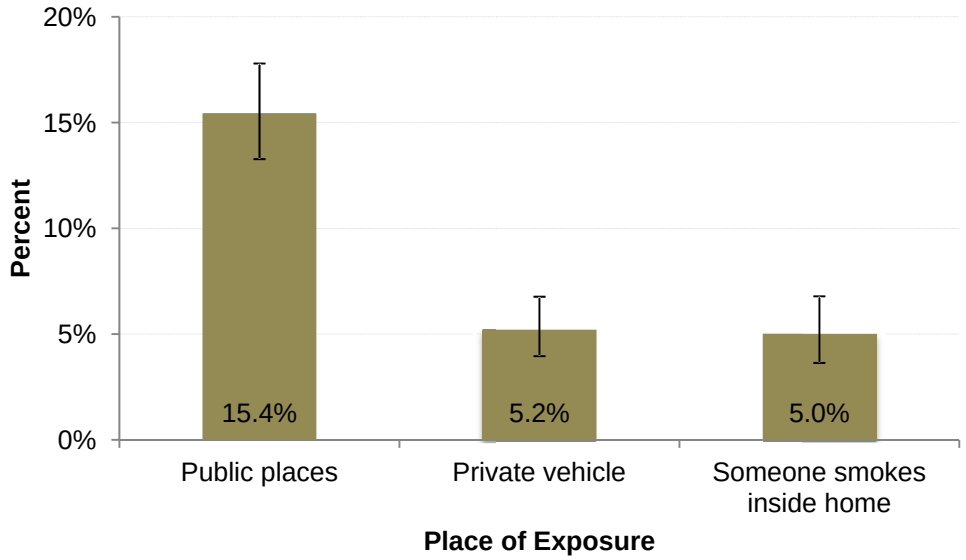
Notes: Error bars (I) denote 95% confidence intervals.
Data Source: Paglia-Boak, A., Adlaf, E.M., & Mann, R.E. (2011). Drug use among Ontario students, 1977-2011: Detailed OSDUHS findings (CAMH Research Document Series No. 32). Toronto, ON: Centre for Addiction and Mental Health.

Second-Hand Smoke Exposure

Scientists have firmly established that there is no safe level of exposure to SHS, which like direct smoking, causes death and disease. In Canada, SHS exposure causes the death of at least 800 non-smokers annually.[28]

Since the 2006 enactment of the SFOA, smoking has been prohibited in indoor public places and workplaces, with the goal of reducing the public's exposure to SHS. Nevertheless, exposure persists, especially in outdoor public places. Data from the 2009/10 CCHS show that 15 percent of non-smoking Toronto adults were exposed to SHS every day or almost every day in a variety of public places. In contrast, 5 percent of non-smoking adults were exposed to SHS in a private vehicle, and 5 percent reported that someone smokes inside their home (Figure 8).

Figure 8: Percent of Current Non-Smokers Exposed to Secondhand Smoke Everyday or Almost Everyday, Aged 18 and Older, Toronto, 2009/10 Combined



Notes: (1) Error bars (I) denote 95% confidence intervals. (2) Examples of public places included: bars, restaurants, shopping malls, arenas, bingo halls, bowling alleys.

Data Source: Canadian Community Health Survey, 2009/10. Statistics Canada, Share File, Knowledge Management and Reporting Branch, Ontario Ministry of Health and Long-Term Care.

Expanded Tobacco Control Required Despite Health Gains

The burden of illness from tobacco-related health effects, smoking prevalence and exposure to SHS have all improved compared to where they were over 10 to 15 years ago. Both mortality and incidence for illnesses like lung cancer, IHD and COPD which are strongly impacted by tobacco use have declined from historical levels.

The following statistics from this report are particularly striking:

- Adult smoking rates have remained relatively stable since 2001. Nineteen percent of Toronto adults still smoke, a rate that has not changed substantially in recent years. Over one in four (26%) of Toronto's young adults (ages 18-24) smoke.
- While youth smoking rates have significantly declined since 1999, nine percent of Toronto youth continue to smoke.
- Despite reductions in smoking indoors and in specific locations, Toronto residents continue to be exposed to SHS in both private and public settings.
- Mortality rates for cardiovascular diseases and respiratory diseases associated with smoking, have declined since the 1990s but remain leading causes of death in Canada, while lung cancer incidence rates have remained relatively stable.
- Tobacco use and SHS exposure remain the leading causes of preventable death in Canada.

Two other reports ("Toronto Public Health Tobacco Control Plan- An Update." and "Toward a Smoke-Free Toronto: New Frontiers to Improve Protection") being considered by the Board of Health discuss actions to address the health issues identified in the current report.

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