# 2012 burden of tobacco

## The Use and Consequences of Tobacco in Peel

Region of Peel
Working for you
Public Health

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# introduction

There are many risk factors that can result in reduced life expectancy; excessive alcohol use, physical inactivity, poor diet, stress and smoking are the five most hazardous health behaviours for Ontarians. Within this group of five, smoking is one of the biggest contributors to the equity gap in both life expectancy and health-adjusted life expectancy.[1] The impacts of tobacco-related diseases are felt by the smoker, their family and the health care system.

Over the past 60 years, both Canada and Ontario have achieved many successes in their battle against smoking. Some examples include:

- Enacting smoking restrictions in public places, workplaces and motor vehicles,
- Educating the public about the direct association between tobacco addiction and serious morbidity and mortality,
- Making the provision or sale of tobacco to those under 19 years of age illegal in Ontario,
- Restricting tobacco advertising,
- Banning tobacco sponsorship, and retail displays of cigarette and tobacco products,
- Providing regulations for the cigarette pack size and cigarette pack warning labels, and
- Introducing new rules to reduce contraband tobacco.

Peel has also been active over the last 30 years in its efforts to reduce tobacco use:

- Mid-1980s – Brampton, Caledon and Mississauga passed by-laws that required all eating establishments to make 25 per cent of the seating area smoke-free.
- 1999 – Brampton, Caledon and Mississauga made workplaces and public places smoke-free. Bars, restaurants, food courts, recreation facilities, billiard and bingo halls, nightclubs and casinos were exempt.
- 2001 – Peel banned smoking in all restaurants, banquet halls, food courts and food areas in recreational facilities unless an enclosed separately-ventilated smoking room was created.
- 2003 – The Region of Peel Smoke-Free By-Law was passed. This by-law stipulated that all enclosed public places had to phase out their designated smoking rooms (DSRs) by June 1, 2010.
- 2004 – Peel banned smoking in bars, bingo halls, nightclubs and taverns unless a separately-ventilated DSR was built. The Town of Caledon went further and banned DSRs altogether.[2]

### *Purpose of this Report*

This report is intended to be used as a foundational document to support the "Living Tobacco Free" strategic priority outlined in Peel Public Health's 10-Year Strategic Plan and to support the Region of Peel's Term of Council Priorities for 2012–2014. Ultimately, Peel Public Health plans to use the information to guide the development of new strategies to reduce tobacco use and its many health consequences.

There are still many things about tobacco that we do not know. Gaps in existing data sources are assessed to describe limitations in our ability to fully assess tobacco use in Peel and across Ontario.

The intended audiences for this report are Peel Public Health staff, Region of Peel Councillors, community partners, hospital administrators, health care providers, students and educators.

## HOW TO READ THIS REPORT

***Burden of Tobacco: The Use and Consequences of Tobacco in Peel, 2012*** provides an overview of the use of tobacco, the important health consequences of cigarette use and tobacco use in the context of our community, the tobacco industry and the tobacco regulatory system.

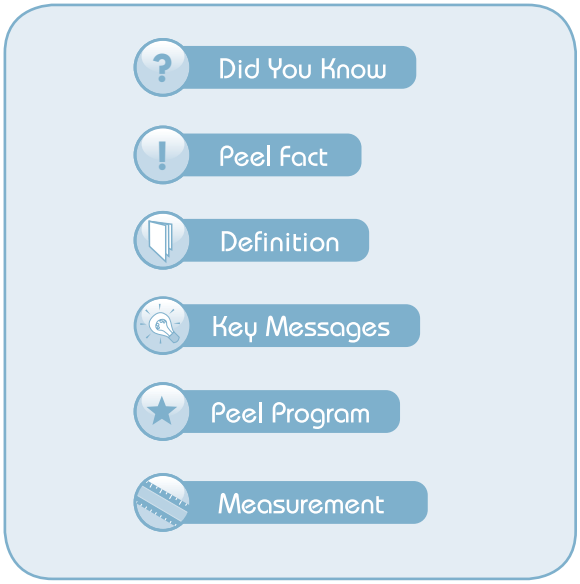
Throughout this report we have tried to illustrate our points with local Peel data. Sometimes, however, data for Peel are unavailable or the numbers are too small and unreliable to be reported. In these instances, we provide data for Ontario or Canada. Additionally, we occasionally make use of provincial, national or international data for the purposes of comparison.

Ninety-five per cent confidence intervals (presented as 95% CI in the report) are provided for many of the estimates (e.g., percentages, rates) throughout this document. The confidence interval presents a lower and upper range of values, which we are confident contains the true value of the estimate for the whole population 95% of the time, or 19 times out of 20.

When the 95% confidence interval of one estimate does not overlap with that of another estimate, the difference between the estimates is considered to be statistically significant (i.e., very unlikely to be due to chance). If the confidence intervals of two estimates do overlap, the estimates may still be significantly different. An appropriate statistical test would be required to assess the statistical difference of the two estimates.

Some data included in this report are described spatially using a customized level of geography called "data zones". These data zones were developed for Peel Public Health using Census data for the purposes of mapping health status data, and are an aggregation of neighbouring census tracts. Data zones do not cross municipal boundaries. Map 1.1 is a reference map of the data zones with major roadways highlighted.

Key messages and facts are presented throughout the report by various icons. The following box describes these icons and their meaning.




Much of the data used in this report were provided to us by external organizations, and we extend our thanks to the following:

- Statistics Canada
- Cancer Care Ontario
- Canadian Institute for Health Information
- Ontario Ministry of Health and Long-Term Care
- Institute for Clinical Evaluative Sciences

Sources of data, data limitations and methods of analysis used in this report are described in Chapter 12 – Data Sources and Limitations and Chapter 13 – Data Methods. For additional details or information, please contact HealthStatusData@peelregion.ca.

### *Report Content*

This report has been produced in two formats: a detailed report and a summary version. Both the detailed version and the summary version are available in hard copy and electronically. The web version of these reports can be found at peelregion.ca/health/resources.

Finally, there are two types of references used in this report: text references and data references.

- Text references refer to references from articles, books, etc., and are defined by a superscript number. Example: A higher risk of heart disease was observed among smokers.[1]
- Data references refer to the source of the data for the statistic being presented in the text and are defined by a superscript letter. Example: Over 25% of the population reported having heart disease.[A] In this example, the "A" would refer to the source of the data.

## ABOUT PEEL REGION

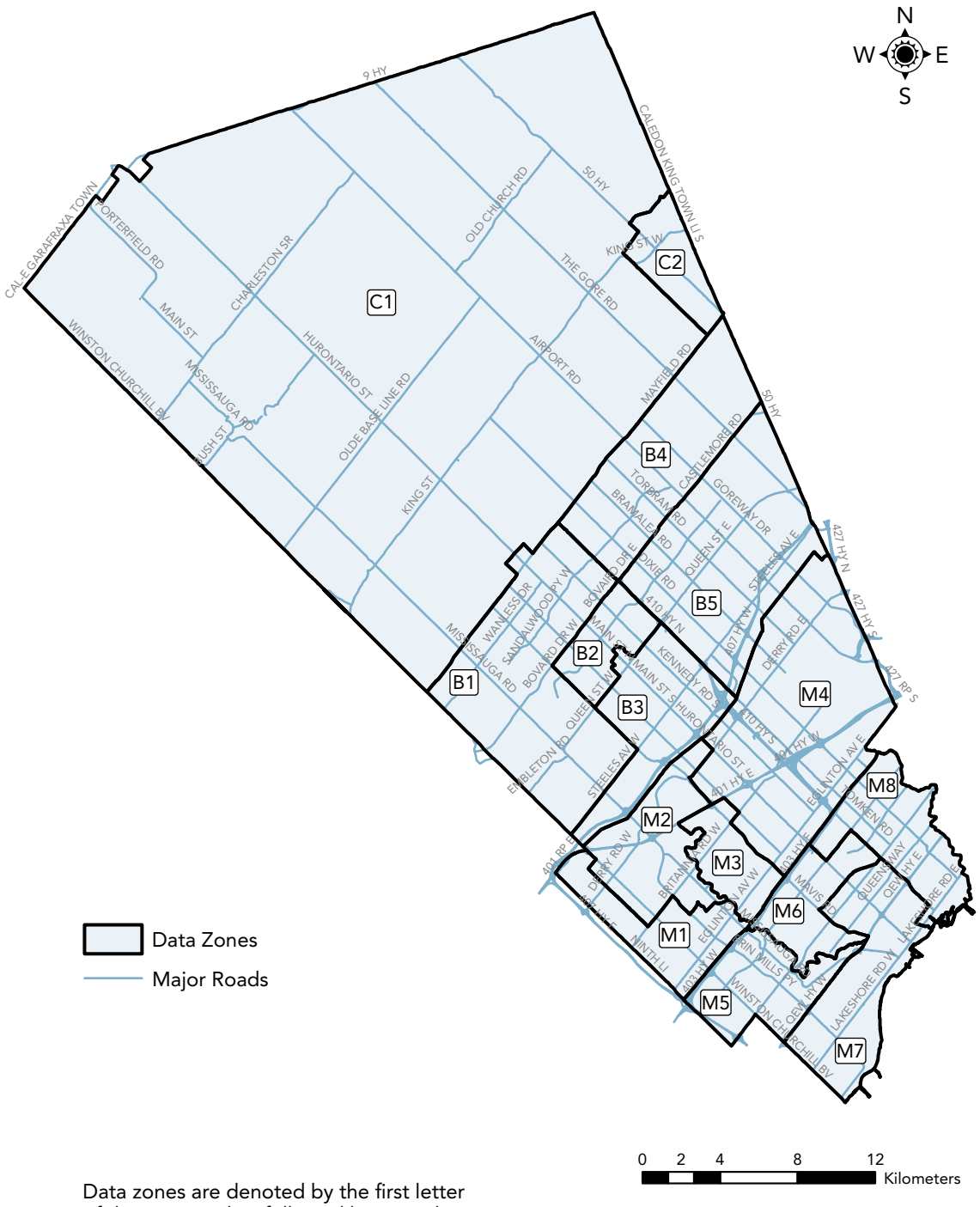
The region of Peel, located directly west of Toronto and York Region, includes the cities of Mississauga and Brampton, and the town of Caledon. At the time of the 2011 Census, 1.3 million people live in Peel; making it one of the largest municipalities in Canada and second largest in Ontario. Peel has experienced rapid population growth with the population increasing by 12% between 2006 and 2011.[A1] By 2031, Peel's population is expected to exceed 1.6 million people.[H]

Peel Fact

### Facts about Peel's Population

- Peel has a high proportion of children, as well as adults of reproductive age.[A1]
- Fifty-nine per cent of residents over the age of 25 years have some post-secondary education.[A2]
- Thirty-nine per cent of residents aged 25 to 64 years received their post-secondary qualifications outside of Canada.[A2]
- The median after-tax income among individuals 15 years and older was $25,157 in 2005 (similar to Ontario's median of $24,604).[A2]
- Eleven per cent of people in private households lived below the after-tax low-income cut-off in 2005 (same as Ontario).[A2]
- Almost half (49%) of Peel residents are immigrants, and 10% of immigrants arrived in Canada in the past five years (recent immigrants).[A2]
- One out of every five residents (18%) report "East Indian" as their ethnic origin, the most commonly reported ethnic origin in Peel.[A2]
- Fifteen per cent of residents are employed in shift work.[C1]
- Twenty-eight per cent of Peel's industry is composed of the manufacturing and retail trade.[A2]

**Map 1.1**
**Peel Data Zones**




Data zones are denoted by the first letter of the municipality, followed by a number (e.g., C1 denotes Caledon data zone 1).

Source: Developed for Peel Public Health by McMaster University, School of Geography and Earth Sciences, 2009

chapter 1

# THE HISTORY OF TOBACCO AND ITS USE

Key Messages

**What does this Chapter tell us?**

- Tobacco has been used worldwide for hundreds of years.
- The ill-effects of tobacco have been documented since the early 1600s.
- Governments worldwide have been trying to regulate tobacco use for centuries.

*"But this same poyson, steeped India weede*

*In head, hart, lunges, do the soote*
*and cobwebs breede*

*With that he gasp'd, and breath'd*
*out such a smoke*

*That all the standers by were like to choke."*

1601 – Samuel Rowlands

**Definition**

**The word nicotine comes from Nicotiana, the botanical name for the tobacco plant, named for Jean Nicot (c.1530 – 1600). He was the French ambassador to Portugal, who introduced tobacco to France by sending tobacco seeds as a gift to the French court in 1560.[3]**

The tobacco plant is believed to have been used by American inhabitants as far back as 1 BCE (before the common era). Documentation about the effects of tobacco and efforts to reduce its use date back for centuries.

### *History of Tobacco Use, Health Effects of Tobacco, and Prevention Strategies*

- 600 – 1000 CE (common era): First pictorial record of smoking on a pottery vessel in Guatemala.[4]
- 1600s: Tobacco in use by First Nations in Canada (as introduced by trade with Europeans). First Nations peoples used tobacco as an offering to the spirits in exchange for their protection and continued harmony between the natural and the spirit world.[5]
- Early 1600s – 1735: French government in Canada restricts retail sale of tobacco in New France.[5]
- 1604: King James I of England writes "*A Counterblaste to Tobacco*". In his treatise, the King noted that autopsies found smokers' *"inward parts" were "infected with an oily kind of soot." James also said if he ever had the Devil to dinner, he'd offer him a pipe.*[4]
- 1610: Sir Francis Bacon in England writes that tobacco use is increasing and that it is a custom hard to quit.[4]
- 1634: Czar Alexis of Russia creates penalties for smoking: The first offense is whipping, a slit nose, and transportation to Siberia. The second offense is execution.[4]
- 1719: Smoking is prohibited in France. Exceptions: the Franche-Comt, Flanders and Alsace.[4]
- 1791: London physician John Hill reports cases in which use of snuff caused nasal cancers.[4]
- 1800: In Canada, tobacco begins to be commercially grown in Southern Ontario.[4]
- 1830s: First organized anti-tobacco movement in United States begins as part of the temperance movement. Tobacco use is considered to dry out the mouth "creating a morbid or diseased thirst" that only liquor could quench.[4]
- 1856 – 1857: A running debate in England among readers about the health effects of tobacco runs in the British medical journal, *Lancet*. The argument runs as much along moral as medical lines, with little substantiation.[4]
- 1871: The Census records 1.2 million pounds of tobacco grown in Quebec, Canada.[5]
- 1908: In Canada, the Tobacco Restraint Act is passed, which bans sales of cigarettes to those under 16 years of age – never enforced.[4]
- 1930: The *Journal of the American Medical Association (JAMA)* decries health claims made by cigarette ads.[4]

- 1950: Richard Doll and A Bradford Hill publish their first report on Smoking and Carcinoma of the Lung in the British Medical Journal, finding that heavy smokers were fifty times as likely as non-smokers to contract lung cancer. The Cancer Advisory Committee of the Ministry of Health say they have demonstrated an association, not a cause, and advise the government to do nothing.[4]
- 1954: The Canadian Medical Association issues its first public warnings on the dangers of smoking.[2]
- 1963: Policy action to control tobacco is begun by the Canadian government.[5]
- 1967: First report concerning the adverse effects of environmental tobacco smoke (ETS) on children's health is published.[6]
- 1970s: Cigarettes are the most heavily advertised product in America.[4]
- 1972: Surgeon General's Report "*The Health Consequences of Smoking: A Report of the Surgeon General*" addresses "public exposure to air pollution from tobacco smoke" and danger of smoking to the unborn child.[4]
- 1977: First National Non-Smoking Week in Canada.[4]
- 1988: Canada passes legislation to restrict smoking in federally-regulated workplaces and prohibit tobacco advertising. The legislation also requires manufacturers to put health warnings on all cigarette packs.[2]
- 1993: Canada restricts the sale of tobacco to those 18 years of older and prohibits cigarette vending machines everywhere, except inside bars.[2]
- 1997: Canada bans tobacco sponsorships, restricts the size of cigarette packs and makes warning labels on packs bigger and stronger.[2]
- 2006: Ontario introduces the Smoke Free Ontario Act. Further amendments were made in 2008 and 2009.
- 2011: Ontario passes the Supporting Smoke-Free Ontario by Reducing Contaband Act.
- 2011: Canada introduces the Tobacco Products Labelling Regulations which stipulate requirements for the health-related labels displayed on cigarette and little cigar packages.


Source: Little Katie Chewing Tobacco, Emergency of Advertising in America On-Line Project – Ad #D0259, Tobacco Advertising collection, John W. Hartman Centre for Sales, Advertising and Marketing History, David M. Rubenstein Rare Book and Mauscript Library, Duke University, ***http://library.duke.edu/digitalcollections/eaa/***

# chapter 2

## THE USE OF CIGARETTES AND OTHER FORMS OF TOBACCO

Key Messages

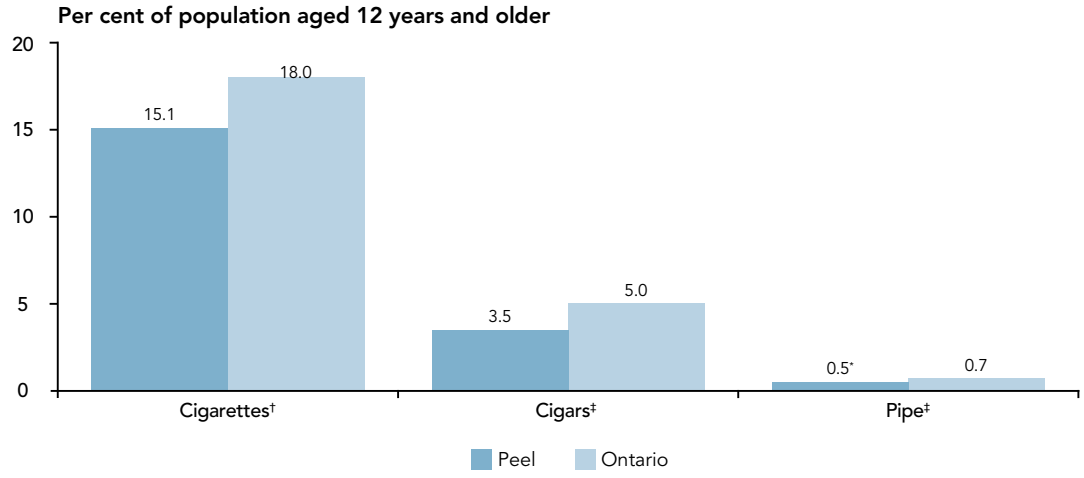
**What does this Chapter tell us?**

- Cigarettes are the most common form of tobacco product used in Peel.
- Tobacco is available in many other forms in Peel. We do not have a good understanding about the use of these alternate forms of tobacco.
- Youth are experimenting with cigarettes and other types of tobacco products.

Tobacco is used in many different ways: through inhalation of tobacco smoke, by chewing leaves or sniffing dried tobacco. Nicotine, the chemical component which makes tobacco so addictive, is consumed regardless of the type of product.

In Peel, 15% of the population uses tobacco in the form of cigarettes. A small proportion of the population consumes tobacco in the form of cigars and pipes (Figure 2.1). The remainder of this chapter provides an overview of the use of alternate forms of tobacco. Additional details about cigarette use can be found in Chapter 5 – Profile of a Smoker.

**Figure 2.1**
**Use of Typical Tobacco Products, Peel and Ontario, 2009/2010**




* Use estimate with caution
† Current use
‡ Use in the past month
Source: Canadian Community Health Survey 2009/2010, Statistics Canada Share File, Ontario Ministry of Health and Long-Term Care

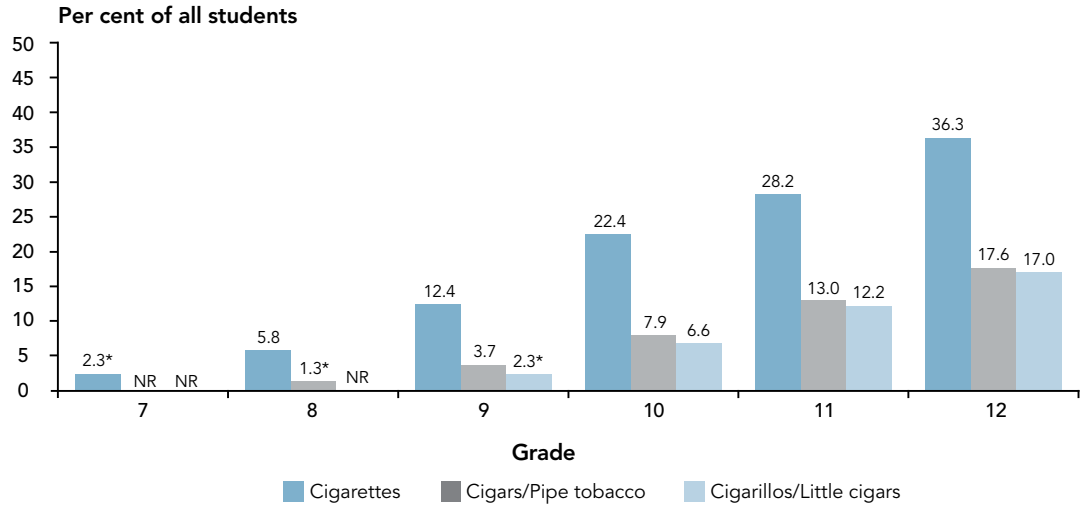
Among younger Peel residents, 19% of students in grades 7 to 12 reported using cigarettes, 8% reported using cigars/pipe tobacco, and 7% reported using cigarillos/little cigars at least once in their lifetime. Use of these alternative tobacco products is twice as high among males (10%) than females (5%).[D] Figure 2.2 shows the per cent of youth that have used cigarettes, cigars/pipe tobacco or cigarillos/little cigars at least once by grade level.

**Did You Know**

**Products containing tobacco (and therefore nicotine) are regulated under the Tobacco Act and associated regulations. Under the Tobacco Products Labelling Regulations (Cigarettes and Little Cigars), packages of cigarettes and little cigars are required to have:**

- **A health warning message covering 75% of the front and back of the package,**
- **A health information message on the inside of the package, and**
- **A toxic emission statement on the side of the package.[7]**

**Figure 2.2**
**Use of Typical Tobacco Products† by Grade, Peel, 2011**




* Use estimate with caution
† Used at least once
NR – Not releasable due to small numbers
Source: Student Health Survey 2011, Peel Public Health

*Cigarettes are the most common form of tobacco used in Peel.*

Measurement

### Measurement of Tobacco Use

The tobacco use data described in this report are self-report data from the Canadian Community Health Survey and the Peel Student Health Survey. Using a comparison of self-reported data against a measured biological marker for tobacco use (cotinine levels), Statistics Canada has found that self-reported tobacco use closely approximate the measured cotinine levels of individuals from the Canadian Health Measures Survey.[8]

Therefore, smoking data described in this report are an accurate estimate of actual smoking rates.

## Alternate Tobacco Products and their Use

Definition

*Alternate tobacco products* are defined as tobacco that is consumed in a form other than a cigarette, cigar or pipe. These include bidis, clove cigarettes, shisha, chew, snuff, snus, gutkah and hard snuff.

Did You Know

As with cigarettes, alternative tobacco products (such as clove cigarettes, bidis, leaf tobacco, cigars, pipe tobacco and smokeless tobacco products) fall under the Tobacco Act and the Tobacco Products Information Regulations. The regulation requires that the tobacco packaging for these products include:

- A health warning,
- A health information message, and
- Toxic emissions and constituents.[9]

### *Bidis*

Imported from India, bidis are thin sticks of tobacco wrapped in tendu leaves and tied with string (Figure 2.3). While they are smoked in a similar manner to cigarettes, users of bidis typically puff harder and inhale more deeply than users of traditional cigarettes, which can result in greater exposure to harmful carcinogens and nicotine.[10]

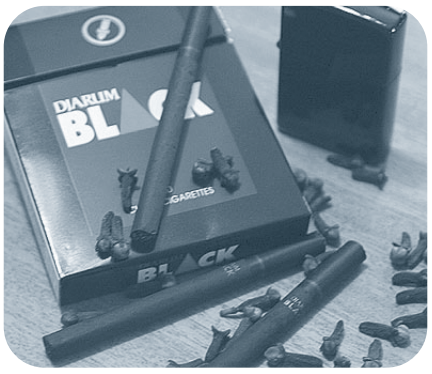
**Figure 2.3**
**Package of Bidis and a Singular Bidi**

Source: Peel Public Health, 2012

### *Clove Cigarettes*

Manufactured in Indonesia and distributed worldwide, clove cigarettes (Figure 2.4) are made of a blend of ground cloves and tobacco. Cloves contain eugenol, a mild anaesthetic, which is believe to act like menthol by decreasing the harshness of tobacco smoke, making it more palatable for the user.[10] Clove cigarettes are smoked in the same way as traditional cigarettes.

**Figure 2.4**
**Clove Cigarettes**




Source: Wikipedia. *http://en.wikipedia.org/wiki/File:Djarum-blacks-kretek.jpg*. Accessed on January 16, 2012

**Peel Fact**

**Kretek International, based in Mississauga, Ontario, is one of the main Canadian importers of clove cigarettes.**

### *E-cigarettes (Electronic Cigarettes)*

E-cigarettes produce a vapourized liquid, often containing nicotine, for the user to inhale.[11] Marketed as a healthier alternative to regular cigarette use, e-cigarettes are battery-powered vessels that look like cigarettes, but do not contain any tobacco.

Some e-cigarettes contain nicotine and their use could result in a nicotine addiction. E-cigarettes that contain nicotine or that make therapeutic claims are not approved for sale in Canada.

Figure 2.5 shows three different types of electronic cigarette models. The first picture closely resembles a traditional cigarette, whereas the second picture shows two different models in black, more closely resembling a clove cigarette.

**Figure 2.5**
**E-cigarettes**

Sources: *http://en.wikipedia.org/wiki/File:Safesmokes.jpg; http://en.wikipedia.org/wiki/File:Electronic_cigarettes_RN4072_CT-M401.jpg*

### *Waterpipe Smoking (also known as narghile, hookah, hubble bubble)*

The waterpipe has been used for centuries in the South-East Asia and Middle East regions to smoke shisha and its use is spreading globally.[12] Shisha comes in a variety of flavours and may or may not contain tobacco. Tobacco shisha is a moist mixture of tobacco, preservatives and flavourings that are held together with molasses or honey.

**Did You Know**

**In 2006, 4% of Canadians aged 15 years and older reported that they had ever used a waterpipe and 1% had used a waterpipe in the past month.[13]**

A waterpipe typically consists of four main parts: a head, body, water bowl and one or more hoses with a mouthpiece. Figure 2.6 shows two different sized waterpipes. Lit charcoal is placed on top of tinfoil to cause the shisha to smoke. When the user starts sucking on the hose, a vacuum will be created and the smoke will be pulled down through the hollow body of the pipe and into the water bowl. The smoke will then bubble up through the water bowl before being inhaled by the user.[14]

Hookah bar establishments can be found in large urban centres across the country and shisha is readily available for sale in hundreds of Canadian retail establishments and over the internet.[15] Currently, there is no systematic way of knowing how many hookah bars or shisha retailers exist in Ontario. Toronto Public Health reports that there could be 150 premises offering water pipe smoking in the city. [15] In the region of Peel, Peel Public Health is aware of approximately seven hookah bars in the city of Mississauga.

The popularity of waterpipes can be attributed to a combination of factors including the flavourings used, misperception on harm, and the social nature of smoking a waterpipe.[14]

**Figure 2.6**
**Waterpipe used to Smoke Shisha**

Sources: *http://en.wikipedia.org/wiki/File:Hoookah.jpg*
*http://en.wikipedia.org/wiki/File:Small_Argileh.jpg*

Many users believe that tobacco shisha is safer to smoke than regular cigarettes because the smoke is passed through water before inhalation.[16] Waterpipe use has been associated with a number of negative health outcomes such as higher rates of respiratory illness, lung cancer, low-birth weight and periodontal disease.[17]

**Did You Know**

Nicotine can be inhaled from the following types of products:

- Cigarettes, cigars or pipes (tobacco smoke),
- Bidis (tobacco smoke),
- Clove cigarettes (tobacco smoke),
- E-cigarettes (vaporized liquid containing nicotine), and
- Waterpipe (tobacco and/or shisha smoke).

## Smokeless Tobacco Products

**Did You Know**

Smokeless tobacco is available in Peel region in various forms including:

- Chew,
- Snuff,
- Snus, and
- Gutkha.

### *Chew*

Chew consists of flavoured, loose tobacco leaves that are placed between the user's cheeks and gum and held there, while the user spits out or swallows the tobacco juices. The process is also known as "dipping". Figure 2.7 shows two of the different ways that consumers can buy chew.

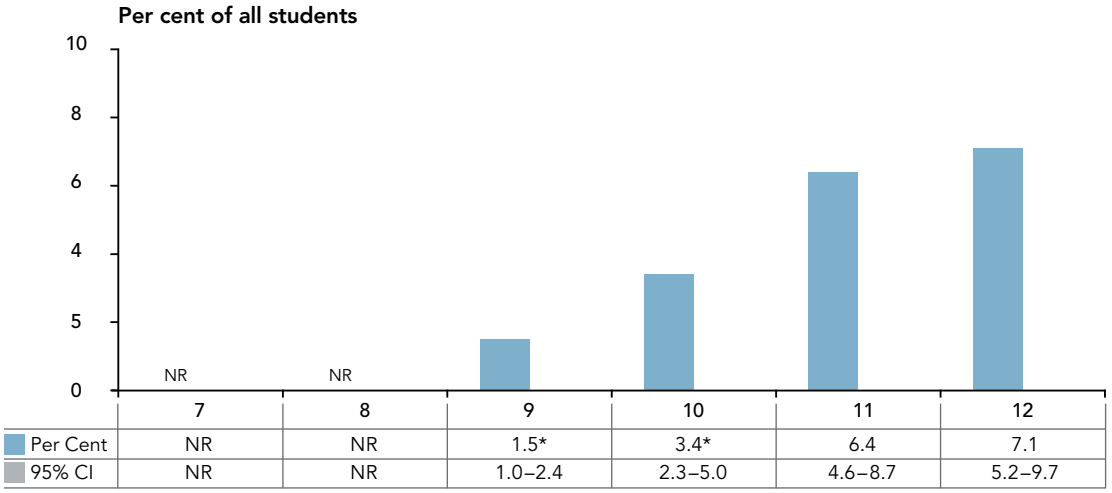
**Figure 2.7**
**Forms of Chewing Tobacco**


Source: Wikipedia. *http://en.wikipedia.org/wiki/File:Tuggtobak.jpg.* Accessed on January 19, 2012.

In Ontario, less than one per cent of the population aged 12 years and older report using chew in the past month. [B1] Data are not releasable for Peel due to small numbers.

In Peel, 3% of students in grades 7 to 12 combined have used chewing tobacco at least once. The proportion of students who have used chewing tobacco at least once is much higher among males (6%) compared to females (1%* – use estimate with caution), and experimentation increases by grade (Figure 2.8).

**Figure 2.8**
**Prevalence of Chewing Tobacco Use† by Grade, Peel, 2011**




| | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|
| Per Cent | NR | NR | 1.5* | 3.4* | 6.4 | 7.1 |
| 95% CI | NR | NR | 1.0–2.4 | 2.3–5.0 | 4.6–8.7 | 5.2–9.7 |

Grade

† Used one or more times
* Use estimate with caution
NR – Not releasable due to small numbers
Note: 95% CI reflects the 95% confidence interval of the estimate
Source: Student Health Survey 2011, Peel Public Health

### *Snuff*

Snuff is finely ground or shredded tobacco that is packaged loose in tins or in sachets similar to tea bags. The user takes a pinch of the snuff or a snuff sachet and places it between their lip or cheek, and gum. The process of using snuff is also called "dipping."[18] Dry forms of snuff can be sniffed into the nose of the user.

**Figure 2.9**
**Tube of Creamy Snuff**


Source: Asha Industries Website.
Accessed online at: *http://www.ipcosnuff.com* on January 16, 2012

Snuff is also available in a creamy format (Figure 2.9), packaged in a tube similar to toothpaste. The user applies it to their teeth with a toothbrush or their finger for three or four minutes and then rinses with water.

In Ontario, less than 1% of the population aged 12 years and older have used snuff in the past month. [B1] Data for Peel are not releasable due to small numbers.

In Peel, less than 1% of students in grades 7 to 12 report that they have ever used snuff.[D]

### *Snus*

Originating from Sweden, snus is a moist powdered tobacco product that is smokeless and spitless. The product comes in a pouch which the user places between their lip and gums for hours at a time. When finished, the user discards the pouch.[18] Figure 2.10 shows a popular brand of snus from Sweden.

**Figure 2.10**
**A Tin Portioned Snus**


Source: Asha Industries Website.
Accessed online at: *http://www.ipcosnuff.com* on January 16, 2012

### *Gutkha and Paan*

Gutkha and paan are popular in parts of South East Asia and found in other parts of the world where South East Asian immigrants live. Gutkha is a type of smokeless tobacco that is sold in foil packets or sachets and tins (Figure 2.11). The product is a dry mixture of tobacco, areca nut, catechu, slaked lime and other ingredients.[19]

**Figure 2.11**
**Guthka**


Source: Peel Public Health, 2012

Gutkha users place a pinch of the mixture between the gum and cheek, and gently suck or chew on the product while periodically swallowing or spitting out the excess saliva that is produced. Paan is also chewed. Paan is a preparation of spices, slaked lime and areca nut wrapped in a betel leaf that is chewed. Pan may also contain tobacco.[22]

**Did You Know**

Chewing areca nut, on its own or in preparations containing tobacco (such as paan or gutkha), is a known risk factor for oral cancer.[20]

Areca nut chewing is widely practiced in many parts of Asia and in Asian migrant communities. It is important for health care practioners, including oral health care practioners, to be aware of areca nut and tobacco usage in their patients.

Chewers of areca nut often exhibit oral manifestations. Healthcare practioners can play an important role in educating patients on the risks of using areca nut and tobacco products and in the early detection of premalignant and malignant conditions.[21]

In Peel region, paan (which may or may not contain tobacco) and gutkha are available at retail locations.

### *Dissolvable Tobacco Products (also known as hard snuff)*

Dissolvable tobacco products or "hard snuff" are products made from compressed tobacco powder that dissolves completely in the user's mouth; similar to a hard candy.[18] The user does not have to spit as no tobacco juices are created. Dissolvable tobacco products, as with all tobacco products, can poison and ultimately cause death if ingested by children.[23] In 2011 in Ontario, 176 voluntary reports of poisoning due to tobacco products were made to the Ontario Poison Centre. This included 55 poisonings from nicotine pharmaceuticals (e.g., nicotine gum) and 121 poisonings from tobacco products such as cigarettes.[24]

## Summary

Tobacco products are available in a variety of different forms, and many of the products described in this chapter are legally available for sale in Peel. From the data that we have today, cigarettes are the most commonly used type of tobacco product. We do know that youth also experiment with a variety of other tobacco products and that use of these products increases with age.

chapter 3

# THE BURDEN OF TOBACCO ADDICTION

Key Messages

**What does this Chapter tell us?**

- Tobacco use affects and causes disease in many body systems.

Annually within Peel:

- There are over 3,000 hospitalizations for diseases attributable to smoking
- A total of 689 deaths are attributable to smoking
- Peel residents lose almost 5,000 years of life due to smoking-attributable disease as a result of premature death

Tobacco use causes significant morbidity, disability and death directly (to those individuals who use tobacco), and indirectly (to those who do not smoke) through environmental tobacco smoke (ETS).

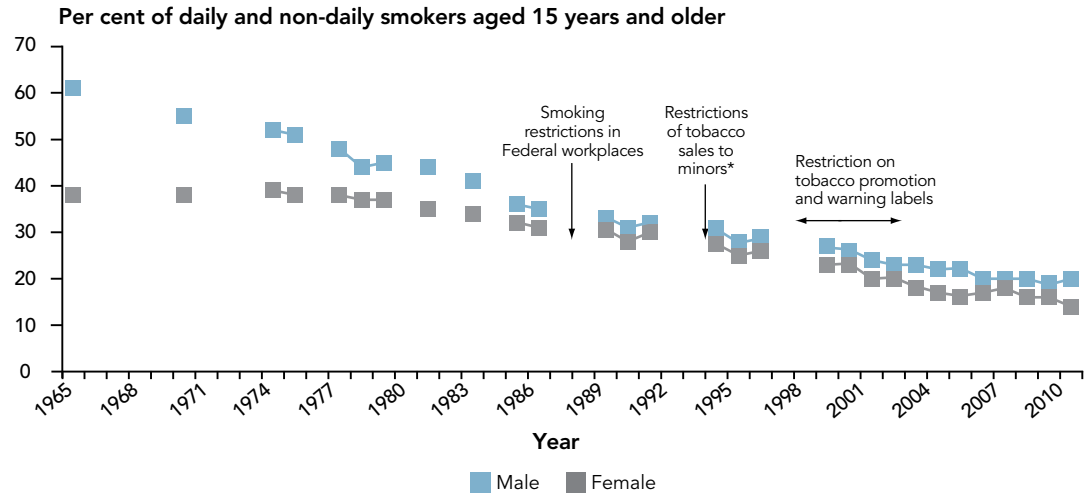
This section of the report will describe and quantify the number of hospitalizations, deaths and potential years of life lost for diseases attributable to smoking in Peel.

As described in Chapter 2 – The Use of Cigarettes and Other Forms of Tobacco, the data sources that have information about tobacco use in Peel (e.g., Canadian Community Health Survey, Peel Student Health Survey) only include questions about the use of cigarettes, cigars, pipes, snuff and chewing tobacco. Since cigarettes are the main form of tobacco used, the remainder of this report will focus only on the use of cigarettes.

In Canada in 1965, approximately two-thirds of males and just over one-third of females aged 15 years and older smoked. Canadian smoking rates have been declining since 1966 (Figure 3.1). The current Canadian smoking rate is 17% with a continued higher prevalence among males (20%) compared to females (14%).

While not shown, in 2009/2010, approximately 15% of Peel residents were current smokers. Additional details concerning tobacco use in Peel can be found in Chapter 5 – Profile of a Smoker.

**Figure 3.1**
**Prevalence of Smoking by Sex and Year, Canada, 1965-2010**

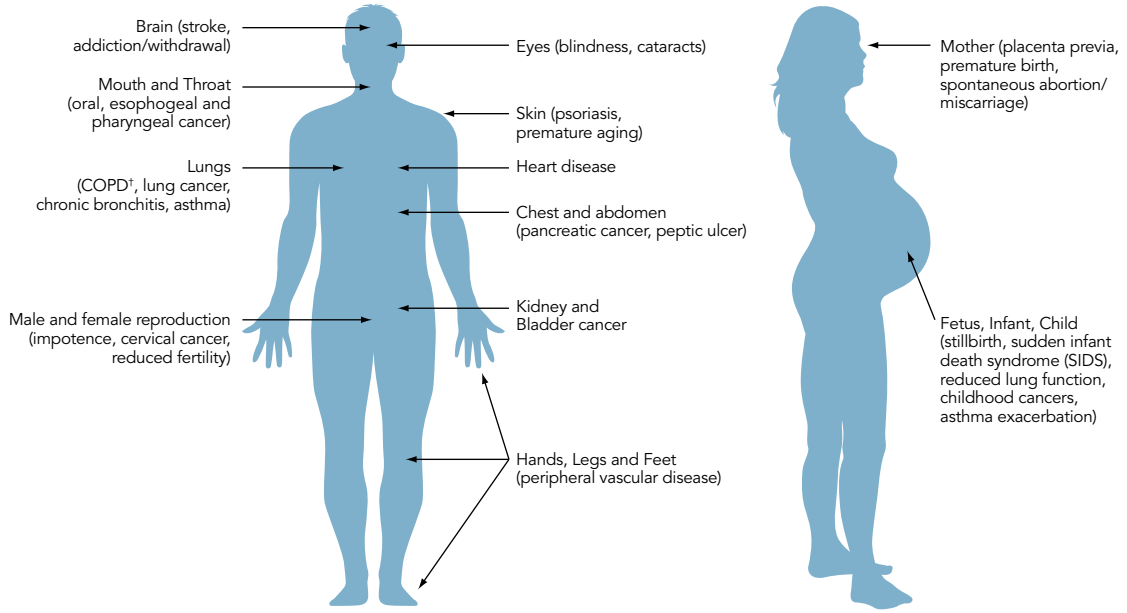



* In 1994, the Tobacco Control Act came into affect in Ontario. Tobacco sales were restricted to those aged 19 years and older.
Data Sources: 1965-1986: A Critical Review of Canadian Survey Data on Tobacco Use, Attitudes and Knowledge (Health and Welfare Canada, 1988); 1989 1989: Smoking Behaviour of Canadians: A National Alcohol and Other Drugs Survey Report, 1989 (Health and Welfare Canada, 1992); 1990: Canada's Health Promotion Survey 1990: Technical Report (Health and Welfare Canada, 1993); 1991: Health Status of Canadians: Report of the 1991 General Social Survey (Statistics Canada); 1994: National Population Health Survey (Statistics Canada); 1995, 1996: General Social Survey (Statistics Canada) [all as quoted in: Physicians for a Smokefree Canada, Smoking in Canada, 2008v]; 1999-2010: Canadian Tobacco Use Monitoring Survey (Health Canada)

Exposure to tobacco directly or indirectly, through second-hand smoke, has systemic effects. Figure 3.2 depicts some of these smoking-attributable health consequences.

Smoking increases an individual's risk of developing and dying from a variety of different cancers, a number of cardiovascular and respiratory diseases, ulcers, perinatal conditions, and fires ignited with smoker's materials and open flame. Table 3.1 describes the relative risk associated with each of the health consequences due to smoking.

**Figure 3.2**
**Selected Health Consequences of Smoking in Adults and Risks of Smoking During Pregnancy**




† Chronic obstructive pulmonary disease
Source: Eriksen M, MacKay J, Ross, H. The Tobacco Atlas. Fourth edition. Atlanta, Georgia: American Cancer Society, Inc.;2012.

**Table 3.1**
**Relative Risk for Chronic Diseases, by Smoking Status and Sex**

| Chronic Diseases | Male | | Female | |
|---|---|---|---|---|
| | Current Smoker | Former Smoker | Current Smoker | Former Smoker |
| **ACTIVE SMOKING** | | | | |
| **Cancers** | | | | |
| Lung† | 23.26 | 8.70 | 12.69 | 4.53 |
| Larynx† | 14.60 | 6.34 | 13.02 | 5.16 |
| Lip, oral, pharynx† | 10.89 | 3.40 | 5.08 | 2.29 |
| Esophagus† | 6.76 | 4.46 | 7.75 | 2.79 |
| Bladder† | 3.27 | 2.09 | 2.22 | 1.89 |
| Kidney† | 2.72 | 1.73 | 1.29 | 1.05 |
| Pancreas† | 2.31 | 1.15 | 2.25 | 1.55 |
| Cervix† | NA | NA | 1.59 | 1.14 |
| Stomach† | 1.96 | 1.47 | 1.36 | 1.32 |
| Acute myeloid leukemia† | 1.86 | 1.33 | 1.13 | 1.38 |
| Colon, rectum‡ | 1.15 | 1.30 | 1.22 | 1.40 |
| **Cardiovascular Diseases** | | | | |
| Aortic aneurysm† | 6.21 | 3.07 | 7.07 | 2.07 |
| Stroke† | 1.63-3.27 | 1.04 | 1.49-4.00 | 1.03-1.30 |
| Ischemic heart disease† | 1.51-2.80 | 1.21-1.64 | 1.60-3.08 | 1.20-1.32 |
| Atherosclerosis† | 2.44 | 1.33 | 1.83 | 1.00 |
| Other arterial disease† | 2.07 | 1.01 | 2.17 | 1.12 |
| Other heart disease† | 1.78 | 1.22 | 1.49 | 1.03 |
| **Respiratory Diseases** | | | | |
| Bronchitis, emphysema† | 17.10 | 15.64 | 12.04 | 11.77 |
| Chronic airway obstruction (other chronic obstructive pulmonary disease)† | 10.58 | 6.80 | 13.08 | 6.78 |
| Pneumonia, influenza† | 1.75 | 1.36 | 2.17 | 1.10 |
| **Ulcers€** | 2.07 | 2.24 | 2.07 | 2.24 |
| **PASSIVE SMOKING** | **Regular exposure to ETS** | | | |
| Lung Cancer¥ | 1.21 | | | |
| Ischemic heart disease¥ | 1.24 | | | |

NA - Not applicable
Sources:
† Thun MJ, Day-Lally C, Myers DG, Calle EE, Flanders WD, Zhu BP, et al. Trends in tobacco smoking and mortality from cigarette use in cancer prevention studies I (1959 through 1965) and II (1982 through 1988). Bethesda, MD: US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute; 1997.
‡ Chao A, Thun MJ, Jacobs EJ, Henley SJ, Rodriguez C, Calle EE. Cigarette smoking and colorectal cancer mortality in the cancer prevention study II. J Natl Cancer Inst. 2000 Dec 6;92(23):1888-96.
€ English DR, Holman CDJ, Milne E, Winter MJ, Hulse GK, Codde G, et al. The quantification of drug caused morbidity and mortality in Australia 1995. Canberra, Australia: Commonwealth Department of Human Services and Health; 1995.
¥ Baliunas D, Patra J, Rehm J, Popova S, Kaiserman M, Taylor B. Smoking-attributable mortality and expected years of life lost in Canada 2002: Conclusions for prevention and policy. Chronic Dis Can. 2007;27(4):154-62; and de Groh M, Morrison HI. Environmental tobacco smoke and deaths from coronary heart disease in Canada. Chronic Dis Can. 2002;23(1):13-6.

We can interpret the meaning of the relative risk in Table 3.1 using lung cancer as an example:

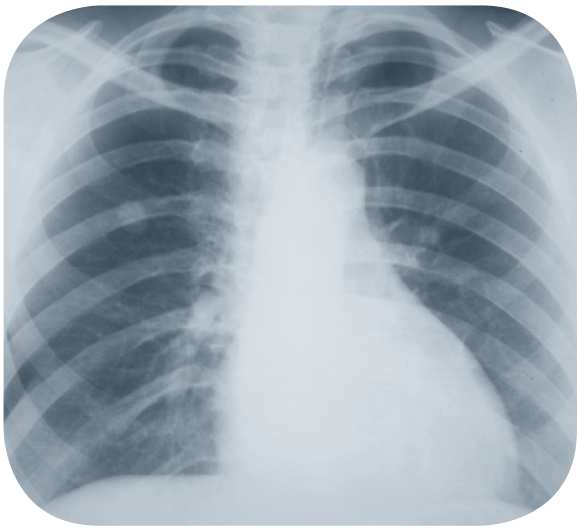
- The relative risk for lung cancer for males who smoke is 23.[26] This means that male smokers are about 23 times more likely to develop and die from lung cancer than those who have never been smokers.

**Definition**

*Relative Risk (RR)* is defined as the proportional difference in disease rates between exposed and non-exposed persons. The *relative risk* tells us how much more likely people with a specific exposure (e.g., smoking) are of developing a disease (e.g., lung cancer) compared to people without the exposure (e.g., non-smokers).

- If RR=1, the risk in exposed persons equals the risk in non-exposed persons.
- If RR>1, the risk in exposed persons is greater than the risk in non-exposed persons.
- If RR<1, the risk in exposed persons is less than the risk in non-exposed persons.

By combining the relative risk for a specific disease due to a specific risk factor with the prevalence of the risk factor – in this case, smoking in a population, and applying this product to hospitalizations, deaths or potential years of life lost for smoking-related diseases; the number and proportion of disease-specific hospitalizations, deaths or potential years of life lost that are caused by smoking can be calculated. This is called the smoking-attributable fraction (SAF).



**Definition**

The *Smoking-Attributable Fraction (SAF)* describes the proportion of all cases of disease or death that are attributed to smoking. It is a way of considering the influence of smoking on a population's burden of disease.

The smoking-attributable risk gives an estimate of the amount of disease that could be prevented if smoking were eliminated or reduced in the population. For example, if the population-attributable fraction for lung cancer and smoking was 84%, this means that 84% of cases of lung cancers are caused by smoking, and all would be eliminated if no one smoked.

Use of the SAF is dependent on the existence of good evidence about the relationship between smoking and specific disease outcomes.

While the numbers of hospitalizations, deaths or potential years of life lost will be presented in the following tables, these numbers should be interpreted as an estimate of the contribution of smoking to these conditions. For each of the tables in this section, the average annual number of hospitalizations, deaths, or potential years of life lost, are based on several years of data. The years used to calculate the average annual number also vary depending on the data source. The information about what years were included in the calculation can be found in the footnotes underneath each table.

Additional details about the methods used to calculate the hospitalizations, mortality and potential years of life lost that are attributable to smoking can be found in Chapter 13 – Data Methods.

## Smoking-Attributable Hospitalizations

Tables 3.2 and 3.3 show the number of hospitalizations in Peel that are attributable to smoking and exposure to second-hand smoke on an annual basis.

In reviewing these tables the reader should be aware of one important caveat:

- It is possible that one person could have had several admissions for the same smoking-related disease. Since the data in Tables 3.2 and 3.3 have not been adjusted to account for this, the data must be interpreted to reflect admissions and not people.

Definition

A *hospitalization* is defined as a discharge from hospital due to death, discharge home, or transfer to another facility.

**Table 3.2**
**Average Annual Number of Hospitalizations† Attributable to Smoking**

| | Smoking Attributable Fraction (SAF)% | Male | | Female | | Total | |
|---|---|---|---|---|---|---|---|
| | | Number of Hospitalizations | Number of Hospitalizations Attributable to Smoking | Number of Hospitalizations | Number of Hospitalizations Attributable to Smoking | Number of Hospitalizations | Number of Hospitalizations Attributable to Smoking |
| **RESPIRATORY DISEASES** | | | | | | | |
| Bronchitis, Emphysema | 84.0% | 17 | 15 | 16 | 13 | 33 | 28 |
| Chronic airway obstruction | 76.8% | 521 | 418 | 510 | 375 | 1,031 | 793 |
| Pneumonia and Influenza | 18.5% | 462 | 103 | 468 | 69 | 930 | 172 |
| Lung cancer | 79.6% | 185 | 163 | 150 | 103 | 335 | 266 |
| Laryngeal cancer | 80.2% | 19 | 16 | 5 | <5 | 24 | 20 |
| **RESPIRATORY TOTAL** | | **1,204** | **715** | **1,149** | **564** | **2,353** | **1,279** |
| **CARDIOVASCULAR DISEASES** | | | | | | | |
| Ischemic heart disease | 24.3% | 2,339 | 675 | 1,035 | 145 | 3,374 | 820 |
| Cerebrovascular diseases | 22.0% | 615 | 113 | 528 | 138 | 1,143 | 251 |
| Other heart disease | 14.4% | 1,548 | 310 | 1,484 | 126 | 3,032 | 436 |
| Atherosclerosis | 23.0% | 31 | 9 | 19 | <5 | 50 | 11 |
| Aortic aneurysm and dissection | 62.0% | 105 | 68 | 32 | 16 | 137 | 84 |
| Other arterial disease | 18.0% | 100 | 20 | 70 | 11 | 170 | 31 |
| **CARDIOVASCULAR TOTAL** | | **4,738** | **1,195** | **3,168** | **438** | **7,906** | **1,633** |
| **DIGESTIVE SYSTEM DISEASES** | | | | | | | |
| Ulcer | 34.9% | 167 | 65 | 100 | 28 | 267 | 93 |
| Colorectal cancer | 9.6% | 293 | 30 | 220 | 19 | 513 | 49 |
| Esophageal cancer | 65.7% | 27 | 19 | 12 | 7 | 39 | 26 |
| Stomach cancer | 21.0% | 73 | 20 | 38 | <5 | 111 | 24 |
| Pancreatic cancer | 23.9% | 44 | 12 | 38 | 8 | 82 | 20 |
| Cancer of the lip, oral cavity and pharynx | 63.8% | 48 | 36 | 28 | 12 | 76 | 48 |
| **DIGESTIVE TOTAL** | | **652** | **182** | **436** | **78** | **1,088** | **260** |

Table 3.2 continues ...

**Table 3.2 continued**

| | Smoking Attributable Fraction (SAF)% | Male | | Female | | Total | |
|---|---|---|---|---|---|---|---|
| | | Number of Hospital-izations | Number of Hospital-izations Attributable to Smoking | Number of Hospital-izations | Number of Hospital-izations Attributable to Smoking | Number of Hospital-izations | Number of Hospital-izations Attributable to Smoking |
| **OTHER DISEASES** | | | | | | | |
| Cervical cancer | 9.0% | – | – | 31 | <5 | 31 | <5 |
| Kidney, Renal cancer | 25.3% | 79 | 30 | 50 | <5 | 129 | 32 |
| Bladder cancer | 41.4% | 183 | 85 | 54 | 13 | 237 | 98 |
| Acute myeloid leukemia | 13.7% | 18 | <5 | 25 | <5 | 43 | 6 |
| **OTHER TOTAL** | | **296** | **119** | **160** | **20** | **440** | **139** |
| **OVERALL TOTAL** | | **6,890** | **2,211** | **4,913** | **1,100** | **11,787** | **3,311** |

† Reflects cardiovascular, respiratory and ulcer hospitalizations for those aged 35 years and older.
Cancer hospitalizations reflect those aged 30 years and older.
Note: Number of hospitalizations reflects an annual average for the years 2005-2009.
Sources:
Hospital In-Patient Discharge Data 2005-2009, IntelliHEALTH Ontario, Ministry of Health and Long Term Care.
Smoking Prevalence: Canadian Community Health Survey 2003, 2005, 2007/2008 combined, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care.
Relative Risk for smoking and diseases attributable to smoking (excluding colorectal cancer and ulcer): Thun MJ, Day-Lally C, Myers DG, Calle EE, Flanders WD, Zhu BP, et al. Trends in tobacco smoking and mortality from cigarette use in cancer prevention studies I (1959 through 1965) and II (1982 through 1988). Bethesda, MD: US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute; 1997.
Relative Risk for smoking and colorectal cancer from: Chao A, Thun MJ, Jacobs EJ, Henley SJ, Rodriguez C, Calle EE. Cigarette smoking and colorectal cancer mortality in the cancer prevention study II. J Natl Cancer Inst. 2000 Dec 6;92(23):1888-96.
Relative Risk for smoking and ulcer: English DR, Holman CDJ, Milne E, Winter MJ, Hulse GK, Codde G, et al. The quantification of drug caused morbidity and mortality in Australia 1995. Canberra, Australia: Commonwealth Department of Human Services and Health; 1995.

**Table 3.3**
**Average Annual Number of Hospitalizations† in Non-Smokers Attributable to Environmental Tobacco Smoke (ETS)*, Peel, 2005-2009**

| | Smoking Attributable Fraction (SAF)% | Male | | Female | | Total | |
|---|---|---|---|---|---|---|---|
| | | Number of Hospital-izations | Number of Hospital-izations Attributable to ETS | Number of of Hospital-izations/ Separations | Number of Hospital-izations Attributable to ETS | Number of Hospital-izations | Number of Hospital-izations Attributable to ETS |
| Lung cancer | 3.7% | 185 | 7 | 150 | 5 | 335 | 12 |
| Ischemic heart disease | 4.3% | 2,385 | 103 | 1,035 | 41 | 3,420 | 144 |
| **TOTAL** | | **2,570** | **110** | **1,185** | **46** | **3,755** | **156** |

† Reflects hospitalizations of those aged 30 years and older for lung cancer and 35 and older for ischemic heart disease.
* Are exposed regularly to environmental tobacco smoke in the home, a private vehicle or public place.
Note: Number of hospitalizations reflects an annual average for the years 2005-2009.
Sources:
Hospital In-Patient Discharge Data 2005-2009, IntelliHEALTH Ontario, Ministry of Health and Long Term Care.
Prevalence of ETS: Canadian Community Health Survey 2003, 2005, 2007/2008 combined, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care.
Relative Risk ETS exposure: Baliunas D, Patra J, Rehm J, Popova S, Taylor B. Smoking-attributable morbidity: Acute care hospital diagnoses and days of treatment in Canada, 2002. BMC Public Health. 2007 Sep 18;7:247; de Groh M, Morrison HI. Environmental tobacco smoke and deaths from coronary heart disease in Canada. Chronic Dis Can. 2002;23(1):13-6.

### *What does this mean?*

Overall there are over 156 hospitalizations every year (13 per month) from lung cancer and ischemic heart disease that are attributable to exposure to ETS.

## Smoking-Attributable Mortality

In Peel, the numbers of deaths from chronic diseases that are caused by smoking have decreased over the past two decades. Much of the decline in lung cancer deaths and emphysema/bronchitis/chronic obstructive pulmonary disease deaths can be attributed to the decline in smoking prevalence (data not shown).

Tables 3.4 and 3.5 show the number of deaths that are attributable to smoking and to exposure to second-hand smoke.

**Table 3.4**
**Average Annual Number of Deaths† Attributable to Smoking, Peel, 2003-2007**

| | Smoking Attributable Fraction (SAF)% | Male | | Female | | Total | |
|---|---|---|---|---|---|---|---|
| | | Number of Deaths | Number of Deaths Attributable to Smoking | Number of Deaths | Number of Deaths Attributable to Smoking | Number of Deaths | Number of Deaths Attributable to Smoking |
| **RESPIRATORY DISEASES** | | | | | | | |
| Bronchitis, Emphysema | 85.8% | 9 | 8 | <5 | <5 | 13 | 11 |
| Chronic airway obstruction | 76.8% | 65 | 52 | 65 | 48 | 130 | 100 |
| Pneumonia and Influenza | 18.2% | 50 | 11 | 59 | 9 | 109 | 20 |
| Lung cancer | 80.2% | 181 | 160 | 129 | 89 | 310 | 249 |
| Laryngeal cancer | 81.2% | 8 | 7 | <5 | <5 | 9 | 8 |
| **RESPIRATORY TOTAL** | | **313** | **238** | **258** | **150** | **571** | **388** |
| **CARDIOVASCULAR DISEASES** | | | | | | | |
| Ischemic heart disease | 16.3% | 393 | 83 | 277 | 26 | 670 | 109 |
| Cerebrovascular diseases | 16.3% | 121 | 14 | 156 | 10 | 277 | 24 |
| Other heart disease | 13.2% | 93 | 19 | 133 | 11 | 226 | 30 |
| Atherosclerosis | 19.4% | <5 | <5 | <5 | 0 | 6 | <5 |
| Aortic aneurysm and dissection | 60.3% | 26 | 17 | 12 | 6 | 38 | 23 |
| Other arterial disease | 17.5% | 9 | <5 | 10 | <5 | 19 | <5 |
| **CARDIOVASCULAR TOTAL** | | **645** | **136** | **591** | **55** | **1,236** | **191** |
| **DIGESTIVE SYSTEM DISEASES** | | | | | | | |
| Ulcer | 34.3% | 6 | <5 | <5 | <5 | 10 | <5 |
| Colorectal cancer | 9.5% | 87 | 9 | 76 | 7 | 163 | 16 |
| Esophageal cancer | 65.9% | 24 | 17 | 10 | 6 | 34 | 23 |
| Stomach cancer | 21.4% | 38 | 10 | 18 | <5 | 56 | 12 |
| Pancreatic cancer | 23.8% | 38 | 10 | 35 | 7 | 73 | 17 |
| Cancer of the lip, oral cavity and pharynx | 64.7% | 14 | 11 | 7 | <5 | 21 | 14 |
| **DIGESTIVE TOTAL** | | **207** | **59** | **150** | **26** | **357** | **85** |

Table 3.4 continues ...

## Table 3.4 continued

| | Smoking Attributable Fraction (SAF)% | Male | | Female | | Total | |
|---|---|---|---|---|---|---|---|
| | | Number of Deaths | Number of Deaths Attributable to Smoking | Number of Deaths | Number of Deaths Attributable to Smoking | Number of Deaths | Number of Deaths Attributable to Smoking |
| **OTHER DISEASES** | | | | | | | |
| Cervical cancer | 9.4% | – | – | 12 | <5 | 12 | <5 |
| Kidney, Renal cancer | 25.5% | 21 | 8 | 13 | <5 | 34 | 9 |
| Bladder cancer | 39.7% | 21 | 10 | 9 | <5 | 30 | 12 |
| Acute myeloid leukemia | 16.5% | 11 | <5 | 9 | <5 | 20 | <5 |
| **OTHER TOTAL** | | **53** | **20** | **43** | **5** | **96** | **25** |
| **OVERALL TOTAL** | | **1,218** | **453** | **1,042** | **236** | **2,260** | **689** |

† Reflects cardiovascular, respiratory and ulcer hospitalizations for those aged 35 years and older.
Cancer hospitalizations reflect those aged 30 years and older.
Note: Number of hospitalizations reflects an annual average for the years 2005-2009.
Sources:
Hospital In-Patient Discharge Data 2005-2009, IntelliHEALTH Ontario, Ministry of Health and Long Term Care.
Smoking Prevalence: Canadian Community Health Survey 2003, 2005, 2007/2008 combined, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care.
Relative Risk for smoking and diseases attributable to smoking (excluding colorectal cancer and ulcer): Thun MJ, Day-Lally C, Myers DG, Calle EE, Flanders WD, Zhu BP, et al. Trends in tobacco smoking and mortality from cigarette use in cancer prevention studies I (1959 through 1965) and II (1982 through 1988). Bethesda, MD: US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute; 1997.
Relative Risk for smoking and colorectal cancer from: Chao A, Thun MJ, Jacobs EJ, Henley SJ, Rodriguez C, Calle EE. Cigarette smoking and colorectal cancer mortality in the cancer prevention study II. J Natl Cancer Inst. 2000 Dec 6;92(23):1888-96.
Relative Risk for smoking and ulcer: English DR, Holman CDJ, Milne E, Winter MJ, Hulse GK, Codde G, et al. The quantification of drug caused morbidity and mortality in Australia 1995. Canberra, Australia: Commonwealth Department of Human Services and Health; 1995.

## Table 3.5

**Average Annual Number of Deaths† in Non-Smokers that are Attributable to Environmental Tobacco Smoke (ETS)*, Peel, 2003-2007**

| | Smoking Attributable Fraction (SAF)% | Male | | Female | | Total | |
|---|---|---|---|---|---|---|---|
| | | Number of Deaths | Number of Deaths Attributable to ETS | Number of Deaths | Number of Deaths Attributable to ETS | Number of Deaths | Number of Deaths Attributable to ETS |
| Lung cancer | 3.7% | 181 | 7 | 129 | <5 | 310 | 11 |
| Ischemic heart disease | 9.8% | 393 | 17 | 278 | 11 | 671 | 28 |
| **TOTAL** | | **574** | **24** | **407** | **15** | **981** | **39** |

† Deaths from ischemic heart disease reflect for those aged 35 years and older. Deaths from lung cancer reflect those aged 30 years and older.
* Are exposed regularly to environmental tobacco smoke in the home, a private vehicle or public place.
Notes: Mortality counts reflect an annual average for the years 2003-2007.
Sources:
Ontario Mortality Database 2003-2007, IntelliHEALTH Ontario, Ministry of Health and Long-Term Care
Prevalence of ETS: Canadian Community Health Survey 2003, 2005, 2007/2008 combined, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care.
Relative Risk for ETS exposure: Baliunas D, Patra J, Rehm J, Popova S, Kaiserman M, Taylor B. Smoking-attributable mortality and expected years of life lost in Canada 2002: Conclusions for prevention and policy. Chronic Dis Can. 2007;27(4):154-62. de Groh M, Morrison HI. Environmental tobacco smoke and deaths from coronary heart disease in Canada. Chronic Dis Can. 2002;23(1):13-6.

### *What does this mean?*

Eliminating smoking would reduce the number of smoking-attributable deaths by 689 annually (two every day) in Peel. Lung cancer and ischemic heart disease comprise half of all smoking-related deaths. If you extrapolate from Canadian estimates of smoking-attributable death, the mortality estimate for Peel is much higher (around 1,400 deaths). However, this may be due to differences in Peel's population structure (e.g., higher proportion of healthy immigrants, a lower smoking rate).

In Peel, exposure to environmental tobacco smoke results in approximately 40 deaths annually due to lung cancer and ischemic heart disease among non-smokers each year (approximately three deaths per month).

**Definition**

***Potential Years of Life Lost (PYLL)***

**PYLL is a measure of disease burden that takes into account the age at which deaths occur by giving greater weight to deaths occurring at younger ages and lower weight to deaths occurring at older ages. Each death is weighted by the number of years before the age of 75 at which the death occurs. Deaths in infancy get the most weight; deaths at or after age 75 get zero weight.**

## Smoking-Attributable Potential Years of Life Lost

Smoking-attributable potential years of life lost (PYLL) is a measure of the impact of smoking on premature mortality in the population. The PYLL presented in this report reflects the number of years of life lost assuming a life expectancy of 75 years. Given that Peel life expectancy for males and females is currently 81 and 85 years respectively, and that mortality from certain diseases (e.g., cardiovascular disease) are higher among those over the age of 75 years, the estimates provided should be considered to be conservative.

Tables 3.6 and 3.7 show the number of PYLL in Peel that are attributable to smoking.

*Respiratory diseases, especially lung cancer, contribute the greatest number of smoking-attributable PYLL.*

**Peel Fact**

**Two of Peel's 12 deaths each day are attibutable to smoking.**

**Table 3.6**

**Annual Number of Potential Years of Life Lost (PYLL)† from Smoking-Attributable Diseases, Peel, 2003-2007**

| | Smoking Attributable Fraction (SAF)% | Male | | Female | | Total | |
|---|---|---|---|---|---|---|---|
| | | Number of PYLL | Number of PYLL Attributable to Smoking | Number of PYLL | Number of PYLL Attributable to Smoking | Number of PYLL | Number of PYLL Attributable to Smoking |
| **RESPIRATORY DISEASES** | | | | | | | |
| Bronchitis, Emphysema | 86.4% | 31 | 28 | 11 | 9 | 42 | 37 |
| Chronic airway obstruction | 76.5% | 97 | 78 | 111 | 82 | 208 | 160 |
| Pneumonia and Influenza | 19.1% | 150 | 34 | 110 | 16 | 260 | 50 |
| Lung cancer | 80.3% | 1,304 | 1,152 | 917 | 631 | 2,221 | 1,783 |
| Laryngeal cancer | 81.2% | 61 | 50 | 9 | 6 | 70 | 56 |
| **RESPIRATORY TOTAL** | | **1,643** | **1,342** | **1,158** | **744** | **2801** | **2,086** |
| **CARDIOVASCULAR DISEASES** | | | | | | | |
| Ischemic heart disease | 32.1% | 2,794 | 969 | 686 | 149 | 3,480 | 1,118 |
| Cerebrovascular diseases | 29.9% | 566 | 178 | 395 | 109 | 961 | 287 |
| Other heart disease | 15.0% | 482 | 96 | 366 | 31 | 848 | 127 |
| Atherosclerosis | 24.7% | <5 | <5 | <5 | <5 | 5 | <5 |
| Aortic aneurysm and dissection | 63.5% | 153 | 100 | 17 | 9 | 170 | 109 |
| Other arterial disease | 17.7% | 46 | 9 | 44 | 7 | 90 | 16 |
| **CARDIOVASCULAR TOTAL** | | **4,045** | **1,353** | **1,509** | **305** | **5,554** | **1,658** |
| **DIGESTIVE SYSTEM DISEASES** | | | | | | | |
| Ulcer | 35.9% | 40 | 16 | 15 | <5 | 55 | 20 |
| Colorectal cancer | 9.6% | 783 | 80 | 531 | 46 | 1,314 | 126 |
| Esophageal cancer | 66.7% | 212 | 149 | 67 | 37 | 279 | 186 |
| Stomach cancer | 21.7% | 347 | 93 | 147 | 15 | 494 | 108 |
| Pancreatic cancer | 24.2% | 342 | 90 | 248 | 53 | 590 | 143 |
| Cancer of the lip, oral cavity and pharynx | 67.2% | 211 | 159 | 75 | 33 | 286 | 192 |
| **DIGESTIVE TOTAL** | | **1,935** | **587** | **1,083** | **188** | **3,018** | **775** |

Table 3.6 continues ...

**Table 3.6 continued**

| | Smoking Attributable Fraction (SAF)% | Male | | Female | | Total | |
|---|---|---|---|---|---|---|---|
| | | Number of PYLL | Number of PYLL Attributable to Smoking | Number of PYLL | Number of PYLL Attributable to Smoking | Number of PYLL | Number of PYLL Attributable to Smoking |
| **OTHER DISEASES** | | | | | | | |
| Cervical cancer | 9.4% | – | – | 210 | 20 | 210 | 20 |
| Kidney, Renal cancer | 29.6% | 218 | 83 | 76 | <5 | 294 | 86 |
| Bladder cancer | 41.0% | 93 | 43 | 30 | 8 | 123 | 51 |
| Acute myeloid leukemia | 17.1% | 112 | 26 | 77 | 6 | 189 | 32 |
| **OTHER TOTAL** | | **423** | **152** | **393** | **37** | **816** | **189** |
| **OVERALL TOTAL** | | **8,046** | **3,434** | **4,143** | **1,274** | **12,189** | **4,708** |

† Potential years of life lost reflect those aged 30 years and older for deaths due to cancer, and 35 years and older for deaths due to all other respiratory disease, cardiovascular disease and ulcer.
Note: Potential years of life lost reflect an annual average from 2003-2007.
Sources:
Ontario Mortality Database 2003-2007, IntelliHEALTH Ontario, Ministry of Health and Long-Term Care
Smoking Prevalence: Canadian Community Health Survey 2003, 2005, 2007/2008 combined, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care.
Relative Risk for smoking and diseases attributable to smoking (excluding colorectal cancer and ulcer): Thun MJ, Day-Lally C, Myers DG, Calle EE, Flanders WD, Zhu BP, et al. Trends in tobacco smoking and mortality from cigarette use in cancer prevention studies I (1959 through 1965) and II (1982 through 1988). Bethesda, MD: US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute; 1997.
Relative Risk for smoking and colorectal cancer: Chao A, Thun MJ, Jacobs EJ, Henley SJ, Rodriguez C, Calle EE. Cigarette smoking and colorectal cancer mortality in the cancer prevention study II. J Natl Cancer Inst. 2000 Dec 6;92(23):1888-96.
Relative Risk for smoking and ulcer: English DR, Holman CDJ, Milne E, Winter MJ, Hulse GK, Codde G, et al. The quantification of drug caused morbidity and mortality in Australia 1995. Canberra, Australia: Commonwealth Department of Human Services and Health; 1995.

**Table 3.7**
**Average Annual PYLL† in Non-Smokers that are Attributable to Environmental Tobacco Smoke (ETS)*, Peel, 2003-2007**

| | Smoking Attributable Fraction (SAF)% | Male | | Female | | Total | |
|---|---|---|---|---|---|---|---|
| | | Number of PYLL | Number of PYLL Attributable to ETS | Number of PYLL | Number of PYLL Attributable to ETS | Number of PYLL | Number of PYLL Attributable to ETS |
| Lung cancer | 3.7% | 1,304 | 51 | 917 | 32 | 2,221 | 83 |
| Ischemic heart disease | 4.3% | 2,794 | 121 | 686 | 27 | 3,480 | 148 |
| **TOTAL** | | **4,098** | **172** | **1,603** | **59** | **5,701** | **231** |

† Reflects deaths of those aged 30 years and older for lung cancer and 35 years and and older for ischemic heart disease.
* Are exposed regularly to environmental tobacco smoke in the home, a private vehicle or public place.
Note: Number of PYLL reflect an annual average for the years 2003-2007.
Sources:
Ontario Mortality Database 2003-2007, IntelliHEALTH Ontario, Ministry of Health and Long-Term Care
Prevalence of ETS: Canadian Community Health Survey 2003, 2005, 2007/2008 combined, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care.
Relative Risk for ETS exposure: Baliunas D, Patra J, Rehm J, Popova S, Kaiserman M, Taylor B. Smoking-attributable mortality and expected years of life lost in Canada 2002: Conclusions for prevention and policy. Chronic Dis Can. 2007;27(4):154-62; and de Groh M, Morrison HI. Environmental tobacco smoke and deaths from coronary heart disease in Canada. Chronic Dis Can. 2002;23(1):13-6.

### *What does this mean?*

Almost 5,000 years of life are lost as a result of premature death from smoking-related diseases. The majority of these lost years are due to death from lung cancer and ischemic heart disease. For all causes of death, men lose considerably more years of life than women.

Exposure to ETS results in 231 years of life lost annually among non-smokers as a result of death due to lung cancer and ischemic heart disease. Men lose more potential years of life annually than women.

## Overall Burden of Smoking in Peel

Table 3.8 is a summary table that describes the overall burden of smoking-attributable hospitalizations and deaths in Peel. Diseases that are attributable to smoking are responsible for 15% of all deaths in Peel, and almost 5% of all hospitalizations.

**Table 3.8**
**Summary of the Burden of Smoking in Peel**

| | Hospitalizations | Deaths |
|---|---|---|
| Total number | 72,914† | 4,478‡ |
| Number attributable to smoking | 3,316 | 689 |
| Per cent attributable to smoking | 4.5 | 15.4 |

† Excludes hospitalizations related to pregnancy. Total number of events portrayed is average annual number between 2005 and 2009.
‡ Total number of events portrayed is the average annual number between 2003 and 2007
Sources:
Hospital In-Patient Discharge Data 2005-2009, IntelliHEALTH Ontario, Ministry of Health and Long Term Care.
Ontario Mortality Database 2003-2007, IntelliHEALTH Ontario, Ministry of Health and Long-Term Care.

## Summary

This chapter described the disease burden caused by tobacco by quantifying the number of hospitalizations, deaths, and PYLL that are attributable to smoking.

In Peel:

- There are over 3,000 annual hospitalizations to Peel residents attributable to smoking-related diseases. This is the equivalent of about nine hospitalizations per day.
- Eliminating smoking would reduce the number of deaths attributable to smoking by 689 (almost two every day). Lung cancer and ischemic heart disease comprise half of all smoking-related deaths.
- Almost 5,000 years of life are lost as a result of dying from smoking-related diseases.
- Overall, there are 156 hospitalizations every year for lung cancer or ischemic heart disease that are attributable to someone else's smoke (approximately 13 per month).
- Exposure to ETS results in approximately 40 deaths annually due to lung cancer and ischemic heart disease among non-smokers each year (approximately three deaths per month).
- Exposure to ETS contributes to 231 years of life lost annually among non-smokers as a result of premature death due to lung cancer and ischemic heart disease.

chapter 4

# TOBACCO RELATED HEALTH CARE USE AND COSTS

Key Messages

**What does this Chapter tell us?**

- Current or former smokers in Canada utilize more hospitalization resources than non-smokers.[26] In Peel, by the age of 50, the proportion of the population with one or more hospitalisations begins to increase.[G] As our smokers succeed in quitting, there will be additional resources available for health care.
- In Peel the hospital cost of treating smoking-attributable disease is almost $50 million. This is a conservative estimate. Treatment of cardiovascular diseases attributable to smoking make up over half of this estimate. Extrapolating from Canadian data[27], this estimate would be closer to $100 million.

In Canada, individuals with a history of smoking have higher odds of hospitalization and spend more time in hospital than never-daily smokers.[26] In addition, hospital expenditures in Canada represent a large share of health care costs and total costs associated with treating smoking-related illnesses. In Peel, the proportion of the population who have had one or more hospitalization begins to increase by the age of 50. Current smokers have a significantly higher rate of hospitalization compared to non-smokers (data not shown).[G]

In Canada, the total costs of treating smoking-attributable diseases is $16,996.2 million. Within this estimate, $4,360.2 million are direct health care costs (Table 4.1)[27], which include: acute care hospital costs, ambulatory care physician fees, family physician visits and prescription drug use. Indirect costs (not directly related to health care expenditures) include things such as: productivity losses due to long-term disability, short-term disability and premature mortality.

**Table 4.1**
**Hospitalization Costs Attributable to Smoking, Canada and Ontario, 2002**

| Type of Cost | Canada ($ millions) | Ontario ($ millions) |
|---|---|---|
| Direct Costs Total<br>• Health Care Costs<br>- Hospital Costs<br>• Prevention and Research<br>• Other | $4,525.3<br>• $4,360.2<br>- $2,551.2<br>• $78.1<br>• $87.0 | NA |
| Indirect Costs (productivity) | $12,470.0 | NA |
| **TOTAL COSTS** | **$16,996.2** | **$6,057.2** |

Source: Rehm J, Baliunas D, Brochu S, Fischer B, Gnam W, Patra J, et al. The costs of substance abuse in Canada 2002. Canadian Centre on Substance Abuse; March 2006.

To estimate annual hospital costs associated with treating smoking-related diseases in Peel, we multiplied the average unit cost for treating each case of disease[28] by the average annual number of hospitalizations attributable to smoking for each disease.

The reader should note that there are many conditions listed in Table 4.2 that do not have cost estimates available, including: laryngeal cancer, aortic aneurysm and dissection, other arterial disease, esophageal cancer, stomach cancer, pancreatic cancer, cervical cancer, kidney and renal cancer, and acute myeloid leukemia.

Using currently available data, it is estimated that the hospitalization costs of treating smoking-attributable diseases is just over $49 million per year in Peel. Extrapolating from Canadian tobacco-related hospitalization cost estimates[27], this cost estimate would be closer to $100 million annually.

**Table 4.2**

**Average Number of Hospitalizations[£] and Smoking-Attributable Hospitalizations and Costs, Peel, 2005-2009**

| | Smoking Attributable Fraction (SAF)% | Number of Hospital-izations | Number of Hospital-izations Attributable to Smoking | Cost per stay | Cost for all Hospital-izations | Cost for Hospital-izations Attributable to Smoking |
|---|---|---|---|---|---|---|
| **RESPIRATORY DISEASES** | | | | | | |
| Bronchitis, Emphysema[¥] | 84.0% | 33 | 28 | $8,060 | $265,980 | $225,680 |
| Chronic airway obstruction | 76.8% | 1,032 | 793 | $8,060 | $8,317,920 | $6,391,580 |
| Pneumonia and Influenza | 18.5% | 932 | 172 | See below[€] | $3,868,248 | $674,374 |
| Lung cancer | 79.6% | 335 | 267 | $11,665 | $3,907,775 | $3,114,555 |
| Laryngeal cancer | 80.2% | 24 | 20 | Data not available | | |
| **RESPIRATORY TOTAL** | | **2,356** | **1,280** | | **$16,359,923** | **$10,406,189** |
| **CARDIOVASCULAR DISEASES** | | | | | | |
| Ischemic heart disease | 24.3% | 3,420 | 820 | See below[†] | $37,872,511 | $9,079,482 |
| Cerebrovascular diseases | 22.0% | 1,141 | 251 | $14,261 | $16,271,801 | $3,579,511 |
| Other heart disease | 14.4% | 3,032 | 435 | See below[‡] | $38,185,956 | $23,629,448 |
| Atherosclerosis | 23.0% | 50 | 11 | $14,129 | $706,450 | $155,419 |
| Aortic aneurysm and dissection | 62.0% | 137 | 84 | Data not available | | |
| Other arterial disease | 18.0% | 173 | 31 | Data not available | | |
| **CARDIOVASCULAR TOTAL** | | **7,953** | **1,632** | | **$93,036,718** | **$36,443,860** |
| **DIGESTIVE SYSTEM DISEASES** | | | | | | |
| Ulcer | 34.9% | 267 | 93 | $7,574 | $2,022,258 | $704,382 |
| Colorectal cancer | 9.6% | 513 | 49 | $8,002 | $4,105,026 | $392,098 |
| Esophageal cancer | 65.7% | 39 | 26 | Data not available | | |
| Stomach cancer | 21.0% | 111 | 24 | Data not available | | |
| Pancreatic cancer | 23.9% | 82 | 20 | Data not available | | |
| Cancer of the lip, oral cavity and pharynx | 63.8% | 76 | 48 | $16,628 | $1,263,728 | $798,144 |
| **DIGESTIVE TOTAL** | | **1,088** | **260** | | **$7,391,012** | **$1,894,624** |

Table 4.2 continues ...

**Table 4.2 continued**

| | Smoking Attributable Fraction (SAF)% | Number of Hospital-izations | Number of Hospital-izations Attributable to Smoking | Cost per stay | Cost for all Hospital-izations | Cost for Hospital-izations Attributable to Smoking |
|---|---|---|---|---|---|---|
| **OTHER DISEASES** | | | | | | |
| Cervical cancer | 9.0% | 31 | <5 | Data not available | | |
| Kidney, Renal cancer | 25.3% | 129 | 32 | Data not available | | |
| Bladder cancer | 41.4% | 237 | 98 | $6,293 | $1,491,441 | $616,714 |
| Acute myeloid leukemia | 13.7% | 43 | 6 | Data not available | | |
| **OTHER TOTAL** | | **440** | **139** | | **$1,491,441** | **$616,714** |
| **OVERALL TOTAL** | | **11,837** | **3,311** | | **$118,279,094** | **$49,361,387** |

£ Reflects cardiovascular, respiratory and ulcer hospitalizations for those aged 35 years and older. Cancer hospitalizations reflect those aged 30 years and older.
¥ It is assumed that the costs for bronchitis and emphysema are same as cost for chronic lower respiratory disease, excluding asthma.
€ Pneumonia and influenza costs have been calculated separately for each condition and then summed. Costs include: pneumonia ($7,812); acute upper respiratory infections and influenza ($3,494). It is assumed that the cost of treating influenza is the same as for treating acute upper respiratory tract infections.
† Ischemic heart disease costs have been calculated separately for each condition and then summed. Costs include: angina pectoris ($5,639), acute myocardial infection ($11,043), and other ischemic heart disease ($13,015).
‡ Other heart disease costs have been calculated separately for each condition and then summed. Costs include: Rheumatic fever with heart involvement ($39,748.00), chronic rheumatic heart diseases ($33,678.00), Pulmonary heart disease ($8,582.00), Cardiomyopathy ($21,287.00), Atrial fibrilation ($24,096.00), other conduction disorders and cardiac arrhythmias ($5,966.00), Heart failure ($9,795.00), and Other forms of heart diseases ($10,848.00). Please note that for other heart disease, cost estimate includes ICD-10 code I52.
Note: Number of hospitalizations reflects an annual average for the years 2005-2009.
Sources:
Hospital In-Patient Discharge Data 2005-2009, IntelliHEALTH Ontario, Ministry of Health and Long Term Care.
Smoking Prevalence: Canadian Community Health Survey 2003, 2005, 2007/2008 combined, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care.
Relative Risk for smoking and diseases attributable to smoking (excluding colorectal cancer and ulcer): Thun MJ, Day-Lally C, Myers DG, Calle EE, Flanders WD, Zhu BP, et al. Trends in tobacco smoking and mortality from cigarette use in cancer prevention studies I (1959 through 1965) and II (1982 through 1988). Bethesda, MD: US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute; 1997.
Relative Risk for smoking and colorectal cancer from: Chao A, Thun MJ, Jacobs EJ, Henley SJ, Rodriguez C, Calle EE. Cigarette smoking and colorectal cancer mortality in the cancer prevention study II. J Natl Cancer Inst. 2000 Dec 6;92(23):1888-96.
Relative Risk for smoking and ulcer: English DR, Holman CDJ, Milne E, Winter MJ, Hulse GK, Codde G, et al. The quantification of drug caused morbidity and mortality in Australia 1995. Canberra, Australia: Commonwealth Department of Human Services and Health; 1995.
Canadian Institute for Health Information. The cost of acute care hospital stays by medical condition in Canada, 2004-2005. Ottawa: Canadian Institute for Health Information; 2008.

## Summary

In Peel, current smokers have a higher rate of hospitalization compared to non-smokers.[G] In Peel, we estimate that at the very least, smoking-attributable hospitalization costs about $49 million annually.

chapter 5

# PROFILE OF A SMOKER

Key Messages

**What does this Chapter tell us?**

- Experimentation with cigarettes begins on average by 17 years of age.
- Daily smoking begins on average around 20 years of age.
- While the prevalence of smoking is declining in Peel, about 167,700 people still smoke.
- The odds of being a smoker are 4.4 times higher for males and 6.5 times higher for females if someone else in the home smokes.

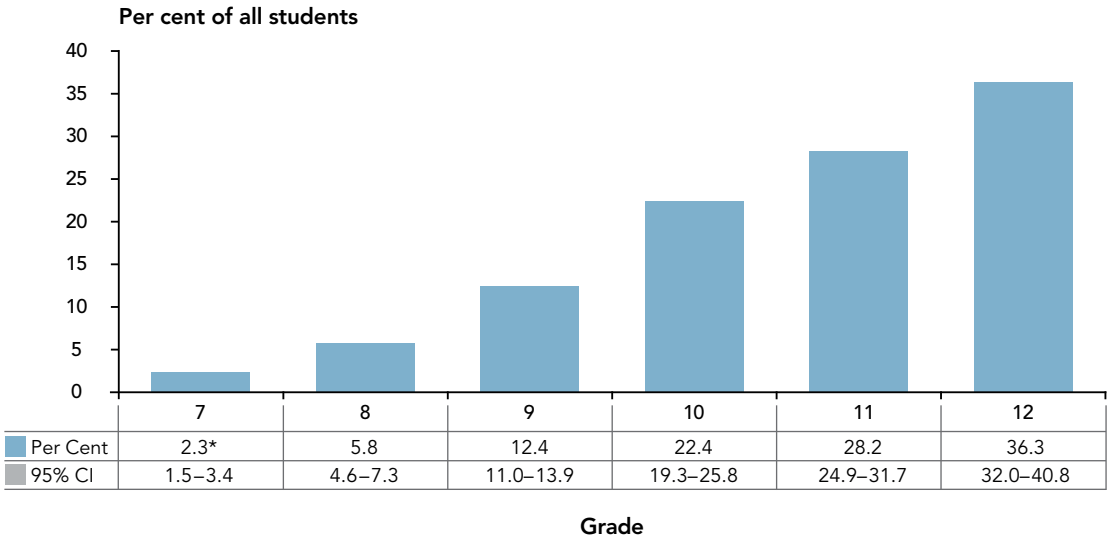
### *Who smokes cigarettes?*

This chapter of the report will describe the attributes of a smoker in Peel. Knowing who smokes and the factors associated with smoking will help Peel Public Health to guide the implementation of effective tobacco control strategies for smoking cessation and the prevention of smoking initiation.

## Youth Experimentation with Cigarettes

Youth begin to experiment with tobacco as early as Grade 4. By the time they reach Grade 12, over one-third of students have tried smoking a cigarette (Figure 5.1).

**Figure 5.1**
**Proportion of Students who have Ever† Smoked a Cigarette by Grade, Peel, 2011**




| | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|
| Per Cent | 2.3* | 5.8 | 12.4 | 22.4 | 28.2 | 36.3 |
| 95% CI | 1.5–3.4 | 4.6–7.3 | 11.0–13.9 | 19.3–25.8 | 24.9–31.7 | 32.0–40.8 |

* Use estimate with caution
† Ever smoked defined as ever tried smoking a cigarette (even just a few puffs)
Note: 95% CI reflects the 95% confidence interval of the estimate.
Source: Student Health Survey 2011, Peel Public Health

**Peel Fact**

The frequency of daily smoking increases by grade. Less than 1% of Grade 9 students smoke cigarettes every day, while 6% of Grade 12 students smoke daily in Peel.[D]

**Peel Fact**

The top three reasons that youth try smoking:

- Curiosity (60%),
- Encouraged by friends (20%), and
- Stress (14%).[D]

## Smoking Initiation

### *Age of Smoking Initiation*

On average, Peel smokers try their first whole cigarette by the age of 17 years. Males tend to try smoking at a younger age than females. The average age at which a person becomes a daily smoker is 20 years of age. Additionally, males become daily smokers at a younger age than females, and are also heavier smokers than females (Table 5.1).

**Did You Know**

**The 1997 Canadian Tobacco Act makes it illegal for the tobacco industry to advertise or promote tobacco products on television or in movies within Canada. However, on-screen tobacco images are still allowed as long as the tobacco industry does not pay for it. On-screen tobacco images are also allowed if the program has been imported.**

**Adolescents who see actors smoking on television or in the movies are more likely to initiate and progress to regular smoking.[29,30]**

**Table 5.1**
**Age of Smoking Initiation, Quantity and Duration of Smoking by Sex, Peel, 2009/2010†**

| Population | Behaviour | Male (mean) | Female (mean) | Total (mean) |
|---|---|---|---|---|
| **All Smokers** | Age of First Whole Cigarette | 16.9 | 18.2 | 17.5 |
| **Daily Smokers** | Age First Smoked Daily | 19.1 | 21.3 | 20.0 |
| | Number of Cigarettes Smoked Daily | 14.1 | 10.0 | 12.5 |
| | Number of Years Smoked Daily | 22.4 | 24.8 | 23.4 |
| **Occasional Smokers** | Number of Cigarettes Smoked on Smoking Days | 2.8 | 2.7 | 2.8 |
| | Number of Days Smoked One or More Cigarettes per Month | 10.6 | 8.6* | 10.0 |

† Reflects population aged 12 years and older who ever smoked a cigarette
*Use estimate with caution
Source: Canadian Community Health Survey 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care.

*On average, males smoke their first whole cigarette at age 17 years; females do the same at age 18 years. A daily pattern of smoking is established by the time males and females are 19 and 21 years old respectively.*

## Type of Smoker

About 12% of Peel's population are daily smokers and 3%, occasional smokers. A greater proportion of males in Peel smoke both daily (15%) and occasionally (5%) compared to females (9% daily and 2% occasionally). Females (75%) are more likely than males (61%) to be never-smokers (Figure 5.2).

**Did You Know**

Young women start smoking for the following reasons:

- Association with others (parents and friends) who smoke,
- Concern with weight, body image or social acceptance,
- Interest in rebelling or stating individuality,
- Reaction to positive images of smoking in magazines, movies and youth culture, and
- Influence from cigarette marketing campaigns targeting women.[31]

**Definition**

A ***daily smoker*** currently smokes daily and has smoked at least 100 cigarettes in their lifetime.

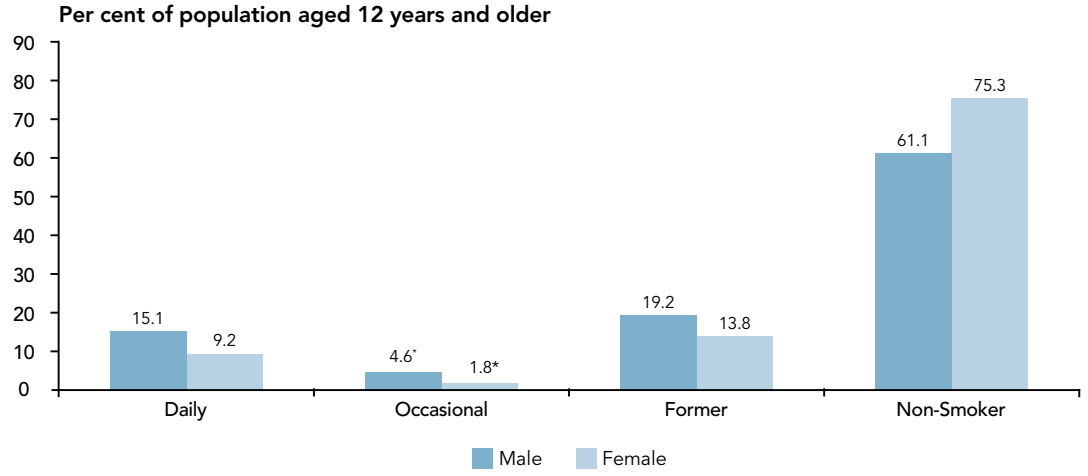
An ***occasional smoker*** currently smokes occasionally, has smoked at least 100 cigarettes in their lifetime and some in the past 30 days.

A ***former smoker*** currently does not smoke at all, has smoked at least 100 cigarettes in their lifetime but has not smoked in the past 30 days.

A ***non-smoker*** does not currently smoke, and has not smoked 100 or more cigarettes in their lifetime.

A ***never-smoker*** in this report is a smaller subset of the non-smoker category and is defined as someone who has never smoked a whole cigarette.[32]

**Figure 5.2**
**Type of Smoker by Sex, Peel, 2009/2010**




* Use estimate with caution
Source: Canadian Community Health Survey 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

**Table 5.2**
**Proportion and Number of Type of Smoker†, Peel, 2009/2010**

| | | Type of Smoker | | | |
|---|---|---|---|---|---|
| | | Daily | Occasional | Former | Never |
| **Males** | Per Cent (95% CI) | 15.1 (12.2–18.5) | 4.6* (3.3–6.6) | 19.2 (16.1–22.7) | 61.1 (56.8–65.2) |
| | Number of people | 81,500 | 25,100 | 103,700 | 330,100 |
| **Females** | Per Cent (95% CI) | 9.2 (6.8–12.2) | 1.8* (1.1–2.7) | 13.8 (11.2–16.9) | 75.3 (71.4–78.8) |
| | Number of people | 51,300 | 9,800 | 77,300 | 421,200 |
| **TOTAL** | **Per Cent (95% CI)** | **12.1 (10.1–14.2)** | **3.2 (2.4–4.2)** | **16.5 (14.4–18.8)** | **68.3 (65.4–71.1)** |
| | **Number of people** | **132,800** | **34,900** | **181,000** | **751,300** |

† Reflects respondents aged 12 years and older
* Use estimate with caution
Note: 95% CI reflects the 95% confidence interval of the estimate.
Source: Canadian Community Health Survey, 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

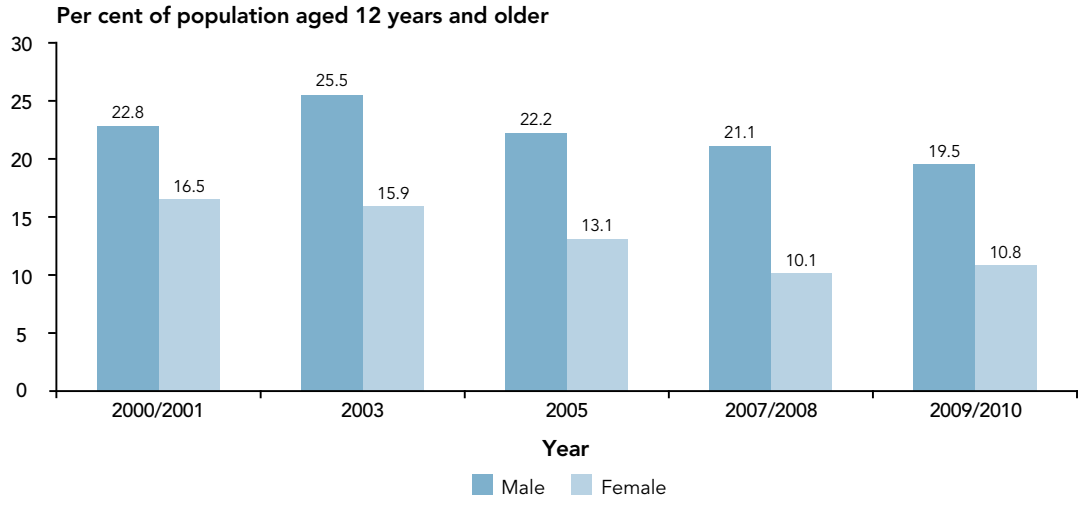
## Profile of Current Smokers

In Peel in 2009/2010, 15% of the population or 167,700 people were current smokers (Figure 5.3 and Table 5.3). Peel's smoking rate is similar to that of Ontario. Compared to 2000/2001, Peel's smoking rate has declined significantly.

**Definition**

A ***current smoker*** is a person who currently smokes daily or occasionally, has smoked at least 100 cigarettes in their lifetime and has smoked in the past 30 days.

**Figure 5.3**
**Prevalence of Current Smoking by Sex and Year, Peel, 2000/2001, 2003, 2005, 2007/2008, 2009/2010**




Source: Canadian Community Health Survey 2000/2001, 2003, 2005, 2007/2008, 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

**Table 5.3**
**Number and Proportion of Current Smokers† by Sex and Year, Peel, 2000/2001, 2003, 2005, 2007/2008, 2009/2010**

| | | 2000/2001 | 2003 | 2005 | 2007/2008 | 2009/2010 |
|---|---|---|---|---|---|---|
| **Males** | Per Cent (95% CI) | 22.8 (19.8–26.1) | 25.5 (21.9–29.6) | 22.2 (19.2–25.6) | 21.1 (17.5–25.3) | 19.5 (16.3–23.2) |
| | Number | 96,700 | 118,000 | 111,200 | 114,400 | 106,600 |
| **Females** | Per Cent (95% CI) | 16.5 (14.1–19.3) | 15.9 (13.3–19.0) | 13.1 (10.6–16.0) | 10.1 (8.0–12.8) | 10.8 (8.4–13.9) |
| | Number | 71,300 | 74,700 | 66,400 | 56,200 | 61,100 |
| **TOTAL** | **Per Cent (95% CI)** | **19.6 (17.6–21.8)** | **20.7 (18.4–23.2)** | **17.6 (15.6–19.8)** | **15.5 (13.4–18.0)** | **15.1 (13.0–17.4)** |
| | **Number** | **168,000** | **192,700** | **177,600** | **170,600** | **167,700** |

† Reflects respondents aged 12 years and older.
Note: 95% CI reflects 95% confidence interval of the estimate.
Sources: Canadian Community Health Survey 2000/2001, 2003, 2005, 2007/2008, and 2009/2010 Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care.

## Former and Non-Smokers

### *What is contributing to the decline in smoking?*

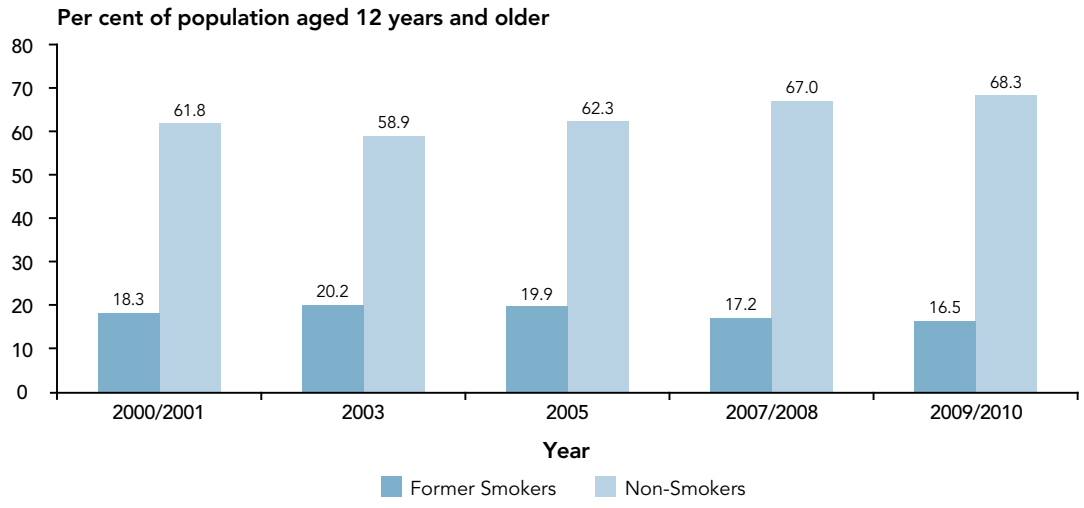
While the proportion of former smokers has not changed over time, the proportion of the population who are classified as non-smokers has increased (Figure 5.4 and Table 5.4). The reader should note that the data in Figure 5.4 come from a survey that collects data at a specific point in time. Former smokers could have quit many years before, but are being reported as former smokers for the point in time of the survey.

**Definition**

A ***former smoker*** currently does not smoke at all, has smoked at least 100 cigarettes in their lifetime but has not smoked in the past 30 days.

A ***non-smoker*** currently does not smoke, and has not smoked 100 or more cigarettes in their lifetime.[32]

**Figure 5.4**
**Prevalence of Former and Non-Smokers by Year, Peel, 2000/2001, 2003, 2005, 2007/2008, 2009/2010**




Source: Canadian Community Health Survey 2000/2001, 2003, 2005, 2007/2008, 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

**Table 5.4**
**Proportion and Number of Current, Former and Non-Smokers by Year†, Peel, 2000/2001, 2003, 2005, 2007/2008, 2009/2010**

| | | 2000/2001 | 2003 | 2005 | 2007/2008 | 2009/2010 |
|---|---|---|---|---|---|---|
| **Current Smokers** | Per Cent (95% CI) | 19.6 (17.6–21.8) | 20.7 (18.4–23.2) | 17.6 (15.6–19.8) | 15.5 (13.4–18.0) | 15.0 (13.0–17.4) |
| | Number of People | 168,000 | 192,800 | 177,600 | 170,600 | 167,700 |
| **Former Smokers** | Per Cent (95% CI) | 18.3 (16.4–20.4) | 20.2 (18.2–22.4) | 19.9 (17.7–22.2) | 17.2 (15.2–19.5) | 16.5 (14.4–18.8) |
| | Number of People | 154,600 | 186,000 | 197,600 | 186,800 | 181,000 |
| **Non-Smokers** | Per Cent (95% CI) | 61.8 (59.2–64.4) | 58.9 (56.2–61.6) | 62.3 (59.5–65.0) | 67.0 (64.1–69.9) | 68.3 (65.4–71.1) |
| | Number of People | 522,400 | 543,100 | 619,700 | 726,600 | 751,300 |

† Reflects respondents aged 12 years and older.
Note: 95% CI reflects 95% confidence interval of the estimate
Source: Canadian Community Health Survey 2000/2001, 2003, 2005, 2007/2008, 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care.

*A lower uptake of smoking has contributed to a decline in Peel's smoking rate since 2000/2001.*

### *Smoking Behaviour among Youth*

**Definition**

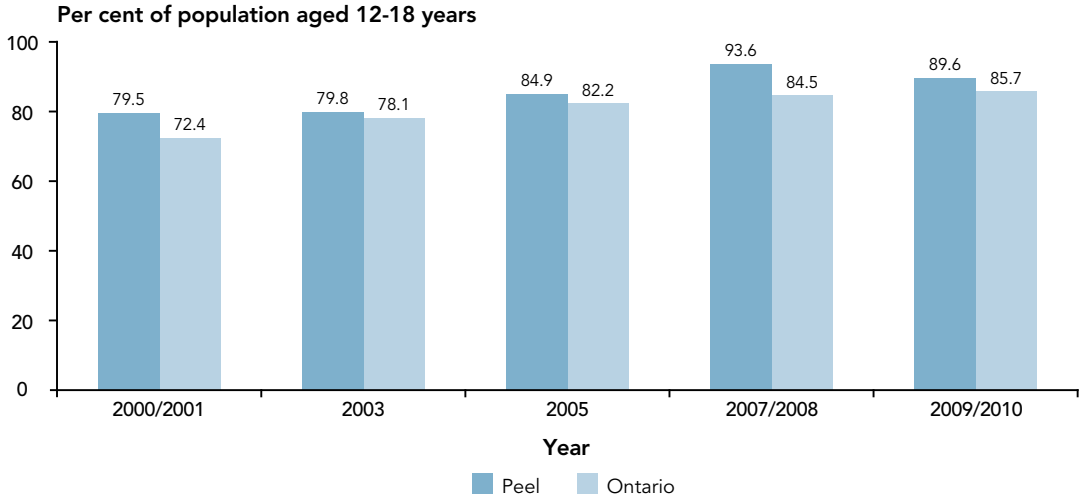
**A *never-smoker* is someone who has never smoked a whole cigarette.**

**A *non-smoker* currently does not smoke, and has not smoked 100 or more cigarettes in their lifetime.** [32]

Ninety per cent of youth in Peel report that they have never smoked a whole cigarette (Figure 5.5). The concept of "never-smoking" reflects low risk taking. What is more telling about smoking behaviour among youth however, is the rate of non-smoking, which reflects those who have tried smoking maybe once or several times, but who have not moved on to become current smokers. In Peel in 2009/2010, 95% of youth were classified as non-smokers (Figure 5.6).

## Figure 5.5

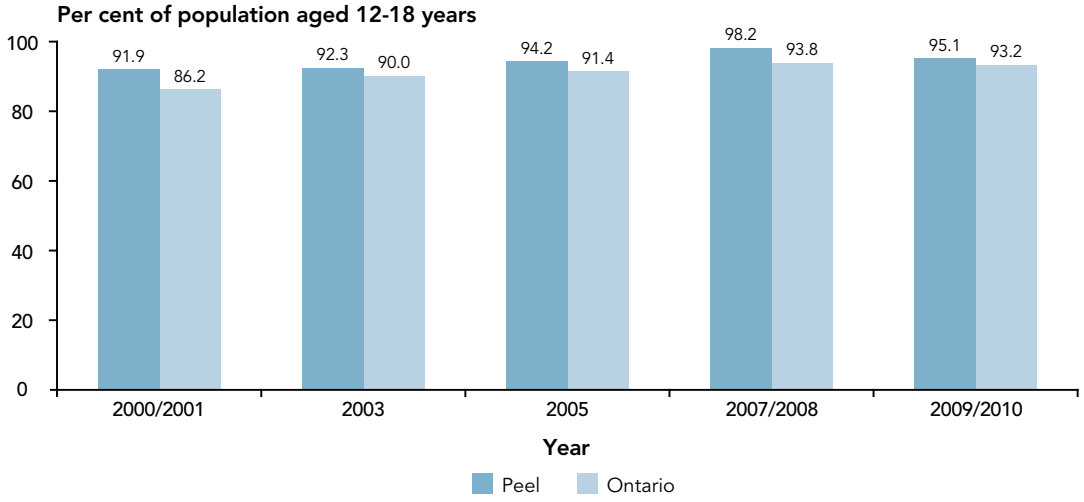
**Prevalence of Never Smoking† among Youth by Year, Peel and Ontario, 2000/2001, 2003, 2005, 2007/2008, 2009/2010**




† Never smoker defined as a person who has never smoked a whole cigarette.
Source: Canadian Community Health Survey 2000/2001, 2003, 2005, 2007/2008, 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

## Figure 5.6

**Prevalence of Non-Smoking† among Youth by Year, Peel and Ontario, 2000/2001, 2003, 2005, 2007/2008, 2009/2010**




†Non-smoking defined as a person does not smoke currently and who has not smoked more than 100 cigarettes in their lifetime.
Source: Canadian Community Health Survey 2000/2001, 2003, 2005, 2007/2008, 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

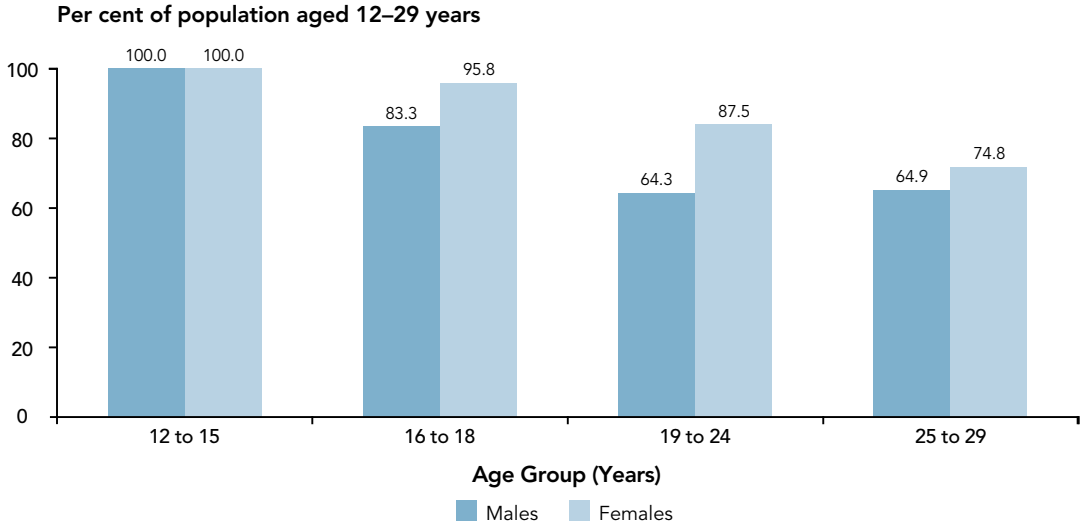
Males and females between the ages of 12 and 15 years are unlikely to be established smokers. Adults who become daily smokers tend to experience their first use of cigarettes by the age of 18 years.[30] This is true in Peel where there are fewer non-smokers among those aged 16 to 18 years and older compared to those aged 12 to 15 years (Figure 5.7).

**Peel Fact**

**In Peel, 41% of youth who are current smokers† have someone else buy the cigarettes for them, or are given them by friends and family (35%).[D] Fifty per cent of youth also report buying cigarettes themselves from a retailer.[D] This undermines the efforts made in tobacco control to limit the supply of cigarettes to underage youth. The fine for selling/supplying tobacco to a youth under 19 can be as high as $4,000 for an individual and $10,000 for a corporation on a first time offence.**

† Smokes daily or at least once a week

**Figure 5.7**
**Prevalence of Non-Smoking† among Youth and Young Adults by Age Group and Sex, Peel, 2009/2010**




†Non-smoking defined as a person does not smoke currently and who has not smoked more than 100 cigarettes in their lifetime.
Source: Canadian Community Health Survey 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

## Determinants of Health and Behavioural Risk Factors Associated with Smoking

There are many factors that are associated with smoking. Sex, age, income level, educational attainment, immigrant status and ethnicity, have all been considered in the literature as potential influential factors in explaining tobacco use. Since some of these factors themselves might be related to one another, an accurate assessment involves examining each of these factors independently through logistic regression modelling, which incorporates multiple variables into the analysis. The results of the logistic regression modelling approach provide a more accurate assessment of an outcome (such as smoking) by considering several dependent variables.

The adjusted results of the regression analysis for the association between current smoking status, health determinants and other risk factors are presented by sex in Table 5.5. This table shows the magnitude of the relationship between each potential health and determinant/risk factor explored, and the likelihood of smoking by depicting the odds ratio as a measure of risk.


**Definition**

An *Odds Ratio (OR)* estimates the chances or the rate of an event occurring in one population in relation to its rate occurrence in another population.

- If the OR=1, the rate of an event occurring in one population equals the rate of an event occurring in another population.
- If the OR>1, the rate of an event occurring in one population is greater than the rate of an event occurring in another population. For example, if the odds ratio equals 2, the odds of the event occurring is twice as high in the one population compared to the other population.
- If the OR<1, the rate of an event occurring in one population is less than the rate of an event occurring in another population. For example, if the odds ratio was 0.50, the odds of the event occurring in one population is 50% lower compared to the other population.

Only the adjusted ORs are provided. The full model containing the unadjusted ORs can be found in Appendix 1 and 2. The adjusted OR describes the increased risk of smoking for each determinant or risk factor, taking into account other factors that may also be associated with smoking. When an adjusted OR is used to explain the excess risk of smoking associated with each determinant or risk factor, it can be assumed that this magnitude of excess risk is attributable to the particular determinant or risk factor alone and not due to the influence of other determinants or risk factors being explored.

**Table 5.5**

**Association between Current Smoking Status† and Social or Behavioural Determinants by Sex, Peel, 2000/2001, 2003, 2005, 2007/2008 Combined**

| Variable | Males Adjusted Odds Ratio (95% CI) | Females Adjusted Odds Ratio (95% CI) |
|---|---|---|
| **Age** | * 0.97 (0.96, 0.98) | * 0.96 (0.95, 0.98) |
| **Household Income Level** | | |
| Lowest to middle | 1.14 (0.59, 2.19) | 1.20 (0.65, 2.21) |
| Upper-middle | 1.0 | 1.0 |
| Highest | 1.00 (0.77, 1.28) | 0.95 (0.72, 1.26) |
| **Educational level of respondent** | | |
| Less than secondary | * 2.06 (1.53, 2.78) | * 1.55 (1.01, 2.37) |
| Secondary graduate | * 1.45 (1.09, 1.95) | * 2.06 (1.52, 2.80) |
| Other post-secondary | 0.65 (0.41, 1.04) | 1.62 (0.93, 2.84) |
| Post-secondary graduate | 1.0 | 1.0 |
| **Ethnicity** | | |
| White | 1.0 | 1.0 |
| Black | 0.70 (0.38, 1.28) | * 0.27 (0.12, 0.64) |
| East/Southeast Asian | 0.85 (0.53, 1.36) | * 0.28 (0.14, 0.57) |
| West Asian/Arab | 1.27 (0.65, 2.47) | 0.64 (0.27, 1.53) |
| South Asian | * 0.58 (0.38, 0.88) | 0.16 (0.02, 1.39) |
| Latin American and Other | 0.74 (0.44, 1.22) | * 0.50 (0.25, 0.98) |
| **Immigrant status** | | |
| Recent immigrant | 0.94 (0.61, 1.46) | * 0.44 (0.25, 0.78) |
| Long-term immigrant | 1.12 (0.84, 1.50) | 1.05 (0.76, 1.46) |
| Non-immigrant | 1.0 | 1.0 |
| **Marital status** | | |
| Now married | 1.28 (0.92, 1.79) | 0.96 (0.65, 1.41) |
| Common-law | * 2.22 (1.31, 3.76) | * 1.84 (1.01, 3.36) |
| Separated/Divorced | * 3.23 (1.88, 5.54) | * 2.29 (1.40, 3.76) |
| Widowed | 0.57 (0.21, 1.59) | 1.02 (0.44, 2.38) |
| Single | 1.0 | 1.0 |
| **Sense of belonging to local community** | | |
| Very strong/somewhat strong | 1.0 | 1.0 |
| Somewhat weak/very weak | 1.10 (0.87, 1.41) | * 1.39 (1.07, 1.80) |
| **Self-perceived life stress** | | |
| Excellent/very good/good | 1.17 (0.90, 1.52) | 1.09 (0.80-1.47) |
| Fair/poor | 1.0 | 1.0 |
| **Employment status in past week** | | |
| At work last week/absent last week‡ | 1.0 | 1.0 |
| No job last week | * 0.56 (0.39, 0.82) | 1.21 (0.86, 1.71) |
| **Self-perceived health** | | |
| Excellent/very good/good | 1.0 | 1.0 |
| Fair/poor | 1.14 (0.75, 1.72) | * 1.73 (1.19, 2.52) |

Table 5.5 continues...

**Table 5.5 continued**

| Variable | Males Adjusted Odds Ratio (95% CI) | Females Adjusted Odds Ratio (95% CI) |
|---|---|---|
| **Weekly alcohol consumption** | | |
| Yes | * 1.34 (1.04, 1.73) | * 1.52 (1.13, 2.05) |
| No | 1.0 | 1.0 |
| **Physical activity level** | | |
| Active | 1.0 | 1.0 |
| Moderate | 0.99 (0.71, 1.38) | 1.02 (0.72, 1.47) |
| Inactive | * 1.45 (1.10, 1.92) | * 1.39 (1.00, 1.94) |
| **Someone smokes in home** | | |
| Yes | * 4.36 (2.91, 6.53) | * 6.51 (4.30, 9.85) |
| No | 1.0 | 1.0 |

† Reflects respondents aged 18 years and older
‡ Employed in last week
* Indicates statistically significant findings (p<0.05).
Source: Canadian Community Health Survey, 2000/2001, 2003, 2005, 2007/2008. Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

## Age, Sex and Current Smoking

Definition

A ***current smoker*** is a person who currently smokes daily or occasionally, has smoked at least 100 cigarettes in their lifetime and has smoked in the past 30 days.

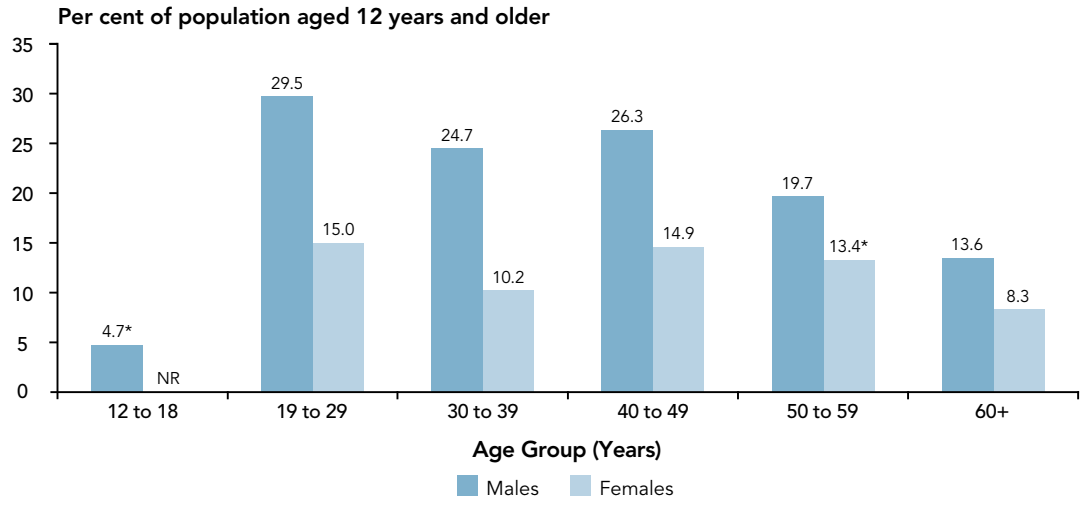
The model results show that as age increases after 18 years the risk of smoking decreases for both males and females.

The prevalence of current smoking among males jumps from the teen years to the 20s as is shown in Figure 5.8. It then gradually declines over subsequent decades. The pattern is also true for females but is less than striking.

Men are more likely than women to be current smokers between the ages of 19 to 49 years (Figure 5.8). While not shown, females in Peel tend to have a lower smoking rate than females in the rest of Ontario. Males in Peel and Ontario have similar smoking rates.[B1]

## Figure 5.8

**Prevalence of Current Smoking by Age Group and Sex, Peel, 2005, 2007/2008, 2009/2010 Combined**




* Use estimate with caution
NR = Not releasable due to small numbers
Source: Canadian Community Health Survey 2005, 2007/2008, 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

## Table 5.6

**Number and Proportion of Current Smokers† by Age Group and Sex, Peel, 2005, 2007/2008, 2009/2010 Combined**

| | | Age Group (Years) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 12 – 18 | 19 – 29 | 30 – 39 | 40 – 49 | 50 – 59 | 60+ |
| Males | Per Cent (95% CI) | 4.7* (2.8–7.7) | 29.5 (24.8–34.8) | 24.7 (20.5–29.4) | 26.3 (21.2–32.0) | 19.7 (14.4–26.4) | 13.6 (10.2–18.0) |
| | Number of people | 9,600 | 86,100 | 65,000 | 91,500 | 47,400 | 32,600 |
| Females | Per Cent (95% CI) | NR | 15.0 (11.5–19.2) | 10.2 (7.6–13.5) | 14.9 (11.3–19.2) | 13.4* (9.0–19.6) | 8.3 (9.9–12.9) |
| | Number of people | NR | 46,100 | 30,100 | 49,000 | 32,600 | 22,200 |

† Reflects respondents aged 12 years and older.
Note: 95% CI reflects 95% confidence interval of the estimate
Source: Canadian Community Health Survey 2005, 2007/2008, 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care.

**Peel Fact**

In Peel, twice as many males smoke compared to females, from the ages of 19 to 49 years.

While not significantly higher, young adult males aged 19 to 29 years comprise the age group with the highest prevalence of current smoking; followed closely by males aged 30 to 49 years. Women aged 19 to 29 and 40 to 49 years have the highest prevalence of current smoking; however, this rate is only half that of males.

## Marital Status and Current Smoking

Marital status is discernibly associated with current smoking status. Results of the regression analysis reveal that after controlling for other factors, the adjusted odds of current smoking among those previously married (i.e., those that are divorced or separated) is almost 2.3 times greater for females and 3.2 times greater for males than those that are single.

## Education Level and Current Smoking

After controlling for all other factors in the model, results of the regression analyses show that the odds of being a current smoker are greater for those with less education. For men, the odds are two times higher for those who have less than secondary school education, and 1.4 times higher for those who completed high school, when compared with those who are post-secondary school graduates.

For women, the odds of being a current smoker are 1.5 times greater for women who have less than secondary education, and two times greater for women who have completed secondary school (OR 2.06), when compared to those who have completed post-graduate studies.

## Income and Current Smoking

Income and health are generally believed to have a positive relationship to one another. Less affluent populations are more likely to suffer from poor health. In Canada, smoking prevalence is highest among those people in the lowest income quartile, and lowest among those in the highest income quartile.[33]

This negative association between income and smoking status, while also observed at the Ontario level, is not apparent in Peel. Individuals in Peel are equally likely to smoke across all levels of income. The factors that contribute to this unexpected relationship are not clear, however, it may be related to immigration patterns in Peel. Peel immigrants tend to smoke less. Furthermore, their incomes may be lower as they establish themselves. We speculate that Peel's high proportion of immigrants, who tend to smoke less and have a different income experience than non-immigrants, may result in this finding.

## Immigrant Status and Current Smoking

**Definition**

**Immigrant Status**

The term ***immigrant*** refers to people who are, or have been, granted the right to live in Canada permanently by immigration authorities.

***Non-immigrant*** refers to the Canadian born population.

***Recent Immigrant*** is defined as someone who has been in Canada for 10 years or less.

A ***long-term immigrant*** is defined as someone who has been in Canada for 11 years or more.

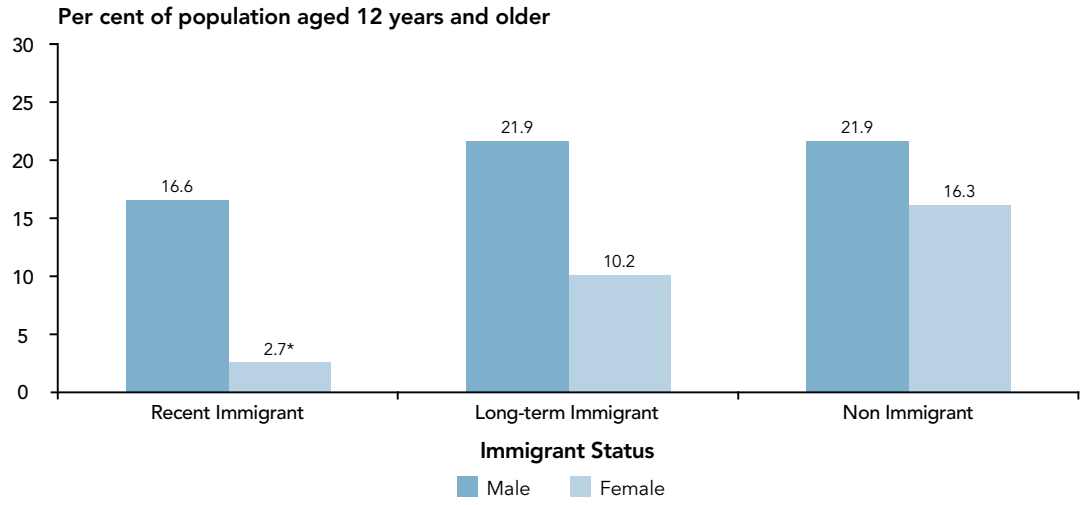
Recent male and female immigrants in Peel have significantly lower smoking rates than non-immigrants (Figure 5.9). There have been no

significant changes over time in the prevalence of smoking among recent, long-term or non-immigrants by sex (data not shown).

In Peel, males smoke at similar rates regardless of immigrant status. Rates of smoking among immigrant women are lowest among recent immigrants (Figure 5.9).

After controlling for all other factors in the regression model, female recent immigrants are less likely to smoke (OR 0.44) compared to non-immigrant females. There was no difference in the likelihood of smoking between female long-term immigrants and non-immigrants. This pattern was not observed for males in Peel.

**Figure 5.9**
**Prevalence of Current Smoking by Immigrant Status and Sex, Peel, 2005, 2007/2008 and 2009/2010 Combined**




* Use estimate with caution
Source: Canadian Community Health Survey 2005, 2007/2008, 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

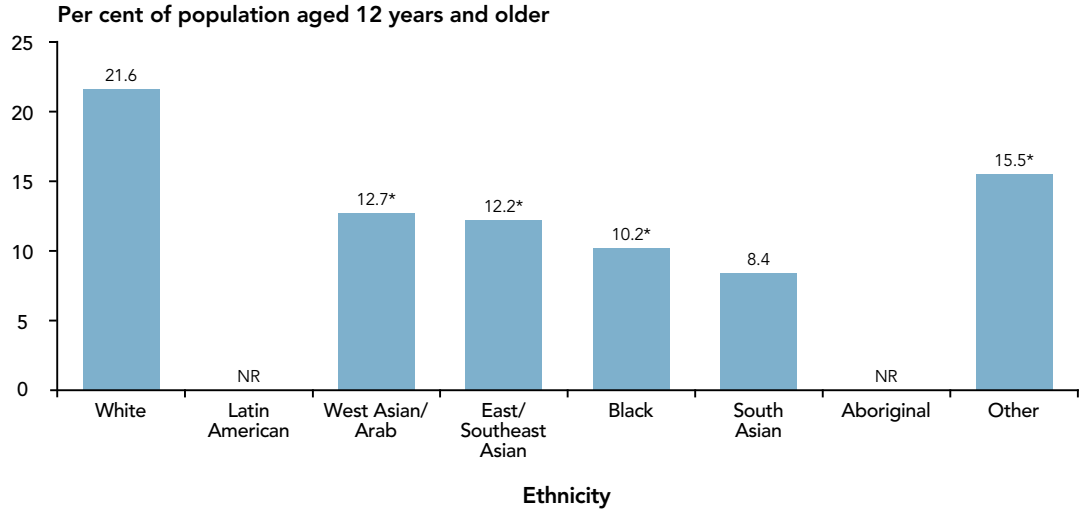
**Did You Know**

Some immigrant and ethnic groups are less likely to smoke cigarettes and more likely to use alternative forms of tobacco (such as shisha, guthka and paan). This type of information is not currently captured in national surveys. The figures presented in these sections report only on cigarette use by immigrant status and ethnicity. The rate of tobacco use (including alternative forms of tobacco) among some immigrant and ethnic groups may be higher than what is depicted in this report.

## Ethnicity and Current Smoking

Peel is a diverse community and is home to individuals of various ethnic backgrounds. In Peel, smoking prevalence varies by ethnicity. Rates of smoking are highest among those who self identify as White (22%) compared to all other ethnic groups (Figure 5.10).

**Figure 5.10**
**Prevalence of Current Smoking by Ethnicity, Peel, 2005, 2007/2008, 2009/2010**




* Use estimate with caution
NR=Not releasable due to small numbers
Source: Canadian Community Health Survey 2005, 2007/2008, 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

After controlling for all other factors in the regression model, females who identified as Black, East/Southeast Asian and Latin American and all other ethnic origins were less likely to be current smokers compared to those of White ethnicity. South Asians were the only ethnic group found to be significantly less likely to smoke among males (Table 5.5). Additional differences in smoking prevalence among different ethnic groups may not have been detected in our analysis due to the small sample size of these groups.

The distribution of smoking prevalence on a worldwide level can provide insight into the smoking behaviour among certain ethnic groups and immigrants to Ontario and Peel. Smoking prevalence is highly variable among nations. Many of these patterns are maintained among individuals of specific ethnic origin in Ontario and Peel (Table 5.7).

**Table 5.7**
**Current Smoking in Country of Origin by Sex, Ontario and Peel, 2007/2008**

| Ethnic Origin | Population, Peel§ 2006 | Smoking Rate in Country of Origin‡ (male) (%) | Smoking Rate in Ontario∑ (male) (%) | Smoking Rate in Country of Origin‡ (female) (%) | Smoking Rate in Ontario∑ (female) (%) | Smoking Rate in Peel (both sexes)∑¶ (%) |
|---|---|---|---|---|---|---|
| Chinese | 67,780 | 57.4 | 21.7 | 2.6 | 3.3* | NR |
| Irish | 102,810 | 31.0 | 26.1 | 27.0 | 22.2 | 22.5 |
| Italian | 93,200 | 28.6 | 22.5 | 16.3 | 14.7 | 23.4* |
| Portuguese | 59,240 | 27.6 | 25.4* | 10.6 | 12.9* | NR |
| Polish | 55,730 | 34.0 | 21.5 | 23.0 | 25.2 | 28.2* |
| South Asian | 211,645 | | 14.1* | | 3.3* | 11.5* |
| • India | | 57.0 | NA | 10.7 | NA | NA |
| • Pakistan | | 27.3 | NA | 4.4 | NA | NA |
| • Sri Lanka | | 24.5 | NA | 1.6 | NA | NA |
| English† | 156,435 | 22.5 | 21 | 20.0 | 17.9 | 17.9 |
| Scottish† | 107,225 | 22.0 | 23.9 | 20.0 | 20.3 | 15.7* |
| Canadian | 140,350 | 16.4 | 23.6 | 14.3 | 22.9 | 14.5* |
| Jamaican | 51,940 | 28.6 | N/A | 7.7 | N/A | N/A |

† United Kingdom.
* Use estimate with caution.
NR - Not releasable due to small numbers.
NA - data not available.
¶ Smoking rates in Peel could not be presented by sex due to small sample numbers.
Sources:
∑ Canadian Community Health Survey 2007/2008, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care
§ 2006 Census, Statistics Canada;
‡ World Health Organization. WHO report on the global tobacco epidemic, 2009: Implementing smoke free environments. France: World Health Organization; 2009.

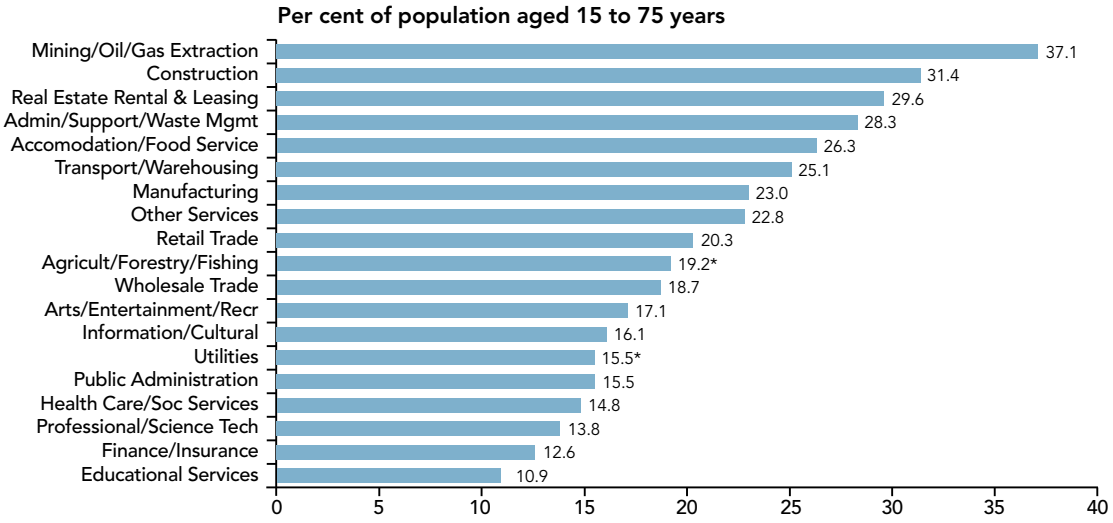
## Employment and Current Smoking

After controlling for all other factors, results of the regression model showed that male respondents who reported not having a job in the previous week were less likely to be a current smoker compared to those reporting employment in the previous week.

## Occupation And Current Smoking

A person's occupation and the practices in a workplace may contribute to variable rates of smoking within employment industries. In Ontario, smoking rates are as low as 11% among those working in educational services, and as high as 37% among those working in the mining, oil or gas extraction industries (Figure 5.11).

**Figure 5.11**
**Prevalence of Current Smoking by Industry of Employment, Ontario, 2009/2010**




* Use estimate with caution
Source: Canadian Community Health Survey 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

## Alcohol Use and Current Smoking

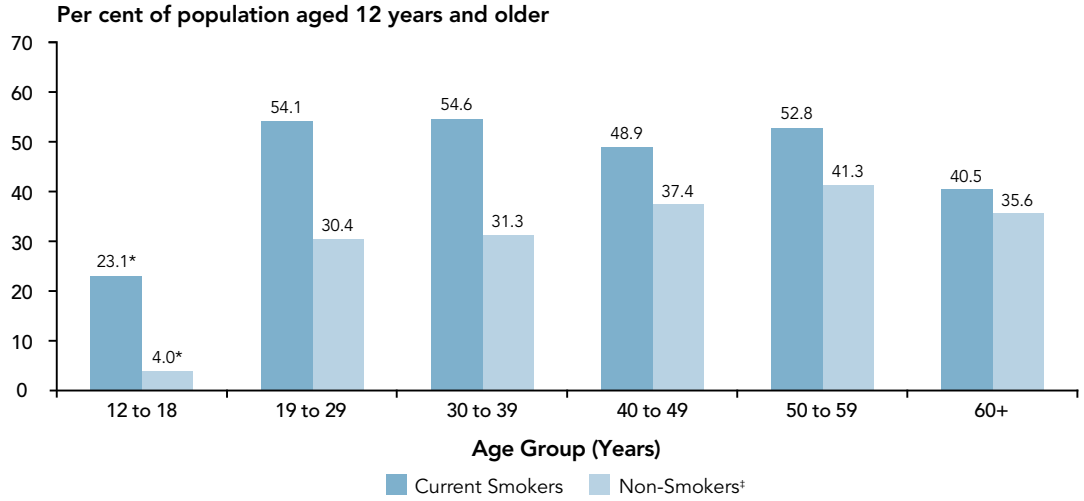
Results of the regression modelling showed that alcohol consumption is associated with current smoking status. The odds of being a current smoker are 1.5 times greater for women who report weekly alcohol consumption and 1.3 times greater for men who report weekly alcohol consumption.

In youth and young adults, smoking status is associated with the onset of other risky behaviours, such as binge drinking and substance abuse.[34] Those who consider themselves social smokers or occasional smokers will typically abstain from smoking; however, they are most susceptible to smoking in social situations and when consuming alcohol (e.g., bar, patio or party).[35] Both the social setting and the concurrence of smoking and drinking are important when considering how youth and young adults transition from occasional smokers to current smokers.[34]

*Youth, aged 12 to 18 years, who are current smokers have a weekly drinking rate that is almost six times that of non-smokers.*

In Peel, a significantly higher proportion of smokers are weekly drinkers (50%) compared to non-smokers (31%). Both males and females who were smokers had higher rates of weekly alcohol use relative to those who were non-smokers. Youth aged 12 to 18 years who are current smokers have a weekly drinking rate that is almost six times that of non-smokers (Figure 5.12).

**Figure 5.12**
**Prevalence of Weekly Drinking† by Smoking Status, Peel, 2000/2001, 2003, 3005, 2007/2008, 2009/2010 Combined**




* Use estimate with caution
† Drink alcoholic beverages once per week or more
‡ Non-smokers are defined as former and never smokers
Source: Canadian Community Health Survey 2000/2001, 2003, 2005, 2007/2008, 2009/2010, Share File, Ontario Ministry of Health and Long-Term Care

*The prevalence of binge drinking is higher across all age groups of smokers compared to non-smokers.*

In Peel, a significantly higher proportion of current smokers binge drink (30%) compared to non-smokers (9%). For youth aged 12 to 18 years, the rate of binge drinking is ten times higher among current smokers compared to non-smokers. This prevalence of binge drinking is consistently higher across all age groups (Figure 5.13).

*The prevalence of binge drinking among youth aged 12 to 18 years is 10 times higher among smokers compared to non-smokers.*

## Mental Health and Smoking

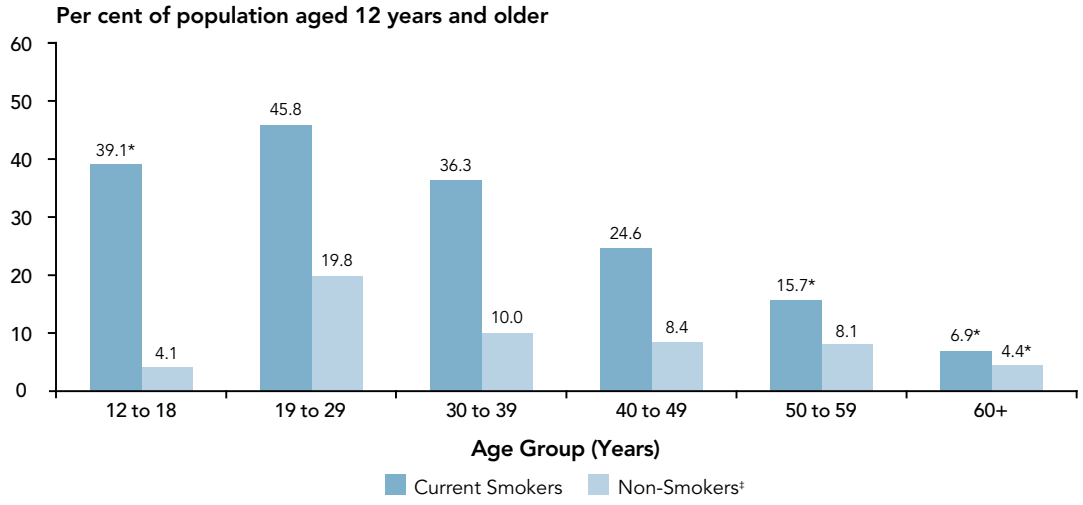
The association between mental health status and smoking is of particular interest when considering smoking prevalence and the co-morbidity factors in a sub-population. Rates of smoking are significantly higher in those affected with psychiatric disorders (e.g., depression and schizophrenia). Psychiatric patients demonstrate difficulty both when attempting to overcome mental health symptoms and when attempting to quit smoking.[36]

In Ontario, approximately 34% of those diagnosed with a mood disorder are current smokers.[37]

## Social Support and Smoking

Lower levels of social capital (measured as social participation or trust) are related to higher rates of daily smoking.[38,39] Results of the regression modelling showed that women who reported a weak sense of belonging to their local community were 40% more likely to report being a current smoker relative to those reporting a strong sense of community belonging. There were no significant findings for men.

**Figure 5.13**
**Prevalence of Binge Drinking† by Smoking Status, Peel, 2000/2001, 2003, 3005, 2007/2008, 2009/2010 Combined**




* Use estimate with caution
† Binge drinking is defined as having five or more drinks on one occasion, once per month or more in the past 12 months
‡ Non-smokers are defined as former and never smokers
Source: Canadian Community Health Survey 2000/2001, 2003, 2005, 2007/2008, 2009/2010, Share File, Ontario Ministry of Health and Long-Term Care

## Summary

In Peel, experimentation with cigarettes begins at a young age (2% of Grade 7 students have ever smoked a cigarette). On average, most daily smokers begin smoking daily at the age of 17 years and smoke about 12 cigarettes per day.

While the prevalence of current smoking (comprised of daily and occasional smokers) has been declining since 2000/2001, the current smoking population in Peel as of 2009/2010 consists of 167,700 people.

Peel is enjoying some successes in that the proportion of those who are never-smokers increased to a high in 2009/2010 of 68%. The proportion of youth who have never smoked is high among those aged 12 to 15 years. By the time a person is in their 20s, the rate of current smoking among males is six times higher, and five times higher among females compared to those aged 12 to 19 years.

By using the results of the regression modelling, we understand more about the relationship between smoking and various social or behavioural determinants of health. Some key highlights include:

- Higher odds of smoking among Peel residents with a secondary education or less compared to those with completed a post-secondary education, and
- Higher odds of smoking among Peel residents who drink weekly.

Smoking and alcohol use are highly correlated. While this pattern is observed among all age groups, the prevalence of weekly drinking among youth is six times higher compared to non-smokers. Binge drinking among youth is 10 times higher among smokers compared to non-smokers.

chapter 6

# EXPOSURE TO ENVIRONMENTAL OR SECOND-HAND TOBACCO SMOKE

Key Messages

**What does this Chapter tell us?**

- In Peel, 5% of mothers smoke at some point during pregnancy. Approximately 10% of Peel mothers who smoked delivered a baby that was low birth weight. This compares to 6% of mothers who did not smoke during pregnancy.
- While Peel has had some success in reducing its population's exposure to second-hand smoke, about one out of every 10 residents still report being exposed to second-hand smoke at home, in private vehicles or in a public space.

**Did You Know**

***Environmental tobacco smoke (ETS)***, also known as second-hand smoke, refers to the exposure to someone else's smoke from a cigarette, cigar or pipe.

- Tobacco smoke consists of solid particles and gases.
- Solid particles make up about 10% of tobacco smoke and include tar and nicotine.
- Gases or vapours make up about 90% of tobacco smoke. The major gas present is carbon monoxide; others include formaldehyde, acrolein, ammonia, nitrogen oxide, pyridine, hydrogen cyanide, vinyl chloride, N-nitrosodimethylamine and acrylonitrile.[40]
- More than 4,000 different chemicals have been identified in tobacco smoke.[40]

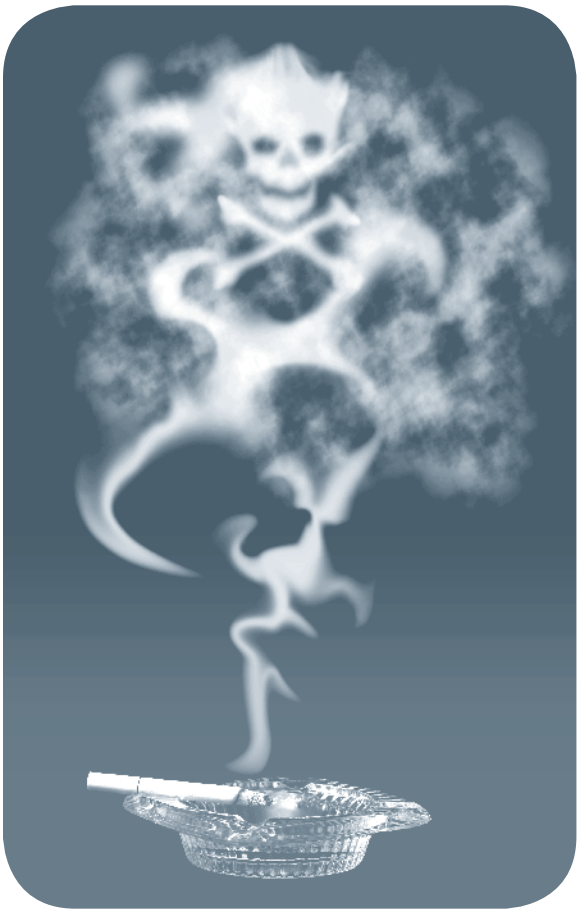
**Figure 6.1**
**What's your Poison?**

When you smoke, you inhale up to 4,000 chemicals including these poisons:

**4-Aminobiphenyl**
**Acetone**
(Paint stripper)
**Arsenic**
(White ant poison)
**Benzene**
**Benzopyrene**
**Cadmium**
(Substance used in car batteries)
**Carbon Monoxide**
(Poisonous gas in car exhausts)
**DDT**
(Insecticide)
**Dibenzacridine**
**Dimethuylnitrosamine**
**Formaldehyde**
**Hydrogen Cyanide**
(Poison used in gas chambers)
**Lead**
**Mercury**
**Phenol**
**Toluene**
(Industrial solvent)
**Urethane**
**Vinyl Choride**

**It's enough to make you sick. Very sick.**

Canadian Cancer Society / Société canadienne du cancer



Regular exposure to ETS is linked to confirmed and suspected health risks that affect children and adults (Table 6.1).[41]

**Table 6.1**
**Diseases Caused by Environmental Tobacco Smoke**

| Health Risks | Adults | Children |
|---|---|---|
| Confirmed | • Aggravation of asthma<br>• Breast cancer<br>• Respiratory disease including bronchitis, emphysema and chronic obstructive pulmonary disease (COPD)<br>• Heart disease<br>• Lung cancer<br>• Nasal sinus cancer | • Aggravation of asthma as well as the cause of asthma in pre-school children<br>• Fetal growth impairment<br>• Middle ear infections<br>• Respiratory infections<br>• Sudden infant death syndrome (SIDS) |
| Suspected | • Brain cancer<br>• Cervical cancer<br>• Leukemia<br>• Lymphoma<br>• Miscarriage<br>• Stroke<br>• Thyroid cancer | • Adverse impact on cognition and behaviour<br>• Decreased lung function<br>• Induction of asthma<br>• Worsening of cystic fibrosis (CS) |

Miller MD, Broadwin R, Green S, Marty MA, Polakoff J, Salmon AG, et al. Proposed identification of environmental tobacco smoke as a toxic air contaminant. Part B: Health effects. California: California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Air Toxicology and Epidemiology Branch; June 24, 2005.

## Smoking during Pregnancy

Exposure to tobacco smoke starts in utero for some Peel residents. Smoking during pregnancy increases the risk of miscarriage, placental complications and stillbirth. It is an important modifiable cause of adverse pregnancy outcomes.[42]

In 2008, approximately 5% of Peel mothers smoked during their pregnancy (Table 6.2). This is a lower percentage than observed for Ontario as a whole (data not shown). This may be due to Peel's high proportion of immigrant mothers, who are less likely to smoke than non-immigrants.

**Measurement**

**Data about smoking during pregnancy is based on information that is self-reported to a health care professional by the mother. These data are limited to some extent as we do not have information about a non-smoking mother's exposure to second-hand smoke.**

*In Peel in 2008, 799 mothers (5%) reported smoking at some point during their pregnancy.*

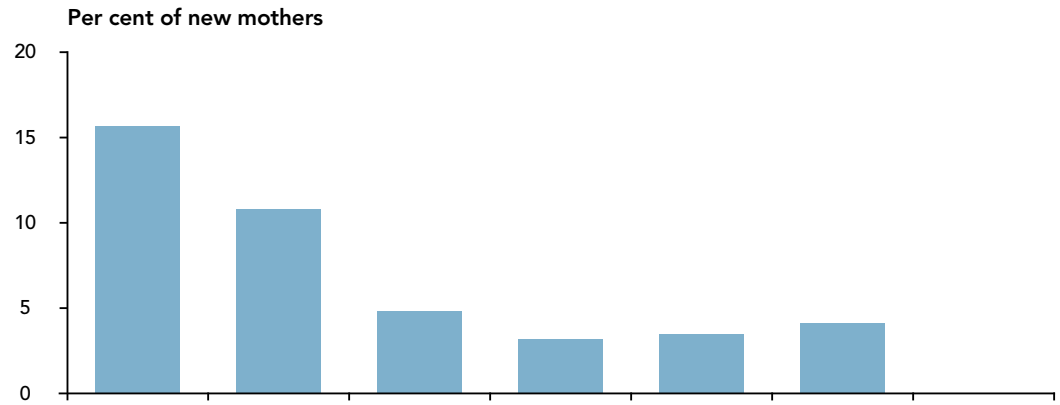
*Mothers under the age of 20 years have the highest smoking rate.*

**Table 6.2**
**Smoking Status during Pregnancy, Peel, 2008**

| Smoking Status | Peel | |
|---|---|---|
| | Number of Smokers | Per Cent of Smokers |
| Smoker* | 799 | 4.9 |
| • Before 20 weeks gestation | 150 | 0.9 |
| • Gestation of 20 weeks or later | 97 | 0.6 |
| • Before and after 20 weeks gestation | 552 | 3.4 |
| Non-smoker | 14,248 | 87.5 |
| Unknown or missing | 1,243 | 7.6 |
| **TOTAL** | **16,290** | **100.0** |

* Smoker defined as having smoked before 20 weeks of gestation and/or after 20 weeks of gestation
Source: BORN-Niday 2008, BORN Ontario

**Figure 6.2**
**Prevalence of Smoking during Pregnancy by Age Group, Peel, 2008**




| | <20 | 20 to 24 | 25 to 29 | 30 to 34 | 35 to 39 | 40 to 44 | 45+ |
|---|---|---|---|---|---|---|---|
| Per Cent | 15.7 | 10.8 | 4.8 | 3.2 | 3.5 | 4.1 | NR |
| Number | 51 | 198 | 239 | 181 | 104 | 25 | NR |

Age Group (Years)

NR = Not releasable due to small numbers
Source: BORN-Niday 2008, BORN Ontario

Infants born to mothers who smoke are more likely to be born preterm (birth delivered before 37 completed weeks or gestation) and/or small-for-gestational-age (SGA) (having a birth weight below the sex specific 10th percentile for gestational age). Both preterm infants and those born SGA are at increased risk of mortality and morbidity during infancy.[43-47]

The association between maternal smoking and adverse outcomes increases with the amount and duration of smoking. Women who quit smoking before or during pregnancy can reduce the risk of preterm birth and SGA in comparison to women who smoke throughout pregnancy.[48]

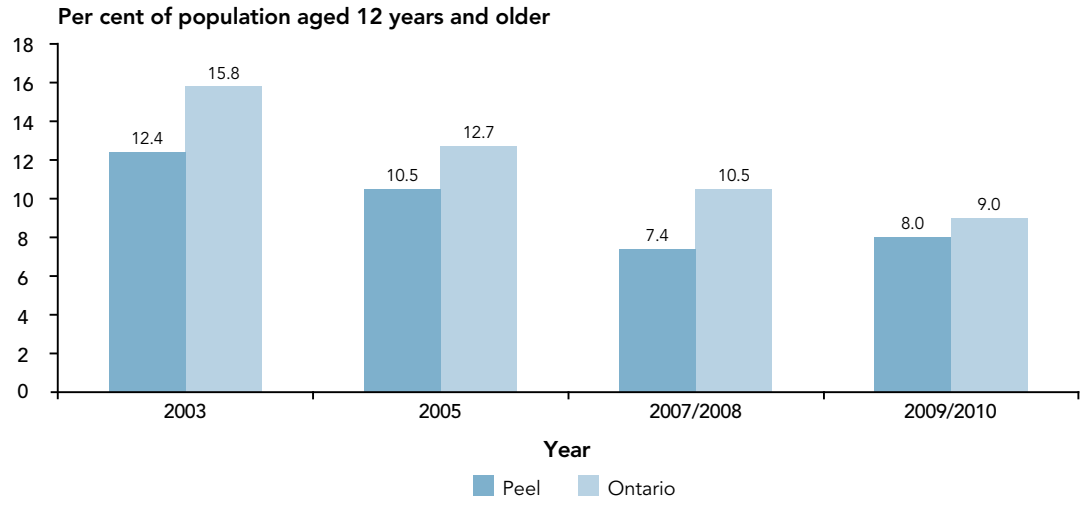
In 2008 in Peel, about 10% of mothers who smoked during pregnancy delivered a low birth weight baby (birth weight less than 2,500 grams) compared to 6% of mothers who were non-smokers (data not shown). While we are unable to calculate the birth weight difference for Peel, it has been estimated that smoking during pregnancy leads to birth weights that are approximately 200 grams less than the mean birth weight of children of non-smokers.[49]

## Environmental Tobacco Smoke (ETS) in the Home

Smoking restrictions in the home are found to be strongly related to an individual's level of cigarette consumption. Having a smoke-free home prolongs the duration of cessation following a quit attempt.[50] This suggests that public health efforts aimed at promoting a smoke-free home will not only protect non-smokers from exposure to second-hand smoke, but would also give family members a tool to reinforce their desire not to smoke.

Currently, approximately 8% of Peel residents live in a household with a smoker (including smokers who live alone). Between 2003 and 2007/2008 there was a decline in the proportion of the population living in a household with a smoker. There has been no significant change in Peel since 2007/2008 (Figure 6.3).

**Figure 6.3**
**Proportion of Population Living in a Home with Someone who Smokes Inside† by Year, Peel and Ontario, 2003, 2005, 2007/2008, 2009/2010**




Notes: Includes smokers living alone
† Smokes inside every day or almost every day
Source: Canadian Community Health Survey 2003, 2005, 2007/2008, 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

Regression modelling in Chapter 5 – Profile of a Smoker identified that male smokers are 4.4 times more likely, and female smokers to be 6.5 times more likely, to be a smoker if they are living with someone who smokes in the home.

In Peel, approximately 20% of smokers (equivalent to 35,600 smokers) live with at least one smoker in the household. Quitting becomes more of a challenge for this group of smokers. Approximately 5% of non-smokers live with one or more smokers in the home (Table 6.3).

**Table 6.3**
**Proportion of Population† Exposed to Smokers in the Home‡, Peel, 2000/2001, 2003, 2005, 2007/2008, 2009/2010 Combined**

| Smoking Status | | Lives Alone§ | Smoking Behaviour in the Home | |
|---|---|---|---|---|
| | | | No One Smokes in Home¥ | One or More Smokers in the Home¥ |
| **Smoker** | Per Cent (95% CI) | 21.2 (14.5–28.0) | 51.8 (43.7–59.9) | 20.3 (13.9–26.7) |
| | Number | 37,200 | 90,800 | 35,600 |
| **Non-Smoker** | Per Cent (95% CI) | 17.2 (14.2–20.1) | 77.7 (73.7–81.6) | 5.1 (3.4–6.7) |
| | Number | 141,700 | 641,200 | 42,000 |
| **TOTAL** | **Per Cent (95% CI)** | **17.9 (15.0–20.7)** | **73.2 (69.4–76.9)** | **7.8 (5.6–9.9)** |
| | **Number** | **178,900** | **732,000** | **77,600** |

† Among those aged 12 years and older that report living in a home with someone who regularly smokes inside.
‡ Smokes inside every day or almost every day.
§ Number of respondents living alone was derived.
¥ These categories are asked of smokers. The response categories "one smoker in home" and "two or more smokers in home" could include the smoker themselves,
Notes:
Per cent rows by smoking status will not add to 100 as "Not Applicable" respondents not reflected in table.
95% CI reflects the 95% confidence interval of the estimate.
Source: Canadian Community Health Survey 2000/2001, 2003, 2005, 2007/2008, 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care.

**Did You Know**

Currently the Smoke-Free Ontario Act provides minimal protection from second-hand smoke for people living in multi-unit dwellings, such as townhouses and apartment buildings.

Under the Act, smoking is only prohibited in the common areas of multi-unit dwellings (e.g., laundry rooms, lobbies and elevators). It is not prohibited for a person to smoke tobacco inside their unit, despite the fact that tobacco smoke can seep from various openings in a multi-unit dwelling and spread the smoke throughout a building.

In 2007/2008, 28% of Ontarians living in multi-unit dwellings noticed tobacco smoke enter their unit from elsewhere in the building.[51] In 2008, 83% of survey respondents stated that smoking should be banned in multi-unit dwellings.[52]

In 2010, Peel Regional Council requested that the Minister of Health Promotion and the Minister of Health and Long-Term Care enact provincial legislation to protect residents in multi-unit dwellings from exposure to second-hand tobacco smoke drifting between units. To date, the Government of Ontario has not made any attempt to strengthen the Smoke-Free Ontario Act or Residential Tenancies Act so as to protect people from second-hand smoke exposure in their units.

While no municipalities within Ontario have by-laws prohibiting smoking in multi-unit dwellings, there are some that have smoke-free options with their social housing providers. For example, Waterloo and Peterborough both have smoke-free social housing options. Effective September 1, 2010 all new leases (new tenants and transfers) with Waterloo Region Housing and Region of Waterloo Community Housing Inc. state that smoking is not allowed inside the buildings. Smoking is restricted to beyond five metres of any window, entrance or exit to the buildings. It does not apply to existing tenants unless they move to a new unit.

## Smoking Restrictions in the Home

Overall, over three-quarters (82%) of Peel residents report that they impose some form of smoking restriction in their home. Non-smokers are more likely to report that they have self-imposed smoking restrictions in the home (84%) compared to smokers (71%) (data not shown).[B2] Types of smoking restrictions by smoking status are shown in Table 6.4.

## Environmental Tobacco Smoke (ETS) in a Vehicle

On January 21, 2009, the Smoke-Free Ontario Act was amended to include smoking restrictions in motor vehicles. Under this law, a driver or passenger is not permitted to smoke in a motor vehicle when someone under the age of 16 years is present. The purpose is to protect children from exposure to second-hand smoke.

**Table 6.4**
**Type of Smoking Restriction in the Home† by Smoking Status, Peel, 2007/2008**

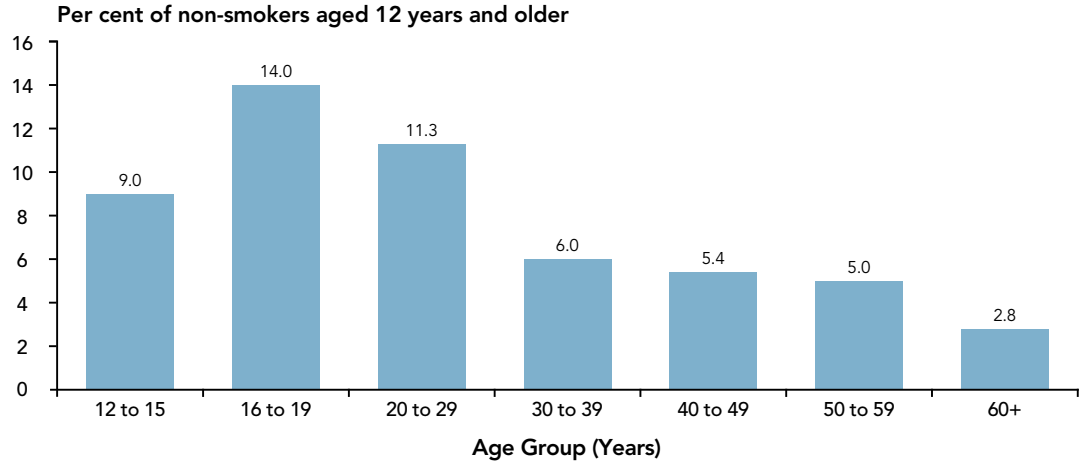
| Type of Smoking Restriction | Smoking Status | |
|---|---|---|
| | Non-Smoker Per Cent (95%CI) | Smoker Per Cent (95%CI) |
| Smoking not permitted in the home | 97.2 (95.5–98.2) | 85.8 (79.2–90.6) |
| Smoking is allowed in certain rooms only | 2.3* (1.3–4.0) | 11.3* (7.0–18.0) |
| Smoking is restricted in the presence of young children | 0.8* (0.5–1.2) | 4.7* (2.7–8.2) |
| Other restriction (not specified) | 0.5* (0.2–0.9) | 0.8* (0.2–3.1) |

*Use estimate with caution.
† Reflects respondents aged 12 years and older who reported that there was some form of smoking restriction in the home.
Note:
95% CI reflects the 95% confidence interval of the estimate.
Source: Canadian Community Health Survey 2007/2008, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care.

*In 2009/2010, 9% of Ontario teens aged 12 to 15 years were still being exposed to second-hand smoke in a private vehicle.*

In both Peel and Ontario in 2009/2010, approximately 7% of non-smokers reported that they were regularly exposed to tobacco smoke in the past month in a private vehicle. In Ontario, one out of 10 teens aged 12 to 15 years are still reporting exposure to second-hand smoke in a private vehicle (Figure 6.4).

**Figure 6.4**
**Prevalence of Exposure to Tobacco Smoke in a Private Vehicle† by Age Group, Ontario, 2009/2010**




† Excluded from analyses is anyone who is a current smoker (daily or occasional)
Source: Canadian Community Health Survey 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

## Environmental Tobacco Smoke (ETS) in Public Spaces

The Smoke-Free Ontario Act currently prohibits smoking in enclosed public places or workplaces and in the following outdoor areas:

- Outdoor patios if the patio has a partial or complete roof,
- School property,
- The reserved seating areas of sports arenas and entertainment venues, and
- Within nine metres of entranceways/exits to hospitals, health care and psychiatric facilities.

Definition

***Enclosed public spaces*** are defined as the inside of a building or structure (which has more than two walls and a roof) to which the public has access, including retail shops, indoor shopping malls, restaurants, bars, places of entertainment, casinos, bingo and billiard halls, taxicabs and limousines.

### *Outdoor Public Spaces*

Outdoor public spaces (e.g., outdoor patios, the entranceways or exits to buildings, parks, playgrounds, outdoor markets) are all areas where the Smoke-Free Ontario Act does not apply.

Outdoor tobacco smoke is an emerging issue in Ontario and across the world. As an increasing number of people enjoy the benefits of smoke-free enclosed workplaces and public places, there has been a push to have protection from second-hand smoke in outdoor areas as well.

Reasons for by-laws restricting smoking outdoors include:

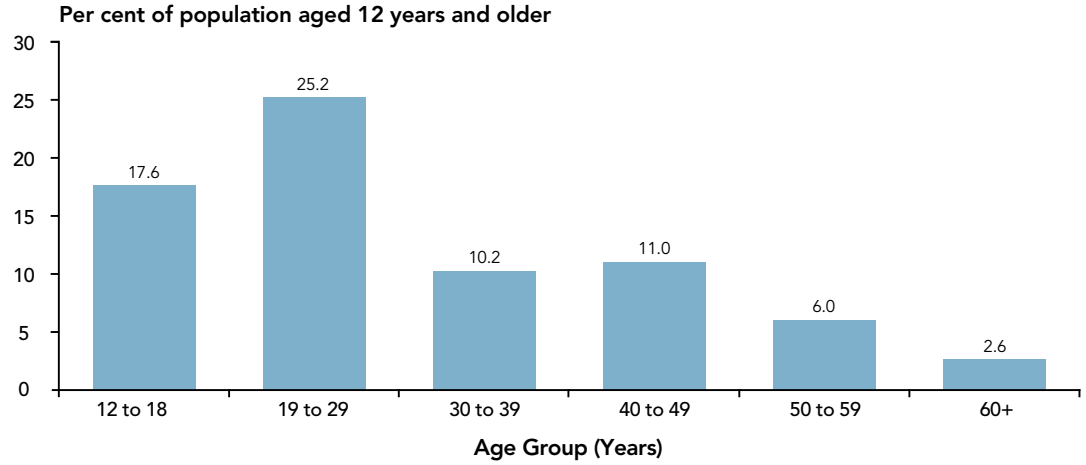
- Reducing exposure to second-hand smoke,
- Reducing smoking-related litter,
- De-normalizing smoking/positive role modelling for youth,
- Promoting smoking cessation, and
- Preventing fire.

More than 50 municipalities in Ontario have enacted legislation restricting smoking in outdoor settings, with many more, including the Region of Peel, considering a by-law. By-laws provide varying levels of protection in outdoor areas with some restricting smoking at parks and playgrounds and others completely banning the smoking of tobacco on outdoor municipal property.

### *Environmental Tobacco Smoke Exposure in a Public Place*

Overall, approximately 11% of the population in both Peel and Ontario report regular exposure to ETS in public spaces (data not shown).[B1] This could include indoor and enclosed public spaces. The proportion of youth and young adults exposed to tobacco smoke in a public space is 18% for 12 to 18 year olds and 25% for young adults aged 19 to 29 years old (Figure 6.5). The question used to capture ETS exposure in public spaces describes indoor settings. It is possible that some respondents to this question considered exposure in other public spaces that are not actually indoor (e.g., an outdoor patio at a restaurant where smoking is allowed).

**Figure 6.5**
**Prevalence of Exposure to Tobacco Smoke in a Public Space† by Age Group, Peel, 2009/2010**




Note: Excluded from analyses is anyone who is a current smoker (daily or occasional)
† Public places such as bars, restaurants, shopping malls, arenas, bingo halls, bowling alleys
Source: Canadian Community Health Survey 2009/2010, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

## Environmental Tobacco Smoke (ETS) and the Workplace

The Smoke-Free Ontario Act prohibits the smoking and/or holding of lit tobacco in enclosed workplaces. Examples of an enclosed workplace include: the inside of a trailer office on a construction site, the inside of a loading dock and the inside of a delivery truck. The ban on smoking in an enclosed workplace is in effect at all times, even during off-hours when people are not working.


**Did You Know**

**Smokeless tobacco products can be used inside enclosed public places and workplaces. While the Smoke-Free Ontario Act prohibits the smoking and or holding of lit tobacco products, this prohibition does not apply to smokeless tobacco products as they are not burned or lit.**

## Summary

Tobacco smoke is comprised of more than 4,000 different chemicals. Exposure to ETS is associated with a variety of health risks among adults and children.

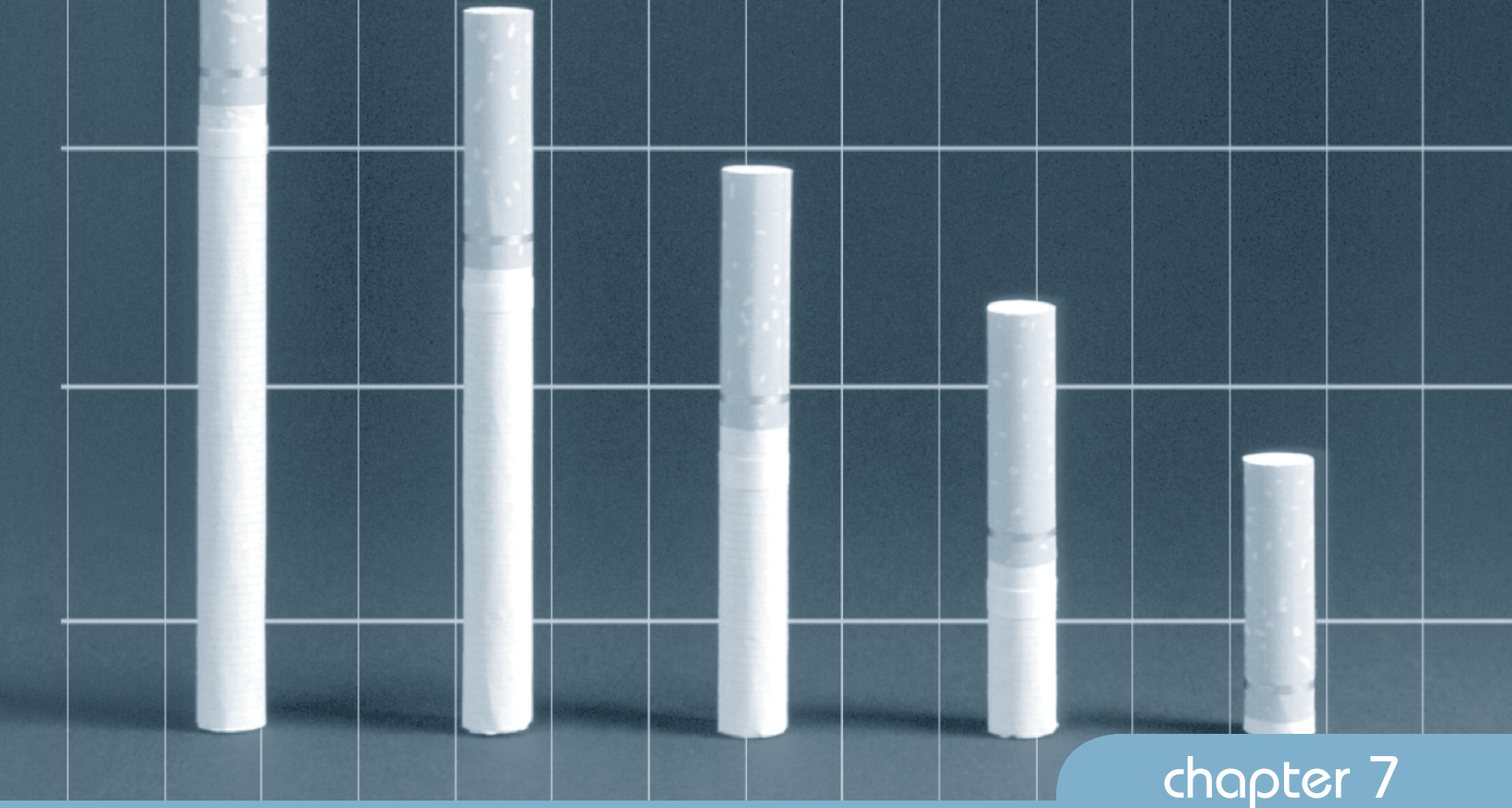
### *Smoking during Pregnancy*

In Peel, 5% of mothers smoke at some point during pregnancy, which increases a pregnant woman's risk of having a preterm birth and small for gestational age baby. Both of these birth outcomes increase an infant's risk of mortality and morbidity during infancy. Approximately 10% of Peel mothers who smoked, delivered a baby that was low birth weight, compared to mothers who did not smoke during pregnancy (6%).

### *Exposure to ETS in the Home, in Private Vehicles and in Public Spaces*

While the proportion of the population in Peel who report being exposed to ETS in the home has declined since 2003, 8% of Peel residents report that they are living in a home with someone who smokes inside the home. Seven per cent of Peel non-smokers report being exposed to second-hand smoke in a private vehicle and youth under the age of 20 years report the highest prevalence of exposure. In Peel, 11% of non-smokers report being exposed to second-hand smoke in a public space. Youth under the age of 19 report the highest prevalence of exposure.

On average, approximately one out of every 10 non-smokers is still being exposed to second-hand smoke.



chapter 7

# HEALTH IMPACTS OF A FIVE PERCENTAGE POINT REDUCTION IN THE SMOKING RATE

Key Messages

**What does this Chapter tell us?**

- If all Peel residents quit smoking, the gain in life expectancy would be 2.3 years.[53]
- In Peel, a five percentage point reduction in smoking prevalence and in exposure to environmental tobacco smoke (ETS) would result in:
  - 351 fewer hospitalizations for smoking-attributable diseases for a cost savings of almost $6 million dollars, and
  - Approximately 77 fewer deaths from smoking-attributable disease, 67 due to active smoking and 10 due to exposure to ETS.

In Ontario if smoking were eliminated all together, the impact on life expectancy would be the addition of 2.5 years.[1] In Peel, the elimination of smoking would further increase life expectancy by 2.3 years.[53] Smoking is the biggest contributor to the equity gap in both life expectancy and health-adjusted life expectancy.[1]

*In Peel, the elimination of smoking would further increase life expectancy by 2.3 years.*

So far, we know that tobacco use in Peel results in:

- 3,300 hospitalizations per year, and
- Almost 700 deaths per year.

The cost of tobacco-related hospitalizations in Peel is estimated to be almost $50 million. If we had data for all causes of smoking attributable hospitalization this estimate could be as high as $100 million.

We also know that the prevalence of current smoking is declining in Peel. The current smoking rate is 15% and consists of 167,700 smokers for Peel.

### *What would happen if we reduced the smoking rate by five percentage points – from 15% to 10%?*

To determine the impact that a reduced prevalence of smoking would have on the number of hospitalizations and deaths at the population level, the smoking-attributable fraction was applied to an "achievable" level of smoking prevalence in Peel (Table 7.1). This level, while ambitious, was set as a five percentage point decrease from the current smoking rate in Peel – that is – from 15% to 10%.

In reviewing these tables the reader should be aware of an important caveat:

- The calculations do not account for the synergistic effects of other exposures, such as the risk of smoking and heavy alcohol use.

## Fewer Hospitalizations

In Peel, a five percentage point reduction in smoking prevalence would result in 351 (11%) fewer hospitalizations attributable to smoking (Table 7.1) annually.

A reduction of 351 hospitalizations attributable to smoking would result in an estimated savings of almost $6 million annually (Table 7.5).

**Table 7.1**
**Annual Number of Hospitalizations† from Diseases Attributable to Smoking at the Current Rate of Smoking, and Assuming a Five Percentage Point Reduction in Smoking, Peel, 2005-2009**

| | Number of Hospitalizations at the Current Smoking Rate | Number of Hospitalizations Assuming a Five Percentage Point Reduction in Smoking Rate | Difference‡ | % Reduction |
|---|---|---|---|---|
| **RESPIRATORY DISEASES** | | | | |
| Bronchitis, Emphysema | 28 | 27 | <5 | 4% |
| Chronic airway obstruction | 793 | 759 | 34 | 4% |
| Pneumonia and Influenza | 172 | 142 | 30 | 17% |
| Lung cancer | 267 | 254 | 13 | 5% |
| Laryngeal cancer | 20 | 19 | <5 | 5% |
| **RESPIRATORY TOTAL** | **1,280** | **1,201** | **79** | **6%** |
| **CARDIOVASCULAR DISEASES** | | | | |
| Ischemic heart disease | 820 | 720 | 100 | 12% |
| Cerebrovascular disease | 251 | 193 | 58 | 23% |
| Other heart disease | 436 | 369 | 67 | 15% |
| Atherosclerosis | 11 | 10 | <5 | 9% |
| Aortic aneurism and dissection | 84 | 78 | 6 | 7% |
| Other arterial disease | 31 | 24 | 7 | 23% |
| **CARDIOVASCULAR TOTAL** | **1,633** | **1,394** | **239** | **15%** |
| **DIGESTIVE SYSTEM DISEASES** | | | | |
| Ulcer | 93 | 88 | 5 | 5% |
| Colorectal cancer | 49 | 43 | 6 | 12% |
| Esophageal cancer | 26 | 24 | <5 | 8% |
| Stomach cancer | 23 | 21 | <5 | 9% |
| Pancreatic cancer | 20 | 17 | <5 | 15% |
| Cancer of the lip, oral cavity and pharynx | 48 | 45 | <5 | 6% |
| **DIGESTIVE TOTAL** | **259** | **238** | **21** | **8%** |

Table 7.1 continues ...

**Table 7.1 continued**

| | Number of Hospitalizations at the Current Smoking Rate | Number of Hospitalizations Assuming a Five Percentage Point Reduction in Smoking Rate | Difference‡ | % Reduction |
|---|---|---|---|---|
| **OTHER DISEASES** | | | | |
| Cervical cancer | 3 | 2 | <5 | 33% |
| Kidney, Renal cancer | 32 | 29 | <5 | 9% |
| Bladder cancer | 98 | 91 | 7 | 7% |
| Acute myeloid leukemia | 6 | 5 | <5 | 17% |
| **OTHER TOTAL** | **139** | **127** | **12** | **9%** |
| **OVERALL TOTAL** | **3,311** | **2,960** | **351** | **11%** |

† Reflects cardiovascular, respiratory and ulcer hospitalizations aged 35 years and older. Cancer hospitalizations reflect those aged 30 years and older.
‡ Difference is calculated as the number of cases at the current smoking rate / the number of cases assuming a five percentage point reduction in the smoking rate.
Notes: Number of hospitalizations reflects an annual average for the years 2005-2009.
Sources:
Hospital In-Patient Discharge Data 2005-2009, IntelliHEALTH Ontario, Ministry of Health and Long Term Care.
Smoking Prevalence: Canadian Community Health Survey 2003, 2005, 2007/2008 combined, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care.
Relative Risks for diseases attributable to smoking (excluding colorectal cancer ulcer): Thun MJ, Day-Lally C, Myers DG, Calle EE, Flanders WD, Zhu BP, et al. Trends in tobacco smoking and mortality from cigarette use in cancer prevention studies I (1959 through 1965) and II (1982 through 1988). Bethesda, MD: US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute; 1997.
Relative Risk for smoking and colorectal cancer from: Chao A, Thun MJ, Jacobs EJ, Henley SJ, Rodriguez C, Calle EE. Cigarette smoking and colorectal cancer mortality in the cancer prevention study II. J Natl Cancer Inst. 2000 Dec 6;92(23):1888-96.
Relative Risk for smoking and ulcer: English DR, Holman CDJ, Milne E, Winter MJ, Hulse GK, Codde G, et al. The quantification of drug caused morbidity and mortality in Australia 1995. Canberra, Australia: Commonwealth Department of Human Services and Health; 1995.

**Table 7.2**
**Annual Number of Hospitalizations from Diseases Attributable to Smoking Overall, with a Five Percentage Point Reduction in Smoking and Hospital Associated Costs, Peel, 2005-2009**

| | Number of Hospitalizations Attributable to Smoking at the Current Smoking Rate | Number of Hospitalizations Attributable to Smoking Assuming a Five Percentage Point Reduction in Smoking Rate | Cost per Stay | Cost for Hospitalizations Attributable to Smoking at the Current Smoking Rate | Cost for Hospitalizations Attributable to Smoking Assuming a Five Percentage Point Reduction in Smoking Rate | Cost Difference |
|---|---|---|---|---|---|---|
| **RESPIRATORY DISEASES** | | | | | | |
| Bronchitis, Emphysema[¥] | 28 | 27 | $8,060 | $225,680 | $217,620 | $8,060 |
| Chronic airway obstruction | 793 | 759 | $8,060 | $6,391,580 | $6,117,540 | $274,040 |
| Pneumonia and Influenza | 172 | 142 | See below[€] | $674,374 | $556,600 | $117,774 |
| Lung cancer | 267 | 254 | $11,665 | $3,114,555 | $2,962,910 | $151,645 |
| Laryngeal cancer | 20 | 19 | Data not available | | | |
| **RESPIRATORY TOTAL** | **1,280** | **1,201** | | **$10,406,189** | **$9,854,670** | **$551,519** |
| **CARDIOVASCULAR DISEASES** | | | | | | |
| Ischemic heart disease | 820 | 720 | See below[†] | $9,079,482 | $7,973,604 | $1,105,878 |
| Cerebrovascular diseases | 251 | 193 | $14,261 | $3,579,511 | $2,752,373 | $827,138 |
| Other heart disease | 436 | 369 | See below[‡] | $23,629,448 | $20,587,688 | $3,041,760 |
| Atherosclerosis | 11 | 10 | $14,129 | $155,419 | $141,290 | $14,129 |
| Aortic aneurysm and dissection | 84 | 78 | Data not available | | | |
| Other arterial disease | 31 | 24 | Data not available | | | |
| **CARDIOVASCULAR TOTAL** | **1,632** | **1,394** | | **$36,443,860** | **$31,454,955** | **$4,988,905** |
| **DIGESTIVE SYSTEM DISEASES** | | | | | | |
| Ulcer | 93 | 88 | $7,574 | $704,382 | $666,512 | $37,870 |
| Colorectal cancer | 49 | 43 | $8,002 | $392,098 | $344,086 | $48,012 |
| Esophageal cancer | 26 | 24 | Data not available | | | |
| Stomach cancer | 24 | 21 | Data not available | | | |
| Pancreatic cancer | 20 | 17 | Data not available | | | |
| Cancer of the lip, oral cavity and pharynx | 48 | 45 | $16,628 | $798,144 | $748,260 | $49,884 |
| **DIGESTIVE TOTAL** | **260** | **238** | | **$1,894,624** | **$1,758,858** | **$135,766** |

Table 7.2 continues ...

**Table 7.2 continued**

| | Number of Hospitalizations Attributable to Smoking at the Current Smoking Rate | Number of Hospitalizations Attributable to Smoking Assuming a Five Percentage Point Reduction in Smoking Rate | Cost per Stay | Cost for Hospitalizations Attributable to Smoking at the Current Smoking Rate | Cost for Hospitalizations Attributable to Smoking Assuming a Five Percentage Point Reduction in Smoking Rate | Cost Difference |
|---|---|---|---|---|---|---|
| **OTHER DISEASES** | | | | | | |
| Cervical cancer | <5 | <5 | Data not available | | | |
| Kidney, Renal cancer | 32 | 29 | Data not available | | | |
| Bladder cancer | 98 | 91 | $6,293 | $616,714 | $572,662 | $44,052 |
| Acute myeloid leukemia | 6 | 5 | Data not available | | | |
| **OTHER TOTAL** | **139** | **127** | | **$616,714** | **$572,662** | **$44,052** |
| **TOTAL** | **3,311** | **2,240** | | **$49,361,387** | **$43,641,145** | **$5,720,242** |

¥ It is assumed that the costs for bronchitis and emphysema are same as cost for chronic lower respiratory disease, excluding asthma.
€ Pneumonia and influenza costs have been calculated separately for each condition and then summed. Costs include: pneumonia ($7,812); acute upper respiratory infections and influenza ($3,494). It is assumed that the costs of treating influenza is the same as for treating acute upper respiratory tract infections.
† Ischemic heart disease costs have been calculated separately for each condition and then summed. Costs include: angina pectoris ($5,639), acute myocardial infection ($11,043), and other ischemic heart disease ($13,015).
‡ Other heart disease costs have been calculated separately for each condition and then summed. Costs include: Rhumatic fever with heart involvement ($39,748.00), chronic rheumatic heart diseases ($33,678.00), Pulmonary heart disease ($8,582.00), Cardiomyopathy ($21,287.00), Atrial fibrilation ($24,096.00), other conduction disorders and cardiac arrhythmias ($5,966.00), Heart failure ($9,795.00), and Other forms of heart diseases ($10,848.00). Please note that for other heart disease, cost estimate includes ICD-10 code I52.
Note: Number of hospitalizations reflects an annual average for the years 2005-2009.
Sources:
Hospital In-Patient Discharge Data 2005-2009, IntelliHEALTH Ontario, Ministry of Health and Long Term Care.
Smoking Prevalence: Canadian Community Health Survey 2003, 2005, 2007/2008 combined, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care.
Relative Risks for diseases attributable to smoking (excluding colorectal cancer and ulcer): Thun MJ, Day-Lally C, Myers DG, Calle EE, Flanders WD, Zhu BP, et al. Trends in tobacco smoking and mortality from cigarette use in cancer prevention studies I (1959 through 1965) and II (1982 through 1988). Bethesda, MD: US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute; 1997.
Relative Risk for smoking and colorectal cancer from: Chao A, Thun MJ, Jacobs EJ, Henley SJ, Rodriguez C, Calle EE. Cigarette smoking and colorectal cancer mortality in the cancer prevention study II. J Natl Cancer Inst. 2000 Dec 6;92(23):1888-96.
Relative Risk for smoking and ulcer: English DR, Holman CDJ, Milne E, Winter MJ, Hulse GK, Codde G, et al. The quantification of drug caused morbidity and mortality in Australia 1995. Canberra, Australia: Commonwealth Department of Human Services and Health; 1995.
Canadian Institute for Health Information. The cost of acute care hospital stays by medical condition in Canada, 2004-2005. Ottawa: Canadian Institute for Health Information; 2008.
Canadian Institute for Health Information. The cost of acute care hospital stays by medical condition in Canada, 2004-2005. Ottawa: Canadian Institute for Health Information; 2008.

## Fewer Deaths

In Peel, a five percentage point reduction in smoking prevalence would result in 67 fewer (10%) deaths attributable to smoking (Table 7.3) annually.

A reduction in smoking prevalence would have the greatest impact on cardiovascular disease deaths attributable to smoking (17% reduction). This is equal to about 32 deaths from all cardiovascular diseases, including 16 deaths from ischemic heart disease (Table 7.3).

*A five percentage point reduction in smoking prevalence would result in about 10% fewer smoking-attributable deaths.*

**Table 7.3**
**Annual Number of Deaths† from Diseases Attributable to Smoking, at the Current Rate of Smoking and Assuming a Five Percentage Point Reduction in Smoking, Peel**

| | Number of Deaths at the Current Smoking Rate | Number of Deaths Assuming a Five Percentage Point Reduction in Smoking Rate | Difference‡ | % Reduction |
|---|---|---|---|---|
| **RESPIRATORY DISEASES** | | | | |
| Bronchitis, Emphysema | 11 | 11 | 0 | 0% |
| Chronic airway obstruction | 100 | 95 | 5 | 5% |
| Pneumonia and Influenza | 20 | 16 | <5 | 20% |
| Lung cancer | 249 | 238 | 11 | 4% |
| Laryngeal cancer | 8 | 7 | <5 | 13% |
| **RESPIRATORY TOTAL** | **388** | **368** | **20** | **5%** |
| **CARDIOVASCULAR DISEASES** | | | | |
| Ischemic heart disease | 109 | 93 | 16 | 15% |
| Cerebrovascular diseases | 24 | 16 | 8 | 33% |
| Other heart disease | 30 | 25 | 5 | 17% |
| Atherosclerosis | <5 | <5 | 0 | 0% |
| Aortic aneurism and dissection | 23 | 21 | <5 | 9% |
| Other arterial disease | <5 | <5 | 0 | 0% |
| **CARDIOVASCULAR TOTAL** | **191** | **159** | **32** | **17%** |
| **DIGESTIVE SYSTEM DISEASES** | | | | |
| Ulcer | <5 | <5 | 0 | 0 |
| Colorectal cancer | 16 | 13 | <5 | 19% |
| Esophageal cancer | 23 | 21 | <5 | 9% |
| Stomach cancer | 12 | 11 | <5 | 8% |
| Pancreatic cancer | 17 | 15 | <5 | 12% |
| Cancer of the lip, oral cavity and pharynx | 14 | 13 | <5 | 7% |
| **DIGESTIVE TOTAL** | **85** | **73** | **12** | **14%** |

Table 7.3 continues ...

A five percentage point reduction in ETS exposure smoking would result in 10 fewer (25%) lung cancer and ischemic heart disease deaths each year (Table 7.4).

**Table 7.3 continued**

| | Number of Deaths at the Current Smoking Rate | Number of Deaths Assuming a Five Percentage Point Reduction in Smoking Rate | Difference‡ | % Reduction |
|---|---|---|---|---|
| **Other Diseases** | | | | |
| Cervical cancer | <5 | <5 | 0 | 0% |
| Kidney, Renal cancer | 9 | 8 | <5 | 11% |
| Bladder cancer | 12 | 11 | <5 | 8% |
| Acute myeloid leukemia | <5 | <5 | 0 | 0% |
| **OTHER TOTAL** | **25** | **23** | **<5** | **8%** |
| **OVERALL TOTAL** | **689** | **622** | **67** | **10%** |

† Number of deaths reflects those aged 35 years and older for circulatory, respiratory and digestive diseases and age 30 years and older for cancer deaths.
‡ Difference is calculated as the number of cases at the current smoking rate / the number of cases assuming a five percentage point reduction in the smoking rate.
Note: Number of deaths reflects an annual average for the years 2003-2007.
Sources:
Ontario Mortality Database 2003-2007, IntelliHEALTH Ontario, Ministry of Health and Long-Term Care.
Smoking Prevalence: Canadian Community Health Survey 2003, 2005, 2007/2008 combined, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care.
Relative Risks for diseases attributable to smoking (excluding colorectal cancer and ulcer): Thun MJ, Day-Lally C, Myers DG, Calle EE, Flanders WD, Zhu BP, et al. Trends in tobacco smoking and mortality from cigarette use in cancer prevention studies I (1959 through 1965) and II (1982 through 1988). Bethesda, MD: US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute; 1997.
Relative Risk for smoking and colorectal cancer: Chao A, Thun MJ, Jacobs EJ, Henley SJ, Rodriguez C, Calle EE. Cigarette smoking and colorectal cancer mortality in the cancer prevention study II. J Natl Cancer Inst. 2000 Dec 6;92(23):1888-96.
Relative Risk for smoking and ulcer: English DR, Holman CDJ, Milne E, Winter MJ, Hulse GK, Codde G, et al. The quantification of drug caused morbidity and mortality in Australia 1995. Canberra, Australia: Commonwealth Department of Human Services and Health; 1995.

**Table 7.4**

**Annual Number of Deaths† in Non-Smokers that are Attributable to Environmental Tobacco Smoke (ETS) Exposure at the Current Rate of Smoking and Assuming a Five Percentage Point Reduction in Environmental Tobacco Smoke* Exposure, Peel, 2003–2007**

| | Number of Deaths at the Current Rate of ETS Exposure | Number of Deaths Assuming a Five Percentage Point Reduction in ETS Exposure | Difference‡ | % Reduction |
|---|---|---|---|---|
| Lung cancer | 12 | 9 | <5 | 25% |
| Ischemic heart disease | 28 | 21 | 7 | 25% |
| **TOTAL** | **40** | **30** | **10** | **25%** |

* Are exposed regularly to environmental tobacco smoke in the home, a private vehicle or public place.
† Number of deaths reflect those aged 35 years and older for ischemic heart disease 30 years and older for lung cancer.
‡ Difference is calculated as the number of cases at the current smoking rate / the number of cases assuming a five percentage point reduction in the smoking rate.
Note:
Number of deaths reflects an annual average of data for the years 2003-2007.
Sources:
Ontario Mortality Database 2003-2007, IntelliHEALTH Ontario, Ministry of Health and Long-Term Care
Smoking Prevalence: Canadian Community Health Survey 2003, 2005, 2007/2008 combined, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care.
Relative Risk for ETS exposure: Baliunas D, Patra J, Rehm J, Popova S, Kaiserman M, Taylor B. Smoking-attributable mortality and expected years of life lost in Canada 2002: Conclusions for prevention and policy. Chronic Dis Can. 2007;27(4):154-62; and de Groh M, Morrison HI. Environmental tobacco smoke and deaths from coronary heart disease in Canada. Chronic Dis Can. 2002;23(1):13-6.

*A five percentage point decline in smoking prevalence and exposure to ETS in Peel would result in 77 fewer deaths from smoking-attributable diseases – 67 due to active smoking and 10 due to exposure to ETS – each year.*

## Summary

If smoking were eliminated completely, life expectancy for Peel residents would increase by 2.3 years.[53]

Any reduction in smoking will enhance the health of Peel current smokers and those exposed to second-hand smoke. If Peel were able to achieve a five percentage point decline in its smoking rate, each year we would expect to see:

- 351 fewer hospitalizations for smoking-attributable diseases for a savings of almost $6 million
- Approximately 77 fewer deaths from smoking-attributable disease - 67 due to active smoking and 10 due to exposure to ETS

chapter 8

# SMOKING CESSATION

Key Messages

**What does this Chapter tell us?**

- It is never too late to quit smoking. Biological benefits of cessation can be seen in as little as 12 hours.
- Just over half of Peel's smokers (88,000 people) have attempted to stop smoking for at least 24 hours. These smokers make at least four quit attempts per year on average.
- In Peel, approximately 90,000 smokers tried unsuccessfully, to quit smoking in the past year. These smokers are motivated and many can be successful if using a proven cessation method.
- Between 60% and 85% of former smokers in Peel successfully used a variety of different pharmaceutical cessation methods. Buproprion was the most popular.
- Peel has a strong network of almost 900 family physicians who can provide cessation counselling. Increasingly, pharmacies are another venue for cessation counselling.

A smoker often makes multiple attempts to successfully quit smoking. The majority of tobacco addicts continue using tobacco for many years, and there is a predictable cycle associated with the addiction, which includes periods of relapse and remission.[54]

## The Benefits of Quitting

It is never too late to quit smoking. In as little time as 12 hours, the level of carbon monoxide in the blood returns to normal. Within three months, circulation increases and lung health is improved.

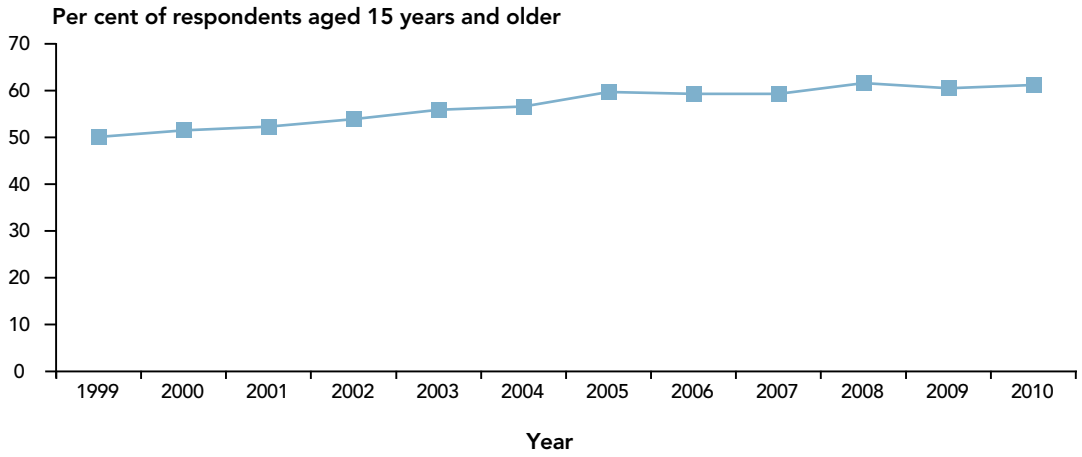
In Canada, the proportion of ever-smokers who had quit increased 11 percentage points (from 50% to 61%) between 1999 and 2010 (Figure 8.1).

**Table 8.1**
**The Benefits of Quitting Smoking over Time**

| Time from Quitting | Benefit of Quitting |
|---|---|
| 12 hours† | Levels of carbon monoxide in the blood returns to normal. |
| 2 weeks to 3 months‡ | Circulation is increased and lung health is improved. |
| 1 year‡ | The risk of coronary heart disease is half of what it would have been given continued smoking behaviour. |
| 5 years§ | Risk of cancer of the mouth, throat, esophagus, and bladder are cut in half. Cervical cancer risk falls to that of a non-smoker. Stroke risk can fall to that of a non-smoker after 2-5 years. |
| 10 years‡€ | The risk of dying from lung cancer is about half that of a person who is still smoking. The risk of cancer of the larynx and pancreas decreases. |
| 15 years§ | The risk of coronary heart disease will return to that of non-smokers. |

Sources:
† U.S. Department of Health and Human Services. The health consequences of smoking: Nicotine addiction: A report of the surgeon general. United States: Public Health Service. Office on Smoking and Health; 1988.
‡ U.S. Department of Health and Human Services. The health benefits of smoking cessation: A report of the surgeon general. . 1990:193, 194,196, 285-287, 304, 323,193, 194,196, 285-287, 304, 323.
§ International Agency for Research on Cancer. Tobacco control: Reversal of risk after quitting smoking. 2007;11:341.
€Centers for Disease Control and Prevention (US); National Center for Chronic Disease Prevention and Health Promotion (US); Office on Smoking and Health (US). How Tobacco Smoke Causes Disease: The Biology and Behavioral Basis for Smoking-Attributable Disease: A Report of the Surgeon General. Atlanta (GA): Centers for Disease Control and Prevention (US); 2010.

**Figure 8.1**
**Proportion of Ever Smokers who Quit Smoking* by Year, Canada, 1999-2010**




* Percentage of ever smokers who were former smokers at the time of survey.
Source: Canadian Tobacco Use Monitoring Survey, 1999-2010.
Reid JL, Hammond D, Burkhalter R, Ahmed R. Tobacco Use in Canada: Patterns and Trends, 2012 Edition. Waterloo, ON: Propel Centre for Population Health Impact, University of Waterloo.

There are many ways in which smoking cessation can be measured. Using the data available for Peel, this section of the report describes:

- Current smokers who tried to quit for at least 24 hours,
- Current smokers who tried to quit, but were unsuccessful,
- Former smokers who quit within the past year, and
- Former smokers who quit more than one year ago.

## Current Smokers' Attempts to Quit Smoking

Over half of current smokers (53%; 88,000 people) attempted to quit smoking for at least 24 hours in the past 12 months (Table 8.2). Current smokers aged 12 to 49 years have a strong interest in quitting smoking. Over half of the smokers within each of these age groups had made a quit attempt over a 24-hour period.

### *Quit Attempts for 24 Hours*

*Just over half of Peel smokers attempted to quit smoking for at least 24 hours in the past 12 months.*

In Peel, the average smoker attempts to quit smoking four times per year. [B2]

The number of attempts to quit smoking for a 24-hour period is similar across age groups and ranges between four and five attempts (Figure 8.2).

*Smokers who try to quit are determined. Peel smokers made an average of four attempts to quit for 24-hours in the past 12 months.*

## Table 8.2

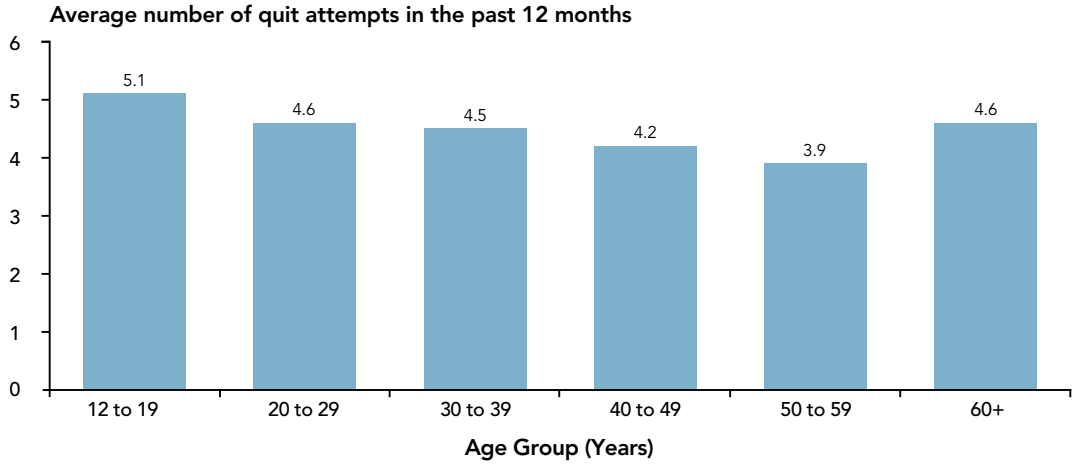
**Proportion of Current Smokers† who Quit Smoking‡ for at Least 24 Hours by Sex and Age Group, Peel, 2007/2008**

| Quit Smoking for at Least 24 Hours | Per Cent (95% CI) | Number |
|---|---|---|
| **Sex** | | |
| • Males | 54.7 (44.2–64.8) | 61,500 |
| • Females | 48.1 (35.8–60.6) | 26,400 |
| **Age Group (Years)** | | |
| • 12–19 | 56.7* (24.9–83.8) | 2,000 |
| • 20–29 | 57.2 (41.0–71.9) | 26,400 |
| • 30–39 | 52.2 (38.0–66.1) | 17,700 |
| • 40–49 | 58.6 (42.5–73.1) | 29,000 |
| • 50–59 | 49.9* (24.8–75.0) | 11,800 |
| • 60+ | 20.8* (10.8–36.1) | 2,900 |
| **TOTAL** | **52.6 (44.4–60.6)** | **88,000** |

† Reflects respondents aged 12 years and older
‡ For the purposes of trying to quit
* Use estimate with caution
Notes:
95% CI reflects 95% confidence interval of the estimate.
Numbers may not add to the total due to rounding.
Source: Canadian Community Health Survey 2007/2008, Statistics Canada, Share File, Ontario Ministry of Health and Long Term Care

## Figure 8.2

**Average Number of Quit Attempts for a 24-Hour Period by Age Group, Peel, 2007/2008**



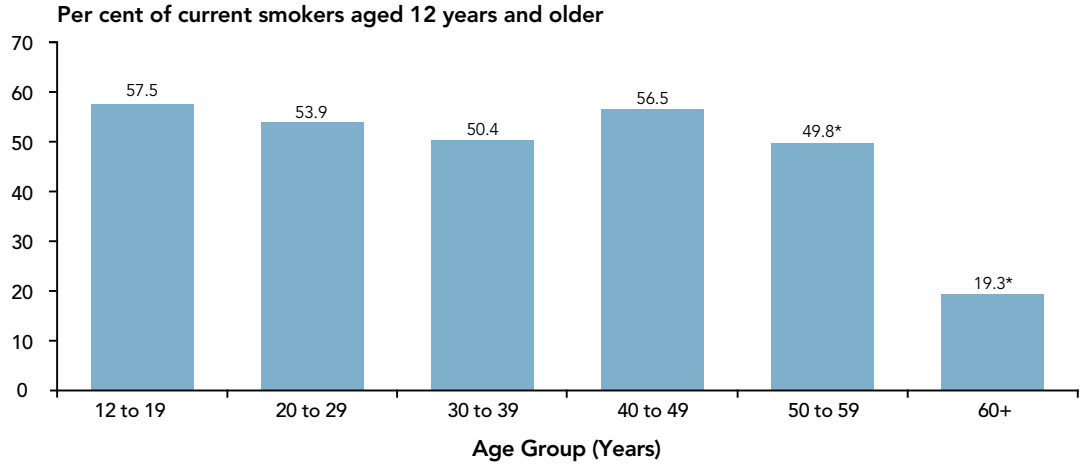

Source: Canadian Community Health Survey 2007/2008, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

### *Unsuccessful Quit Attempts in the Past Year*

In Peel 50% of current daily or occasional smokers have tried to quit smoking in the past year, but have been unsuccessful. While a higher proportion of males (53%) have attempted to quit than females (44%), the difference is not significant. Determining how we can support this particular group of smokers who are keen to quit, but are not having success will be an important strategy for Peel.

In Peel, the proportion of current daily or occasional smokers who have unsuccessfully tried to quit in the past year varies across age groups with the highest proportion among those aged 12 to 19 years (Figure 8.3). Youth and young adults are particularly keen to quit their smoking addiction.

**Figure 8.3**
**Per Cent of Current Smokers who Tried to Quit in the Past Year by Age Group, Peel, 2007/2008**




* Use estimate with caution
Source: Canadian Community Health Survey 2007/2008, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

### *Successful Quit Attempts*

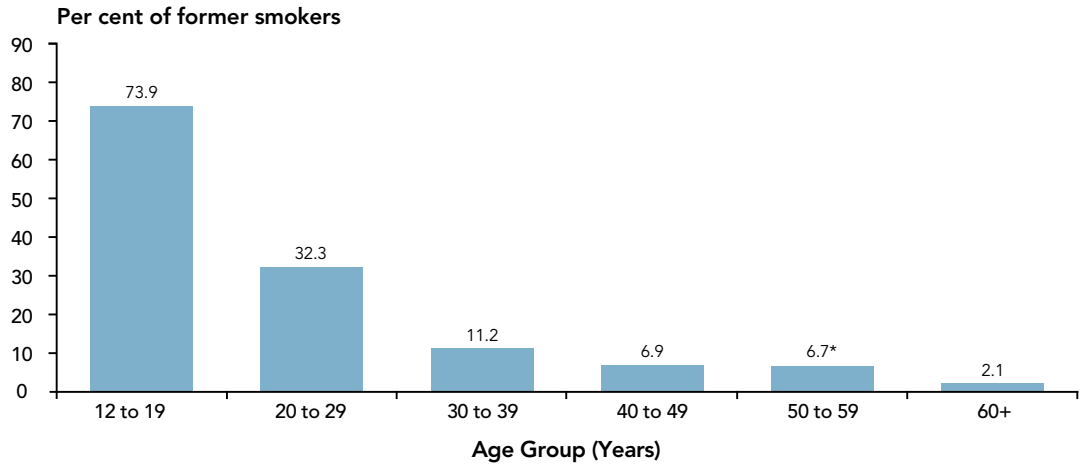
Current daily or occasional smokers who have successfully quit smoking are classified as former smokers. Among the former smoker population in Peel, 8%* (* use estimate with caution) quit within the past year. This is equivalent to about 15,000 people.

In Ontario, almost three-quarters (74%) of those aged 12 to 19 years, and one-third (32%) of those aged 20 to 29 years quit smoking in the past year (Figure 8.4).

Definition

For this section of the report, a ***former smoker*** is defined as a person who previously smoked daily or occasionally but does not smoke now.[32]

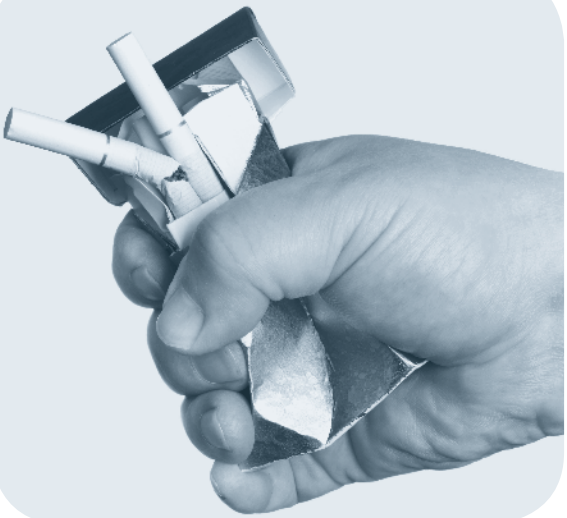
**Figure 8.4**
**Per Cent of Former† Smokers who Quit within the Past Year, by Age Group Ontario, 2007/2008**




† A former smoker is defined as a person who previously smoked daily or occasionally, but does not currently smoke now.
* Use estimate with caution
Source: Canadian Community Health Survey 2007/2008, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

**Peel Fact**

**In Peel, one-third (34%) of youth who are current smokers (smoke daily or at least once a week) reported that they had attempted to quit in the last six months. An additional 41% indicated that although they did not try quitting, they had considered it.[D]**

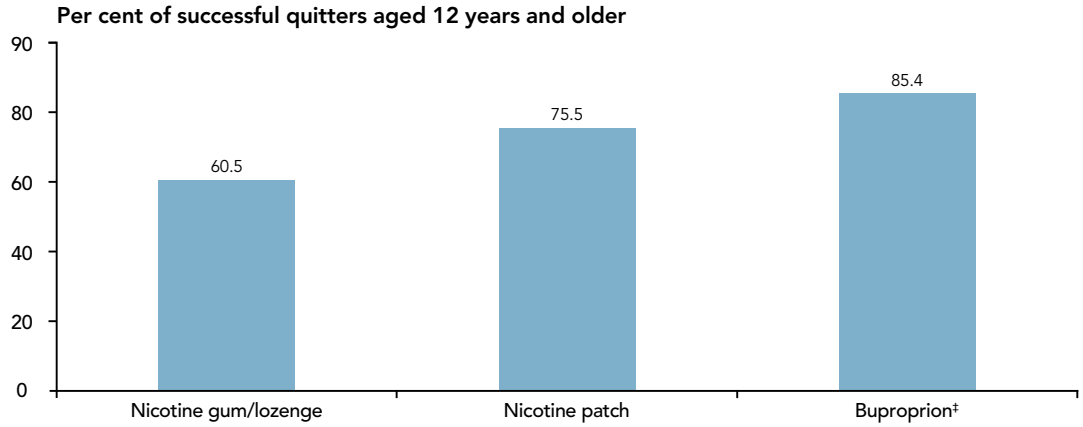


## How People Quit

A number of over-the-counter and prescription smoking cessation medications are available to assist smokers in their efforts to quit. In Ontario, approximately three-quarters of successful quitters find nicotine gum or lozenge, the nicotine patch, and prescription buproprion (also known as Zyban, Prolev or Wellbutrin) to be somewhat or very useful (Figure 8.5).

A smoker who uses nicotine replacement therapy (NRT) or buproprion (e.g., Zyban, Prolev or Wellburtin) will double the odds that they will quit successfully. Additionally, the use of varenicline (Champix) can increase the odds of quitting two to three times, compared with not using any drug therapy.[55]

**Figure 8.5**
**Per Cent of Successful Quitters† by Cessation Method, Ontario, 2007/2008**




† Quit within the past year
‡ Trade names include Zyban, Prolev, Wellburtin
Source: Canadian Community Health Survey 2007/2008, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

**Did You Know**

In 2011, Zyban and Champix were added to the Ontario Drug Benefit (ODB) program. Persons eligible for the ODB program include:

- People 65 years of age and older
- Residents of long-term care homes
- Residents of Homes for Special Care
- People receiving professional services under the Home Care program,
- Trillium Drug Program registrants
- People receiving social assistance (Ontario Works or Ontario Disability Support Program assistance)

This means that Ontarians who are eligible for this program will have access to smoking cessation drugs at no cost. Furthermore, pharmacists may receive funding to bill for cessation counselling to ODB recipients. The combination of cessation counselling and medication will increase the likeliness of having a successful quit attempt.[54]

The cost of using pharmacotherapy may save a smoker money, compared to continuing smoking. Any type of pharmacotherapy used will save a smoker anywhere from $153 to $644 over a three month period (Table 8.3). However, pharmacotherapy is more expensive than smoking contraband tobacco.

**Table 8.3**
**Cost of Smoking Compared to Pharmacotherapy**

| Cost of Pharmacotherapy for Three Months | Type of Pharmacotherapy | Cost of Smoking One Pack of Cigarettes a Day for Three Months† | Estimated Savings Over Three Month period |
|---|---|---|---|
| $304 | Varenicline (Champix) | $840 | $536 |
| $196 | Buproprion (Zyban, Prolev, Wellburtin) | | $644 |
| | NRT | | |
| $370 | • Patch | | $470 |
| $227 | • Gum | | $613 |
| $687 | • Inhaler | | $153 |
| $367 | • Lozenge | | $473 |

† Assumes smoking a $10 per day pack of cigarettes for a 12 week period
NRT = Nicotine replacement therapy
Source: Canadian Agency for Drugs and Technologies in Health. Smoking Cessation Pharmacotherapy. Summary for Health Care Providers. September 2011.

**Did You Know**

The main reasons Ontario smokers do not use smoking cessation patches, gum or medications, are concerns about effectiveness (32%*), possible side effects (35%*) and cost (27%).[E1]

* Use estimate with caution.

## Community Supports for Smoking Cessation

There are various forms of support for smokers in the Peel community who are trying to quit. These include 850 family doctors, some pharmacists and the Smokers' Helpline. For young adults, both Sheridan College and the University of Toronto, Mississauga campus offer free nicotine replacement therapy through the Leave the Pack Behind program.

**Did You Know**

The Canadian Cancer Society provides information through the Smokers' Helpline about the harms due to tobacco use. It is a free, confidential and individualized program to aid cessation efforts by helping design a quit plan and providing support, advice, materials and community-based referrals. Despite this, Peel's smokers are not using the Helpline extensively.

In 2011, the Smokers' Helpline received 765 calls from 154 individuals from Peel.

**Peel Program**

### Peel Health is Piloting the Ottawa Model for Smoking Cessation

Peel Public Health is working with Trillium Health Centre to pilot a hospital inpatient smoking cessation model based on the successful Ottawa Heart Institute model. The results of the pilot should be available in 2014.

### *The Role of Family Physicians*

Family physicians have a central role in helping smokers with their addiction. Building on the relationship of trust and knowledge of the patient, the family physician is well suited to help the patient quit smoking. Primary care practitioners recognize and treat tobacco dependence as a chronic disease, remembering that a person remains vulnerable to relapse for life.

Approximately 53% of Peel smokers (88,000) attempted to quit for at least 24-hours in the past year.[B2] The majority of Peel smokers (85%) have a family physician.[B1]

In addition, in Ontario:

- Seventy per cent of current smokers had visited their family physician in the past year,
- Ninety-six per cent of current smokers had a physician who was aware of their smoking status,
  - Almost three-quarters (70%) of these smokers had a doctor advise them to quit in the past year, and
  - Almost half (44%) of these smokers received specific help or information to quit smoking from their doctor.[B4]

The benefits of visiting a family physician for smoking cessation include:

- The provision of nicotine replacement therapy and counselling that may be provided at no cost to the smoker, if the smoker is enrolled in a participating family health team, community health centre or aboriginal health access centre.
- Allied health professionals who can provide smoking support.

Peel currently has six Family Health Teams (FHTs). These FHTs collectively employ approximately 84 doctors and serve approximately 121,900 patients (Table 8.4).

**Table 8.4**
**Family Health Teams in Peel, 2012***

| Name | Municipality | Number of Patients Enrolled | Number (%) of Patients who Smoke |
|---|---|---|---|
| Wise Elephant | Brampton | 9,000 | 720 (8%) |
| Queen Square Doctors | Brampton | 35,000 | Data not available |
| Summerville | Mississauga | 50,000 | 5,850 (12%) |
| Credit Valley | Mississauga | 11,000 | 880 (8%) |
| Central Brampton Family Health Team | Brampton | 6,900 | Data not available |
| North Peel Family Health Team | Brampton | 8,000 – 10,000 | 1,360 – 1,700 (17%) |

* As of Sept. 2012
Note:
Data systems within some of the family health teams were not fully populated at the time of this report. As a result, the number of patients enrolled and the reported percentage of patients who smoke should be used with caution.

Did You Know

### Physician Billing Codes for Smoking Cessation

Physicians can receive payment to treat patients who require smoking cessation support. Physicians can bill for the initial smoking cessation consultation (code E079), for two follow-up assessments (code K039) and for participation in the Patient Enrolment Models program for providing smoking cessation counselling to enrolled patients (code Q042).

As an additional incentive, as of October 2010, family practitioners who are funded through a blended capitation model will receive full payment for these services.

In Peel in 2009, there were almost 15,000 visits by Peel residents to physicians for an initial smoking cessation visit, and almost 2,000 follow up smoking cessation visits (Table 8.5). If all smokers quit as a result of physician support, this intervention could potentially reduce the number of smokers by almost 15,000 per year.

In the spring of 2011, the Ministry of Health and Long-Term Care began funding Nicotine Replacement Therapy (NRT) and expert counselling through FHTs at no cost to the smoker. This is available once family health teams apply for STOP funding through the Centre for Addiction and Mental Health (CAMH). Some of these services are also available through Community Health Centres, Aboriginal Health Access Centres, some pharmacies and hospitals. The goal is to increase smoking cessation over the next two years through a broader number of health providers.

**Table 8.5**

**Use of Smoking Cessation Billing Codes by Physicians and for Patient Visits, Peel and Ontario, Fiscal Year 2009**

| Fee Schedule Code | Measure | Peel | Ontario |
|---|---|---|---|
| Initial visit for smoking cessation (billing code: E079) | Number of Visits | 14,919 | 227,077 |
| | Number of GPs | 1,526 | 6,274 |
| Follow-up visit for smoking cessation (billing code: K039) | Number of Visits | 1,941 | 41,605 |
| | Number of GPs | 335 | 2,684 |
| Additional fee for physicians in Patient Enrolment Models (billing code: Q042) | Number of Visits | 1,481 | 30,841 |
| | Number of GPs | 242 | 1,894 |
| **TOTAL NUMBER OF GP PHYSICIANS** | | **896** | **11,927** |

Notes: GP = General Practice or Family Medicine Physician
Physicians were only counted once, but physicians from other municipalities may have seen patients from Peel.
Visits were based on residence of the patient.
Visits were only counted once; however, several services could have been billed for each visit.
Ratio is the number of visits divided by the number of physicians.
Source: Medical Service 1 Yr, MOHLTC, IntelliHEALTH ONTARIO [All information on medical services for most recent fiscal year (Apr 1, 2009 – Mar 31, 2010) available from OHIP Approved Claims]

## Pharmacies

Peel Program

### Smoking Cessation Pharmacy Program

Peel has 335 pharmacies located throughout the region with 119 in Brampton, 206 in Mississauga and 10 in Caledon.

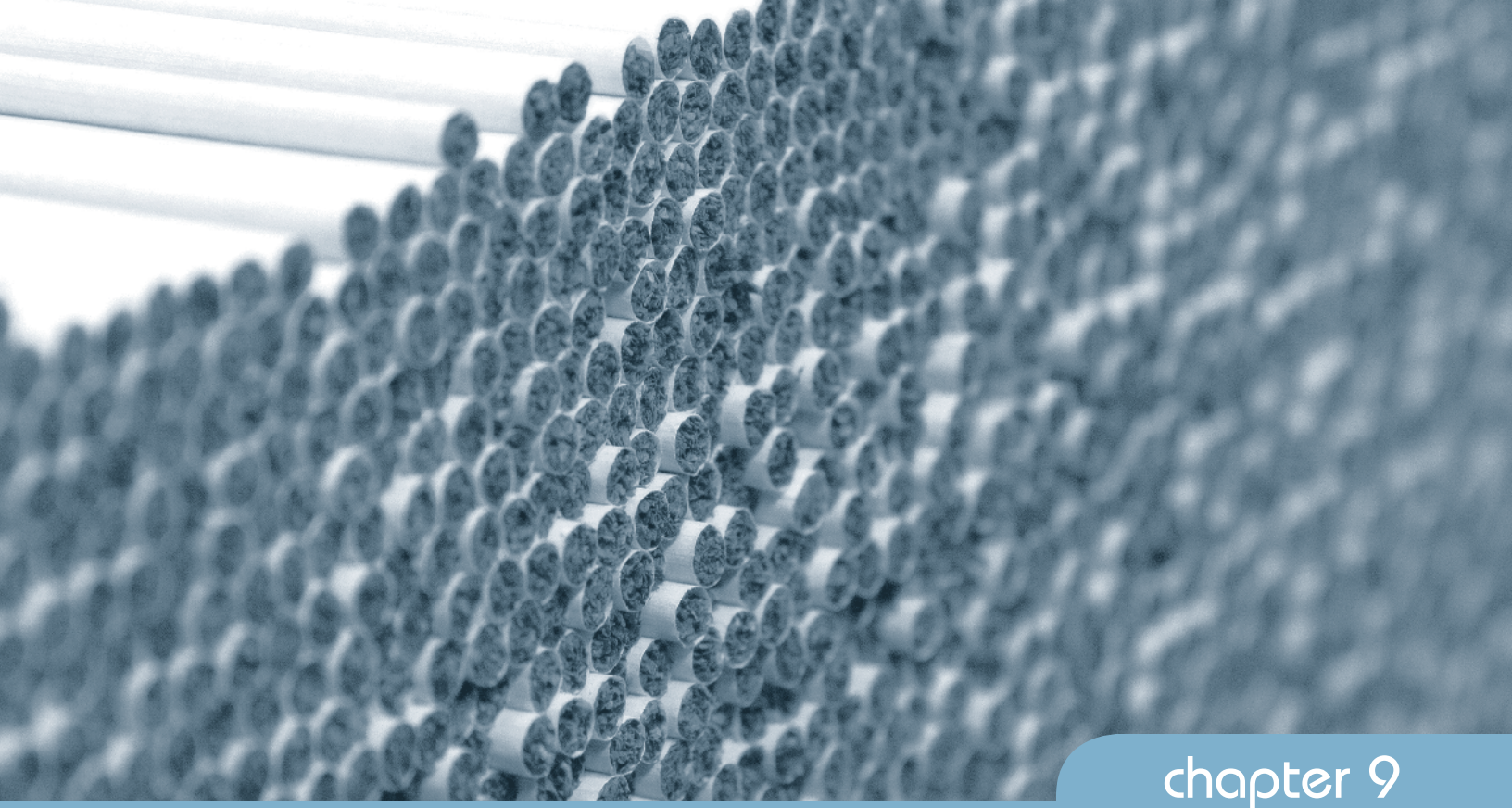
## Summary

It is never too late to quit smoking. Just over half of Peel's smokers (88,000 people) have attempted to stop smoking for at least 24 hours in the past year for the purposes of attempting to quit. In addition, these smokers make at least four attempts on average.

While many smokers try to quit smoking, many do not succeed. In Peel, approximately 90,000 smokers tried, unsuccessfully to quit smoking in the past year. This is an important group of people to support because they are motivated. Smoke free places will offer this group important types of support.

Between 60% and 85% of former smokers in Peel successfully used a variety of different pharmaceutical cessation methods. Buproprion was the most popular.

Peel has a variety of community supports with 850 family physicians, including six family health teams, and Smokers Helpline. Pharmacies may become more active in cessation support in the future.



chapter 9

# THE TOBACCO INDUSTRY

## Key Messages

What does this Chapter tell us?

- The production of tobacco in Canada and Ontario has declined since the 1970s. Most of the tobacco grown in Canada continues to be grown in a highly concentrated area of south-western Ontario.
- In Ontario, approximately 11 billion cigarettes were sold in 2010; down from 22 billion in 1980.
- Ontario has approximately 14,000 tobacco retailers; 780 of which are located in Peel. While there are some areas in Peel with a higher density of tobacco retailers per population, there does not appear to be a relationship between vendor density and smoking prevalence.

Definition

The ***tobacco industry*** refers to the people and companies involved in the cultivation, processing, shipment, marketing, distribution and advertisement of tobacco and tobacco related products.

The production, manufacturing, advertising, selling and use of tobacco are all heavily regulated in Canada through a patchwork of federal, provincial and, in some cases, municipal legislation.

Legislation impacting the tobacco industry, or use of tobacco, exists in the form of:

- Regulation on raw leaf tobacco,
- Regulation of the contents of tobacco products,
- Regulation of tobacco product disclosures,
- Packaging and labelling of tobacco products,
- Tobacco advertising, promotion and sponsorship,
- Tobacco sales,
- Tobacco taxation, and
- Protection from exposure to second-hand smoke.

Definition

**What is tobacco?**

Tobacco is a plant from the Solanaceae family, better known as Nicotiana (genus). Grown worldwide, the tobacco plant is harvested when the leaves begin to turn yellow.

After picking, the tobacco leaves are dried and then cured through flue-curing, air-curing or sun-curing.

- Flue-curing – This method is carried out in an enclosed building that contains a heat source. The interior temperature is gradually increased until the tobacco leaves are completely dry. This process takes approximately one week.
- Air-curing – This drying method is carried out in an open-frame building in which tobacco leaves suspended from cross beams are sheltered from the wind and sun. This process takes approximately four to eight weeks.
- Sun-curing – The tobacco leaves are dried in nets under the action of the sun. This process takes approximately one month (depending on weather conditions).

The cured leaves are sold to a processor, who shreds the leaves and makes the tobacco product.

Did You Know

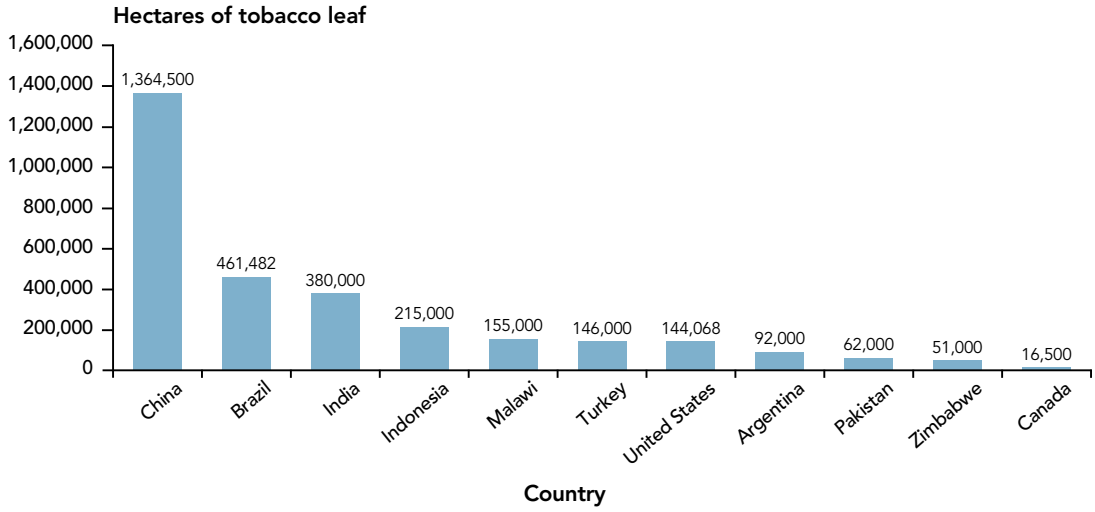
Worldwide, more than one billion people smoke. In 2009, six trillion cigarettes were consumed, an increase of 13% from 1999.[31]

## Tobacco Production and Manufacturing

Tobacco production in Canada has decreased steadily since 1970 when over 43,000 hectares of land were devoted to tobacco growth.[56] By 2009, the amount of land devoted to tobacco had decreased to 16,414 hectares.[56] As a comparator, the United States still has 144,000 hectares devoted to tobacco growth.

Over 90% of the tobacco grown in Canada is produced in a highly concentrated area in south-western Ontario, on the north shore of Lake Erie.[57]

**Figure 9.1**
**Leading Producers of Tobacco Leaf (Hectares) by Country of Production, 2007**




Source: The Tobacco Atlas 3rd edition. [Internet]. Atlanta, Georgia, U.S.A.: The American Cancer Society; cited November 18, 2011]. Available from: http://www.tobaccoatlas.org/growing.html.

Did You Know

### Tobacco Transition Program

In 2008, Agriculture and Agri-Food Canada initiated a program called the Tobacco Transition Program. The program was created in response to the decline in demand for Canadian flue-cured tobacco. The program had three main goals:

- Replace the supply-managed quota system with a licensing system,
- Assist the transition of Ontario flue-cured tobacco producers to exit the tobacco industry, and
- Bolster the viability of the remaining tobacco producers in southern Ontario.[58]

With this program came a major change to Canada's tobacco leaf supply system. The quota and auction system that had been in place for decades was replaced with a manufacturer-controlled contract buying system. Under the new system, a tobacco grower must have a contract for purchase from a licensed tobacco manufacturer before being granted a license to grow tobacco by the Ontario Flue-Cured Tobacco Growers Marketing Board.

Approximately 1,050 quota holders accepted payment under the Tobacco Transition Program in exchange for agreeing to exit the industry. It is believed that only four quota holders opted out.[59] Each farmer received $1.05 per pound of quota. In total $284 million was paid out.[60]

### *Tobacco Manufacturing – Employment*

Estimating the true size and economic impact of the Canadian tobacco industry is difficult because of the uncertainty surrounding the underground tobacco industry that exists in Ontario and Quebec, and the impact of illegal tobacco entering from the United States and other parts of the world.

**Did You Know**

**Both tobacco production and manufacturing declined in Canada between the years 1999 and 2008.[61]**

The Canadian tobacco manufacturing sector has experienced a 10% decline in employees between 1999 and 2008, as demonstrated in Table 9.1. By comparison, total employment in the manufacturing sector showed a decrease of 1.6% per year over the 1999 to 2008 period.[61]

**Table 9.1**
**Number of Canadians Employed in Tobacco Manufacturing, Canada, 1999, 2008 and 2009**

| | Cigarette Manufacturing Employees* | | |
|---|---|---|---|
| Year | Production† | Administration‡ | Total |
| 1999 | 2,287 | 1,706 | 3,993 |
| 2008 | 953 | 428 | 1,381 |
| 2009 | NA | NA | 1,281 |

† Production employees include those employees engaged in processing, assembling, storing, inspecting, handling, packing, maintenance, repair, janitorial, watchmen services and working foremen.
‡ Administrative employees include all employees that are not involved directly in production and related manufacturing activities. Examples include those involved in management, personnel, secretarial, sales, finance and other similar activities.
NA – data not available
* Prior to 2004, data covers incorporated establishments with employees, primarily engaged in manufacturing and with sales of manufactured goods equal or greater than $30,000.
Source: Statistics Canada, special tabulation, unpublished data, Annual Survey of Manufactures, 2000 to 2003; Annual Survey of Manufactures and Logging, 2004 to 2009. Canadian Industry Statistics. Employment Tobacco Manufacturing. NAICS 3122.

Imperial Tobacco, Philip Morris International and JTI-MacDonald are the largest tobacco producers in Canada[62]. In 2008, their combined sales accounted for approximately 98% of the Canadian market.[63] Ontario is home to seven of the 14 legal tobacco manufacturing employers in Canada.[64]

## Tobacco Sales

**Did You Know**

In 2010, 31 billion cigarettes were sold in Canada, down from 64 billion in 1980.[62]

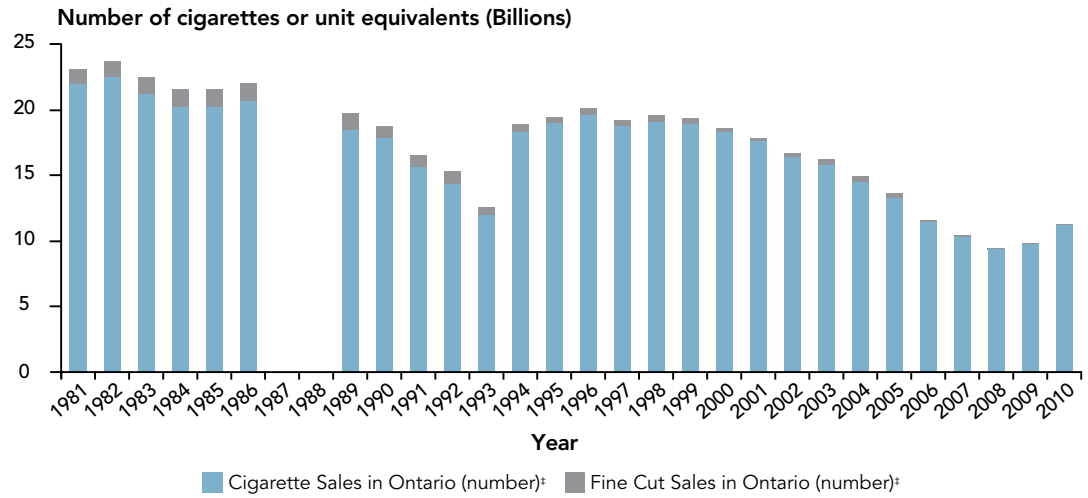
Between 2010 and 2011, provincial and federal revenues from tobacco sales in Canada were $3,011,472,182.[65]

**Definition**

***Fine Cut Tobacco*** is loose tobacco used with rolling papers or filter tubes (includes roll your own and make your own cigarettes).

There is no direct measure of tobacco sales in Peel. However, approximately 11 billion cigarettes were sold in Ontario in 2010. An additional 91 million unit equivalents of fine cut tobacco were sold in the same year.[62] In 1980, the number of cigarettes sold in Ontario each year was almost double what was sold in 2010 (Figure 9.2).

**Figure 9.2**
**Number of Legal Cigarettes and Fine Cut Tobacco Units†, Sold in Ontario, 1980-2009**




† One unit of fine cut tobacco is equivalent to one cigarette
‡ Sales not available for 1997 and 1998
Source: Wholesale sales data - Cigarette and Fine-cut Sales in Ontario, 1980-2010 [Internet].: Health Canada; 2011 [updated October 5, 2011; cited March 7, 2012]. Available from: http://www.hc-sc.gc.ca/hc-ps/tobac-tabac/research-recherche/indust/_sales-ventes/on-eng.php#fine.

**Did You Know**

In 2010, over 11 billion cigarettes (plus 91 million cigarette equivalents) were sold in Ontario, down from 22 billion equivalents for 1980.

## Tobacco Vendors in Peel

There are approximately 14,000 tobacco vendors in Ontario.[57] Approximately 780 are located in Peel.

**Peel Program**

Peel Public Health ensures that all tobacco retailers are aware of the requirements of the Smoke-Free Ontario Act by conducting annual inspections on each tobacco retailer in the region. The purpose of these inspections is to monitor for compliance with the Act and to provide education to the owner or operator on the requirements of the Act. The Region also employs youth between 15 to 17 years of age to monitor tobacco vendors for compliance with youth access laws.

**Table 9.2**
**Vendor Density by Data Zone, Peel, 2011**

| Data Zone | Number of Vendors† | Population Size‡ | Vendors/ 10,000 pop | Per cent Current Smokers€ |
|---|---|---|---|---|
| C1 | 30 | 41,599 | 7.2 | 11.5* |
| B4 | 19 | 89,015 | 2.1 | 12.7* |
| B1 | 44 | 106,489 | 4.1 | 13.1* |
| M5 | 36 | 64,689 | 5.6 | 14.4 |
| M1 | 28 | 131,368 | 2.1 | 15.4* |
| M4 | 105 | 96,947 | 10.8 | 15.5 |
| B3 | 77 | 85,626 | 9.0 | 16.0 |
| M6 | 54 | 70,999 | 7.6 | 16.9 |
| M3 | 19 | 73,868 | 2.6 | 17.2* |
| M8 | 104 | 102,975 | 10.1 | 18.7 |
| B5 | 76 | 123,107 | 6.2 | 20.6 |
| M7 | 85 | 109,621 | 7.8 | 20.8 |
| M2 | 39 | 74,557 | 5.2 | 21.2 |
| C2 | 16 | 24,800 | 6.5 | 26.7* |
| B2 | 30 | 102,509 | 2.9 | 27.6 |

* Use estimate with caution.
Sources:
† Number of vendors: Tobacco Inspection System, extracted January 2011, Peel Public Health
‡ Population Size: Projected estimate for 2010 using 2006 Census, Statistics Canada
€ Per cent of Current Smokers: Canadian Community Health Survey 2003, 2005, 2007/08 combined, Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

Tobacco retailers are required to abide by the provincial Smoke-Free Ontario Act and Tobacco Tax Act. Under the provincial Tobacco Tax Act, retail dealers of tobacco products are required to have a valid "tobacco retail dealer's permit." Tobacco retailers are also responsible for ensuring that they purchase tobacco products from wholesalers who have a valid wholesaler's permit.[68]

In addition to federal and provincial laws, retailers are also subject to municipal licensing by-laws. In Peel region, the lower tier municipalities of Brampton and Mississauga require tobacco retailers to have a tobacco business licence, in addition to the provincial dealer's permit.[66]

Tobacco vendors are unequally distributed across Peel neighbourhoods. While some neighbourhoods have two tobacco vendors per 10,000 population, others have 10 or 11 vendors per 10,000 population (Table 9.2). Vendor density (number vendors per population size) does not appear to be related to smoking prevalence in Peel neighbourhoods.

## Summary

The production of tobacco in Canada and Ontario has declined since the 1970s. Most of Ontario tobacco continues to be grown in a highly concentrated area of south-western Ontario.

In Ontario, approximately 11 billion cigarettes were sold in 2010; down from 22 billion in 1980.

Ontario has approximately 14,000 tobacco vendors; 780 of which are located in Peel. While there are some areas in Peel with a higher density of tobacco vendors per population, there does not appear to be a relationship between vendor density and smoking prevalence.

# chapter 10

## THE TOBACCO REGULATORY SYSTEM

### Key Messages

**What does this Chapter tell us?**

- The growth, distribution, sale, taxation and use of tobacco is regulated through federal, provincial and municipal laws and regulations.
- Two Federal Acts (Non-smokers' Health Act and the Tobacco Act) regulate smoking in workplaces, and the manufacturing, selling, labelling and promoting of tobacco. In Ontario, we have the Smoke-Free Ontario Act, and the Supporting Smoke Free Ontario by Reducing Contraband Tobacco Act.
- Provincial polls show that Ontario residents have become less tolerant over the past 10 years towards the sale of tobacco products, the tobacco industry's role in smoking related health care costs and attitudes towards second-hand smoke.
- Ontario has one of the lowest tobacco tax rates in Canada (second only to Quebec). As the tax rate has increased, the prevalence of smoking has declined.
- The consumption of contraband tobacco has increased substantially between 2006 and 2008 in Ontario.

The growth, distribution, sale, taxation, and use of tobacco is regulated through federal, provincial, and municipal laws and regulations. This section will describe the purpose of these tobacco laws and will also include a description of the impact of sales tax on contraband tobacco.

## Laws and Regulations

### *Federal Laws and Regulations*

The Non-smokers' Health Act came into effect in 1989. This Act is administered by the Department of Human Resources and Skills Development and was amended on October 25, 2007. The Non-smokers' Health Act regulates smoking in the workplaces under federal jurisdiction. It also amended the Hazardous Products Act in relation to cigarette advertising.

The key aspect of this amended Act was that smoking rooms and smoking areas were prohibited in federal work places, including any enclosed space under the control of the employer whether or not the space is attached to a building.

The Tobacco Act, passed in 1997 and administered by Health Canada, governs the manufacturing, sale, labelling and promotion of tobacco products. This Act also provides authority to the Governor in Council to make regulations on these issues.

Key regulations of the Act include:

#### *Manufacturing*

- Tobacco products must be manufactured in conformity with product standards.
- Manufacturers of a tobacco product must provide information about the product and its emissions.

#### *Selling*

- Tobacco products may not be furnished to a young person in a public place or in a place to which the public has reasonable access.
- Retailers must post signs that inform the public that the sale or giving of a tobacco product to a young person is prohibited by law.
- Retailers may not sell a tobacco product by means of a display that permits a person to handle the tobacco product before paying for it.

#### *Labelling*

- Manufacturers or retailers may not sell a tobacco product unless the package containing it displays information about the product and its emissions, and about the health hazards and health effects arising from the use of the product or from its emissions.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### *Promoting*

Tobacco products or tobacco product-related brand elements may not be promoted, except as authorized by this Act or the regulations.

- Inspectors may enter any place in which they believe a tobacco product is manufactured, tested, stored, packaged, labelled or sold.

## Provincial Laws and Regulations

Provincially, the Smoke-Free Ontario Act 2006 (which amends the 1994 Tobacco Control Act), and the Supporting Smoke Free Ontario by Reducing Contraband Tobacco Act:

- Sets rules about selling and smoking tobacco,
- Prohibits smoking in all enclosed workplaces and enclosed public spaces and in motor vehicles when children under 16 years of age are present,
- Bans the public display of tobacco products prior to purchase and prohibits youth–targeted tobacco products, such as flavoured cigarillos, and
- Enhances control of contraband by introducing:
  - New fines for possession of contraband,
  - A system for identifying illegal fine cut tobacco,
  - Greater management of all raw leaf tobacco products, and
  - The authority for police to seize contraband products.

## Municipal Laws and Regulations

In 1999, the three municipalities in the Region of Peel passed bylaws requiring workplaces and public spaces to become smoke-free. With the exception of certain types of establishments (i.e., restaurants, food courts, recreation facilities, skating rinks, billiard halls, bingo halls, casinos, bars/taverns or nightclubs), workplaces and public spaces in Peel became 100% smoke free in 1999. Listed below is some history about the changes to the municipal legislation over time within Peel:

- June 1, 2001: Restaurants, banquet halls, food courts and the food areas of recreational facilities in Peel were required to become 100% smoke-free or provide an enclosed, separately ventilated smoking room.

- 2003: Region of Peel Council passed the Region of Peel's Smoke-free By-law. This by-law stipulated that all enclosed public spaces had to phase out their designated smoking rooms (DSRs) by June 1, 2010.
- June 1, 2004: As part of the Region of Peel's Smoke-free By-law, billiard halls, bingo halls, casinos, bars/taverns, and nightclubs were to become 100% smoke-free or provide an enclosed, separately ventilated smoking room.
- 2006: The Smoke-Free Ontario Act superseded the Region of Peel's Smoke-free By-law, requiring all enclosed public spaces and workplaces to be now 100% smoke-free (i.e., no DSRs). This eliminated DSRs from billiard halls, bingo halls, casinos, bars/taverns, nightclubs and entertainment lounges in Peel four years earlier than the Region of Peel's Smoke-free By-law.

## Public Opinion about Tobacco Regulation

Provincial polls regarding the sale of tobacco products, the tobacco industry's role in smoking related health care costs and attitudes towards second-hand smoke demonstrate that Ontarians have become less tolerant over the past 10 years.

### *General sale of cigarettes:*

- 69% of Ontario residents agree that the number of outlets selling cigarettes should be reduced.[F1]
- 42% of Ontario residents agree that tobacco products should be sold in government-owned stores.[F1]
- 72% of Ontario residents agree that cigarettes should be sold in plain white packages that only display health warnings, ingredients and brand name.[F1]
- 57% of Ontario residents agreed that smokeless tobacco (i.e., oral snuff, spit or chewing tobacco) should not be sold in Ontario.[F2]

### *Improper sale of tobacco:*

- 86% of Ontario residents agree that stores convicted of selling tobacco to young people under 19 years of age should lose their license.[F4]

### *Tobacco taxes:*

- 45% of Ontario residents support the increase of cigarette taxes.[F1]

### *Tobacco industry accountability:*

- 76% of Ontario residents agree that tobacco companies are responsible for the health problems of smokers.[F3]
- 60% of Ontario residents agree that tobacco companies should be fined by the government for the money they earn from minors who smoke.[F4]
- 52% of Ontario residents agree that the Ontario government should sue tobacco companies for health care costs that result from tobacco smoking.[F3]

### *Smoking in public spaces:*

- 59% of Ontario residents agree that smoking should be banned in public parks and beaches.[E2]
- 50% of Ontario residents support a smoking ban on public sidewalks.[F1]
- 80% of Ontario residents agree that smoking should not be allowed on restaurant or bar patios.[F1]
- 84% of Ontario residents agreed that smoking should not be allowed in multi-unit dwellings with shared ventilation, such as apartment buildings, rooming houses and retirement homes.[F1]

### *Smoking in the home and cars:*

- 80% of Ontario residents agree that parents should be banned from smoking inside if children live at home.[F1]
- 93% of Ontario residents support legislation banning parents from smoking in their cars if children are present.[F1]

## Tobacco Taxation and Tax Revenue from Tobacco Sales

Taxation is an important tool that serves two purposes: it reduces tobacco use by increasing price and serves as a revenue source for government. In Ontario, tobacco taxes are applied through a variety of federal and provincial excise taxes collected at the manufacturer level and at the point of purchase.[37]

In Canada, the federal government applies both an excise duty and an excise tax to tobacco products. Excise duties are applied to a specific list of domestic products, which includes spirits, beer, cigarettes and tobacco. The excise duty on cigarettes consists of a specific amount in dollars applied per thousand standard cigarettes. The excise duty is higher for cigarettes that contain more tobacco.[67]

Excise taxes are either a fixed dollar amount imposed on a specific quantity of goods or an ad valorem tax applied to a prescribed list of domestic and imported goods and certain specific taxes. These taxes are in addition to the general or retail sales taxes.[67]

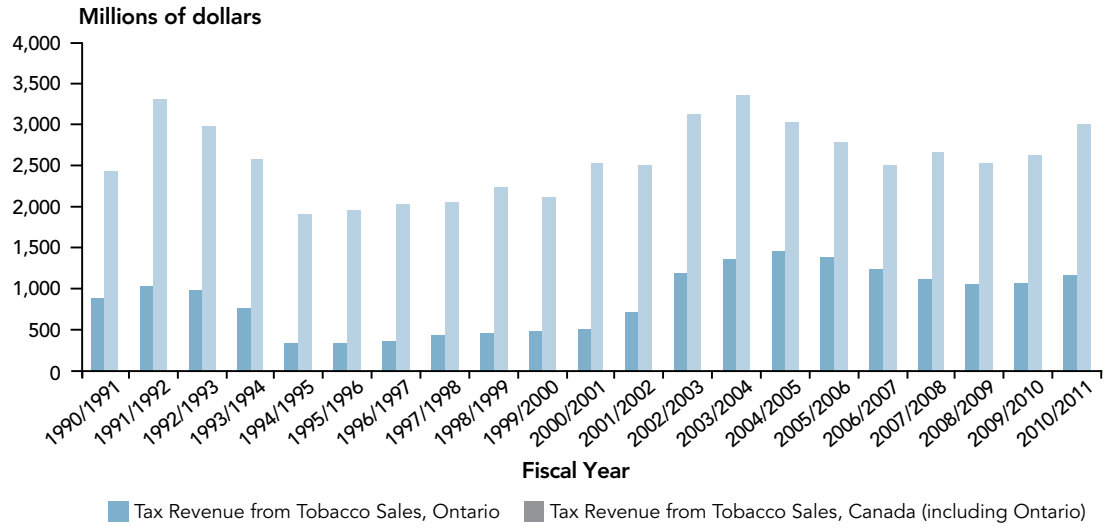
In Ontario, tobacco taxes are applied to all tobacco products sold (cigarettes, cigars and other tobacco such as loose, bidis, snuff, chewing, leaf, blunt wraps, water pipe and snus).[68]

**Peel Fact**

**The Cities of Brampton and Mississauga both require stores and shops where tobacco is sold by retail to have a tobacco license. Alternative tobacco products fall under these licensing requirements.**

The tax revenue collected from cigarettes (Figure 10.1) is much lower than the health care costs attributable to smoking. In 2009, Ontario collected $1 billion in tax revenue from tobacco sales, compared to an estimated $6 billion (direct and indirect costs) spent for smoking-attributable health costs.[27]

**Figure 10.1**
**Tax Revenue from Tobacco Sales by Fiscal Year, Ontario and Canada, 1990-2011**




† one unit of fine cut tobacco is equivalent to one cigarette
‡ sales not available for 1997 and 1998
Source: Tax Revenues from Tobacco Sales [Internet]. Ottawa: Physicians for a Smoke-Free Canada [updated November 2011; cited May 18, 2012]. Available from: http://www.smoke-free.ca/pdf_1/totaltax.pdf.

Using cigarette pricing to impact tobacco use is a well proven tobacco control strategy. Increases in the price of cigarettes result in: decreased demand; decreased consumption of cigarettes; and an increase in tax revenues for government.[37,69] For every 10% increase in the real price of cigarettes there is a three to four per cent decrease in consumption.[33,37]

Compared to other Canadian provinces and territories, the tobacco tax in Ontario is low. In 2012 the average price of a carton of 200 cigarettes in Ontario was $80.16. Of the 13 provinces and territories in Canada, only Quebec sells a carton for a lower price. The majority of the cost of a carton of cigarettes is driven by tobacco taxes (Table 10.1).[37]

**Did You Know**

**Ontario's tobacco taxes are among the lowest compared to all other provinces and territories.**

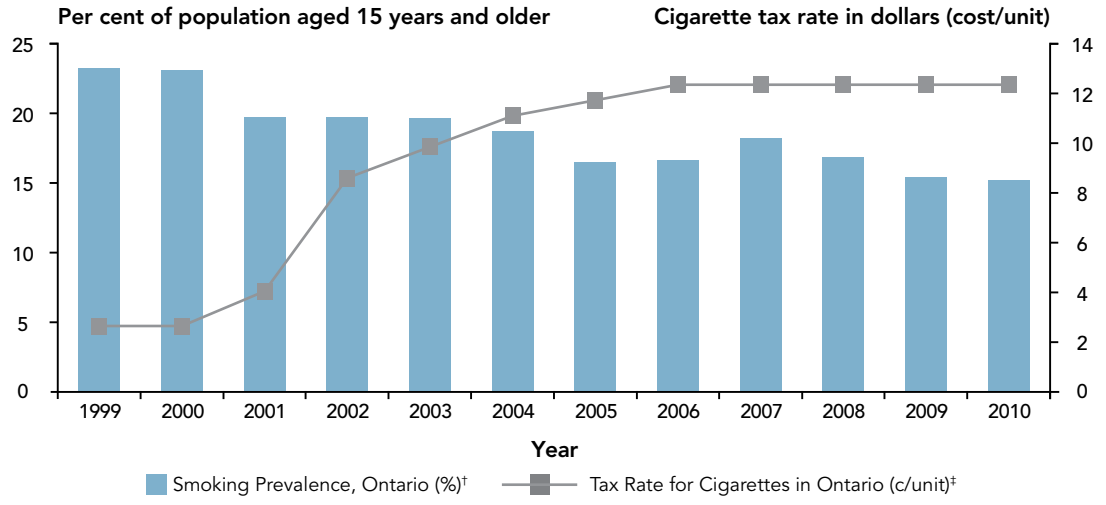
**Table 10.1**
**Total Tobacco Taxes and Total Retail Price for a Carton of 200 Cigarettes in Canada's Provinces and Territories†**

| Province | Total Tobacco Taxes ($)‡ | Total Retail Price ($) |
|---|---|---|
| Northwest Territories | 79.37 | 108.61 |
| Nova Scotia | 73.43 | 102.67 |
| Manitoba | 72.95 | 102.19 |
| Saskatchewan | 67.82 | 97.06 |
| Prince Edward Island | 72.65 | 101.89 |
| Newfoundland and Labrador | 65.95 | 95.19 |
| British Columbia | 63.99 | 93.23 |
| Yukon Territory | 63.41 | 92.65 |
| Nunavut | 63.41 | 92.65 |
| Alberta | 61.31 | 90.55 |
| New Brunswick | 61.43 | 90.67 |
| Ontario | 50.92 | 80.16 |
| Quebec | 42.20 | 71.44 |

† As of January 4, 2012
‡ GST/HST is calculated on the total of pre-tax price + federal excise duty + provincial excise tax.
Notes: All provincial and federal taxes (including GST) are included.
Source: Cigarette prices in Canada [Internet]. Ottawa: Non-Smokers' Rights Association, Smoking and Health Action Foundation [updated April 13, 2011; cited May 18, 2012]. Available from: http://www.nsra-adnf.ca/cms/file/pdf/cigarette_prices_Canada_13_April_2011_map_and_table.pdf

In Ontario, tobacco products are produced and distributed by licensed manufacturers, and regulated through the Tobacco Tax Act. The relationship between taxation and smoking prevalence is shown in Figure 10.2.

**Figure 10.2**
**Smoking Prevalence and Tax Rate for Cigarettes by Year, Ontario, 1999-2010**




Sources:
† Reid JL, Hammond D, Burkhalter R, Ahmed R. Tobacco use in Canada: Patterns and trends, 2012 edition. Waterloo, Ontario: Propel Centre for Population Health Impact, University of Waterloo; 2012.
‡ Tobacco tax: Current tobacco tax rates [Internet].: Government of Ontario: Ministry of Finance; 2011 [updated October 21, 2011; cited November 25, 2011]. Available from: http://www.rev.gov.on.ca/en/tax/tt/rates.html.

In addition to taxation, another way that the government can control tobacco pricing is with the use of a mandated pre-tax price (the price of tobacco before taxes) for tobacco products. The implementation of minimum pre-tax price in Ontario should help to control the growing "discount" cigarette market. [70]

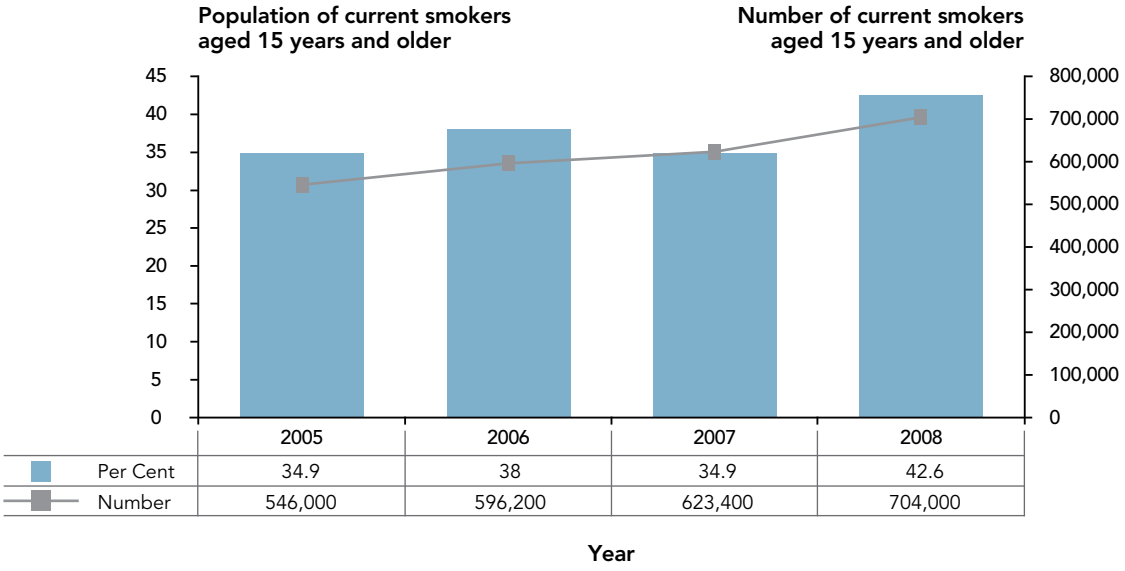
**Did You Know**

***Discount brand cigarettes*** refer to cigarettes that are legally sold at a discount price. They are typically sold at $12 to $32 a carton less than "premium" brands.[70]

Discount cigarettes are tobacco products that are priced to be attractive to cost-conscious consumers. Discount cigarettes sell for between $12 and $32 less a carton than "premium" brands, and now account for approximately 50% of the legal market; up from 10% of the market in 2003.[70]

In 2008, 43% of Ontario smokers purchased a discount brand of cigarettes (Figure 10.3).

**Figure 10.3**
**Per Cent and Number of Smokers who Purchased a Discount Cigarette Brand† by Year, Ontario, 2005–2008**




† Purchased within the past six months
Source: Canadian Tobacco Use Monitoring Survey 2005, 2006, 2007, 2008. Tobacco Information Monitoring System, Ontario Tobacco Research Unit

## Contraband Tobacco Sales

**Key Messages**

***Contraband tobacco*** **is tobacco that is sold illegally, without taxation or regulation, or in a way that evades the practices and principles outlined in provincial and federal legislation.**

**Did You Know**

**First Nations individuals who are registered Indians are exempt from payment of tobacco tax on tobacco products that are purchased for their own consumption on their reserves.**

**Foreign diplomats are also exempt for payment of tobacco tax on tobacco products purchased for their own consumption through their diplomatic mission.**

The Ontario Ministry of Revenue designates a production limit for native reserve cigarettes and allows for a specified quota of mainstream tax-exempt cigarettes to be sold on reserves. First Nations reserve vendors are required to add the cigarette tax to tobacco products when selling to non-native status customers. This tax is then collected by the Ministry of Revenue. If the vendor does not add the cigarette tax for non-native status customers then the cigarettes are considered to be sold illegally as contraband.

The majority of contraband cigarettes in Ontario come from tax-exempt tobacco that is manufactured and sold on First Nations reserves. The second source of contraband comes to Ontario by means of smuggling and arrives in unmarked or counterfeit packages.[71]

Did You Know

**How Contraband is Sold**

- In unmarked plastic bags of 200 cigarettes by unlicensed dealers in public venues and on the street,
- To non-natives purchasing untaxed tobacco products from reserve smoke shops, and
- By tobacco retailers selling untaxed cigarettes.[71]

Did You Know

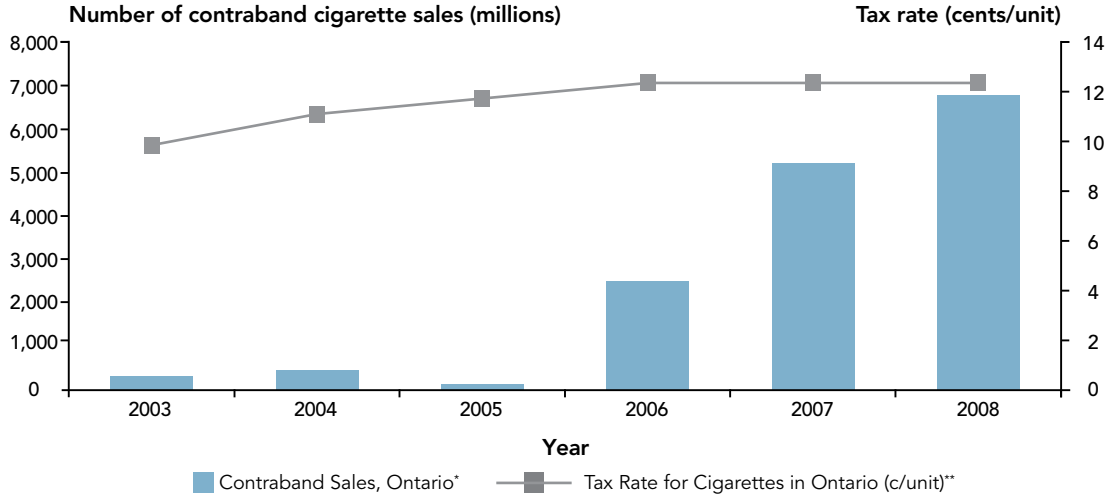
In 2012, the average price of 200 cigarettes sold legally in Ontario (one carton) was $80, $50.92 of which is tax collected by the Federal and Provincial governments.[72,73] A bag of 200 contraband cigarettes can be purchased for as low as $10.[74]

Did You Know

Individuals caught in possession of contraband cigarettes face serious consequences ranging from a fine to imprisonment.[75]

The rate of tax on cigarettes does not result in a direct impact on contraband sales as can be seen in Figure 10.4. While the rate of cigarette tax has remained constant between 2006 and 2008, the contraband market has grown almost three-fold.

**Figure 10.4**
**Contraband Cigarette Sales and Tax Rate by Year, Ontario, 2003-2008**




Sources:
* Estimating the volume of contraband sales of tobacco in canada. Physician's for a Smoke-Free Canada; April 2010. Derived from smoking prevalence data (Canadian Tobacco Use Monitoring Survey) and wholesale shipments reported to Health Canada
** Tobacco tax: Current tobacco tax rates [Internet].: Government of Ontario: Ministry of Finance; 2011 [updated October 21, 2011; cited November 25, 2011]. Available from: http://www.rev.gov.on.ca/en/tax/tt/rates.html.

**Peel Fact**

**In Peel, almost one-quarter of youth (24%) who are current smokers use cigarettes from native reserves or unbranded cigarettes.[D]**

**Did You Know**

**In Ontario between April 1, 2008 and December 31, 2011, approximately 182 million illegal cigarettes, 1.7 million untaxed cigars, and 56 million grams of fine cut tobacco were seized by the Ministry of Finance.[76]**

## Summary

The production, distribution, sale, taxation, and use of tobacco is regulated through federal, provincial and municipal laws and regulations.

Two Federal Acts (Non-smokers' Health Act and the Tobacco Act) regulate smoking in workplaces under Federal jurisdiction, and the manufacturing, selling, labelling and promoting of tobacco. In Ontario, we have the Smoke-Free Ontario Act, and the Supporting Smoke Free Ontario by Reducing Contraband Tobacco Act. In Peel, we follow the Smoke-Free Ontario Act.

Provincial polls shows that over the past 10 years Ontario residents have become less tolerant towards the sale of tobacco products, the tobacco industry's role in smoking related health care costs and attitudes towards second-hand smoke.

Ontario has one of the lowest tobacco tax rates in Canada (second only to Quebec). As the tax rate has increased, the prevalence of smoking has declined.

The consumption of contraband tobacco has increased between 2006 and 2008 in Ontario.

chapter 11

## ACKNOWLEDGEMENTS

This report was written by Julie Stratton, Dr. Megan Ward and Carrie Cartmill.

Chapter authors and other major contributors included: Kathie Brown, Marilyn Kusi-Achampong, Adam O'Connell, Barb Patten and Melanie Vefaie.

Additional input was provided by Diane Clapham (Public Health and Preventive Medicine Resident, University of Toronto) and the Tobacco Steering Committee.

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chapter 12

# DATA SOURCES AND LIMITATIONS

Numerous data sources were used in this report and are described in this section. For additional details about the methods of analysis used in each of the chapters of this report, please refer to Chapter 13 – Data Methods.

### *Census Data*

The Census is conducted every five years and data are provided by Statistics Canada. While the most recent Census was in May, 2011, not all data from this Census have been released. As a result, with the exception of the age and sex population counts for Peel, we have continued to refer to 2006 Census data.

Limitations:

- The Census undercounts some groups, such as the homeless, young adults and Aboriginal people on reserves.
- Comparison between censuses is affected by changes in question wording and in the definition of the population concerned.

### *Canadian Community Health Survey*

The Canadian Community Health Survey (CCHS) is a Statistics Canada survey aimed at providing health information at the provincial, regional and health unit levels. The target population of the CCHS includes household residents in all provinces and territories, with the principal exclusion of populations on Indian Reserves, Canadian Forces Bases, and those living in institutions or more remote areas. There is one randomly selected respondent per household, with an over-sampling of youths resulting in a second member of certain households being interviewed. The CCHS sample is primarily a selection of dwellings drawn from the Labour Force Survey area sampling frame. For the regional level survey, the sample is supplemented with a random digit-dialling sample in some health regions.

The interview for the health region-level survey includes common content to be asked of all sample units, optional content determined by each health region from a predefined list of questionnaire modules, and socioeconomic and demographic content. A focused provincial-level survey consists of some general health content and one focus content topic per cycle. Focus content is intended to be an in-depth treatment of topical issues.

Prior to 2007, data were collected every two years on an annual period. Data presented for 2000/2001, 2003 and 2005 reflect this data collection method. Starting in 2007, major changes were made to the survey design in order to improve its effectiveness and flexibility through data collection on an ongoing basis. As a result, data collection now occurs every year, but for Peel a "cycle" is still considered to be a two-year period (e.g., 2007/2008, 2009/2010).

Data collection for the CCHS is done by either computer assisted personal or telephone interviewing for the area sample or telephone interviewing for the random digit-dialling sample. Data are weighted to reflect the population of Peel.

Limitations:

- Depending upon the question, data may be subject to recall bias, social desirability bias and errors from proxy reporting.
- Individuals and/or households without a telephone would be excluded from the sampling frame.
- Some analyses are limited by sample size.

### *Peel Student Health Survey*

In March 2011, Peel Public Health conducted the Student Health Survey of students in the region of Peel between grades 7 and 12 in partnership with the Dufferin-Peel Catholic District School Board and the Peel District School Board. The survey consisted of a self-completed questionnaire completed by students within randomly selected schools and classes in Peel. The survey captured information on a variety of topics, including eating habits, physical activity, substance use, mental health, bullying, injury and sun safety. Height and weight measurements were taken by a public health nurse for each participating student. In addition, a physical fitness assessment was conducted by trained assessors (for Grade 9 students only) and an oral health assessment was completed by public health dental hygienists (for grades 10 and 12 only). The final sample included approximately 8,500 students from 37 elementary schools and 23 secondary schools in Peel.

Limitations

- Data are not weighted to reflect the student population in Peel.
- Excluded by design are student dropouts and students enrolled in French schools and private schools.

- Results should be interpreted with caution as self-reported survey data have the potential for recall error and providing socially desirable answers.
- Due to the cross-sectional nature of the data, causal relationships cannot be inferred.

### *Cancer Incidence*

The Ontario Cancer Registry (OCR), housed at Cancer Care Ontario, is a computerized database of information on all Ontario residents who have been newly diagnosed with cancer (incidence) or who have died of cancer (mortality). All types of cancer are registered, except non-melanoma skin cancer. The system is passive and relies predominantly on administrative data. The Registry is compiled by linking administrative data, clinical and demographic data from four major data sources:

- Hospital discharge and ambulatory care records with cancer diagnoses in the Canadian Institute of Health Information (CIHI), Discharge Abstract Database (DAD) and National Ambulatory Care Reporting System (NACRS),
- Pathology reports with any mention of cancer from hospitals and private laboratories,
- Records from Regional Cancer Centres or Princess Margaret Hospital, and
- Ontario death certificates with cancer as the underlying cause of death.

All cancer-related data on these records are reviewed by an electronic system of medical logic to produce consolidated information about the cancer diagnosis. Cancer diagnoses are classified according to the International Classification of Diseases for Oncology, 3rd edition (ICDO-3).

Limitations

- Currently, this data source only provides information at the Census Division (CD) or Public Health Unit (PHU) level of geography.
- The population data source is not as current as that used for other analyses.

### *Mortality Data*

The Office of the Registrar General obtains information about mortality from death certificates, which are completed by physicians. All deaths within Ontario are registered in the office of the division registrar within which the death occurs. A Statement of Death must be filed with a division registrar before a Burial Permit can be issued.

Limitations:

- Co-morbidity contributes to uncertainty to classifying the underlying cause of death.
- Determining the true cause of death may be influenced by the social or legal conditions surrounding the death and by the level of medical investigation (e.g., AIDS, suicide).

### *Hospital Discharge Data*

A hospital separation is a discharge from a hospital due to death, discharge home or transfer to another facility. Hospitalization data provide only a crude measure of the condition being quantified for the following reasons: a person may be hospitalized several times for the same disease or injury event, or may be discharged from more than one hospital (when transferred) for the same injury event or may not seek care at a hospital.

Limitations

- Co-morbidity contributes uncertainty to classifying the most responsible diagnosis.
- Data are influenced by factors that are unrelated to health status such as availability and accessibility of care, and administrative policies and procedures. This may influence comparisons between areas and over time.

### *Better Outcomes Registry Network (BORN)*

BORN-Niday data includes detailed information on maternal, infant and perinatal care characteristics. Starting in 2009, the former Niday database captured data from all hospitals in Ontario. Prior to 2007, Headwaters Health Care Centre in Orangeville did not participate in Niday, therefore Peel mothers who delivered there were not captured. This means the number of births to Peel mothers prior to 2007 may have been an underestimate of the true number of births.

Limitations

- As the data are entered by hospital staff or retrieved from the hospital's database electronically, estimates may be an under-representation of the true prevalence of the occurrence in the population.
- For some variables (e.g., smoking during pregnancy, intention to breastfeed), some women may provide the socially desirable response to avoid perceived negative consequences or feelings of being judged by their health care provider.

chapter 13

# DATA METHODS

## *General Methods*

Within the majority of tables and figures of this report, values are presented to one decimal of precision, while values in the text of the report are rounded to nearest whole number. Due to rounding, some values may sum to more or less than 100%.

The following terms have been used to imply statistical significance between groups: "significantly," "more likely" and "less likely." Ninety-five per cent confidence intervals were used to determine the significance of differences between groups.

To ensure confidentiality and to meet reporting requirements, data are presented as follows:

- Canadian Community Health Survey (CCHS):
  - "NR – not releasable due to small numbers" (when coefficient of variation greater than or equal to 33.4), and
  - "* Use estimate with caution" (when coefficient of variation is between 16.6 and 33.3).
- Cell counts with less than five individuals were suppressed for mortality, hospitalization and cancer incidence data.
- Peel Student Health Survey:
  - "NR – not releasable due to small numbers" (when unweighted numerators had less than 10 individuals and denominator counts had less than 30 individuals, and
  - "* Use estimate with caution" (when coefficient of variation is between 16.6 and 33.3).

### *International Classification of Diseases (ICD) Codes*

"Causes" of death or illness are coded using a standard system called the International Statistical Classification of Diseases and Related Health Problems Tenth Revision (ICD-10). The Ninth Revision of the International Classification of Diseases (ICD-9) was used to code cause of death between 1979 and 1999, and hospital separations between 1986 and 2002. The ICD-10 system was used to code mortality data from 2000 forward. Hospitalization data from 2003 forward were coded using the Canadian version of the ICD-10 system (ICD-10-CA), with codes provided by the Canadian Institute for Health Information. As changes in the coding system may cause artificial changes in the number of cases of a particular cause of illness, trends in specific causes must be interpreted with caution. These were noted in the text when applicable.

### *Age Standardization*

When comparing mortality, hospitalization or cancer incidence data between two populations (or between the same population at different points in time), differences in the respective age distributions were controlled for by using age-standardized rates. This minimizes the effect of differences in age distributions between populations, so that observed differences can then be attributed to factors other than age. The direct age-standardization method was used for the calculation of rates with the 1991 Canadian population being used as the "standard" population.

### *Canadian Community Health Survey Data Analysis*

For analyses using the Canadian Community Health Survey (CCHS), outcomes of interest where a "missing," "do not know" or "refused" response was greater than 5% were included in the denominator.

Unless otherwise stated, the following CCHS variables were defined as follows:

Household Income is based on self-reported total household income and the number of individuals in the household (Table 13.1).

**Table 13.1**
**Household Income Categories, Canadian Community Health Survey**

| Income Level | Income Level Name in the household | Number of people income | Total household |
|---|---|---|---|
| I1 | Low-Lower Middle | 1 – 2 people<br>3 – 4 people<br>5+ people | <$14,999<br><$19,999<br><$29,999 |
| I2 | Middle | 1 – 2 people<br>3 – 4 people<br>5+ people | $15,000 to $29,999<br>$20,000 to $39,999<br>$30,000 to $59,999 |
| I3 | Low-Lower Middle | 1 – 2 people<br>3 – 4 people<br>5+ people | $30,000 to $59,999<br>$40,000 to $79,999<br>$60,000 to $79,999 |
| I4 | Highest | 1 – 2 people<br>3+ people | More than $60,000<br>More than $80,000 |

Source: Canadian Community Health Survey, Statistics Canada.

Education is categorized into the following:

- Less than secondary school graduation
- Secondary school graduation, no post-secondary education
- Other post-secondary education
- Post-secondary degree/diploma

Immigrant Status is defined as follows:

- Recent Immigrant: arrived in Canada within the past 10 years
- Long-term Immigrant: resident of Canada for 11 or more years
- Non-Immigrant: Canadian-born population

Ethnicity is categorized into the following eight groups based on the population aged 12 years and older who responded to the question about their cultural and racial background at the time of the interview:

- White
- East/Southeast Asian (e.g., Chinese, Filipino, Southeast Asian, Cambodian, Indonesian, Laotian, Vietnamese, Japanese, Korean)
- West Asian/Arab (e.g., Arab, West Asian, Afghan, Iranian)
- South Asian (e.g., East Indian, Pakistani, Sri Lankan)
- Latin American (e.g., Mexican, Caribbean, South American)
- Black
- Aboriginal people of North America (e.g., North American Indian, Metis, Inuit/Eskimo)
- Other (multiple responses across categories defined here and non response/don't know/refusal)

Ethnicity for regression modelling is categorized into the following six groups based on the population aged 18 years and older who responded to the question about their cultural and racial background at the time of the interview:

- White
- Black
- East/Southeast Asian (e.g., Chinese, Filipino, Southeast Asian, Cambodian, Indonesian, Laotian, Vietnamese, Japanese, Korean)
- West Asian/Arab (e.g., Arab, West Asian, Afghan, Iranian)
- South Asian (e.g., East Indian, Pakistani, Sri Lankan)
- Latin American (e.g., Mexican, Caribbean, South American) and other (Aboriginal people of North America (e.g., North American Indian, Metis, Inuit/Eskimo, and multiple responses across categories defined here, and non-response/don't know/refusal)

## Chapter Specific Methods

### *Chapter 3 – The Burden of Smoking*

In this chapter, the smoking attributable fraction (SAF) was used to determine the annual number of preventable hospitalizations, deaths and potential years of life lost (PYLL) due to selected diseases that are attributable to active smoking and exposure to environmental tobacco smoke (ETS). The diseases selected were those where there were strong relative risk data for smoking and/or ETS and the disease. The diseases chosen for this analysis, along with the relative risk of disease for current and former smokers by sex, are listed in Table 13.2.

The smoking attributable fractions for hospitalizations, deaths and PYLL were calculated using relative risk estimates and Peel specific smoking prevalence according to the following formulas:

SAFs for each disease (listed in Table 13.2) are calculated age and sex specifically, and are derived from the following formula:

$$SAF = [(p0 + p1(RR1) + p2(RR2)) - 1] / [p0 + p1(RR1) + p2(RR2)]$$

### *Relative Risk (RR) Estimates*

Scientific studies have identified the magnitude of increased risk that current smokers and former smokers experience in comparison to never-smokers for developing and dying from specific chronic illnesses. The magnitude of this increased risk is called the "Relative Risk," and it provides a quantifiable measure of the increased likelihood a smoker or former smoker has for developing or dying from a disease relative to a never-smokers.

- If RR=1, the risk in exposed persons equals the risk in non-exposed persons,
- If RR>1, the risk in exposed persons is greater than the risk in non-exposed persons, and
- If RR<1, the risk in exposed persons is less than the risk in non-exposed persons.

| Measure | Definition |
|---|---|
| p0 | Percentage of adult never smokers in study group |
| p1 | Percentage of adult current smokers in study group |
| p2 | Percentage of adult former smokers in study group |
| RR1 | Relative risk of death for adult current smokers relative to never smokers |
| RR2 | Relative risk of death for adult former smokers relative to never smokers |

Source: Association of Public Health Epidemiologists in Ontario, Core Indicators, 5A-smoking-attributable mortality [Internet]; 2011.

The following RR estimates were used in calculations of SAF (Table 13.2):

**Table 13.2**
**Relative Risk for Chronic Diseases, by Smoking Status and Sex**

| Chronic Diseases | Male | | Female | |
|---|---|---|---|---|
| | Current Smoker | Former Smoker | Current Smoker | Former Smoker |
| **ACTIVE SMOKING** | | | | |
| **CANCERS** | | | | |
| Lung† | 23.26 | 8.70 | 12.69 | 4.53 |
| Larynx† | 14.60 | 6.34 | 13.02 | 5.16 |
| Lip, oral, pharynx† | 10.89 | 3.40 | 5.08 | 2.29 |
| Esophagus† | 6.76 | 4.46 | 7.75 | 2.79 |
| Bladder† | 3.27 | 2.09 | 2.22 | 1.89 |
| Kidney† | 2.72 | 1.73 | 1.29 | 1.05 |
| Pancreas† | 2.31 | 1.15 | 2.25 | 1.55 |
| Cervix† | NA | NA | 1.59 | 1.14 |
| Stomach† | 1.96 | 1.47 | 1.36 | 1.32 |
| Acute myeloid leukemia† | 1.86 | 1.33 | 1.13 | 1.38 |
| Colon, rectum‡ | 1.15 | 1.30 | 1.22 | 1.40 |
| **CARDIOVASCULAR DISEASES** | | | | |
| Aortic aneurysm† | 6.21 | 3.07 | 7.07 | 2.07 |
| Stroke† | 1.63–3.27 | 1.04 | 1.49–4.00 | 1.03–1.30 |
| Ischemic heart disease† | 1.51–2.80 | 1.21–1.64 | 1.60–3.08 | 1.20–1.32 |
| Atherosclerosis† | 2.44 | 1.33 | 1.83 | 1.00 |
| Other arterial disease† | 2.07 | 1.01 | 2.17 | 1.12 |
| Other heart disease† | 1.78 | 1.22 | 1.49 | 1.03 |
| **RESPIRATORY DISEASES** | | | | |
| Bronchitis, emphysema† | 17.10 | 15.64 | 12.04 | 11.77 |
| Chronic airway obstruction (other chronic obstructive pulmonary disease)† | 10.58 | 6.80 | 13.08 | 6.78 |
| Pneumonia, influenza† | 1.75 | 1.36 | 2.17 | 1.10 |
| **ULCERS€** | 2.07 | 2.24 | 2.07 | 2.24 |
| **PASSIVE SMOKING** | **Regular exposure to ETS** | | | |
| Lung cancer¥ | 1.21 | | | |
| Ischemic heart disease¥ | 1.24 | | | |

Sources:
NA = Not applicable
† Thun MJ, Day-Lally C, Myers DG, Calle EE, Flanders WD, Zhu BP, et al. Trends in tobacco smoking and mortality from cigarette use in cancer prevention studies I (1959 through 1965) and II (1982 through 1988). Bethesda, MD: US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute; 1997.
‡ Chao A, Thun MJ, Jacobs EJ, Henley SJ, Rodriguez C, Calle EE. Cigarette smoking and colorectal cancer mortality in the cancer prevention study II. J Natl Cancer Inst. 2000 Dec 6;92(23):1888-96.
€ English DR, Holman CDJ, Milne E, Winter MJ, Hulse GK, Codde G, et al. The quantification of drug caused morbidity and mortality in Australia 1995. Canberra, Australia: Commonwealth Department of Human Services and Health; 1995.
¥ Baliunas D, Patra J, Rehm J, Popova S, Kaiserman M, Taylor B. Smoking-attributable mortality and expected years of life lost in Canada 2002: Conclusions for prevention and policy. Chronic Dis Can. 2007;27(4):154-62; and de Groh M, Morrison HI. Environmental tobacco smoke and deaths from coronary heart disease in Canada. Chronic Dis Can. 2002;23(1):13-6.

### *Risk Factor Prevalence*

Current, former and never smoking prevalence were used in calculations of the SAF as age and sex specific estimates. Prevalence estimates for smoking status were based on an average of three cycles of the Canadian Community Health Survey (CCHS), 2003, 2005, 2007/2008. Using prevalence estimates based on multiple years of data allowed the use of stable estimates in all age and sex groups.

The following definitions were used to define smoking status:

Current Smoker: a person who currently smokes daily or occasionally, has smoked at least 100 cigarettes in their lifetime and some in the past 30 days.

Former Smoker: currently does not smoke at all, has smoked at least 100 cigarettes in their lifetime but has not smoked in the past 30 days.

Never-smoker: has not smoked 100 cigarettes in their lifetime.

### *Prevalence of Exposure to Environmental Tobacco Smoke*

Prevalence estimates for regular exposure to environmental tobacco smoke (ETS) were based on an average of three cycles of the CCHS: 2003, 2005, 2007/2008. ETS exposure is defined as a person who reports that they are regularly exposed to ETS in the home, a private vehicle or in a public space. This indicator was derived from three CCHS questions:

- ETS_10: Including both household members and regular visitors, does anyone smoke inside your home, every day or almost every day?
- ETS_20: In the past month, were you exposed to second-hand smoke, every day or almost every day, in a car or other private vehicle?
- ETS_20B: (In the past month,) were you exposed to second-hand smoke, every day or almost every day, in public places (such as bars, restaurants, shopping malls, arenas, bingo halls, bowling alleys)?

### *Smoking Attributable Hospitalization, Deaths and Potential Years or Life Lost (PYLL)*

Smoking-attributable disease hospitalizations, mortality and PYLL were captured using the ICD-10 and ICD-9 codes listed in Table 13.3. Various years of data were used depending on the data source and disease of interest. When necessary, several years of data were averaged and used when calculating smoking attributable mortality (SAM) to avoid concerns about small numbers and year-to-year variation.

**Table 13.3**
**Data Sources and Criteria for Case Inclusion in Calculations of Smoking Attributable Hospitalization, Mortality and PYLL**

| Disease | Hospitalization | Mortality and PYLL |
|---|---|---|
| **RESPIRATORY DISEASES** | | |
| Bronchitis, emphysema | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 J40-J42, J43; ICD-9 490.0-492.9]<br>Age = 35 years and older<br>Years = 2005-2009 (average) | Mortality, HELPS [ICD-10 J40-J42, J43; ICD-9 490.0-492.9]<br>Age = 35 years and older<br>Years = 2003-2007 (average) |
| Chronic airway obstruction | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 J44; ICD-9 496.0-496.9]<br>Age = 35 years and older<br>Years = 2005-2009 (average) | Mortality, HELPS [ICD-10 J44; ICD-9 496.0-496.9]<br>Age = 35 years and older<br>Years = 2003-2007 (average) |
| Pneumonia, influenza | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 J09-J18; ICD-9 480.0-487.9]<br>Age = 35 years and older<br>Years = 2005-2009 (average) | Mortality, HELPS [ICD-10 J09-J18; ICD-9 480.0-487.9]<br>Age = 35 years and older<br>Years = 2003-2007 (average) |
| Lung cancer | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 C33-C34; ICD-9 162.0-162.9]<br>Age = 30 years and older<br>Years = 2005-2009 (average) | Mortality, HELPS [ICD-10 C33-C34; ICD-9 162.0-162.9]<br>Age = 30 years and older<br>Years = 2003-2007 (average) |
| Laryngeal cancer | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 C32; ICD-9 161.0-161.9]<br>Age = 30 years and older<br>Years = 2005-2009 (average) | Mortality, HELPS [ICD-10 C32; ICD-9 161.0-161.9]<br>Age = 30 years and older<br>Years = 2003-2007 (average) |
| **CARDIOVASCULAR DISEASES** | | |
| Ischemic heart disease | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 I20-I25; ICD-9 410.0-414.9]<br>Age = 35 years and older<br>Years = 2005-2009 (average) | Mortality, HELPS [ICD-10 I20-I25; ICD-9 410.0-414.9]<br>Age = 35 years and older<br>Years = 2003-2007 (average) |
| Cerebrovascular Diseases | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 I60-I69; ICD-9 430-434, 436-438 (excludes 435)]<br>Age = 35 years and older<br>Years = 2005-2009 (average) | Mortality, HELPS [ICD-10 I60-I69; ICD-9 430-434, 436-438 (excludes 435)]<br>Age = 35 years and older<br>Years = 2003-2007 (average) |

Table 13.3 continues ...

**Table 13.3 continued**

| Disease | Hospitalization | Mortality and PYLL |
|---|---|---|
| **CARDIOVASCULAR DISEASES** | | |
| Other heart disease | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 I00-I09, I26-I51; ICD-9 390.0-398.9, 415.0-417.9, 420.0-429.9]<br>Age = 35 years and older<br>Years = 2005-2009 (average) | Mortality, HELPS<br>[ICD-10 I00-I09, 126-151; ICD-9 390.0-398.9, 415.0-417.9, 420.0-429.9<br>Age = 35 years and older<br>Years = 2003-2007 (average) |
| Atherosclerosis | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 I70; ICD-9 440.0-440.9]<br>Age = 35 years and older<br>Years = 2005-2009 (average) | Mortality, HELPS<br>[ICD-10 I70; ICD-9 440.0-440.9]<br>Age = 35 years and older<br>Years = 2003-2007 (average) |
| Aortic aneurysm | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 I71; ICD-9 441.0-441.9]<br>Age = 35 years and older<br>Years = 2005-2009 (average) | Mortality, HELPS<br>[ICD-10 I71; ICD-9 441.0-441.9]<br>Age = 35 years and older<br>Years = 2003-2007 (average) |
| Other arterial disease | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 I72-I78; ICD-9 442.0-448.9]<br>Age = 35 years and older<br>Years = 2005-2009 (average) | Mortality, HELPS<br>[ICD-10 I72-178; ICD-9 442.0-448.9]<br>Age = 35 years and older<br>Years = 2003-2007 (average) |
| **DIGESTIVE SYSTEM DISEASES** | | |
| Ulcers | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 K25-K28; ICD-9 531-534]<br>Age = 35 years and older<br>Years = 2005-2009 (average) | Mortality, HELPS<br>[ICD-10 K25-K28; ICD-9 531-534]<br>Age = 35 years and older<br>Years = 2003-2007 (average) |
| Colon and rectum cancer | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 C18-C21, C26.0; ICD-9 153, 154.0-154.1, 159.0]<br>Age = 30 years and older<br>Years = 2005-2009 (average) | Mortality, HELPS [ICD-10 C18-C21, C26.0; ICD-9 153, 154.0-154.1, 159.0]<br>Age = 30 years and older<br>Years = 2003-2007 (average) |
| Esophageal cancer | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 C15; ICD-9 150.0-150.9]<br>Age = 30 years and older<br>Years = 2005-2009 (average) | Mortality, HELPS<br>[ICD-10 C15; ICD-9 150.0-150.9]<br>Age = 30 years and older<br>Years = 2003-2007 (average) |

Table 13.3 continues ...

**Table 13.3 continued**

| Disease | Hospitalization | Mortality and PYLL |
|---|---|---|
| **DIGESTIVE SYSTEM DISEASES** | | |
| Stomach cancer | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 C16; ICD-9 151.0-151.9] Age = 30 years and older Years = 2005-2009 (average) | Mortality, HELPS [ICD-10 C16; ICD-9 151.0-151.9] Age = 30 years and older Years = 2003-2007 (average) |
| Pancreatic cancer | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 C25; ICD-9 157.0-157.9] Age = 30 years and older Years = 2005-2009 (average) | Mortality, HELPS [ICD-10 C25; ICD-9 157.0-157.9] Age = 30 years and older Years = 2003-2007 (average) |
| Lip, oral, pharynx cancer | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 C00-C12; ICD-9 140.0-149.9] Age = 30 years and older Years = 2005-2009 (average) | Mortality, HELPS [ICD-10 C00-C12; ICD-9 140.0-149.9] Age = 30 years and older Years = 2003-2007 (average) |
| **OTHER DISEASES** | | |
| Cervical cancer | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 C53; ICD-9 180.0-180.9] Age = 30 years and older Years = 2005-2009 (average) | 2003-2007 Mortality, HELPS [ICD-10 C53; ICD-9 180.0-180.9] Age = 30 years and older Years = 2003-2007 (average) |
| Bladder cancer | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 C67; ICD-9 188.0-188.9] Age = 30 years and older Years = 2005-2009 (average) | Mortality, HELPS [ICD-10 C67; ICD-9 188.0-188.9] Age = 30 years and older Years = 2003-2007 (average) |
| Kidney cancer | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 C64-C66, C68; ICD-9 189.0-189.9] Age = 30 years and older Years = 2005-2009 (average) | Mortality, HELPS [ICD-10 C64-C66, C68; ICD-9 189.0-189.9] Age = 30 years and older Years = 2003-2007 (average) |
| Acute myeloid leukemia | Hospital In-Patient Discharge Data, intelliHEALTH Ontario, Ministry of Health and Long Term Care [ICD-10 C92.0; ICD-9 205.0] Age = 30 years and older Years = 2005-2009 (average) | Mortality, HELPS [ICD-10 C92.0; ICD-9 205.0] Age = 30 years and older Years = 2003-2007 (average) |

### *Calculating Smoking Attributable Outcomes from Relative Risk and Prevalence of Smoking or Prevalence of Exposure to ETS, Hospitalizations, Deaths and PYLL*

#### *Hospitalizations*

The product of the SAF and the number of hospitalizations in the population yields a count of hospitalizations in Peel that are attributable to smoking (SAMMEC):

*Smoking Attributable Hospitalizations = Number of hospitalizations x SAF*

Smoking attributable hospitalizations were calculated separately for each disease and for each sex. The number of all-cause smoking attributable hospitalizations was calculated by summing the cases for all diseases (including both sexes) for the appropriate age categories.[77]

#### *Mortality*

The product of the SAF and the number of annual deaths in the population yields a count of deaths in Peel that are attributable to smoking (SAMMEC):

*Smoking Attributable Mortality (SAM) = Number of deaths x SAF*

Smoking attributable mortality was calculated separately for each disease and for each sex. The number of all-cause smoking attributable deaths was calculated by summing the deaths from all diseases (including both sexes) for the appropriate age categories.[77]

#### *PYLL*

The product of the SAF and the number of PYLL in the population yields a count of PYLL in Peel that are attributable to smoking (SAMMEC):

*Smoking Attributable PYLL = Number of PYLL x SAF*

Smoking attributable PYLL were calculated separately for each disease and for each sex. The number of all-cause smoking attributable PYLL was calculated by summing the cases for all diseases (including both sexes) for the appropriate age categories.[77]

## Chapter 4 – Tobacco Related Health Care Use and Costs

### *Smoking-Attributable Health Expenditures*

Direct hospitalization costs attributable to smoking were calculated for Peel using Canadian Institute for Health Information (CIHI) cost for hospitalization by disease estimates.[28]

The number of hospitalizations attributable to smoking were calculated by applying the Smoking Attributable Fraction (SAF) to the average number of annual hospitalizations for the years 2005 to 2009 for each disease category.

A disease-specific unit cost (Table 13.4) was applied to each hospitalization to estimate the annual cost of hospitalizations for each disease:

*Annual Hospitalization Costs = Number of Smoking - Attributable Hospitalizations x Unit Cost*

**Table 13.4**
**Unit Cost for Each Diagnosis of Selected Chronic Diseases, by Sex, Canada 2004-2005**

| Disease | Cost Attributed to the Treatment of Primary Diagnosis and Complexities, All Sexes | Notes |
|---|---|---|
| Cancer of the lip, oral cavity and pharynx | $16,628 | |
| Trachea, bronchus and lung cancer | $11,665 | |
| Colorectal cancer | $8,002 | |
| Pneumonia | $7,812 | Calculated by disease, then summed and presented in Table 4.2 as pneumonia and influenza |
| Acute upper respiratory infections and influenza | $3,494 | |
| Chronic lower respiratory disease | $8,060 | Presented in Table 4.2 as bronchitis and emphysema |
| Chronic airway obstruction | $8,060 | |
| Angina pectoris | $5,639 | Calculated by disease, then summed and presented in Table 4.2 as as ischemic heart disease |
| Acute myocardial infarction | $11,043 | |
| Other ischemic heart disease | $13,015 | |
| Cerebrovascular disease | $14,261 | |
| Rheumatic fever with heart involvement | $39,748 | Calculated by disease, then summed and presented in Table 4.2 as as "Other heart disease" |
| Chronic rheumatic heart diseases | $8,582 | |
| Cardiomyopathy | $21,287 | |
| Atrial fibrillation | $24,096 | |
| Other conduction disorders and cardiac arrhythmias | $5,966 | |
| Heart failure | $9,795 | |
| Other forms of heart disease | $10,848 | |
| Atheroschlerosis | $14,129 | |
| Ulcer | $7,574 | |

Source: Canadian Institute for Health Information, 2008. The Cost of Acute Care Hospital Stays by Medical Condition in Canada, 2004/2005.

The unit cost per diagnosis represented the average cost per hospital stay in Canada in 2004/2005.[28] For pneumonia and influenza, ischemic heart disease and other heart disease, hospitalization data by specific disease category were calculated, and then summed together to reflect the overall category as described in Table 13.4.

## Chapter 5 – Profile of a Smoker

### *Regression modelling*

Smoking outcome models were developed specific to males and females using data from cycles 1.1 (2000/2001), 2.1 (2003), 3.1 (2005) and 4.1 (2007/2008) of the CCHS.

Current smoking status was defined as the proportion of respondents who reported being daily or occasional smokers. Respondents who were former smokers (daily and occasional) were grouped with never-smokers.

### *Independent variables*

The determinants of health included for analyses in the model were age, sex, household income level, educational level of respondent, racial group, immigrant status, marital status, sense of belonging to the local community, self-perceived life stress and work status in the past week. Other risk factors found in the literature that were relevant to each health outcome were also included in the appropriate models.

### *Household income level*

Household income level was derived using the total household income and the number of people living in the household. The variable was categorized as lowest to middle, upper-middle and highest, with the referent group being respondents in the upper-middle category.

### *Educational level of respondent*

The educational level was defined as the highest level of education reported by the respondent. The variable was categorized as less than secondary school education, secondary graduate, other post-secondary education and post-secondary graduate. Respondents who were post-secondary graduates were defined as the referent group.

### *Ethnicity*

The variable for ethnicity was categorized into respondents who identified as the following: White (referent category), Black, East or Southeast Asian, West Asian or Arab, South Asian, Latin American or Other racial origins (including multiple origins). Due to small sample size, respondents identifying as Latin American and Other racial origins were grouped together in the regression analyses stratified by sex. Respondents who self-reported as being "White" were defined as the referent group.

### *Immigrant status*

A variable for immigrant status was derived using reported time since immigration to Canada. Respondents were categorized as recent immigrants if they immigrated 10 or less years ago, and long-term immigrants were defined as those who immigrated to Canada eleven years ago or longer. A referent category for non-immigrants (i.e., Canadian-born respondents) was also included in the analysis. Respondents who were non-immigrants were defined as the referent group.

### *Marital status*

The variable describing marital status consists of three categories. Respondents were grouped as currently married or in a common-law relationship; divorced, separated or widowed; and single (referent group).

### *Sense of belonging to the local community*

A self-reported variable was used to measure respondents' sense of belonging to the local community. The variable was grouped into two categories – very strong or somewhat strong (referent group), and somewhat weak or very weak.

### *Self-perceived life stress*

The variable for self-perceived life stress was similarly dichotomized into respondents who reported being extremely stressed or quite a bit stressed, and those reporting being not at all stressed, not very stressed or being a bit stressed. The latter was used as the referent category.

### *Employment status in past week*

The employment status of respondents was categorized as those who reported being at work in the last week or were absent from work last week (referent category), and those who reported having no job last week. Respondents who reported being permanently unable to work were excluded from the analysis due to the small sample size in Peel.

### *Self-perceived health*

The variable for self-perceived health was included in all four models and consisted of two categories: excellent, very good or good health; and fair or poor health. Respondents reporting excellent, very good or good health were used as the referent category.

### *Weekly alcohol consumption*

Weekly alcohol consumption was defined as the proportion of current drinkers who consumed alcohol at least once per week in the past 12 months. The variable was included in the models for smoking and overweight obesity, and was dichotomized into those respondents who consumed alcohol on a weekly basis, and those who did not (referent).

### *Smoking status*

The variable consisted of three categories: current smokers (daily and occasional), former smokers (daily and occasional) and never-smokers. Respondents who reported being never-smokers were used as the referent category.

### *Physical activity level*

Physical activity levels were defined using calculated energy expenditure values and were categorized as active (referent group), moderate and inactive. The variable was included in the analyses for all four models.

### *Fruit and vegetable consumption*

A dichotomous variable for fruit and vegetable consumption was created and included in the model for overweight/obesity. The variable categorized respondents into those who reported consuming fruit and vegetables five or more times per day (referent category), and those who reported consuming five or less times per day.

### *Someone smokes in the home*

A dichotomous variable was created to assess whether household members or regular visitors smoke inside the home everyday or almost everyday (yes/no). The variable was included in the analyses for the smoking and binge drinking models. Those who reported no smoking in the home were used as the referent group.

### *Injured in past 12 months*

Survey respondents were asked if they had sustained an injury in the preceding 12 months that was serious enough to limit their normal activities (categorized as yes or no). The variable excluded repetitive strain injuries. Those who reported no injury were established as the referent group in the present analyses.

### *Inclusion and exclusion criteria*

The present analyses were restricted to residents of the region of Peel who were 18 years of age and older.

### *Statistical Analysis*

Analysis was performed using SPSS statistical software 19.0. Common variables were identified across each individual cycle and were combined to create a merged dataset. Changes in questionnaire content across each cycle were considered prior to merging to ensure the appropriateness of combining cycles. For the final logistic regression analyses, a bootstrap procedure developed by Statistics Canada to account for the complex sampling design of the survey was used to generate robust estimates and confidence intervals.

Exploratory modelling was conducted using a block approach. All determinants of health variables were selected for inclusion in the model. Additional explanatory variables identified in the literature were also considered for inclusion. Missing data were excluded from the analyses.

Collinearity Diagnostics were conducted using the Variance Inflation Factor (VIF) and Tolerance (TOL). In all models, the variable of inflation was less than five for each variable, indicating no problems with collinearity among the covariates.[78] Odds ratios and 95% confidence intervals were generated.

Effect modification was not assessed in the present models, as the bootstrap program did not allow for the inclusion of interaction terms. However, based on the previous literature, the models for current smoking status and overweight/obesity were stratified by sex, and analyses were run to assess the presence of effect modification.[79,80] Due to insufficient cell counts, stratification by sex could not be carried out for binge drinking.

There are several limitations which may have important impacts on the results of this analysis. First, due to their availability in the CCHS, there were important determinants of health that could not be included (e.g., social support or the social and physical environment indicators). Alternatively, some variables of importance were not included because they were not consistently collected or were not measured in a useful way (e.g., language spoken at home changed between cycles). Also, determinants may not have been measured in a manner which would reflect distinctions in fair or poor health status. The process of combining years of CCHS data will also dilute any changes that might have occurred over the years from 2000/2001 to 2007/2008. Finally, even with four cycles of the CCHS the unweighted Peel sample was small and may not have been able to detect true differences where they may exist (e.g., education and self-rated general health).

## Chapter 7 – Health Impacts of a Five Percentage Point Reduction in the Smoking Rate

This section provides an estimate of the number of smoking-attributable incident cases, prevalent cases and deaths of disease that would be avoided with a five percentage point decline in smoking prevalence in Peel from 15% to 10%. These calculations follow an identical methodology as described above:

- The SAF is applied to the number of disease-specific cases and deaths observed in Peel to estimate the number that are attributable to smoking.
- In calculating the SAF, a smoking prevalence is used that is five percentage points lower than the current smoking rate. The hypothetical prevalence is age-and-sex specific (Table 13.5).
- The prevalence of exposure to ETS was similarly reduced by five percentage points in this hypothetical scenario.
- Prevalence estimates for categories of former smoking, never smoking and not exposed to ETS were increased to offset the five percentage point decline in current smoking, exposure to ETS and maternal smoking prevalence.
- To reflect the five percentage point decline in current smoking, former smoking prevalence was increased by one percentage point and never-smoking prevalence was increased by four percentage points. This proportional divide was chosen based on the observation that the majority (approximately 80%) of the decline in current smoking since 2000/2001 has been a result of reduced initiation, while a smaller amount has been due to increased smoking cessation (approximately 20%).
- The prevalence estimates described in Table 13.5 were used in calculating the expected number of disease cases and deaths that would result with a five percentage point decline in smoking prevalence.

**Table 13.5**

**Age- and Sex-Specific Prevalence Estimates used in Hypothetical Calculations of SAF Given a Five Percentage Decline in Current Smoking Rate, Peel**

| Indicator | Age Group (Years) | Male Hypothetical Smoking Rate % | Female Hypothetical Smoking Rate % |
|---|---|---|---|
| Never Smoker | 30 + | 46.9% | 67.4% |
| Former Smoker | 30 + | 30.1% | 20.6% |
| Current Smoker | 30 + | 18.9% | 8.0% |
| Never Smoker | 35 + | 49.6% | 70.4% |
| Former Smoker | 35 + | 32.1% | 21.6% |
| Current Smoker | 35 + | 18.3% | 8.0% |
| Never Smoker | 35 – 64 | 51.7% | 69.7% |
| Former Smoker | 35 – 64 | 27.1% | 20.6% |
| Current Smoker | 35 – 64 | 21.2% | 9.7% |
| Never Smoker | 65 + | 38.0% | 73.5% |
| Former Smoker | 65 + | 60.1% | 26.2% |
| Current Smoker | 65 + | 1.9% | 0.3% |
| Not Exposed to ETS† | 30 + | 85.6% | 87.8% |
| Exposed to ETS† | 30 + | 14.4% | 12.2% |
| Not Exposed to ETS† | 35 + | 86.1% | 87.7% |
| Exposed to ETS† | 35 + | 13.9% | 12.3% |

† Environmental tobacco smoke

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H Hemson Consulting, Population Forecast, Region of Peel.

## Appendix 1

**Association Between Current Smoking Status† and the Social and Behavioural Determinants of Health Females, Peel, 2000/2001, 2003, 2005, 2007/2008 Combined**

| Variable | Unadjusted Odds Ratio (95% CI) | Adjusted Odds Ratio (95% CI) |
|---|---|---|
| **Age** | *0.98 (0.98–0.99) | *0.96 (0.95–0.98) |
| **Household income level** | | |
| Lowest to middle | 1.18 (0.68–2.04) | 1.20 (0.65, 2.21) |
| Upper-middle | 1.0 | 1.0 |
| Highest | 1.14 (0.91–1.43) | 0.95 (0.72–1.26) |
| **Educational level of respondent** | | |
| Less than secondary | 1.29 (0.93–1.80) | *1.55 (1.01–2.37) |
| Secondary graduate | *2.08 (1.60–2.70) | *2.06 (1.52–2.80) |
| Other post-secondary | *1.72 (1.11–2.66) | 1.62 (0.93–2.84) |
| Post-secondary graduate | 1.0 | 1.0 |
| **Ethnicity** | | |
| White | 1.0 | 1.0 |
| Black | *0.26 (0.12–0.55) | *0.27 (0.12–0.64) |
| East/Southeast Asian | *0.21 (0.11–0.40) | *0.28 (0.14–0.57) |
| West Asian/Arab | 0.63 (0.30–1.35) | 0.64 (0.27–1.53) |
| South Asian | 0.13 (0.01–1.17) | 0.16 (0.02–1.39) |
| Latin American and Other | *0.56 (0.33–0.95) | *0.50 (0.25–0.98) |
| **Immigrant status** | | |
| Recent immigrant | *0.18 (0.12–0.29) | *0.44 (0.25–0.78) |
| Long-term immigrant | *0.54 (0.42–0.69) | 1.05 (0.76–1.46) |
| Non-immigrant | 1.0 | 1.0 |
| **Marital status** | | |
| Single | 1.0 | 1.0 |
| Married | *0.54 (0.40–0.72) | 0.96 (0.65–1.41) |
| Common law | *1.81 (1.05–3.10) | *1.84 (1.01–3.36) |
| Separated/Divorced | *1.69 (1.18–2.41) | *2.29 (1.40–3.76) |
| Widowed | *0.40 (0.23–0.70) | 1.02 (0.44–2.38) |
| **Sense of belonging to local community** | | |
| Very strong/Somewhat strong | 1.0 | 1.0 |
| Somewhat weak/Very weak | *1.62 (1.28–2.04) | *1.39 (1.07–1.80) |
| **Self-perceived life stress** | | |
| Quite a bit/Extremely | *1.35 (1.05–1.73) | 1.09 (0.80–1.47) |
| Not at all/Not very/A bit | 1.0 | 1.0 |
| **Employment status in past week** | | |
| At work last week/Absent last week‡ | 1.0 | 1.0 |
| No job last week | 0.85 (0.64–1.14) | 1.21 (0.86–1.71) |

Appendix 1 continues ...

## Appendix 1 continued

| Variable | Unadjusted Odds Ratio (95% CI) | Adjusted Odds Ratio(95% CI) |
|---|---|---|
| **Self-perceived health** | | |
| Excellent/Very good/Good | 1.0 | 1.0 |
| Fair/Poor | *1.46 (1.08–1.99) | *1.73 (1.19–2.52) |
| **Weekly alcohol consumption** | | |
| Yes | *1.88 (1.50–2.37) | *1.52 (1.13–2.05) |
| No | 1.0 | 1.0 |
| **Physical activity level** | | |
| Active | 1.0 | 1.0 |
| Moderate | 1.04 (0.74–1.47) | 1.02 (0.71–1.47) |
| Inactive | 1.32 (0.98–1.77) | *1.39 (1.00–1.94) |
| **Someone smokes in home** | | |
| Yes | *7.66 (5.38–10.91) | *6.51 (4.30–9.85) |
| No | 1.0 | 1.0 |

† Reflects respondents aged 18 years and older.
‡ Employed in last week
* Indicates statistically significant findings ($p<0.05$).
Source: Canadian Community Health Survey, 2000/2001, 2003, 2005, 2007/2008. Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

## Appendix 2

**Association between Current Smoking Status† and the Social and Behavioural Determinants of Health, Males**
**Peel, 2000/2001, 2003, 2005, 2007/2008 Combined**

| Variable | Unadjusted Odds Ratio (95% CI) | Adjusted Odds Ratio (95% CI) |
|---|---|---|
| **Age** | *0.98 (0.97–0.98) | *0.97 (0.96–0.98) |
| **Household income level** | | |
| Lowest to middle | 1.07 (0.62–1.85) | 1.14 (0.59–2.19) |
| Upper-middle | 1.0 | 1.0 |
| Highest | 1.08 (0.88–1.33) | 1.00 (0.77–1.28) |
| **Educational level of respondent** | | |
| Less than secondary | *1.88 (1.46–2.43) | *2.06 (1.53–2.78) |
| Secondary graduate | *1.62 (1.26–2.09) | *1.45 (1.09–1.95) |
| Other Post-secondary | 0.94 (0.66–1.33) | 0.65 (0.41–1.04) |
| Post-secondary graduate | 1.0 | 1.0 |
| **Ethnicity** | | |
| White | 1.0 | 1.0 |
| Black | 0.71 (0.43–1.16) | 0.70 (0.38–1.28) |
| East/ Southeast Asian | 0.67 (0.44–1.00) | 0.85 (0.53–1.36) |
| West Asian/Arab | 0.99 (0.51–1.90) | 1.27 (0.65–2.47) |
| South Asian | *0.50 (0.35–0.72) | *0.58 (0.38–0.88) |
| Latin American and Other | 0.69 (0.42–1.13) | 0.74 (0.44–1.22) |
| **Immigrant status** | | |
| Recent immigrant | *0.65 (0.47–0.91) | 0.94 (0.61–1.46) |
| Long-term immigrant | *0.76 (0.61–0.95) | 1.12 (0.84–1.50) |
| Non-immigrant | 1.0 | 1.0 |
| **Marital status** | | |
| Single | 1.0 | 1.0 |
| Married | *0.63 (0.50–0.80) | 1.28 (0.92–1.79) |
| Common law | *1.85 (1.17–2.94) | *2.22 (1.31–3.76) |
| Separated/Divorced | *2.11 (1.43–3.12) | *3.23 (1.88–5.54) |
| Widowed | *0.35 (0.18–0.69) | 0.57 (0.21–1.59) |
| **Sense of belonging to local community** | | |
| Very strong/Somewhat strong | 1.0 | 1.0 |
| Somewhat weak/Very weak | *1.49 (1.20–1.85) | 1.10 (0.87–1.41) |
| **Self-perceived life stress** | | |
| Quite a bit/Extremely | *1.32 (1.05–1.65) | 1.17 (0.90–1.52) |
| Not at all/Not very/A bit | 1.0 | 1.0 |
| **Employment status in past week** | | |
| At work last week/Absent last week‡ | 1.0 | 1.0 |
| No job last week | *0.52 (0.39–0.69) | *0.56 (0.39–0.82) |

Appendix 2 continues ...

## Appendix 2 continued

| Variable | Unadjusted Odds Ratio (95% CI) | Adjusted Odds Ratio(95% CI) |
|---|---|---|
| **Self-perceived health** | | |
| Excellent/Very good/Good | 1.0 | 1.0 |
| Fair/Poor | 1.20 (0.83–1.73) | 1.14 (0.75–1.72) |
| **Weekly alcohol consumption** | | |
| Yes | *1.53 (1.25–1.89) | *1.34 (1.04–1.73) |
| No | 1.0 | 1.0 |
| **Physical activity level** | | |
| Active | 1.0 | 1.0 |
| Moderate | 0.93 (0.70–1.24) | 0.99 (0.71–1.38) |
| Inactive | *1.42 (1.12–1.80) | *1.45 (1.10–1.92) |
| **Someone smokes in home** | | |
| Yes | *4.50 (3.18–6.37) | *4.36 (2.91–6.53) |
| No | 1.0 | 1.0 |

† Reflects respondents aged 18 years and older.
‡ Employed in last week
* Indicates statistically significant findings (p<0.05).
Source: Canadian Community Health Survey, 2000/2001, 2003, 2005, 2007/2008. Statistics Canada, Share File, Ontario Ministry of Health and Long-Term Care

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