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 3 – 4 people 5+ people	<$14,999 <$19,999 <$29,999
I2	Middle	1 – 2 people 3 – 4 people 5+ people	$15,000 to $29,999 $20,000 to $39,999 $30,000 to $59,999
I3	Low-Lower Middle	1 – 2 people 3 – 4 people 5+ people	$30,000 to $59,999 $40,000 to $79,999 $60,000 to $79,999
I4	Highest	1 – 2 people 3+ people	More than $60,000 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] Age = 35 years and older Years = 2005-2009 (average)	Mortality, HELPS [ICD-10 J40-J42, J43; ICD-9 490.0-492.9] Age = 35 years and older 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] Age = 35 years and older Years = 2005-2009 (average)	Mortality, HELPS [ICD-10 J44; ICD-9 496.0-496.9] Age = 35 years and older 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] Age = 35 years and older Years = 2005-2009 (average)	Mortality, HELPS [ICD-10 J09-J18; ICD-9 480.0-487.9] Age = 35 years and older 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] Age = 30 years and older Years = 2005-2009 (average)	Mortality, HELPS [ICD-10 C33-C34; ICD-9 162.0-162.9] Age = 30 years and older 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] Age = 30 years and older Years = 2005-2009 (average)	Mortality, HELPS [ICD-10 C32; ICD-9 161.0-161.9] Age = 30 years and older 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] Age = 35 years and older Years = 2005-2009 (average)	Mortality, HELPS [ICD-10 I20-I25; ICD-9 410.0-414.9] Age = 35 years and older 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)] Age = 35 years and older Years = 2005-2009 (average)	Mortality, HELPS [ICD-10 I60-I69; ICD-9 430-434, 436-438 (excludes 435)] Age = 35 years and older 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] Age = 35 years and older Years = 2005-2009 (average)	Mortality, HELPS [ICD-10 I00-I09, 126-151; ICD-9 390.0-398.9, 415.0-417.9, 420.0-429.9 Age = 35 years and older 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] Age = 35 years and older Years = 2005-2009 (average)	Mortality, HELPS [ICD-10 I70; ICD-9 440.0-440.9] Age = 35 years and older 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] Age = 35 years and older Years = 2005-2009 (average)	Mortality, HELPS [ICD-10 I71; ICD-9 441.0-441.9] Age = 35 years and older 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] Age = 35 years and older Years = 2005-2009 (average)	Mortality, HELPS [ICD-10 I72-178; ICD-9 442.0-448.9] Age = 35 years and older 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] Age = 35 years and older Years = 2005-2009 (average)	Mortality, HELPS [ICD-10 K25-K28; ICD-9 531-534] Age = 35 years and older 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] Age = 30 years and older Years = 2005-2009 (average)	Mortality, HELPS [ICD-10 C18-C21, C26.0; ICD-9 153, 154.0-154.1, 159.0] Age = 30 years and older 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] Age = 30 years and older Years = 2005-2009 (average)	Mortality, HELPS [ICD-10 C15; ICD-9 150.0-150.9] Age = 30 years and older 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