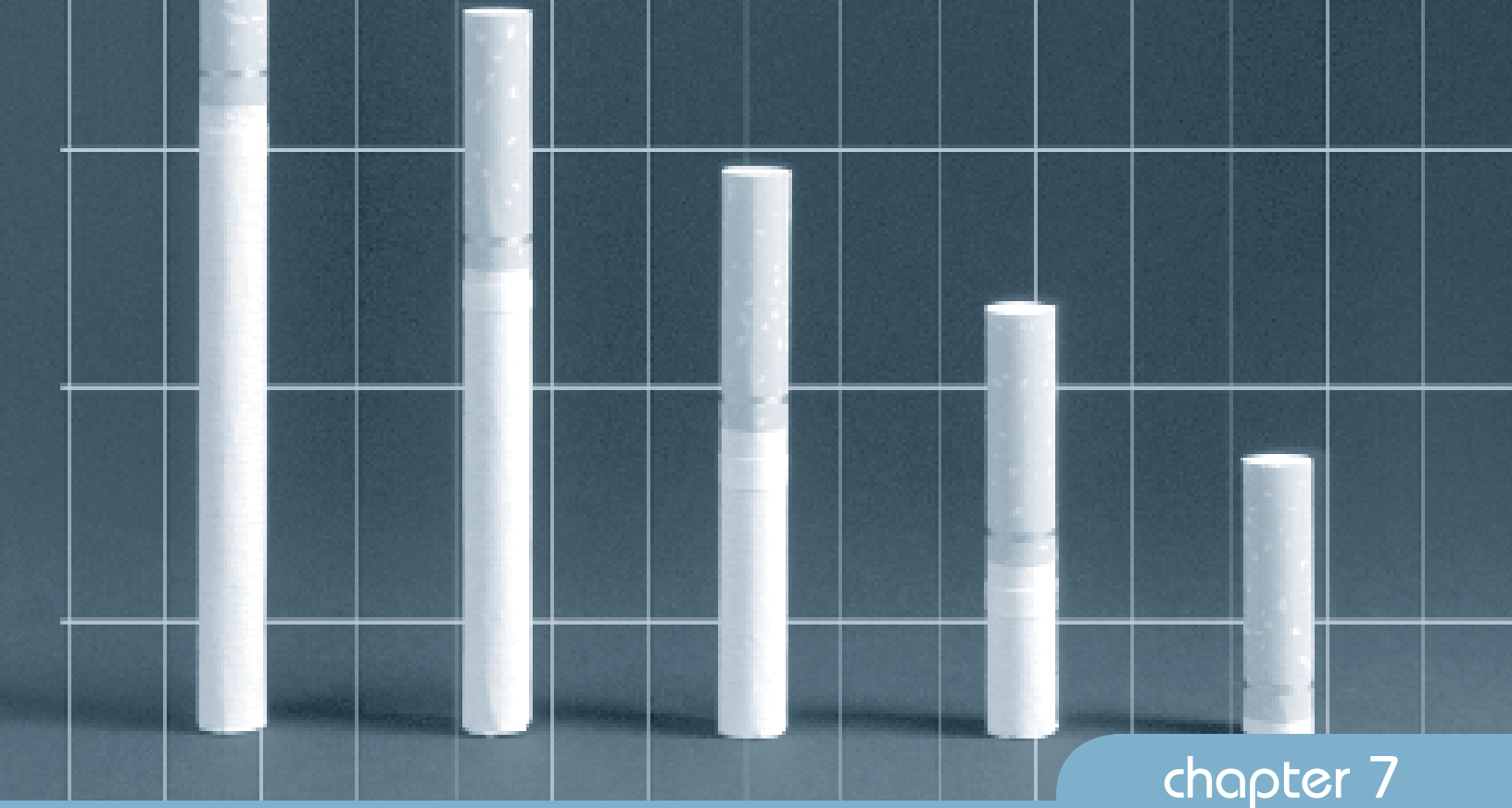

chapter 7

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