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The Costs of Tobacco Use in Canada, 2012.

Highlights

At a Glance

- The total costs of tobacco use were $16.2 billion, with indirect costs accounting for $9.5 billion, direct health care costs accounting for $6.5 billion, and other direct costs responsible for the remainder.
- Overall, an estimated 45,464 deaths were attributable to smoking in Canada in 2012, leading to 599,390 potential years of life lost from premature mortality.
- The analyses in this updated report focused on mortality, morbidity, and direct health care costs of cigarette smoking and did not include the consumption of cigars, smokeless tobacco, pipe tobacco, or any other forms of tobacco consumption. Other costs, such as fire, policing, and research and prevention cover all tobacco products.

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CUSTOM RESEARCH

Summary of the Costs of Tobacco Use for 2012

Tobacco use is one of the primary causes of preventable morbidity and mortality worldwide. According to the World Health Organization, it is responsible for more than 5 million deaths annually.[1] *The Costs of Tobacco Use in Canada, 2012* provides an update of the mortality and costs of tobacco use in Canada and in all provinces and territories using up-to-date reference information and data from the year 2012.

The analyses in this updated report focused on mortality, morbidity, and direct health care costs of cigarette smoking and did not include the consumption of cigars, smokeless tobacco, pipe tobacco, or any other forms of tobacco consumption. Other costs, such as fire, policing, and research and prevention, cover all tobacco products. These findings will complement the evidence base around the design and delivery of tobacco policy in Canada.

An estimated 45,464 deaths were attributable to smoking in Canada in 2012, with about half of these deaths (51.8 per cent) occurring in later years of life (75+ years) and more than three-quarters (77.6 per cent) among those 65 years and older. This included 26,610 deaths among males (or 58.5 per cent of all smoking-attributable deaths) and 18,853 deaths among females (or 41.5 per cent). These represented about 18.4 per cent of all deaths in Canada,[2] or nearly one in five deaths in 2012. This means there were approximately 125 smoking-attributable deaths in Canada every day—more deaths than the sum of all deaths due to motor vehicle collisions, other external causes of accidental injury, intentional self-harm, and assault.[3] Smoking-attributable mortality resulted in nearly 600,000 potential years of life lost in 2012,

1 World Health Organization, *WHO Report on the Global Tobacco Epidemic*.

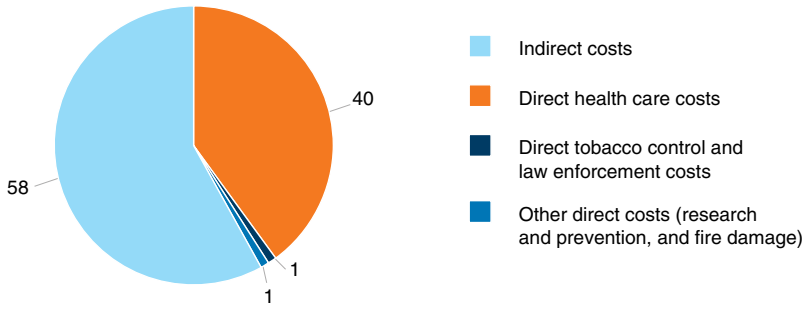
2 Statistics Canada, CANSIM table 102-0522.

3 Statistics Canada, CANSIM table 102-0540; Transport Canada, *Canadian Motor Vehicle Traffic Collision Statistics*.

primarily due to malignant neoplasms, cardiovascular diseases, and respiratory diseases.

The total costs of tobacco use were $16.2 billion, with indirect costs accounting for over half of total costs (58.5 per cent) and direct costs accounting for the remainder (41.5 per cent). Health care costs were the largest component of direct costs attributable to smoking, coming in at roughly $6.5 billion in 2012. (See Chart 1 and Table 1.) This included the costs associated with prescription drugs ($1.7 billion), physician care ($1.0 billion), and hospital care ($3.8 billion). The federal, provincial, and territorial governments also spent $122.0 million on tobacco control and law enforcement.

Chart 1
Smoking-Attributable Costs, by Cost Category, Canada, 2012
(per cent)



Source: The Conference Board of Canada.

The indirect costs related to smoking, which reflect production losses (i.e., foregone earnings) as a result of smoking-attributable morbidity and premature mortality were also estimated. These production losses amounted to $9.5 billion overall, of which almost $2.5 billion were due to premature mortality and $7.0 billion were due to short- and long-term disability.

Table 1
Summary of Direct and Indirect Costs in Canada, 2012
($ millions)

Category	2012	2002
Direct health care costs	**6,533.6**	**4,360.2**
Hospital care	3,843.9	2,551.2
Prescription drugs	1,659.4	1,360.5
Physician care	1,030.3	448.5
Direct tobacco control and law enforcement costs	**122.0**	**–**
Tobacco control	84.4	–
Law enforcement	37.6	–
Direct costs for research and prevention	**10.7**	**78.1**
Direct costs as a result of fire damage	**74.4**	**86.5**
Other direct costs	**–**	**0.5**
Indirect costs: production losses	**9,485.1**	**12,471.8**
Due to short-term disability	181.8	61.5
Due to long-term disability	6,844.8	10,536.8
Due to premature mortality	2,458.6	1,873.5
Total costs	**16,225.8**	**16,997.1**

Source: The Conference Board of Canada.

The Evolution of Cost Estimation Studies in Canada

The first comprehensive study of the costs of substance abuse (including tobacco use) was released in 1996 by the Canadian Centre on Substance Abuse, in collaboration with several federal and provincial organizations. The authors estimated the costs of tobacco use at $9.5 billion in Canada for the year 1992.[4] An updated 2006 report estimated the costs of tobacco use at $17 billion in Canada for the year 2002.[5]

Why Do We Need a New Cost Study?

The 2006 report provided the last and most comprehensive estimate of the costs of tobacco use in Canada. It has been a decade since the release of that report, and during this time new research and scientific evidence of the effects of smoking has been published. For example, the United States Surgeon General (USSG) 2014 report *The Health*

4 Single and others, *The Costs of Substance Abuse in Canada*.
5 Rehm and others, *The Costs of Substance Abuse in Canada 2002*.

This report provides an update of the mortality and costs of smoking in Canada using reference information and data from 2012.

Consequences of Smoking—50 Years of Progress made updated relative risk (RR) estimates available for smoking-attributable diseases and established a causal relationship between smoking and five additional diseases: age-related macular degeneration, diabetes mellitus, tuberculosis, liver cancer, and colorectal cancer.[6] This is in addition to the 23 health conditions already linked to smoking by the USSG and included in the 2006 report.

The Costs of Tobacco Use in Canada, 2012 provides an update of the mortality and costs of smoking in Canada and in all provinces and territories using current reference information and data from 2012. Smoking-attributable mortality (SAM) was calculated as a function of the smoking-attributable fraction and overall mortality for each respective disease by age group and sex. This updated report summarizes the number of deaths and the direct and indirect economic costs due to smoking.

A Word of Caution on Comparing Studies

Although both this report and the 2006 report attempt to quantify the impact of smoking, direct comparisons of the results are not always feasible. The current report used updated RR aggregated by different age groups, which does not lead to a straightforward comparison of SAM. The advent of new medical care procedures and their associated costs drove part of the increase in direct health care costs, though the extent of this could not be accurately quantified. Finally, the methodology used to estimate indirect costs differed between the reports, so the costs are not directly comparable.

Estimating the Costs of Tobacco Use

The following cost components have been included in this report: health care (hospital care, prescription drug costs, and physician care), tobacco control and law enforcement, research and prevention, fire damage, and indirect costs (due to short- and long-term disability and premature mortality).

6 U.S. Department of Health and Human Services, *The Health Consequences of Smoking*.

Health Care Costs

Direct health care costs are the sum of private and public expenditures resulting from the treatment of smoking-attributable diseases. The total direct health care costs attributable to smoking in Canada were estimated at more than $6.5 billion in 2012. These costs were divided into three components, with hospital care expenditures representing the largest proportion of health care costs at $3.8 billion, followed by prescription drugs expenditure at $1.7 billion and physician care expenditures at $1.0 billion.

This study used a prevalence-based epidemiological approach to estimate smoking-attributable health care costs.[7] The smoking-attributable fraction (i.e., the proportion of a disease that can be attributed to smoking) was multiplied by the national health care expenditure to obtain the disease-specific health care costs attributable to smoking.

The *Economic Burden of Illness in Canada, 2005–2008* (EBIC 2005–2008) data from the Public Health Agency of Canada were used as the source for disease-specific national health care expenditures.[8] EBIC 2005–2008 is a comprehensive cost-of-illness data repository that provides a breakdown of the burden of illness and injury by cost type, diagnostic category, age group and sex, and province or territory. It is the only comprehensive Canadian cost-of-illness source that provides comparable costing information for all major illnesses, including those that were directly related to smoking.

Tobacco Control and Law Enforcement Costs

Direct tobacco control costs were those normally associated with the development and delivery of tobacco control policy and programming at the federal, provincial, and territorial levels. Meanwhile, law enforcement costs were defined as those expenditures associated with policing, court costs, and corrections, including law enforcement costs to curb tobacco smuggling.

7 Single and others, *International Guidelines for Estimating the Costs of Substance Abuse*; World Health Organization, *Economics of Tobacco Toolkit*.

8 Public Health Agency of Canada, *Economic Burden of Illness in Canada*.

The SAM, PYLL, and direct and indirect costs were highest in Ontario and Quebec.

Total expenditures associated with federal, provincial, and territorial tobacco control and law enforcement in Canada were estimated at $122.0 million in 2012. Core tobacco control program funding by federal, provincial, and territorial governments was estimated at $84.4 million (or 69.2 per cent of total tobacco control and law enforcement costs), with the remaining $37.6 million spent on law enforcement.

Research, Prevention, and Fire Damage Costs

Outside of direct expenditures on tobacco control programs by federal, provincial, and territorial governments, additional research and prevention costs were estimated to be $10.7 million in 2012, and fire damage costs were estimated to be $74.4 million.

Indirect Costs

Indirect costs refer to the value of lost production due to inability to work, either because of short- or long-term disability or premature mortality. This report uses the human capital approach to estimate the value of foregone earnings (or lost production) over the lifetime of an individual who is no longer able to work, presuming the loss of income is a permanent loss to the economy.[9] The 2006 report employed a "hybrid approach," which combined the human capital and friction cost methods.[10] Hence, the indirect cost estimates are not comparable between the two reports.

Total indirect costs due to smoking in 2012 were $9.5 billion. Premature mortality accounted for $2.5 billion of indirect costs, while short- and long-term disability accounted for $7 billion.

Costs of Smoking by Province and Territory

A breakdown of SAM, potential years of life lost (PYLL), and direct and indirect costs by province and territory are provided in Table 2. Not surprisingly, the SAM, PYLL, and direct and indirect costs were highest in Ontario and Quebec due to population size.

9 Koopmanschap and Rutten, "A Practical Guide for Calculating Indirect Costs of Disease."

10 Rehm and others, *The Costs of Substance Abuse in Canada 2002.*

Table 2
Burden of Smoking, by Province and Territory, 2012
($ millions)

	AB	BC	MB	NB	NL	NS	ON	PE	QC	SK	YT/NT/NU	Canada
SAM* (number of deaths)	3,848	5,295	1,680	1,206	985	1,772	15,970	254	12,897	1,479	136	45,464
PYLL* (years)	51,563	66,923	21,693	15,897	12,977	23,024	208,665	4,076	175,301	17,570	2,245	599,390
Direct costs**	617.2	733.4	239.5	188.5	135.4	240.8	2,256.4	29.0	1,874.6	200.1	18.8	6,533.6
Indirect costs—premature mortality***	315.5	231.3	97.2	56.8	53.2	81.1	883.5	10.5	642.1	77.3	10.2	2,458.6
Direct and mortality costs	932.6	964.7	336.7	245.3	188.6	321.9	3,139.9	39.6	2,516.6	277.4	28.9	8,992.2

*The sum of the provinces does not add up to the Canadian total due to rounding in the weighted prevalence of smoking when calculating the SAM and PYLL for each geographic region.
**Does not include federal costs such as research and prevention, tobacco control, and law enforcement.
***Does not include the costs of short- and long-term disability.
Source: The Conference Board of Canada.

What the Results Tell Us About the Health Burden of Smoking in Canada

Total tobacco-attributable costs in Canada were $16.2 billion in 2012. Behind the dollar figure, however, there were over 45,000 Canadian deaths attributable to smoking in 2012, and these premature deaths resulted in nearly 600,000 potential years of life lost. In terms of the epidemiological results, SAM increased from 37,209 in 2002 to 45,464 in 2012 (a 22.2 per cent increase) and PYLL increased from 515,607 in 2002 to 599,390 in 2012 (or 16.2 per cent).

There are numerous reasons for these increases. First, evidence on the effects of smoking has evolved over the past decade, which resulted in higher SAM and more PYLL. Indeed, the 2006 report reflected 23 health conditions caused by cigarette smoking, while this report includes those same conditions plus five additional ones: age-related macular degeneration, diabetes mellitus, tuberculosis, liver cancer, and colorectal cancer. Second, smoking rates and daily consumption of cigarettes were higher 30 to 50 years ago, and as the young smokers from that period have aged, chronic conditions due to their smoking have surfaced. For example, the RR and SAM for lung cancer and chronic obstructive pulmonary disease were higher in the 65 years and older age group than other age groups. While it is uncommon for smokers to have lung cancer

SAM may continue to rise as it is based primarily on people who began smoking 30 to 50 years ago.

in their 20s, as they age they become more susceptible to smoking-attributable conditions, which increases SAM.

Another possible explanation for the increase in PYLL is the increase in average life expectancy in Canada, from 79.6 years in 2002 to 81.2 years in 2012. Assuming average age at death due to SAM remains the same, the rise in life expectancy means PYLL has also gone up. Additionally, because SAM was higher in Canada in 2012, it led to an increased number of deaths, which in turn increased PYLL.

What This Study Means for the Future

Although much progress has been made in tobacco control across the country, millions of Canadians continue to smoke. Based on the latest survey results from the Canadian Tobacco, Alcohol and Drugs Survey, more than 3.9 million Canadians were current smokers in 2015, including 2.8 million who reported smoking daily. Youth continue to experiment with tobacco, as almost one-fifth of grades 6 to 12 students (grade 6 to Secondary V in Quebec) had tried smoking a cigarette in 2014–15.[11]

Despite a steady decline in the number of smokers in Canada, SAM and direct health costs were higher in 2012, compared with a decade ago. Demographics are expected to play a key role going forward: with Canada's rapidly aging population, there is a possibility that SAM may continue to rise as it is based primarily on people who began smoking 30 to 50 years ago. Even among adults who quit smoking decades ago, the lingering effects of smoking on specific health conditions may eventually manifest themselves in the older age cohorts. Additionally, if a causal relationship between smoking and additional diseases is discovered, smoking-attributable costs are likely to increase.

Research and evidence on the impact of smoking on health has evolved since the last SAM estimate for Canada was published more than a decade ago. Understanding Canadian trends in smoking is vital to the effective development, implementation, and evaluation of national, provincial, and territorial strategies, policies, and programs. This study

11 Government of Canada, Summary of Results.

provides an updated estimate of the burden of disease that might be avoided through prevention and cessation of smoking. The findings in this report will help build the evidence base considered relevant to the design and delivery of tobacco policy and programs under a renewed tobacco control strategy across Canada.

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APPENDIX A

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