

**GPI** *Atlantic*

Genuine Progress Index for Atlantic Canada / Indice de progrès véritable - Atlantique

**MEASURING SUSTAINABLE DEVELOPMENT**

---

**APPLICATION OF THE GENUINE PROGRESS INDEX TO NOVA SCOTIA**

---

THE COST OF  
TOBACCO USE IN NOVA SCOTIA

---

Prepared by:  
Ronald Colman, PhD and Janet Rhymes, MA  
August, 2007

## EXECUTIVE SUMMARY

Conventionally, smoking has been counted as a benefit to the economy. Thus, economic growth and GDP-based measures of progress count sales of tobacco products, tobacco cessation products, and smoking-attributable health care costs as contributors to economic growth. Yet there are substantial physical, emotional, economic, and environmental costs to tobacco use that are invisible in conventional accounting mechanisms. By contrast to GDP-based measures of progress, the Genuine Progress Index (GPI) counts the costs of tobacco use and tobacco-related illnesses as liabilities, rather than gains to the economy. Costs of tobacco use include premature mortality and disability; direct hospital, physician and drug expenditures on smoking-attributable illnesses; and indirect costs such as productivity losses to the economy.

From this perspective, the GPI also considers tobacco reduction strategies as public health investments that may be highly cost-effective in yielding significant future returns on investment in the form of savings in avoided health care costs and productivity losses. Investing in tobacco reduction therefore has the potential to reduce suffering and premature mortality, to improve the health and wellbeing of Nova Scotians and their families, and to reduce the direct and indirect costs associated with tobacco use.

The full economic and social costs of tobacco use in Nova Scotia were reported by GPI Atlantic in *The Cost of Tobacco in Nova Scotia* (2000). This current report uses the latest and most widely accepted research and analytical techniques to update and enhance our knowledge of the real costs of tobacco use to Nova Scotians. This update is necessary in light of recent research findings and because new results have become available to provide evidence of the impacts of comprehensive tobacco control strategies in other jurisdictions. Most importantly, tobacco use in the province has declined significantly since 2000, largely as a result of comprehensive tobacco reduction strategies implemented by the Province of Nova Scotia, so the trends outlined in the 2000 report (based on the most recent 1999 data available at that time) also required updating.

Tobacco use in Nova Scotia has declined dramatically since 1999, with rates of current smoking falling more than 7 percentage points from 29% in 1999 to 22% in 2006, a 24% decline. Although smoking rates declined sharply from 2000 to 2003 (from 30% to 22%), they appear to have stagnated since then. Tobacco use among teens aged 15–19 has declined particularly sharply, from 30% in 1999 to 15% in 2006, a decline of 50%. Rates of tobacco use among young adults (age 20–24) fell from 37% in 1999 to 33% in 2006, a decline of 11%. However, this young adult smoking rate is still considered unacceptably high and has shown no clear sign of steady decline.

Regular exposure of children to Environmental Tobacco Smoke (ETS) in the home has also declined steadily in the province over time, from a 30% exposure rate in 2000 to 14% in 2006—though this remains the third highest rate in the country. In 2005, 64% of Nova Scotians were employed in places where tobacco use is completely restricted.

Smoking and exposure to ETS kills approximately 1,748 Nova Scotians every year, accounting for 21% of all deaths in the province. Tobacco use also adds a significant cost burden to the Nova Scotian economy, costing \$171.3 million in direct health care costs and an additional \$526

million in indirect costs (productivity losses due to long and short-term disability and premature mortality). In addition, it costs Nova Scotian employers about \$263.6 million more each year to employ smokers instead of non-smokers, due largely to on-the-job productivity losses incurred in unauthorized smoke breaks. When additional costs such as prevention and research costs and losses due to fires are added, smoking costs the Nova Scotian economy an estimated \$943.8 million a year, or more than \$1,000 for every person in the province. Some \$538 million, or 57% of the total cost of tobacco use in Nova Scotia, is paid for by society. The continued high costs of tobacco use in Nova Scotia reflect high smoking rates in the past. The recent decline in smoking prevalence will produce significant cost reductions in the future.

Interventions to reduce the burden of tobacco use help smokers quit, protect Nova Scotians from ETS, and keep young people from starting to smoke. Nova Scotia's comprehensive Tobacco Strategy in 2001 saw the implementation of a wide range of tobacco reduction interventions in the province based on proven best practices in other jurisdictions. The high costs of tobacco use outlined in this report, evidence from other jurisdictions on successful tobacco reduction interventions, and a wide-ranging review of the literature suggest that the following actions can further reduce the costs and hardship generated by tobacco use in Nova Scotia:

- Although all Canadian jurisdictions have increased tobacco taxes substantially in recent years, it is noteworthy that—in inflation-adjusted terms—the January 1994 price level of cigarettes has only recently been surpassed. As a result, continue to increase tobacco taxes regularly over time at least to keep pace with inflation and to ensure that real prices do not fall, while providing financial assistance for cessation supports, particularly for low-income smokers.
- Continue and expand broad-based anti-tobacco media and education campaigns with locally targeted messages to address priority groups.
- Continue to support cost-effective cessation approaches such as counselling, physician advice, telephone help lines, and cessation aids. Begin data collection on the smoking prevalence rates of priority populations, and provide targeted and culturally appropriate cessation supports for groups such as low-income, pregnant/post-partum women, mental health consumers and young smokers.
- Institute workplace cessation programs, especially in the sales and service, business/finance and administration, and trades/transportation sectors, where smoking rates are higher than average.
- Implement a strategy to increase the use of prevention and cessation resources in schools and support and encourage health-promoting schools.
- Continue to fund community groups engaged in tobacco reduction initiatives, and continue to enhance community-based partnerships and collaborations.

The evidence points to the enormous potential benefits of investing in tobacco reduction in lives saved, improved long-term health outcomes, and cost savings. A further 27% drop in smoking rates in Nova Scotia, from 22% at present to 16% (the current smoking rate in British Columbia and therefore eminently achievable) is estimated to save the province more than \$193 million a year in avoided future health care costs and productivity losses. To achieve this very reasonable goal, it is estimated that funding to Nova Scotia's tobacco control strategy must be increased to a minimum of \$5 per capita, or \$4.7 million a year—approximately

double the current spending. This amounts to less than 3% of the federal and provincial tobacco tax revenues currently accruing from tobacco sales in the province. From the GPI perspective, such tobacco control funding is not a cost but rather a highly cost-effective investment that will yield a significant return to the province and taxpayers in avoided future health care costs and productivity losses.

## ACKNOWLEDGEMENTS

GPI Atlantic gratefully acknowledges funding for this study from the Canadian Cancer Society – Nova Scotia Division, and would like to thank the many contributors who generously provided information, advice and suggestions.

The authors would like to extend special thanks to Andrea Caven, Canadian Cancer Society – NS Division; Holly Gillis and Sharon MacIntosh, Capital Health; Steve Machat, NS Health Promotion and Protection; Judy Snider, Canadian Tobacco Use Monitoring Survey (CTUMS) and Statistics Canada, for their important advice and contributions. Thanks also to Sheena Clarke, GPI Atlantic for research assistance, and to Clare Levin, GPI Atlantic, and Cynthia Martin for editorial assistance. An earlier draft of this report was completed by Mark Raymond, PhD.

*Errors or misinterpretations and all viewpoints expressed are the sole responsibility of the authors and GPI Atlantic.*

©2007 **GPI ATLANTIC**

Written permission from GPI Atlantic is required to reproduce this report in whole or in part. Copies of this report and of other GPI Atlantic publications may be downloaded for free from the website at [www.gpiatlantic.org](http://www.gpiatlantic.org). For those interested in supporting the work of GPI Atlantic, please visit this website, which contains news on GPI Atlantic activities and work in progress, donation and membership information, latest results, and useful statistics on social, environmental and economic realities.

## TABLE OF CONTENTS

Section 1: Tobacco Reduction Interventions and Tobacco Use Trends in Nova Scotia .....	4
1.1 Tobacco Reduction Interventions .....	4
1.2 Trends in Tobacco Use: Canada, Atlantic Canada and Nova Scotia .....	7
General Trends .....	7
Smoking Status by Age and Gender in Nova Scotia .....	12
Daily Average Cigarette Consumption in Nova Scotia, 2000 and 2005 .....	18
Tobacco Use in the Atlantic Provinces, 1999 – 2005 .....	18
Regional Trends in Tobacco Use within Nova Scotia .....	20
1.3 Trends in Exposure to Environmental Tobacco Smoke (ETS): Canada and Nova Scotia .....	25
Exposure to ETS in Nova Scotia’s Health Regions .....	28
Trends in Tobacco Sales: Nova Scotia .....	31
Section 1: Summary of Key Observations .....	33
Section 2: The Costs of Tobacco Use .....	35
2.1 Deaths Due to Tobacco Use in Nova Scotia .....	36
Calculating Smoking-attributable Mortality (SAM) .....	36
Mortality Due to ETS in Nova Scotia .....	40
2.2 Economic Costs Due to Tobacco Use in Nova Scotia .....	43
1. Direct Health Care Costs .....	44
2. Direct Prevention and Research Costs .....	44
3. Other Direct Costs: Cost of Fires Due to Smoking .....	45
4. Indirect Costs .....	45
5. Employer Costs .....	47
Summary of Economic Costs of Tobacco Use in Nova Scotia .....	50
2.3 Who Pays for Tobacco Use in Nova Scotia? .....	55
Section 2: Summary of Key Observations .....	56
Section 3: Tobacco Reduction Interventions .....	58
3.1 Summary of Tobacco Reduction Interventions .....	59
Smoke-free Policy and Programs .....	59
Increasing Tobacco Taxes .....	62
Marketing Bans .....	71
Mass Media and Public Awareness .....	72
Cessation Assistance .....	74
School-Based Programs .....	84
Community-Based Tobacco Control Programs and Education .....	87
3.2 Benefits of Investing in Tobacco Reduction .....	88
Ontario and British Columbia .....	89
California .....	90
The Benefits of Tobacco Reduction for Nova Scotia .....	93
Funding Requirements .....	94
Section 3: Summary of Key Observations .....	96
Appendix A: Data Tables .....	99
Appendix B: Summary of Nova Scotia’s Smoke-Free Places Legislation .....	109
Appendix C: Mortality, Smoking-Related Diseases, RR and SAF Tables .....	111
Table 1: Mortality Data for Nova Scotia (2003) .....	111

Table 2: US CDC Disease Classifications of Smoking-Related Diseases .....	113
Table 3: Relative Risk Values for Selected Diseases (NS Female) .....	114
Table 4: Relative Risk Values for Selected Diseases (NS Male) .....	115
Table 5: Smoking-attributable Fractions in Nova Scotia, 2005 .....	116
Appendix D: Data Limitations .....	117
Smoking-attributable Deaths .....	117
Appendix E: Indirect Cost Calculations .....	118
Appendix F: Economic Cost Literature Guide .....	119
Bibliography of Works Cited .....	120

## LIST OF TABLES

Table 1: Summary of Tobacco Reduction Interventions, Nova Scotia, 2000-2007 .....	5
Table 2: Average Number of Cigarettes Smoked Daily by Daily Smokers, Canada and Nova Scotia, 2000 and 2005 .....	18
Table 3: Nova Scotian District Health Authorities and Statistics Canada Health Zones .....	21
Table 4: Smoking Status by Health Zone and Gender, Population Aged 12 and Older, Nova Scotia, 2005 .....	23
Table 5: Households where Smoking is Completely Restricted, Canada by Province and Territory, 2003 and .....	27
Table 6: Workers (aged 15-75) Employed at Places where Smoking is Completely Restricted, Canada by Province and Territory, 2003 and 2005 .....	28
Table 7: Smoking Attributable Mortality, Male and Female, Nova Scotia, 2005 .....	39
Table 8: Mortality due to ETS Exposure, Males and Females, Nova Scotia, 2002 .....	40
Table 9: Total Deaths due to Tobacco Use in Nova Scotia, Males and Females, Nova Scotia, 2005 .....	41
Table 10: Direct Health Care Costs Attributable to Tobacco Use in Nova Scotia, 2002 .....	45
Table 11: Indirect Productivity Losses Costs Due to Tobacco Use, Nova Scotia, 2002 and 2005 .....	46
Table 12: Per Employee Annual Cost of Employing a Smoker, (NS, \$2005) .....	49
Table 13: Total Costs of Tobacco Use in Nova Scotia, (\$2005) .....	51
Table 14: Federal and Provincial Tobacco Taxes, (carton and fine cut), Nova Scotia, Highlights 1980-2007 (Current Dollars) .....	67
Table 15: Prices for a Carton of 200 Cigarettes in Canada, May 2007 .....	68
Table 16: Federal and Provincial Tobacco Tax Revenues (Current '\$000's) 1990-2006 .....	69
Table 17: Cost-Effectiveness of School-based Smoking Prevention Programs and Estimated Annual Savings to Nova Scotia (\$2006) .....	86
Table 18: Per Capita Tobacco Control Funding in Canada., by Province and Territory, 2004-2005 .....	95

## LIST OF FIGURES

Figure 1: Tobacco Use Prevalence in Canada, Population 15 and Older, 1985–2006 .....	8
Figure 2: Current Smokers by Age, Nova Scotia, 1999–2006 .....	9
Figure 3: Current Youth Smokers, aged 15–24, Canada and Nova Scotia, 1999–2005 .....	10
Figure 4: Current Smokers, aged 25+, Canada and Nova Scotia, 1999–2005 .....	11
Figure 5: Percentage Decline in Tobacco Use in Canadian Provinces, 1999 to 2005 .....	12
Figure 6: Smoking by Gender, Population, aged 15 and older, Canada, 1999–2006 .....	13
Figure 7: Smoking by Gender (Aged 15 and older), Nova Scotia, 1999–2006 .....	13
Figure 8: Male Smoking Status, Nova Scotia, 2005 .....	15
Figure 9: Female Smoking Status, Nova Scotia, 2005 .....	15
Figure 10: Female Smoking Status (%), by Age, Nova Scotia, 2005 .....	17
Figure 11: Male Smoking Status (%), by Age, Nova Scotia, 2005 .....	17
Figure 12: Youth, (Age 15–24), Tobacco Use in Atlantic Provinces, 1999–2005 .....	19
Figure 13: Adult (Age 25+) Tobacco Use in Atlantic Provinces, 1999–2005 .....	20
Figure 14: Daily or Occasional Smokers by Health Zone, Nova Scotia, Population Aged 12 and older, 2000/01/2003/2005 .....	22
Figure 15: Smoking Status by Health Zone, Males, Aged 12 and Older, Nova Scotia, 2005 .....	24
Figure 16: Smoking Status by Health Zone, Female, Nova Scotia, 2005 .....	24
Figure 17: Regular Exposure of Children (0–17) to ETS in the Home, Nova Scotia, 2000–2006 .....	25
Figure 18: Exposure to ETS among Non-Smoking Teens (aged 12–19) and Young Adults (aged 20–34), Canada, 2005 .....	26
Figure 19: Exposure to ETS at Home, Non-Smoking Population aged 12 and older, Nova Scotia, 2005 .....	29
Figure 20: Exposure to ETS in Motor Vehicles, Non-Smoking Population aged 12 and older, Nova Scotia, 2005 .....	30
Figure 21: Exposure to ETS in Public Places, Non-Smoking Population aged 12 and older, Nova Scotia, 2005 .....	31
Figure 22: Cigarettes Sold in Nova Scotia, 1989–2005 .....	32
Figure 23: Real Price in Relation to per Capita Consumption of Cigarettes, Canada, 1949–2002 .....	63



## LIST OF ABBREVIATIONS

ACS	American Cancer Society
AF	Attributable Fraction
AVH	Annapolis Valley Health
CB DHA	Cape Breton District Health Authority
CCHS	Canadian Community Health Survey
CCSA	Canadian Centre on Substance Abuse
C-EH	Colchester-East Hants
CH	Capital Health
CHD	Coronary Heart Disease
COPD	Chronic Obstructive Pulmonary Disease
CPI	Consumer Price Index
CPS-II	Cancer Prevention Studies II
CTUMS	Canadian Tobacco Use Monitoring Survey
DALY	Disability Adjusted Life Year
DHA	District Health Authority
EBIC	Economic Burden of Illness in Canada
ETS	Environmental Tobacco Smoke
WHO FCTC	World Health Organization Framework Convention on Tobacco Control
GDP	Gross Domestic Product
GPI	Genuine Progress Index
ICD	International Classification of Disease
IHD	Ischemic Heart Disease
LBW	Low Birth Weight
NB	New Brunswick
NL	Newfoundland
NRT	Nicotine Reduction Therapy
NS	Nova Scotia
PEI	Prince Edward Island
QALY	Quality Adjusted Life Year
RR	Relative Risk
SAEs	Smoking-attributable Health Care Expenditures
SAF	Smoking-attributable Fraction
SAM	Smoking-attributable Mortality
SEER	Surveillance, Epidemiology and End Results
SES	Socio-Economic Status
SHS	Second Hand Smoke
SIDS	Sudden Infant Death Syndrome
SS	South Shore
SW	South West
UN	United Nations
US CDC	United States Centers for Disease Control
WHO	World Health Organization

## THE COST OF TOBACCO USE IN NOVA SCOTIA

### 1. Introduction

Conventionally, smoking has been counted as a benefit to the economy. Thus, economic growth and GDP-based measures of progress count sales of tobacco products, tobacco cessation products, and smoking-attributable health care costs as contributors to economic growth. Yet there are substantial physical, emotional, economic, and environmental costs to tobacco use that are invisible in conventional accounting mechanisms. By contrast, the Genuine Progress Index (GPI) counts the costs of tobacco use and tobacco-related illnesses as costs rather than gains to the economy. Costs of tobacco use include premature mortality and disability, direct hospital, physician and drug expenditures on smoking-attributable illnesses, and indirect costs such as productivity losses to the economy.

From this perspective, the GPI also considers tobacco reduction strategies as public health investments that are shown to be highly cost-effective in yielding significant returns on investment in the form of savings in avoided health care costs and productivity losses. A healthy population and workforce is a fundamental component of the human capital required to power a healthy economy. Investing in tobacco reduction therefore has the potential to reduce suffering and premature mortality, to improve the health and wellbeing of Nova Scotians and their families, and to reduce the direct and indirect costs associated with tobacco use.

This report uses the latest, most widely accepted, and best available research and analytical techniques to estimate the real costs of tobacco use to Nova Scotians, and provides both an update and an enhancement of the *The Cost of Tobacco in Nova Scotia* (2000) report. Such an update is necessary in light of recent research findings and to improve the costing methodology for Nova Scotia. In addition, and most importantly, tobacco use in the province has declined significantly since 2000, largely as a result of the implementation of comprehensive tobacco reduction strategies implemented by the Province of Nova Scotia, so the trends outlined in the 2000 reports require updating.

Perhaps most importantly, since 2000, results have become available to provide evidence of the impacts of comprehensive tobacco control strategies in other jurisdictions.<sup>1</sup> Because of the time lag between implementation of such strategies and reductions in smoking-attributable disease and mortality, such evidence was not available when the 2000 Nova Scotia report was produced. However, for the first time, such evidence now allows estimations of the potential cost savings

---

<sup>1</sup> Comprehensive tobacco control programs include tobacco tax increases, community interventions, counter-marketing strategies, school-based and other educational and counselling programs, policy and regulation initiatives such as smoke-free legislation, smoke bans, restrictions on advertising and sponsorship, surveillance and evaluation, provision of cost-free quit aids and lawsuits aimed at tobacco companies. For a description of comprehensive tobacco reduction and control programs, see United States Centers for Disease Control (2000). *Surgeon General's Report: Reducing Tobacco Use, Comprehensive Programs: Highlights*. [online] Available at: [www.cdc.gov/tobacco/data\\_statistics/sgr/sgr\\_2000/highlights/highlight\\_comprehensive.htm](http://www.cdc.gov/tobacco/data_statistics/sgr/sgr_2000/highlights/highlight_comprehensive.htm). Accessed April 2007.

that can be expected from particular interventions. In California, for example, dramatic decreases in lung cancer incidence can be partially attributed to the implementation in 1988 of a comprehensive tobacco reduction strategy.<sup>2</sup> Based on such evidence, the potential savings implications of comprehensive tobacco reduction strategies have thus been incorporated into this new report for Nova Scotia.

A number of different sources have been used to update data in this report. Data on tobacco use prevalence, including statistics on daily smoking, for Nova Scotians aged 15 and older are from the *Canadian Tobacco Use Monitoring Survey (CTUMS)* (2006). Daily and occasional smoking rates and rates of exposure to ETS<sup>3</sup> for Nova Scotians aged 12 and older and by health zone are from the *Canadian Community Health Survey (CCHS)* (2000-01, 2003 and 2005).<sup>4</sup> In addition, this report relies heavily on the most recent costs analysis contained in the *Cost of Substance Abuse in Canada 2002* (Rehm *et al* 2006).<sup>5</sup> Unless otherwise indicated, all costs are stated in constant 2005 dollars.

This report has three main goals, corresponding to the three main sections of the report:

1. It provides a review of tobacco reduction interventions and trends in tobacco use in Nova Scotia since the 2000 GPI Atlantic report on *The Cost of Tobacco in Nova Scotia* and since the introduction of the province's comprehensive tobacco control strategy. In addition to provincial initiatives, federal legislation, and community-level interventions have also changed the tobacco use and reduction climate in the province in the last seven years. These trends are reviewed in Section 1 of this report.
2. Section 2 estimates mortality due to tobacco use and ETS exposure in Nova Scotia using accepted and recent methodological approaches that are based on well-established epidemiological meta-analyses of the excess risks for various illnesses attributable to smoking and second-hand smoke. Direct and indirect costs of tobacco use in the province are provided. Cost estimates due to tobacco-related fires, prevention and research costs, and employer costs are also estimated.
3. The report includes a review of the demonstrated effectiveness of core tobacco reduction interventions from the existing literature on this subject. Where possible, extrapolations are provided of costs and/or potential cost savings that might be expected as a result of similar

---

<sup>2</sup> See Barnoya, J., and Glantz, S. (2004). Association of the California tobacco control program with declines in lung cancer incidence, *Cancer Causes Control*. 5:689-695; and Cowling, D. *et al.* (2000) Declines in lung cancer rates: California, 1988 - 1997, *Morbidity and Mortality Weekly Report*, 49: 066 - 069 [online] Available at: [www.cdc.gov/mmwr/preview/mmwrhtml/mm4947a4.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4947a4.htm). Accessed May 2007.

<sup>3</sup> The terms Environmental Tobacco Smoke (ETS), Second Hand Smoke (SHS) and passive smoking will be used interchangeably in this report, as determined by the term used in the source document.

<sup>4</sup> CTUMS data are collected by Statistics Canada on behalf of Health Canada (see [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index_e.html)). CTUMS reports the prevalence of tobacco use for users age 15 and older. CCHS is carried out by Statistics Canada and is available by health zone (see [www.statcan.ca/english/freepub/82-576-XIE/82-576-XIE2003001.htm](http://www.statcan.ca/english/freepub/82-576-XIE/82-576-XIE2003001.htm)). In Nova Scotia, three Statistics Canada health zones match NS District Health Authority (DHA) areas—Cape Breton District Health Authority, Capital Health, and Annapolis Valley Health. Each of the other three Statistics Canada health zones is made up of two combined DHA areas.

<sup>5</sup> Rehm, J. *et al.* (2006). *The Cost of Substance Abuse in Canada 2002*. Canadian Centre on Substance Abuse.

interventions in Nova Scotia. The benefits from a further reduction in tobacco use prevalence through funding and targeted intervention strategies are also explored.

## SECTION 1: TOBACCO REDUCTION INTERVENTIONS AND TOBACCO USE TRENDS IN NOVA SCOTIA

### 1.1 Tobacco Reduction Interventions

There are approximately 1.3 billion smokers around the world—more than at any time in human history.<sup>6</sup> Tobacco use kills 4.9 million people globally each year, making it the leading preventable cause of death in the world. By 2020, this figure is expected to almost double. In Nova Scotia, tobacco use and exposure to ETS kills at least 1,748 people each year and is the cause of an estimated 21% of deaths in the province annually.<sup>7</sup>

In response to the global tobacco epidemic, the World Health Organization Framework Convention on Tobacco Control (WHO FCTC) was adopted in 2003. By 2006, 133 full signatory parties and country representatives had signed the framework, making it one of the most widely-embraced treaties in United Nations (UN) history. Support for the convention is high, precisely because of the heavy health and economic burden of tobacco use.<sup>8</sup>

The implementation of comprehensive tobacco control strategies has had considerable influence on tobacco use trends throughout North America and in other parts of the industrialized world. Well-funded, comprehensive tobacco control programs have been shown to reduce tobacco use.<sup>9</sup> Since the release of GPI Atlantic's original *The Cost of Tobacco in Nova Scotia* (2000) report, a number of Canadian federal legislative changes affecting tobacco reduction have been implemented. As well, a comprehensive tobacco reduction strategy was introduced by the Province of Nova Scotia in 2001.

These actions followed from research demonstrating the effectiveness of comprehensive, multi-faceted approaches to tobacco control and from evidence on best practices adopted in other jurisdictions.<sup>10</sup> The Nova Scotia initiative had particular urgency following the release of the 2000 Canadian Tobacco Use Monitoring Survey (CTUMS) results that showed Nova Scotia with

---

<sup>6</sup> Frieden, T. and Blakeman, D. (2005). The Dirty Dozen: 12 Myths that Undermine Tobacco Control, *American Journal of Public Health*, September, Vol. 95 (9) p.1502.

<sup>7</sup> As calculated in this report.

<sup>8</sup> World Health Organization. (2006). *Global Framework Convention on Tobacco Control: Mobilizing the world for global public health*. [online] Available at: [www.who.int/tobacco/publications/FctcBroE\\_F-FINAL-31JAN06.pdf](http://www.who.int/tobacco/publications/FctcBroE_F-FINAL-31JAN06.pdf). Accessed April 2007.

<sup>9</sup> US Institute of Medicine. (2000). *State Programs Can Reduce Tobacco Use*. Washington DC: National Cancer Policy Board, Institute of Medicine and National Research Council.

<sup>10</sup> As early as 1985, Canadian federal, provincial and territorial Ministers of Health agreed tobacco reduction could only be achieved with a comprehensive and collaborative approach. The National Strategy to Reduce Tobacco Use in Canada (1999) includes five strategic directions: policy and legislation; public education; industry accountability and product control; research; and, building and supporting capacity for action (see Committee for the National Strategy to Reduce Tobacco Use in Canada (1999) [online] Available at: [www.hc-sc.gc.ca/hl-vs/pubs/tobac-tabac/ns-sn/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/pubs/tobac-tabac/ns-sn/index_e.html). Accessed May 2007). Health Canada's Federal Tobacco Control Strategy was endorsed by the federal, provincial and territorial Ministers of Health in 1999 (see Health Canada. (1999). *Federal Tobacco Control Strategy*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/about-apropos/role/federal/strateg/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/about-apropos/role/federal/strateg/index_e.html). Accessed May 2007. Health Canada also supports a *First Nations and Inuit Tobacco Control Strategy*.

the highest adult smoking rates in the country at 30%. Data also showed youth (age 15 to 19) smoking rates at 25% and rates of smoking during pregnancy at 25%.<sup>11</sup> These tobacco use rates were widely acknowledged as unacceptably high.

Nova Scotia's comprehensive tobacco strategy was developed through a process of stakeholder consultations, research and best practice reviews. The strategy was introduced as a community-based model, and thus a key purpose of the strategy was to build synergy through partnerships with local and organizational partners. It included action centred on the following seven target areas (pillars):

- pricing and taxation;
- smoke-free legislation and policy;
- treatment and cessation;
- community-based programming;
- youth smoking prevention;
- media and public awareness; and,
- monitoring and evaluation.

The key federal, provincial, municipal, health authority and community-based tobacco reduction interventions affecting tobacco use in Nova Scotia since GPI Atlantic's original *The Cost of Tobacco in Nova Scotia* (2000) report are summarized in Table 1.<sup>12</sup>

**Table 1: Summary of Tobacco Reduction Interventions, Nova Scotia, 2000-2007**

<i><b>Jurisdiction, Title and Date</b></i>	<i><b>Intervention Description</b></i>
1. Federal: Tobacco Reporting Regulations (2000, 2005 amendment)	Tobacco manufacturers and importers required to provide Health Canada with annual reports including sales data, manufacturing information, tobacco product ingredients, toxic constituents, toxic emissions, research activities, and promotional activities.
2. Federal: Tobacco Products Information regulations (2000)	Labelling regulations with graphic health warnings and health messages regarding cessation and toxic emission/constituents content required.
3. Provincial (2001)	Introduction of comprehensive tobacco reduction strategy
4. Provincial: Smoke-Free Places Act (2002, amendment 2006) <sup>13</sup>	Requires all indoor workplaces to be smoke-free, except designated indoor smoking rooms in health care facilities and facilities for the long-term care of veterans and the aged, including nursing homes. All indoor public areas, workplaces, and outdoor eating establishments must also be smoke-free, with designated smoking rooms not permitted except in long-term care facilities for use by residents since the 2006 Amendment.
5. Municipal (2002–2003):	11 of 55 Nova Scotian municipalities have 100% smoke-free

<sup>11</sup> Nova Scotia Department of Health. (2001). *A Comprehensive Tobacco Strategy for Nova Scotia*. [online] Available at: [admin.acadiau.ca/human/main\\_sections/files/Tobacco\\_Free\\_Initiative/Tobacco\\_Strategy\\_for\\_Nova\\_Scotia.pdf](http://admin.acadiau.ca/human/main_sections/files/Tobacco_Free_Initiative/Tobacco_Strategy_for_Nova_Scotia.pdf). Accessed May 2007.

<sup>12</sup> Sections 8–12 sourced from: Province of Nova Scotia, Health Promotion and Protection (2006). *Nova Scotia Tobacco Control Strategy Evaluation*. Prepared by Pyra Management Consulting. [online] Available at: [www.gov.ns.ca/hpp/repPub/TC/NS-Tobacco-Control-Strategy-Evaluation.pdf](http://www.gov.ns.ca/hpp/repPub/TC/NS-Tobacco-Control-Strategy-Evaluation.pdf). Accessed April 2007.

<sup>13</sup> For details of this legislation, see Appendix B.

Smoke-Free Municipal By-laws <sup>14</sup>	public places by-laws in effect. A 12 <sup>th</sup> , Halifax Regional Municipality, imposed a partial ban to be fully implemented in 2008.
6. District Health Authorities: Smoking bans	Banned smoking on all outdoor DHA properties in the province, including hospital parking lots.
7. Federal/Provincial (2000–2006): Tobacco tax increases <sup>15</sup>	Provincial tobacco tax rates were \$9.04 in 1988 (\$14.10 in \$2007) and increased over time to \$33.04 (\$2007). Federal rates increased from \$5.49 in 1988 (\$8.57 in \$2007) to \$16.41 in 2007. Federal excise tax was removed from cigarette sales in 2003.
8. Provincial: Point-of-sale Legislation (2007)	Restricts point-of-sale advertising (power walls) to force store owners to conceal cigarettes, and other tobacco products. Also expands the list of establishments prohibited from selling tobacco to include, among others, recreational facilities (physical recreation), bowling alleys, fitness centres, gymnasiums, pools and rinks, libraries, community colleges and universities, community centres, and halls. The exception to this legislation is tobacconist shops where 100% of revenues are generated through sale of tobacco products and accessories. These shops are permitted to advertise at point-of-sale provided no customers are under the age of 19 and advertising is not visible from outside the stores.
9. Provincial (2002–2005): Media and public awareness	3-year comprehensive tobacco control communications/public awareness campaign, including: <ul style="list-style-type: none"> <li>• Television ads: <i>Family Outing</i> and <i>Fitting In</i> (2002-03)</li> <li>• <i>Great Reasons to Smoke</i> (2003/04),</li> <li>• Print ads and posters: <i>Great Reasons to Smoke</i>, including distribution to high schools, university newspapers, and bus shelters,</li> <li>• Print ads and posters: <i>Some Things You Shouldn't Do in Public</i>,</li> <li>• www.sickofsmoke.com,</li> <li>• <i>You Choose</i>: a media literacy curriculum for high schools,</li> <li>• Communications support to community partners and workplaces.</li> </ul>
10. Provincial (2002): Smokers Helpline	Funded by Health Canada and coordinated by the Canadian Cancer Society—Nova Scotia Division, the helpline offers telephone evidence-based, personalized support, advice, and information as well as community referrals.
11. Provincial/DHA (2001–2006): Treatment and Cessation	Range of treatment and cessation activities implemented, including: <ul style="list-style-type: none"> <li>• self-help web-based treatment information</li> <li>• dedicating Addictions Services staff within DHAs to provide and evaluate cessation services</li> <li>• supporting and training health care providers in brief</li> </ul>

<sup>14</sup> For a list of smoke-free municipalities, see Appendix B.

<sup>15</sup> For detailed information on tobacco tax increases, see Section 3 and Appendix 1: Data Table 14.



	<ul style="list-style-type: none"> <li>cessation interventions</li> <li>an ongoing media strategy to support cessation and reduction</li> </ul>
12. Provincial: Youth Smoking Prevention	<ul style="list-style-type: none"> <li>Provincial Youth Tobacco Advisory Committee</li> <li>Curriculum development, training and implementation (No More Butts (peer-led high school cessation program), Smoke-free for Life, Teens Tackle Tobacco, Kids Against Tobacco Smoke (KATS), You Choose (media literacy curriculum supplement)</li> <li>School policy guidelines and enforcement</li> <li>Youth possession legislation</li> <li>Partnerships between Tobacco Strategy Coordinators and school Youth Tobacco Action Teams</li> </ul>
13. Community-based	<ul style="list-style-type: none"> <li>Conferences (2001, 2005)</li> <li>Consultations and community involvement in development of tobacco reduction strategy</li> <li>Tobacco coordinators hired in each of 9 DHAs</li> <li>Community group involvement: sport and recreation, First Nations groups, health care sector, municipalities</li> <li>Action in your Community against Tobacco (ACT) helped develop and support community networks for tobacco control</li> <li>First Nations partnerships and collaboration</li> <li>Tobacco control strategies developed at the DHA level</li> </ul>

## 1.2 Trends in Tobacco Use: Canada, Atlantic Canada and Nova Scotia

### *General Trends*

This section of the report examines trends in tobacco use prevalence and ETS exposure over time in Canada, Atlantic Canada and Nova Scotia, with specific emphasis on the 1999 to 2006 period. This allows an update of trends outlined in the 2000 *The Cost of Tobacco in Nova Scotia* report (at which time 1999 data were the most recent available), and takes into account the impact of the wide range of national, provincial, and local tobacco reduction interventions implemented since the 2000 report was prepared—particularly the comprehensive provincial tobacco reduction strategy and federal and provincial tobacco tax increases.

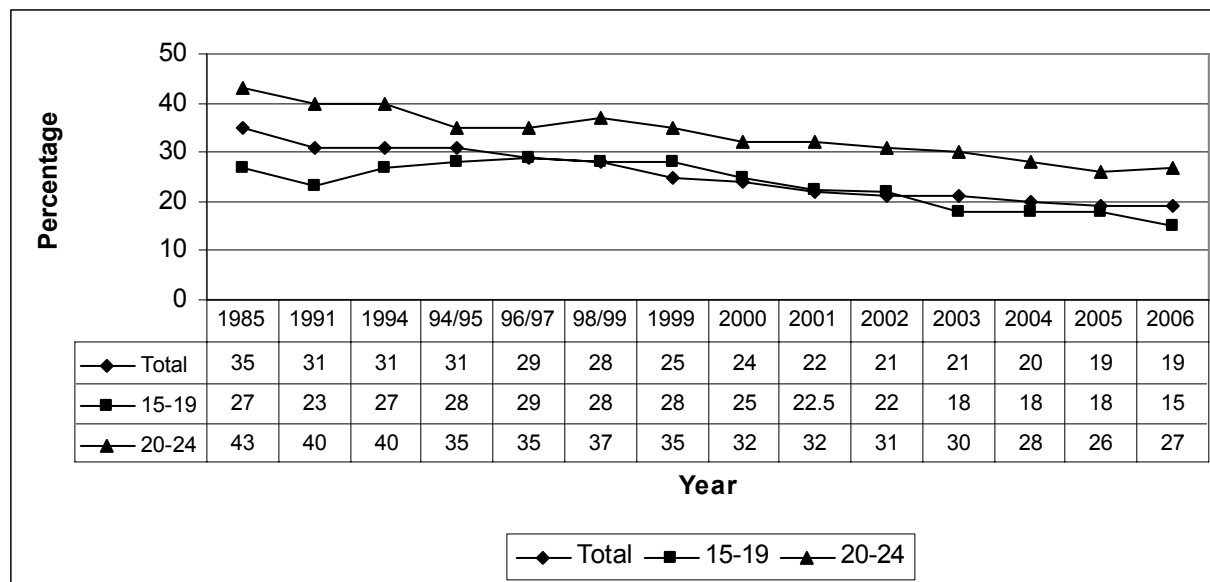
Generally, tobacco use in North America has been on the decline since the late 60s. Since then, tobacco reduction strategies, especially taxation of tobacco products, combined with increasingly strong evidence linking tobacco use to illness, disability and death, have resulted in overall declines in tobacco use prevalence throughout North America, including in Canada and Nova Scotia. Tobacco use prevalence among men peaked nationally in 1960 and among women in 1974. Large declines in youth tobacco use rates took place in the 1980s.

In the past 21 years (1985–2006), Canada has seen an overall decline of 16 percentage points in the prevalence of tobacco use in the population 15 and older (see Figure 1), from a national rate of 35% in 1985 to 19% in 2006—representing a 46% decline in prevalence. Tobacco use among



young adults (ages 20–24) fell from 43% in 1985 to 27% in 2006 (a decline of 37%) and among teenagers (ages 15–19) from 27% in 1985 to 15% in 2006 (a decline of 44%).

**Figure 1: Tobacco Use Prevalence in Canada, Population 15 and Older, 1985–2006**



Source: Health Canada (2006). *Canadian Tobacco Use Monitoring Survey (CTUMS) Annual Results 1985 - 2006*. [online] Available at [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esute/prevalence/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esute/prevalence/index_e.html). Accessed July 2007. *CTUMS notes the 1994 Survey on Smoking in Canada (SOSIC) results are calculated from rebased population estimates and exclude missing values. 1985 to 1998 sources include: 1994/95-1998/99 - National Population Health Survey; May 1994 - Survey on Smoking in Canada (SOSIC); 1985/91 - General Social Surveys.*

According to Health Canada, the prevalence of youth trying any form of tobacco product (cigarettes, cigars or pipes, bidis,<sup>16</sup> chewing tobacco, and snuff) has continued to fall over time. The 2004–05 *Youth Smoking Survey* claims 21% of youth in Grades 5 through 9 had ever tried any form of tobacco product in 2004–05, a 50% reduction since 1994.<sup>17</sup>

National declines in tobacco use prevalence are generally mirrored in Nova Scotia statistics. As shown in Figure 2, in the 1999 to 2005 period there was an overall decline in tobacco use prevalence among the population 15 and older in the province of 7 percentage points—from 29% in 1999 to 22% in 2006, representing a 24% decline.<sup>18</sup> Between 1999 and 2005, tobacco use prevalence among Nova Scotian teens (aged 15–19) dropped even more dramatically—from 30% to 15%, representing a decline of 50%. Among young adults (aged 20–24), tobacco use prevalence fell from 37% to 33%, representing an 11% decline.

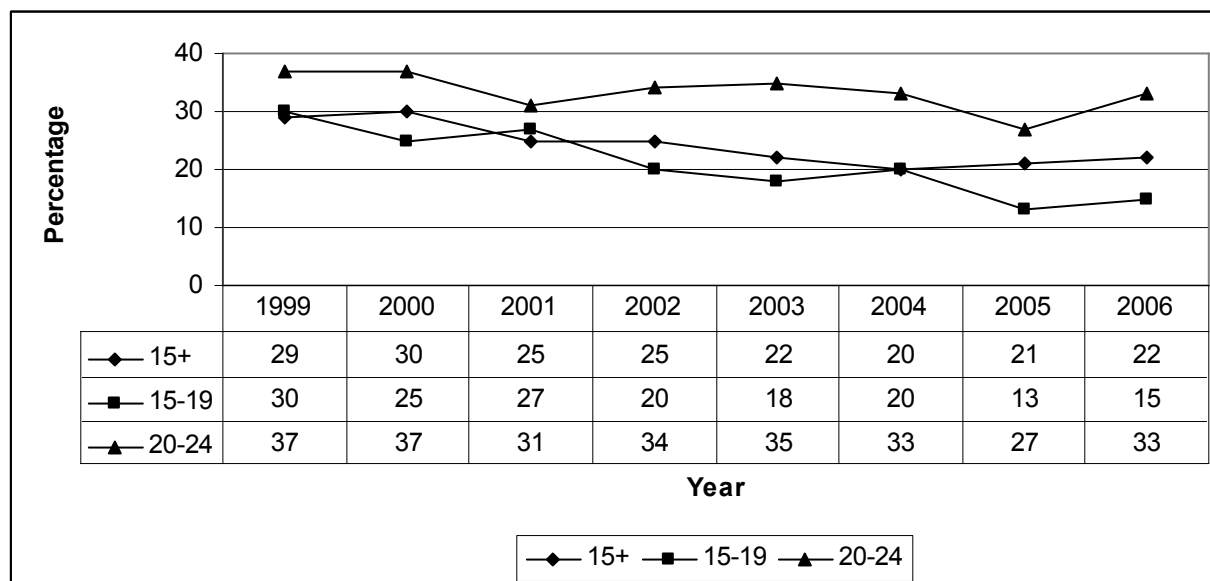
<sup>16</sup> A thin, often flavored Indian cigarette made of tobacco wrapped in a leaf.

<sup>17</sup> Health Canada (2005). *Summary of Results of the 2004–05 Youth Smoking Survey*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/survey-sondage/2004-2005/result\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/survey-sondage/2004-2005/result_e.html). Accessed May, 2007.

<sup>18</sup> Unfortunately, comparable provincial level tobacco use prevalence data for Nova Scotia from 1986–2005 are not available due to inadequate sample sizes in earlier surveys.

Despite the considerable declines in tobacco use in the last seven years, it is noteworthy that smoking rates have stagnated since 2003 and have even risen slightly in the last three years. Thus, 22% of Nova Scotians smoked in 2003, as did 20% in 2004, 21% in 2005, and 22% in 2006. Thus, the initial gains of the province's 2001 comprehensive tobacco control strategy do not seem to have maintained their momentum in recent years.

**Figure 2: Current Smokers by Age, Nova Scotia, 1999–2006**



Source: Health Canada (2006). *Canadian Tobacco Use Monitoring Survey (CTUMS), Annual Results 1999 - 2006*. [online] Available at [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/prevalence/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/prevalence/index_e.html). Accessed July 2007.

Teens and young adults are identified as key target groups for intervention strategies, both to reduce existing tobacco use and to prevent smoking initiation and uptake. As tobacco is highly addictive, reduced prevalence and initiation in these early years results in the greatest lifetime health and economic cost savings. As highlighted and evidenced in the *The Cost of Tobacco in Nova Scotia* (2000), youth demand for tobacco products is particularly sensitive to tobacco tax increases, which may account for some of the sharp declines in youth smoking rates in recent years. Tobacco taxes are discussed in greater detail in Section 3 of this report.

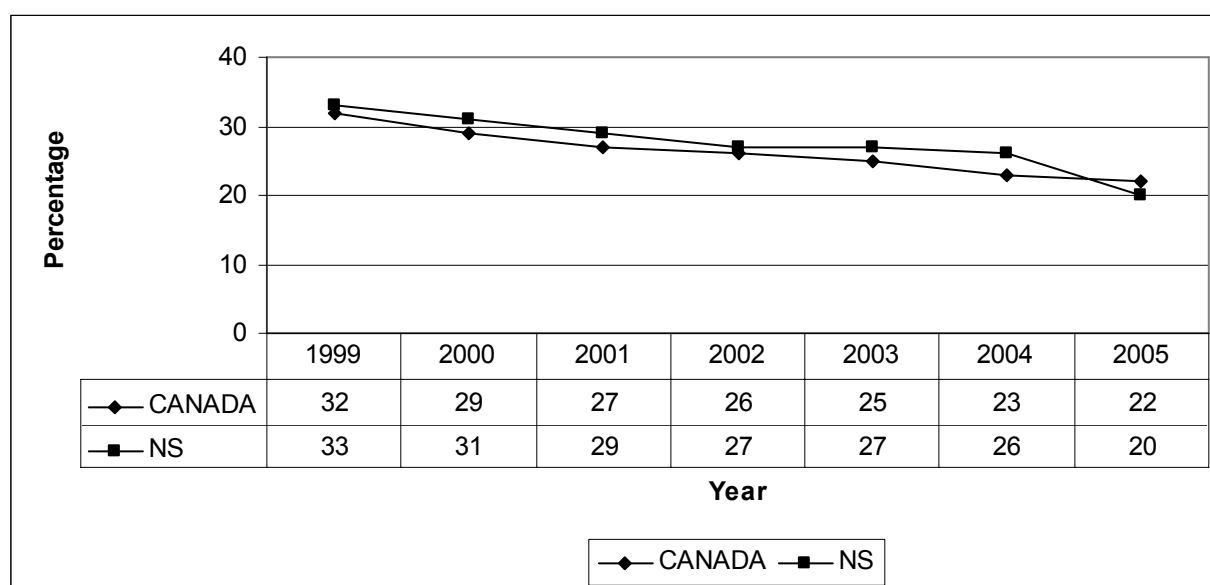
A 2002 survey of Nova Scotia junior and senior high school students reports the most marked change among all forms of substance use, gambling and risky behaviours was a decrease in tobacco use prevalence from 36% in 1998 to 23% in 2002. Nova Scotian youth who do smoke are also smoking fewer cigarettes. Results show that the prevalence of cigarette smoking among Nova Scotian students is now at the lowest level observed since 1991 when the survey began.<sup>19</sup>

<sup>19</sup> Dalhousie University: Department of Community Health and Epidemiology, and NS Department of Health: Addiction Services. (2003). *Nova Scotia Student Drug Use 2002: Highlights Report*. [online] Available at: [www.gov.ns.ca/health/downloads/2002\\_NSDrugHighlights.pdf](http://www.gov.ns.ca/health/downloads/2002_NSDrugHighlights.pdf). Accessed May 2007.

Figures 3 and 4 compare Nova Scotian and Canadian tobacco use prevalence rates (current users) for teens and young adults (aged 15–24) and for adults aged 25 and older. Figure 3 shows an overall decline in tobacco use prevalence for the 15–24 age group in Nova Scotia, generally mirroring a similar trend across the country. The sharpest decline in Nova Scotian youth tobacco use was between 2004 and 2005 when rates fell dramatically by six percentage points from 26% to 20%—below the Canadian average. Thus, in 2005, 20% of Nova Scotian teens and young adults were tobacco users compared to an average of 22% in Canada. At least some of the fall may be attributable to the effectiveness of Nova Scotia’s comprehensive tobacco control strategy, including considerably higher tobacco taxes than Ontario, Quebec and New Brunswick, successful school-based programs and media-based messaging targeting youth, and the implementation of the province’s smoke-free places legislation.

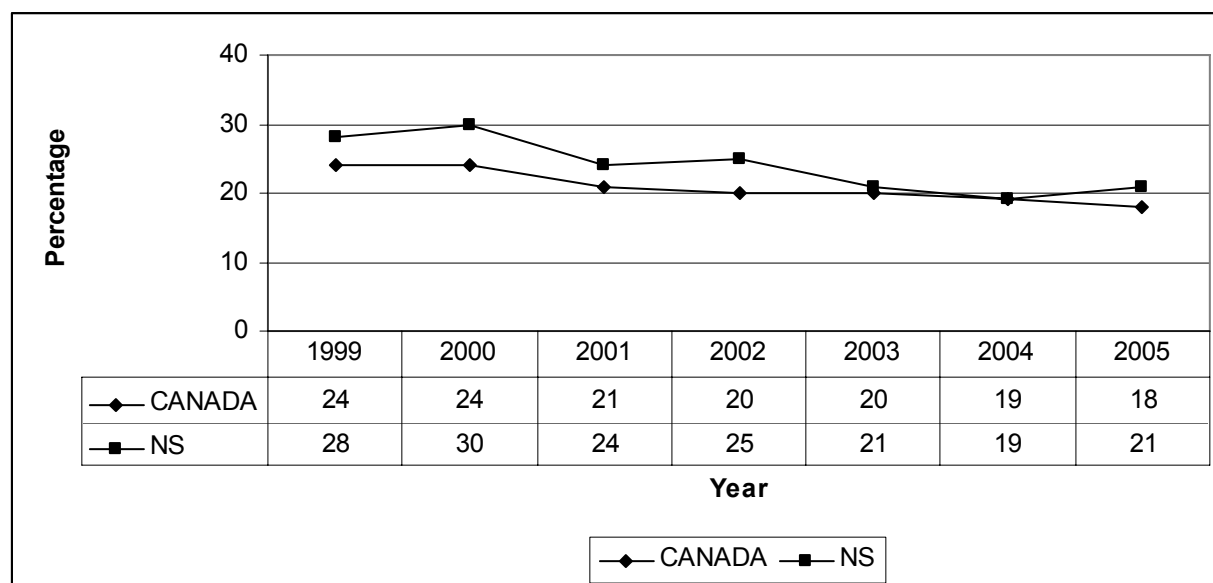
Figure 4 shows the general decline in tobacco use among adults (age 25 and older) in Nova Scotia, dropping from 28% in 1999 to 21% in 2005. This is consistent with an overall decline in adult tobacco use rates across the country, from 24% in 1999 to 18% in 2005.

**Figure 3: Current Youth Smokers, aged 15–24, Canada and Nova Scotia, 1999–2005**



Source: Health Canada (2006). *Canadian Tobacco Use Monitoring Survey, Annual Results, 1999-2005*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index_e.html). Accessed June 2007. For a complete data table comparing all provinces, see Appendix A: Table 1.

**Figure 4: Current Smokers, aged 25+, Canada and Nova Scotia, 1999–2005**

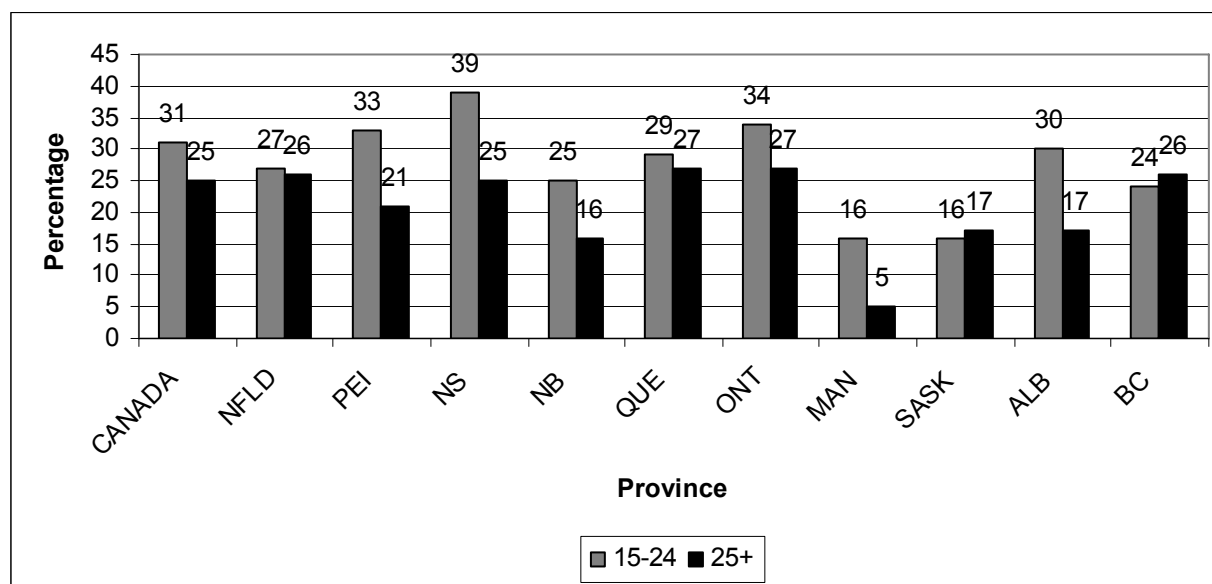


Source: Health Canada. (2006) *Canadian Tobacco Use Monitoring Survey, Annual Results 1999 - 2005*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index_e.html). Accessed June 2007. For a complete data table comparing all provinces, see Appendix A: Table 2

Current smoking rates have recently been released by Health Canada, Canadian Tobacco Use Monitoring Survey (CTUMS) for 2006. These results show the rate of current smokers in Nova Scotia (age 15 and older) at 21.8% versus 18.6% for Canada as a whole. Smoking among teens (15–19) rests at 14.8%, lower than the Canadian average of 15%. Smoking among young adults (20–24) remains high at 32.6% in Nova Scotia, higher than the Canadian average of 27.3%.

Comparing 1999 and 2005 data for all Canadian provinces, Nova Scotia has seen the most dramatic decline in tobacco use prevalence among teens and young adults (aged 15–24) in the country (see Figure 5, below). For teens and young adults, tobacco use prevalence rates fell 13 percentage points from 33% in 1999 to 20% in 2005, representing an overall decline of 39%. For adults aged 25 and older, smoking rates fell from 28% in 1999 to 21% in 2005, representing an overall decline of 25%—comparable to the national rate of decline. Figure 5 shows the comparative percentage declines in tobacco use in all 10 provinces.

**Figure 5: Percentage Decline in Tobacco Use in Canadian Provinces, 1999 to 2005**



Source: As calculated by authors, based on Health Canada. (2006) *Canadian Tobacco Use Monitoring Survey, Annual Results 1999-2005*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index_e.html). Accessed June 2007. Data found in Appendix A: Table 3.

Figure 5 shows that on a relative and comparative basis in particular, Nova Scotia has made considerable strides in reducing tobacco use rates during this period for both adults and youth, and has experienced some of the sharpest drops in usage—a decline of 39% among youth 15 – 24 and a decline of 25% among adults 25 and over.

Overall, Nova Scotia went from the second-highest rate of tobacco use in the country in 1999 and the highest rate in 2000 to one that is now comparable with most other Canadian provinces. British Columbia still has the lowest tobacco use rates in the country, at only 16% in 2006—27% lower than the Nova Scotia rate of 22%<sup>20</sup> – showing that both this province and the rest of the country can still make considerable additional gains in further reducing tobacco use.

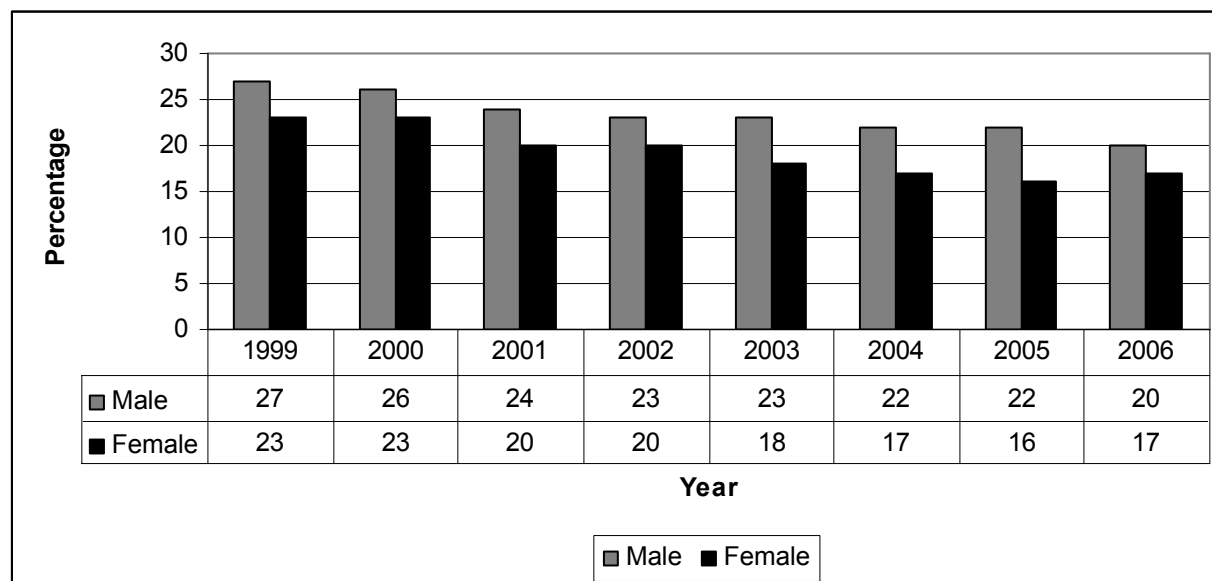
### ***Smoking Status by Age and Gender in Nova Scotia***

Figures 6 and 7 show the smoking status of male and female smokers between 1999 and 2006 in Canada and Nova Scotia. Figure 6 shows that in 1999, 27% of Canadian males age 15 and older identified themselves as current smokers, versus 20% in 2006. Figure 7 shows that in Nova Scotia, 31% of males surveyed identified themselves as current smokers in 1999, versus 23% in 2006. Between 1999 and 2006, then, male smoking rates have declined by 26% in both Canada and Nova Scotia.

<sup>20</sup> Health Canada. (2006). *Canadian Tobacco Use Monitoring Survey, Supplementary Tables, Table 2*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2005/ann-table2\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2005/ann-table2_e.html). Accessed July 2007.

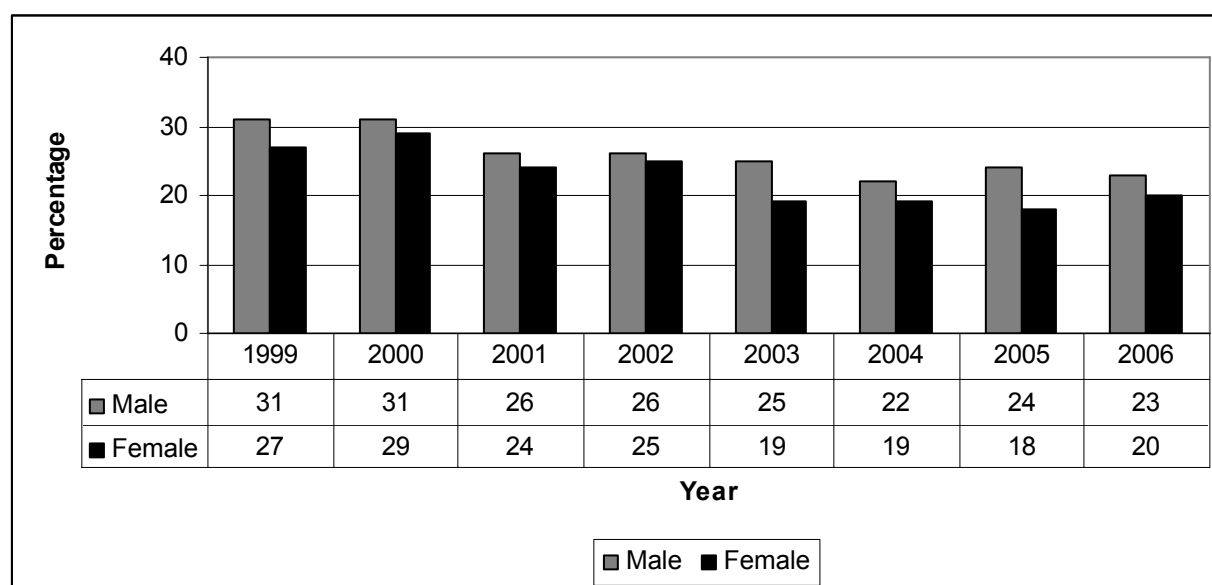
Figure 6 shows that in Canada, 23% of females age 15 and older identified themselves as current smokers in 1999 versus 17% in 2006. Figure 7 shows that 27% of Nova Scotian females identified themselves as current smokers in 1999 versus 20% in 2006. Between 1999 and 2006, then, female smoking rates have declined by 26% in both Canada and Nova Scotia.

**Figure 6: Smoking by Gender, Population, aged 15 and older, Canada, 1999-2006**



Source: Health Canada (2006) *Canadian Tobacco Use Monitoring Survey Annual Results, 1999-2006*. [online] Available at [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/prevalence/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/prevalence/index_e.html). Accessed July 2007.

**Figure 7: Smoking by Gender (Aged 15 and older), Nova Scotia, 1999-2006**



Source: Health Canada (2006) *Canadian Tobacco Use Monitoring Survey Annual Results 1999-2006*. [online] Available at [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/prevalence/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/prevalence/index_e.html). Accessed July 2007.

As these results show, an increasing number of Nova Scotians are quitting smoking. According to *Canadian Community Health Survey* results (Cycle 3.1, 2005) (see Figures 8 and 9), 49% of Nova Scotian males and 39% of females indicated they were former smokers. In the same year, 22% of Nova Scotian males and 21% of females identified themselves as current daily or occasional<sup>21</sup> smokers. In 2005, 29% of Nova Scotian males and 40% of females reported that they had never smoked. Thus, the vast majority of Nova Scotians, regardless of gender, do not presently smoke. When never-smokers are added to those who have already quit, it is seen that in 2005, 78% of Nova Scotian males and 79% of females did not smoke.

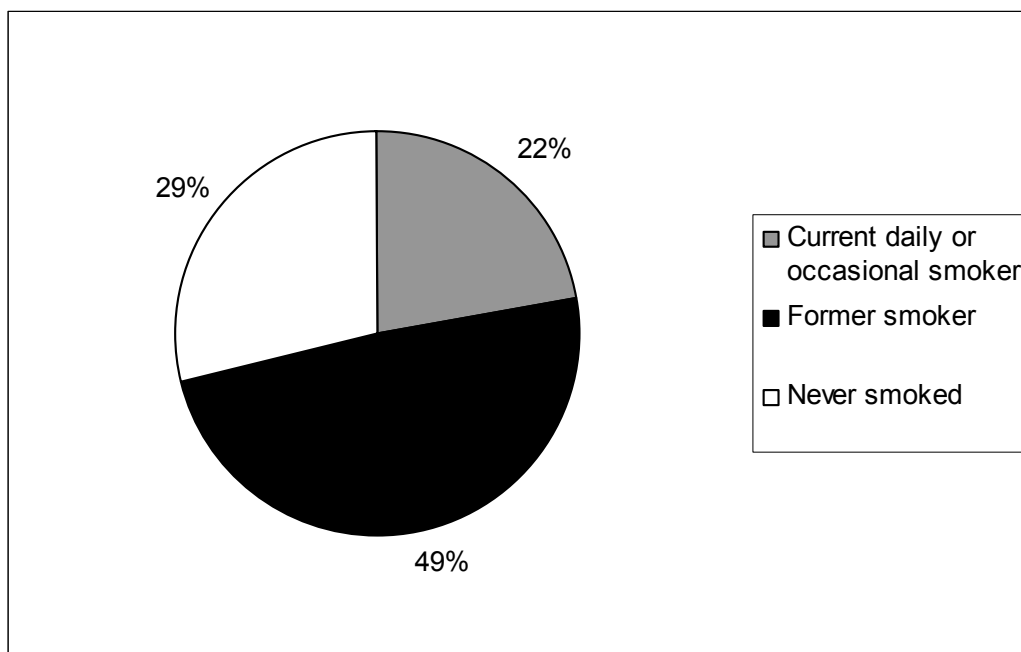
These distinctions are important because the health costs of tobacco use and the benefits of quitting accrue over time, with risks of illness and premature death gradually diminishing with length of time since quitting. See the 2000 GPI Atlantic report on *The Cost of Tobacco in Nova Scotia* for a detailed description of changes over time in smoking-attributable risks among former smokers for lung cancer, heart disease, and coronary obstructive pulmonary diseases. Any assessment of the economic costs of tobacco use therefore require a careful consideration of the percentage of current *and* former users of tobacco in the population.

In 2005, 71% of Nova Scotian males and 60% of females were either current or former smokers.

---

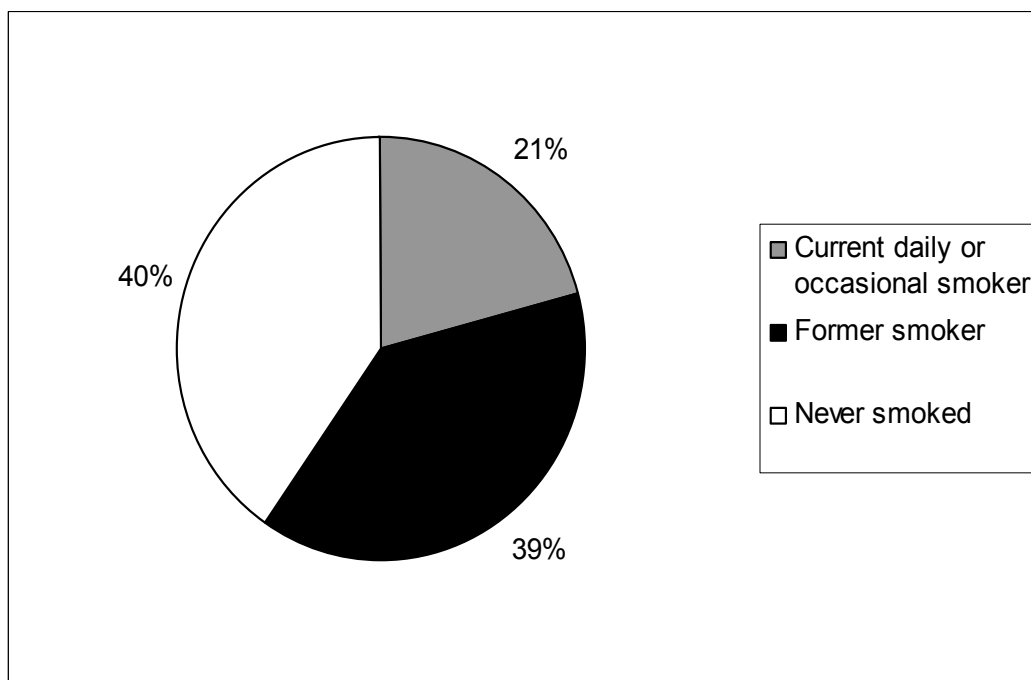
<sup>21</sup> An occasional user is defined as a smoker who smokes less than daily.

**Figure 8: Male Smoking Status, Nova Scotia, 2005**



Source: Statistics Canada. (2005) *Canadian Community Health Survey (Cycle 3.1)*. CANSIM Table no. 105-0427. [online] Available at: [cansim2.statcan.ca/cgi-win/cnsmcgi.pgm](http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm). Accessed June 2007.

**Figure 9: Female Smoking Status, Nova Scotia, 2005**



Source: Statistics Canada. (2005) *Canadian Community Health Survey (Cycle 3.1)*. CANSIM Table no. 105-0427. [online] Available at: [cansim2.statcan.ca/cgi-win/cnsmcgi.pgm](http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm). Accessed June 2007.



In 2005, tobacco use rates for men and women in NS were approximately equal—22% for males, 21% for females. But this was not always the case. In the past, smoking rates tended to be considerably higher for males than for females. Because of this, and because many Nova Scotians have now quit, the former smoker category—particularly for ages 45 years and older—is substantially higher for males than females.

As previously noted, the burden of death from tobacco use lags behind trends in cigarette consumption by as much as 30 to 60 years.<sup>22</sup> As a result, Nova Scotia presently has a large backlog of male and female smokers and former smokers who will require extensive health care system usage over the next 20 years. It is therefore very likely that Nova Scotia will experience an increase in mortality and health care expenditures attributable to smoking over the next 5 to 10 years. This is true even if smoking prevalence amongst Nova Scotia youth continues to decline.

Gradually, however, excess mortality and illness due to smoking will decline. A huge study of one million men and women undertaken by the American Cancer Society found that former light smokers reduced their risk of lung cancer to non-smoker levels after five years, while former heavy smokers reduced their risk of lung cancer by half in that period, returning to non-smoker levels after 13 years. Former light smokers reduced their risk of death from coronary heart disease by half within five years, with a return to non-smoker risk levels after the 10<sup>th</sup> year of cessation. However, it took former heavy smokers seven years to reduce their risk of heart disease death by one-third and more than ten years to reduce it by two-thirds. Because smoking causes an irreversible decline in lung function, risk levels for coronary obstructive pulmonary disease while they do decline with cessation never return to non-smoker levels.<sup>23</sup>

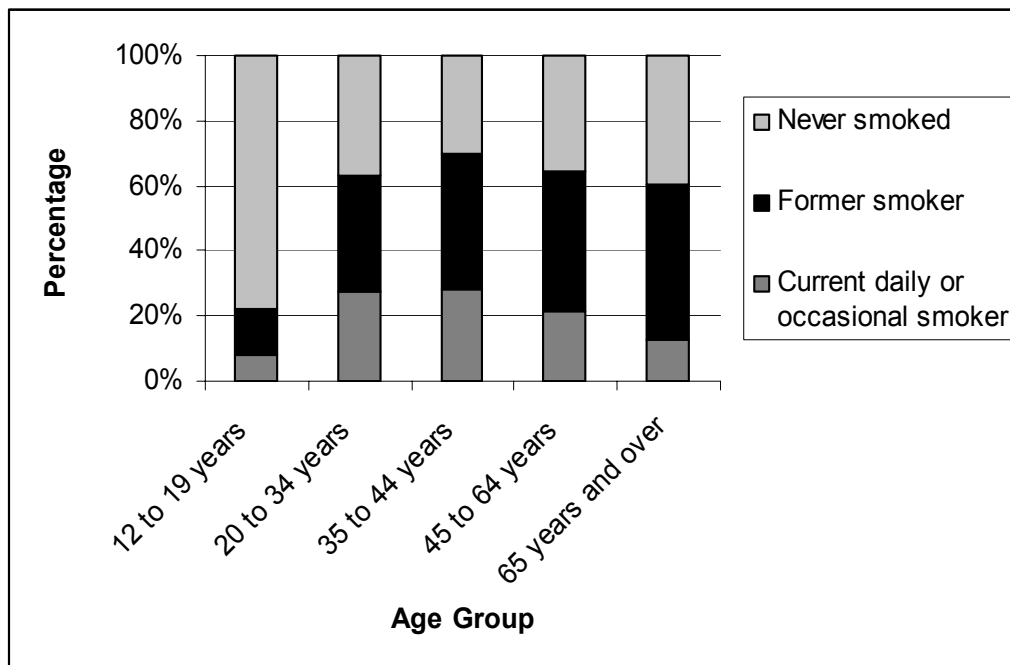
In other words, it takes time for the benefits of smoking cessation to manifest in reduced mortality, illness, health care usage, and economic costs. The age-related backlog is apparent when smoking status is examined by age and gender (Figures 9 and 10 below). Thus, fewer than 20% of men over the age of 45 have never smoked, while more than 60% are former smokers. Because women started smoking in large numbers later in time than men, the smallest number of never-smokers is in the 35 to 44 age group (approximately 30%).

---

<sup>22</sup> Thun, M. and da Costa e Silva, V. (2003). Introduction and Overview of Global Tobacco Surveillance in Shafey, O., Dolwick, S. and Guindon, G. (eds) *Tobacco Control Country Profiles*, 2<sup>nd</sup> ed, pp.7–8. [online] Available at: [www.who.int/tobacco/global\\_data/country\\_profiles/Introduction.pdf](http://www.who.int/tobacco/global_data/country_profiles/Introduction.pdf). Accessed May 2007.

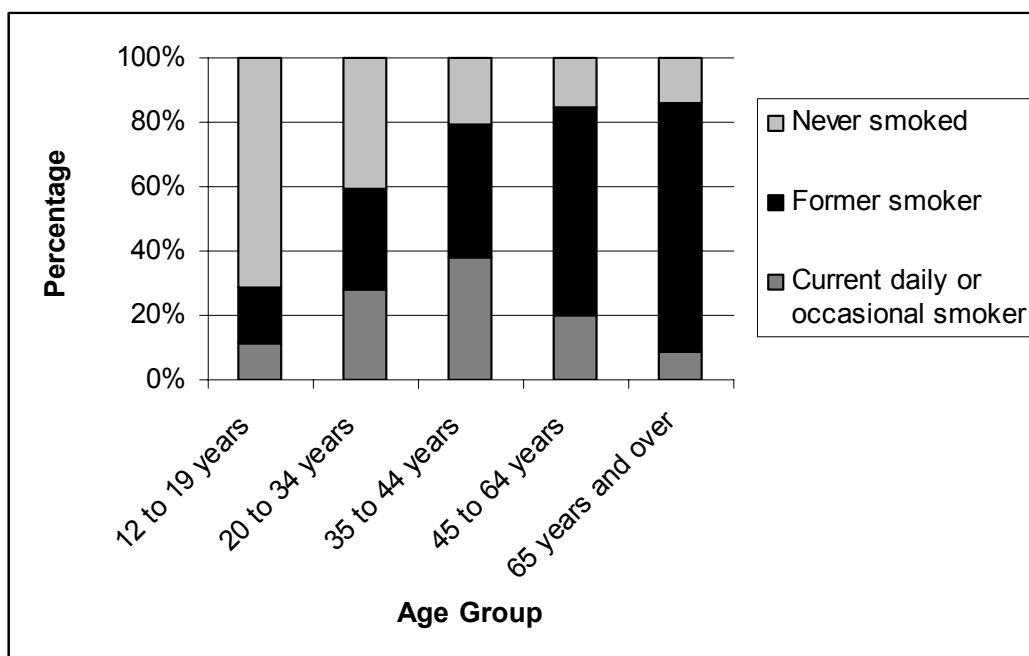
<sup>23</sup> For details, see Colman, R. (2000). *The Cost of Tobacco in Nova Scotia*. p. 33-35.

**Figure 10: Female Smoking Status (%), by Age, Nova Scotia, 2005**



Source: Statistics Canada. (2005) *Canadian Community Health Survey (Cycle 3.1)* CANSIM Table no. 105-0427. Data found in Appendix A: Table 4. [online] Available at: [cansim2.statcan.ca/cgi-win/cnsmcgi.pgm](http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm). Accessed June 2007.

**Figure 11: Male Smoking Status (%), by Age, Nova Scotia, 2005**



Source: Statistics Canada. (2005) *Canadian Community Health Survey (Cycle 3.1)* CANSIM Table no. 105-0427. Data found in Appendix A: Table 4 [online] Available at: [cansim2.statcan.ca/cgi-win/cnsmcgi.pgm](http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm). Accessed June 2007.

### ***Daily Average Cigarette Consumption in Nova Scotia, 2000 and 2005***

Table 2 shows that Nova Scotian daily smokers aged 15 and older consumed an average of 17.7 cigarettes daily in 2000, slightly higher than the Canadian average of 16.8 cigarettes. This declined slightly by 2006, to 16.4 cigarettes, slightly above the 15.7 average for Canada.

These average rates conceal considerable variation in daily consumption by age and gender. Adult males aged 25 and older in Nova Scotia have the highest daily cigarette consumption—smoking an average of 21.2 cigarettes each day in 2000 and 17.8 cigarettes per day in 2006. Youth generally smoke fewer cigarettes daily than adults, and women at every age level smoke fewer cigarettes than men. Disturbingly, however, there has been little change in the daily cigarette consumption of youth and young adults between 2000 and 2006.

**Table 2: Average Number of Cigarettes Smoked Daily by Daily Smokers, Canada and Nova Scotia, 2000 and 2006**

	<b>2000</b>		<b>2006</b>	
<b>Sex/age group</b>	<b>NS</b>	<b>Canada</b>	<b>NS</b>	<b>Canada</b>
Total--all smokers aged 15+	17.7	16.8	16.4	15.4
Youth (age 15–19)	12.9	12.7	12.6	12.3
Young adults (age 20–24)	14.3	13.9	14.3	12.9
Adult males (aged 25+)	21.2	19.8	20.4	17.8
Adult females (aged 25+)	15.7	15	12.8	14.3

Source: Health Canada, *CTUMS, 2000 and 2006*, Supplementary tables, (2), Annual results [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index_e.html). Accessed July 2007.

### ***Tobacco Use in the Atlantic Provinces, 1999 – 2005***

In 1999, tobacco use rates for youth aged 15–24 in the Atlantic Provinces were fairly similar—33% in Nova Scotia (NS), New Brunswick (NB) and Prince Edward Island (PEI), and 32% in Newfoundland (NL). Figure 12 shows an overall decline in youth tobacco use rates in the Atlantic region since 1999, with the sharpest decline in Nova Scotia. Thus, in 2005, youth smoking rates ranged from an Atlantic region high of 24% in NB and NL to a low of 20% in NS, with PEI in the middle at 22%.

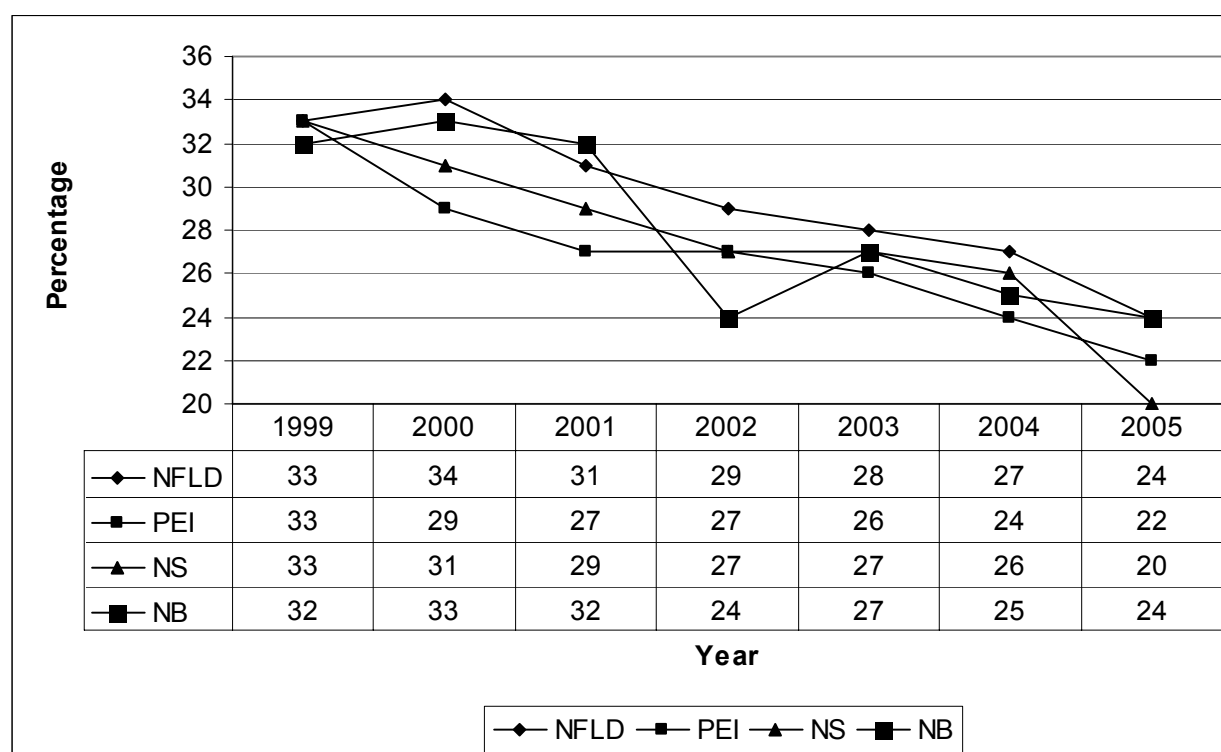
Newly released 2006 CTUMS results indicate youth rates for ages 15–19 at 16.2% for NL, 15.7% for NB, 14.8% for NS and 14.1% for PEI. For 20–24-year-olds, rates include 33.3% in NL, 32.6% in NS, 32.1% in NB and 30.6% in PEI.<sup>24</sup>

<sup>24</sup> Health Canada (2006). *Canadian Tobacco Use Monitoring Survey, Annual Results*, Supplementary Tables, Table 2. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2006/ann-table2\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2006/ann-table2_e.html). Accessed July 2007.

Figure 13 indicates there was also an overall downward trend in tobacco use among adults aged 25 and older in all four Atlantic Provinces between 1999 and 2005. In 1999, NS had the highest tobacco use rate among adults 25 and older in the Atlantic region, at 28%, followed closely by NL at 27%, NB at 25% and PEI at 24%. By 2005, adult tobacco usage rates across all Atlantic Provinces had declined and the gap between provinces narrowed to 21% in both NS and NB, 20% in NL, and 19% in PEI.

Newly released 2006 CTUMS results indicate rates for all current users (15 and older) at 21.7% for NL, 22.6% for NB, 21.8% for NS and 19.2% for PEI.<sup>25</sup>

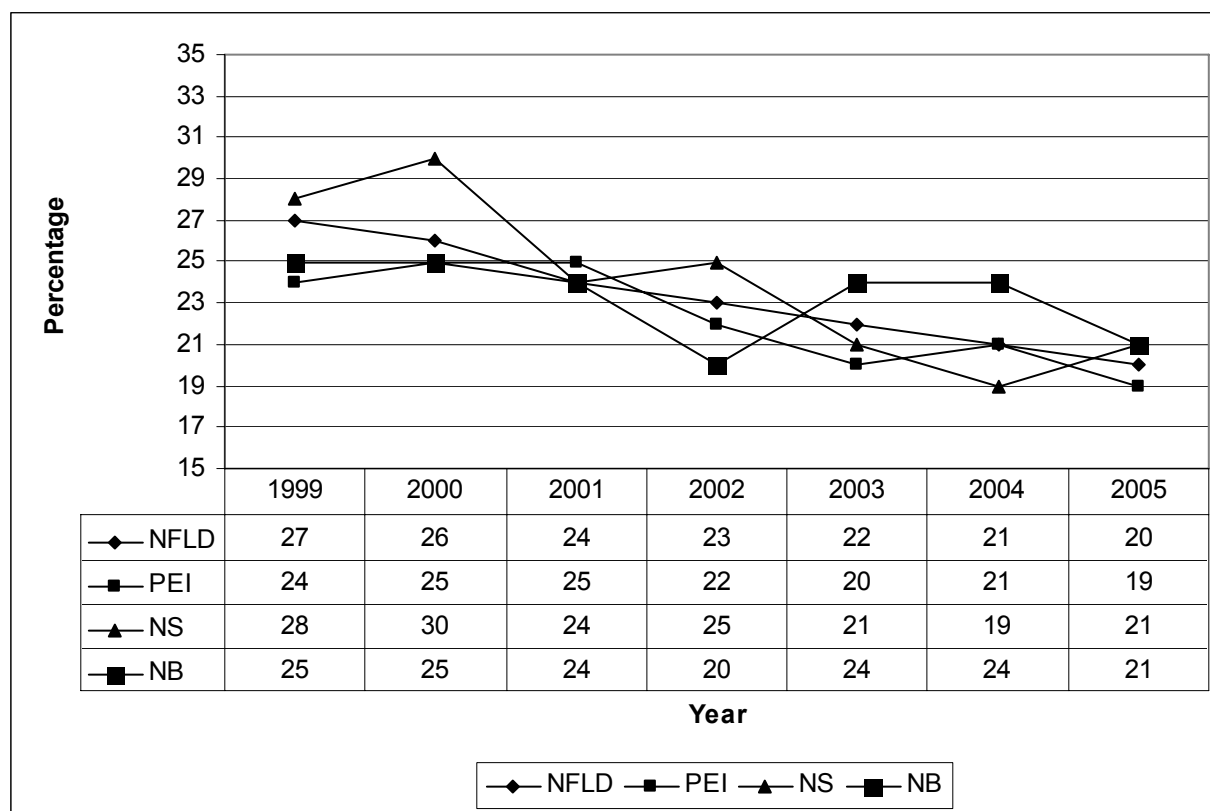
**Figure 12: Youth, (Age 15–24), Tobacco Use in Atlantic Provinces, 1999–2005**



Source: Health Canada. (2006) *Canadian Tobacco Use Monitoring Survey, Annual Results, 1999 - 2005*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index_e.html). Accessed June 2007. Rates for all provinces can be found in Appendix A: Table 1.

<sup>25</sup> Health Canada (2006). *Canadian Tobacco Use Monitoring Survey, Annual Results*, Supplementary Tables, Table 2. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2006/ann-table2\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2006/ann-table2_e.html). Accessed July 2007.

**Figure 13: Adult (Age 25+) Tobacco Use in Atlantic Provinces, 1999-2005**



Source: Health Canada. (2006) *Canadian Tobacco Use Monitoring Survey, Annual Results, 1999 - 2005*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index_e.html). Accessed June 2007. Rates for all provinces can be found in Appendix A: Table 2.

### ***Regional Trends in Tobacco Use within Nova Scotia***

In addition to understanding provincial and national trends in tobacco use prevalence, it is also important to explore regional trends, because both tobacco use and overall health status varies significantly within Nova Scotia. For example, other GPI population health reports have noted the health, risk behaviour, and socio-economic profile of Halifax has more in common with that of Ontario than it does with that of Cape Breton and some other parts of Nova Scotia.<sup>26</sup> Provincial averages, therefore, can be quite misleading in obscuring intra-provincial disparities. Unfortunately, due to data limitations, a detailed analysis of regional data is not possible, but some key trends from the available data are examined here.

Beginning with the 2000/01 CCHS, which substantially increased the survey sample size over the previous National Population Health Surveys, Statistics Canada tobacco use data have been available by health zone. Statistics Canada's Zones 2, 5 and 6 correspond exactly to three of Nova Scotia's District Health Authorities (DHAs)—Annapolis Valley Health (AVH), Cape Breton District Health Authority (CBDHA), and Capital Health (CH), respectively. Statistics

<sup>26</sup> See for example: Colman, R. (2000) *Women's Health in Atlantic Canada*, GPI Atlantic, Halifax. [online] Available at [www.gpiatlantic.org](http://www.gpiatlantic.org). Accessed June 2007.

Canada's Health Zones 1, 3, and 4 are made up of combined DHA areas—South Shore and South West (SS-SW) Health, Colchester-East Hants and Cumberland (C-EH-C) and Pictou County and Guysborough-Antigonish-Strait (P-G-A-S) respectively. See Table 3 for the corresponding six Statistics Canada health zones and Nova Scotia's nine DHAs.

**Table 3: Nova Scotian District Health Authorities and Statistics Canada Health Zones**

District Health Authorities, Nova Scotia		Statistics Canada Zones
DHA 1	South Shore (SS) Health	Zone 1
DHA 2	South West (SW) Health	Zone 1
DHA 3	Annapolis Valley (AV) Health	Zone 2
DHA 4	Colchester East Hants (C-EH) Health Authority	Zone 3
DHA 5	Cumberland (C) Health Authority	Zone 3
DHA 6	Pictou (P) County Health Authority	Zone 4
DHA 7	Guysborough Antigonish Strait (G-A-S) Health Authority	Zone 4
DHA 8	Cape Breton District Health Authority (CBDHA)	Zone 5
DHA 9	Capital Health (CH)	Zone 6

Source: Statistics Canada. (2005) *Health Regions in Canada*,. [online] Available at: [www.statcan.ca/english/freepub/82-221-XIE/2005001/regionstable1.htm](http://www.statcan.ca/english/freepub/82-221-XIE/2005001/regionstable1.htm). Accessed June 2007.

Using data from the CCHS, Figure 14 (below) illustrates tobacco use prevalence of daily and occasional smokers in 2000/01, 2003, and 2005, for each Statistics Canada health zone in Nova Scotia. Due to smaller sample sizes at the health zone level, the following results must be interpreted with some caution.

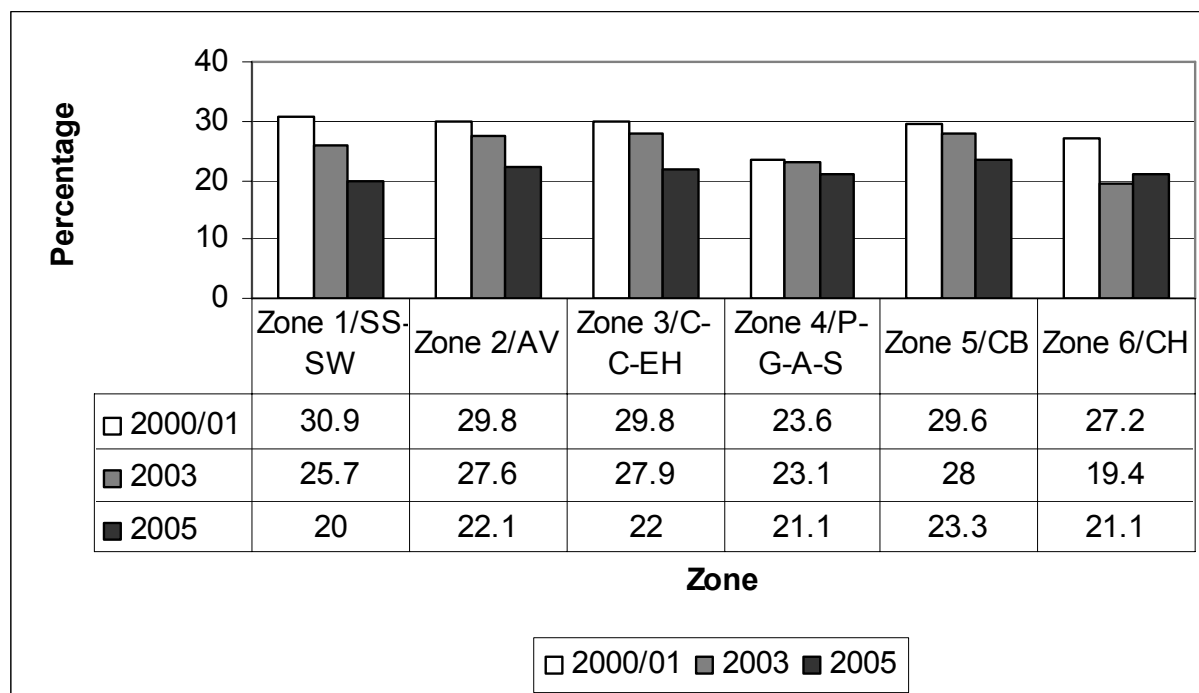
The CCHS results show declines in smoking rates for all DHA areas in the province between 2000 and 2005, with the exception of the Capital District, which saw a slight increase in smoking between 2003 and 2005 but still had the second lowest smoking rate in the province. Smoking rates fell most dramatically in the combined South Shore and South West Health region – from 30.9% in 2000 (the highest rate in the province) to 20% in 2005 (the lowest rate in the province).

Smoking rates in Annapolis Valley Health fell 7.7 percentage points, from 29.8% in 2000 to 22.1% in 2005. Smoking rates in the combined Colchester-East Hants and Cumberland Health fell from 29.8% in 2000 to 22% in 2005, a decline of 7.8 percentage points. Smoking rates in the Pictou County and Guysborough-Antigonish-Strait Health region fell 2.5 percentage points, from 23.6% in 2000 (the lowest rate in the province at that time) to 21.1% in 2005. Smoking rates in the Cape Breton District Health fell from 29.6% in 2000 to 23.3% in 2005, a decline of 6.3 percentage points. In the Capital District, smoking rates declined from 27.2% in 2000 to 21.1% in 2005, a decline of 6.1 percentage points. Rates in the Capital District were slightly lower in 2003, at 19.4% (the lowest rate in the province and below the national average), than in 2005.

It would be most instructive and informative to undertake an analysis correlating the relative changes over time in smoking rates by health zone with particular community-based tobacco control initiatives to assess the effectiveness and success of particular strategies. If, for example,

the sharp decline in smoking in the South Shore—South West Health region, were attributable to particular tobacco reduction initiatives in that region, these could serve as a model for other community-based interventions in the province and beyond.

**Figure 14: Daily or Occasional Smokers by Health Zone, Nova Scotia, Population Aged 12 and older, 2000/01/2003/2005**



Source: Statistics Canada (2000/01) *Canadian Community Health Survey (Cycle 1.1)* CANSIM Table no. 105.0027, Statistics Canada (2003) *Canadian Community Health Survey (Cycle 2.1)* CANSIM Table no. 105-0227, Statistics Canada (2005) *Canadian Community Health Survey (Cycle 3.1)* CANSIM Table no. 105-0327. [online] Available at: [cansim2.statcan.ca/cgi-win/cnsmcgi.pgm](http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm). Accessed June 2007.

The smoking rates by DHA/Health Zone area conceal important gender differences, as is illustrated by Table 4 and Figures 15 and 16. Again, small sample sizes at the health zone level require caution in interpreting the results.

Figure 15 indicates that the percentage of males who have never smoked is fairly similar across health regions—approximately 30% of the population. The only exception to this is Zone 1 (South Shore–South West Health), where fewer males have never smoked (23.7%). This correlates with the trends noted in Figure 14, which show a very high quit rate in that health zone between 2000 (when Zone 1 had the highest smoking rate in the province) and 2005 (when it had the lowest rate). Not surprisingly, this health zone has a higher than average proportion of male former smokers (54.2% compared to the provincial average of 49%).

The highest tobacco use rates among males are found in Zone 2 (Annapolis Valley Health) at 25.8% and Zone 5 (Cape Breton District Health) at 26.7%. Zone 3 (Colchester–East Hants–Cumberland) had the lowest male smoking rate in the province in 2005, at 15.1%, and—



correspondingly—the largest percentage of male former smokers (57.2%). This appears to indicate this region made significant strides to reduce smoking rates among males.

In all health regions, the percentage of females who have never smoked is higher than the percentage of males who have never smoked. This difference is greatest in Zone 4 (Pictou-Guysborough-Antigonish-Strait), where in 2005, 47.9% of women but only 28% of men indicated they have never smoked—a difference of nearly 20 percentage points. The gender difference is smallest in Zone 2 (Annapolis Valley Health), where 31.6% of women and 31.3% of men indicated they have never smoked. Correspondingly, nearly 50% of women in the Annapolis Valley identified themselves as former smokers in 2005—the highest proportion in the province and well above the provincial average of 39%.

In all regions of the province except Zone 3 (Colchester-East Hants-Cumberland), smoking rates for females in 2005 were lower than smoking rates for males. In Zone 3, there were almost twice as many female as male smokers in 2005 (28.6% versus 15.1%). In 2005, the lowest female smoking rates in the province were in Zone 1 (South Shore-South West Health) and Zone 2 (Annapolis Valley Health), at 18.2% and 18.7% respectively.

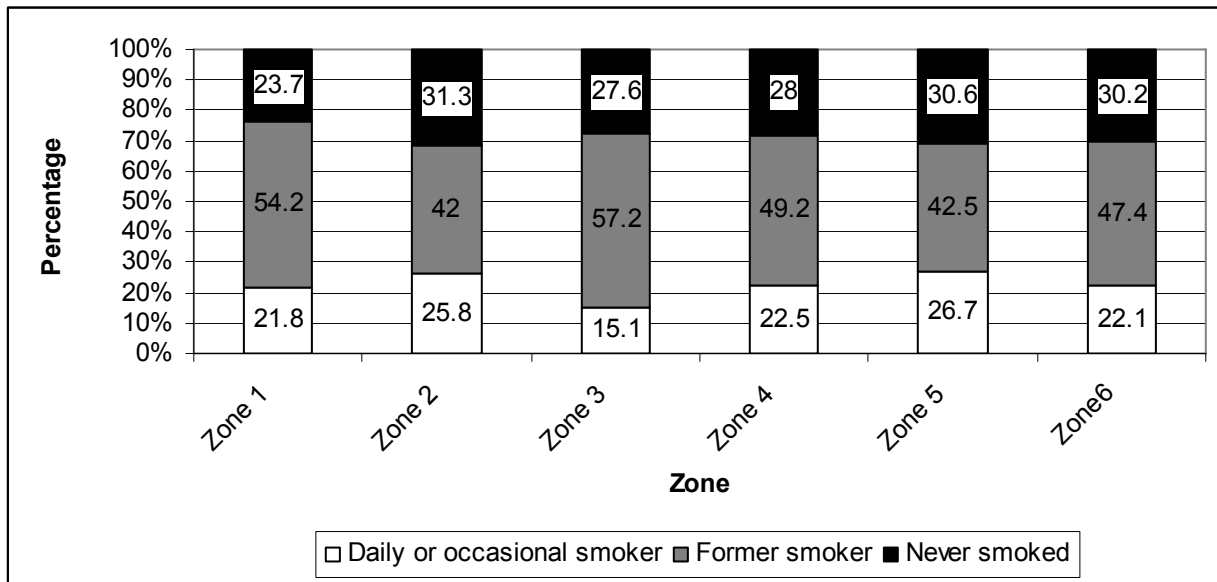
**Table 4: Smoking Status by Health Zone and Gender, Population Aged 12 and Older, Nova Scotia, 2005**

	<b>Zone 1</b>	<b>Zone 2</b>	<b>Zone 3</b>	<b>Zone 4</b>	<b>Zone 5</b>	<b>Zone 6</b>
<b>Male</b>						
Daily or occasional smoker	21.8	25.8	15.1	22.5	26.7	22.1
Former smoker	54.2	42	57.2	49.2	42.5	47.4
Never smoked	23.7	31.3	27.6	28	30.6	30.2
<b>Female</b>						
Daily or occasional smoker	18.2	18.7	28.6	19.7	20.2	20.3
Former smoker	43	49.7	32.5	32.4	35.6	39.3
Never smoked	38.7	31.6	39	47.9	44.2	40.4

Source: Statistics Canada (2005) *Canadian Community Health Survey (Cycle 3.1)*. CANSIM Table no. 105.0327. [online] Available at: [cansim2.statcan.ca/cgi-win/cnsmcgi.pgm](http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm). Accessed June 2007.

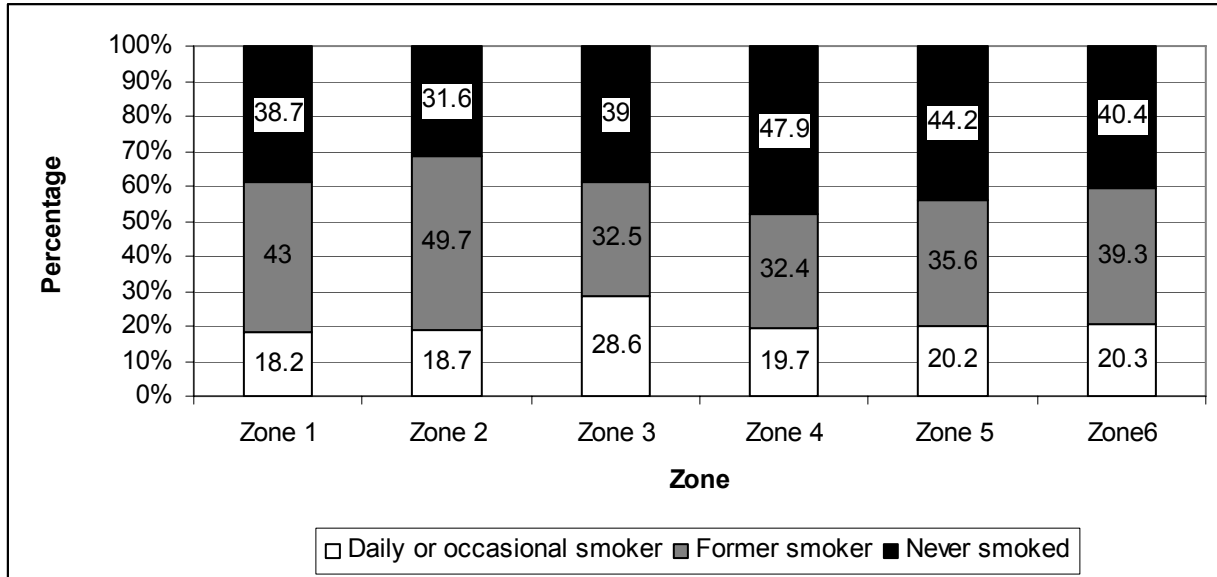


**Figure 15: Smoking Status by Health Zone, Males, Aged 12 and Older, Nova Scotia, 2005**



Source: Statistics Canada (2005). *Canadian Community Health Survey (Cycle 3.1)*. CANSIM Table no. 105.0327. [online] Available at: [cansim2.statcan.ca/cgi-win/cnsmcgi.pgm](http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm). Accessed June 2007. Data found in Appendix A: Table 10.

**Figure 16: Smoking Status by Health Zone, Female, Nova Scotia, 2005**



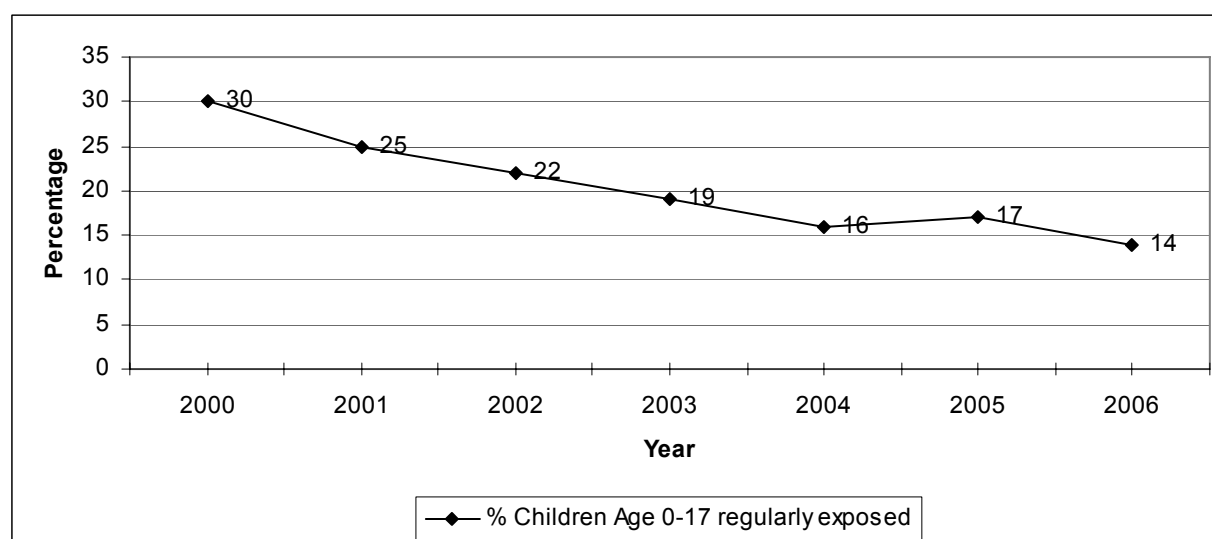
Source: Statistics Canada (2005). *Canadian Community Health Survey (Cycle 3.1)*. CANSIM Table no. 105.0327. [online] Available at: [cansim2.statcan.ca/cgi-win/cnsmcgi.pgm](http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm). Accessed June 2007.

### 1.3 Trends in Exposure to Environmental Tobacco Smoke (ETS): Canada and Nova Scotia

Exposure to ETS in all settings varies by province, depending on the dates that restrictive smoke-free legislation was introduced. Nova Scotia currently has the most restrictive Smoke-free Public Places legislation in the country, with the introduction of a partial ban on tobacco use in public places and workplaces in 2003 and a total ban in 2006.<sup>27</sup>

Health Canada CTUMS results indicate that 9.2% of Canadian children and 10.5% of Nova Scotian children (aged 0–11) were regularly exposed to ETS at home in 2006, as were 14.2% of Canadian teenagers and 18% of Nova Scotian teenagers (aged 12–17).<sup>28</sup> As shown in Figure 17, below, an average of 14% of Nova Scotian children (age 0–17) were regularly exposed to ETS in the home in 2006—the third highest rate of ETS exposure in Canadian provinces behind Quebec at 21.6% and Saskatchewan at 15.4%. However, as shown in Figure 17, exposure of children (age 0–17) to ETS within the home has declined steadily in Nova Scotia over time, from 30% in 2000 to the current rate of 14% in 2006.

**Figure 17: Regular Exposure of Children (0–17) to ETS in the Home, Nova Scotia, 2000–2006**



Source: Health Canada. *CTUMS Annual Results 2000 – 2006, Supplementary Tables* [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2005/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2005/index_e.html). Data found in Appendix A: Table 5.

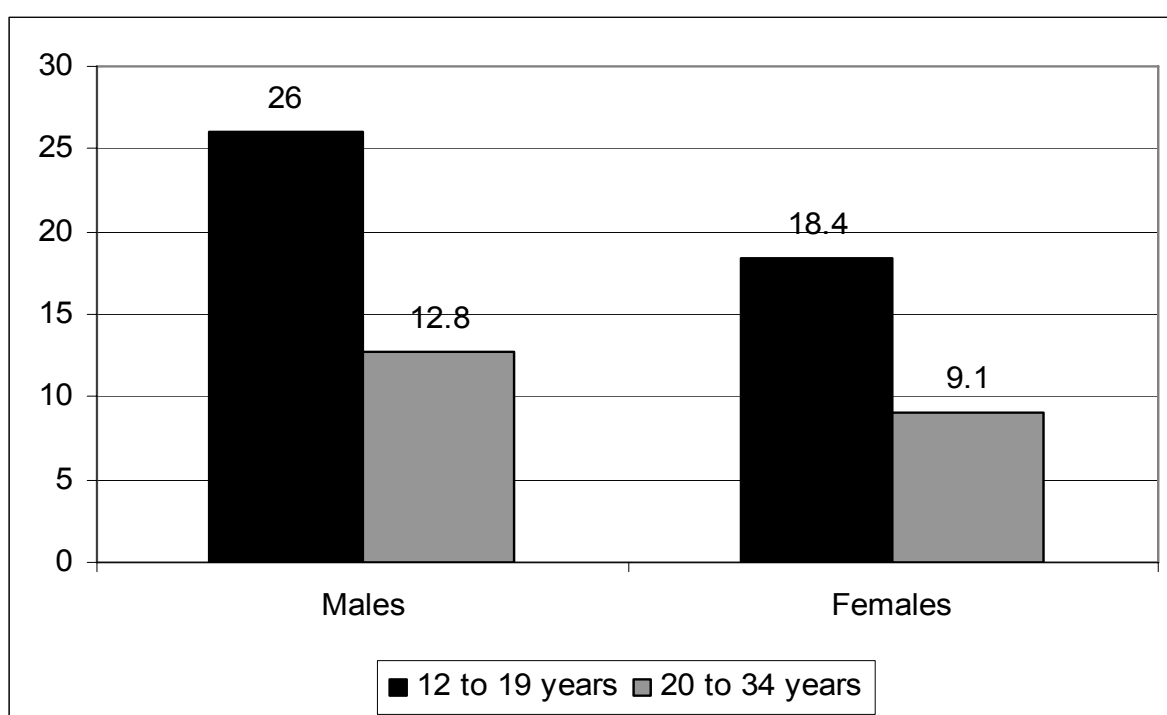
<sup>27</sup> For details, see Appendix B

<sup>28</sup> Health Canada. (2006). *Canadian Tobacco use Monitoring Survey, Supplementary Tables* (Table 9). [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2006/ann-table9\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2006/ann-table9_e.html) Accessed July 2007.

CCHS data assess ETS<sup>29</sup> exposure in vehicles and public places. In 2005, 8.1% of non-smoking Canadians and 9.1% of non-smoking Nova Scotians (aged 12 and older) reported being exposed to SHS in a vehicle. However, 14.7% of Canadians but only 9.2% of Nova Scotians reported exposure in public places in the month previous to the survey.<sup>30</sup> Nova Scotians' much lower rate of SHS exposure in public places in 2005, compared to the Canadian average, is certainly due to its 2003 Smoke-free Places Act.

Figure 18 indicates a particularly high rate of ETS exposure in 2005 for teenage males (age 12–19) in Canada (26%), compared with teenage females (18.4%) and adults aged 20–34.

**Figure 18: Exposure to ETS among Non-Smoking Teens (aged 12–19) and Young Adults (aged 20–34), Canada, 2005**



Source: Statistics Canada (2005) *Canadian Community Health Survey (Cycle 3.1)*. CANSIM Table no. 105-0457. [online] Available at: [cansim2.statcan.ca/cgi-win/cnsmcgi.pgm](http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm). Accessed June 2007.

Between 2003 and 2005 an increasing number of households in all provinces and territories in Canada completely restricted smoking in the home (see Table 5). Some 66% of Nova Scotian households reported complete smoking restrictions in 2005, a significant increase from 59% just two years earlier. In fact, a greater proportion of Nova Scotian households are restricting smoking in the home than the Canadian average (64%)—possibly also as a result of the province's comprehensive tobacco control strategy, media campaign, and awareness generated the 2003 Smoke-free Places legislation.

<sup>29</sup> Cited as SHS exposure in original source.

<sup>30</sup> Source: CCHS, Table No 105-0457, June 2005. [online] Available at: [www.cansim2.statcan.ca](http://www.cansim2.statcan.ca). See Table 14, Appendix A.

However, Table 5 indicates further progress in this area is certainly possible. More than one-third of Nova Scotian households were still not completely restricting smoking in the home in 2005, compared to less than one-quarter in British Columbia—which has the highest rate of home smoking bans in the country at 77%.

**Table 5: Households where Smoking is Completely Restricted, Canada by Province and Territory, 2003 and 2005**

	2003 (%)	2005 (%)
Canada	56.5	64.1
British Columbia	71.7	76.7
Alberta	65.7	71.6
Ontario	63.7	70.6
Nunavut	54.1	67.9
Manitoba	58.3	67.5
Nova Scotia	58.5	66.1
Saskatchewan	55.7	64.3
Prince Edward Island	57.6	63.9
Newfoundland and Labrador	54.1	63.7
Northwest Territories	55.9	63.5
Yukon	62.1	62.2
New Brunswick	54.0	61.3
Quebec	32.9	43.0

Source: Statistics Canada (2006) *Smoking and Diabetes Care: Results from the CCHS Cycle 3.1 (2005)*. [online] Available at: [www.statcan.ca/english/research/82-621-XIE/82-621-XIE2006002.pdf](http://www.statcan.ca/english/research/82-621-XIE/82-621-XIE2006002.pdf). Accessed June 2007.

An increasing number of Canadian workers are employed at workplaces where smoking is restricted (Table 6 below). In 2005, 64% of Nova Scotian workers (aged 15–75) reported being employed at places where smoking was completely restricted. This is a significant increase from only 53% in 2000/01, although it remained slightly below the Canadian average of 68% in 2005. In fact, Nova Scotia's rate of employment in smoke-free workplaces in 2005 was the second lowest in the country after Alberta (61%). This is surprising in light of Nova Scotia's Smoke-free Places legislation, which restricted tobacco use in most workplaces in 2003 (see Appendix B for legislation details). Statistics Canada has noted difficulty measuring workplace smoking restrictions, due to confusion with the wording of the survey question. In many cases respondents indicate that smoking is permitted in designated areas even if there is a total ban inside the building. This makes it difficult to rely on reported trends for workplace smoking restrictions at present.<sup>31</sup>

<sup>31</sup> Statistics Canada. (2007) *Health Reports*, Vol. 18, no. 3. Catalogue no. 82-003.

**Table 6: Workers (aged 15–75) Employed at Places where Smoking is Completely Restricted, Canada by Province and Territory, 2000/01, 2003 and 2005**

	2000/01 (%)	2003 (%)	2005 (%)
Canada	62	67	68
Nunavut	68	76	92
Northwest Territories	58	68	83
Yukon	60	69	79
Manitoba	57	67	76
Ontario	65	69	71
Newfoundland/Labrador	61	63	69
British Columbia	69	72	69
Prince Edward Island	48	66	67
New Brunswick	51	56	67
Quebec	62	66	67
Saskatchewan	51	53	65
Nova Scotia	53	64	64
Alberta	51	60	61

Source: Statistics Canada (2006) *Smoking and Diabetes Care: Results from the CCHS Cycle 3.1 (2005)*. [online] Available at: [www.statcan.ca/english/research/82-621-XIE/82-621-XIE2006002.pdf](http://www.statcan.ca/english/research/82-621-XIE/82-621-XIE2006002.pdf). Accessed June 2007.

### ***Exposure to ETS in Nova Scotia's Health Regions***

In examining trends in exposure to ETS across Nova Scotia's health regions, smaller sample sizes and consequent data limitations do not allow for a complete breakdown by age. Indeed, for many regions there is not enough information to produce reliable results, and the following results should therefore be interpreted with caution. Comparative data from 2003 are included in Appendix A, Data Table 6.

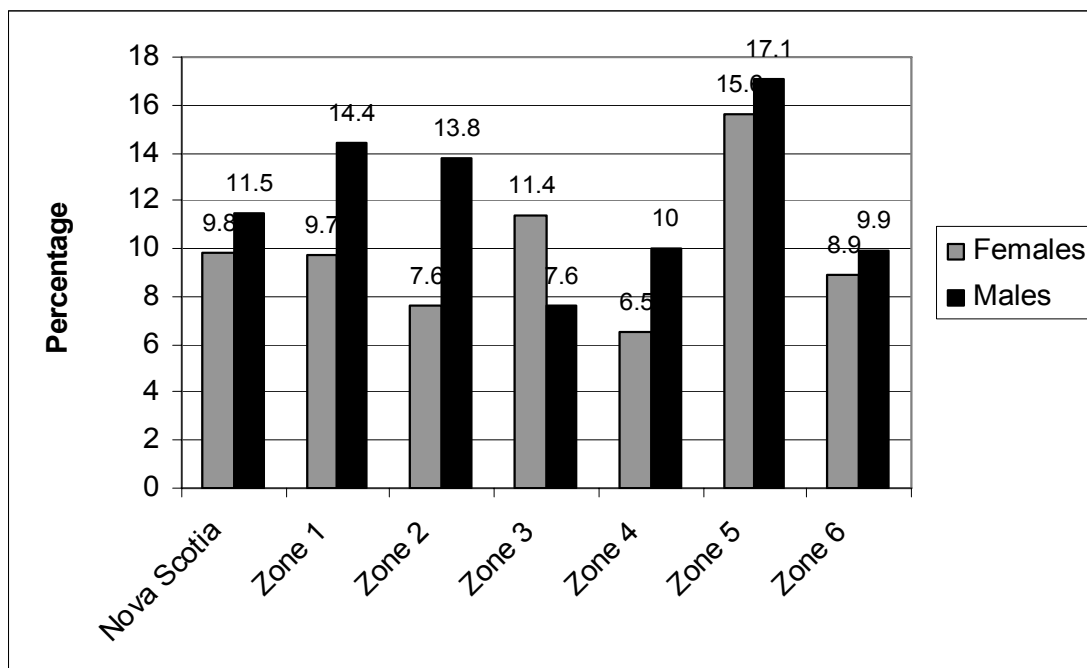
2005 CCHS results show that 11.5% of Nova Scotia's non-smoking males and 9.8% of the province's non-smoking females had been exposed to ETS in the home in the past month (see Figure 19, below). Figure 19 indicates that ETS exposure in the home is highest in the CBDHA, where 17.1% of males 12 and older and 15.8% of non-smoking females are regularly exposed to ETS in the home.

In every health zone except for Zone 3 (Colchester-East Hants-Cumberland), males were more likely to be exposed to ETS than females. It is noteworthy that Zone 3, the Colchester-East Hants-Cumberland region, is also the only region in the province where more women than men smoke and in 2005 recorded the highest rate of female tobacco use (28.6% of women compared to 15.1% of men).

The CBDHA also has the highest rate in the province of ETS exposure in motor vehicles – 14.5% for non-smoking males, 12.2% for non-smoking females—compared to the provincial average of 9.9% for males and 8.3% for females (Figure 20, below). As with ETS exposure in the home (Figure 19), males are more likely to be exposed to ETS in vehicles than females in

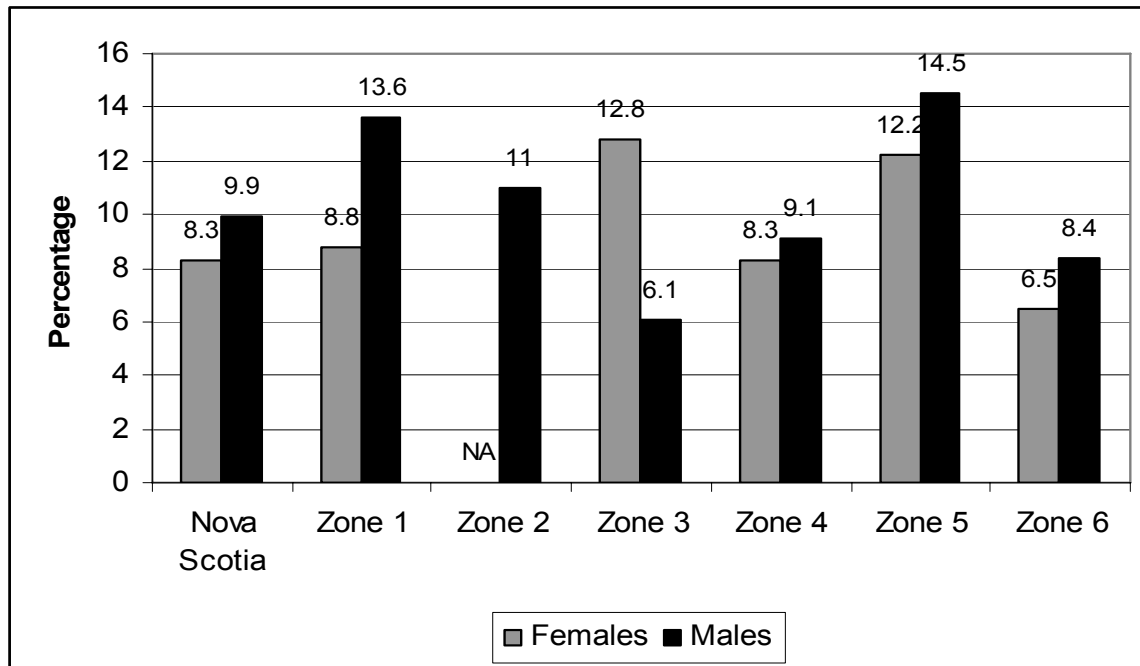
every health region except for Zone 3 (Colchester-East Hants-Cumberland), where more than twice as many women as men are exposed to ETS in vehicles (12.8% versus 6.1%).

**Figure 19: Exposure to ETS at Home, Non-Smoking Population aged 12 and older, Nova Scotia, 2005**



Source: Statistics Canada (2005). *Canadian Community Health Survey (Cycle 3.1)* CANSIM Table no. 105-0456. See Appendix A: Data Table 5. [online] Available at: [cansim2.statcan.ca/cgi-win/cnsmcgi.pgm](http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm). Accessed June 2007.

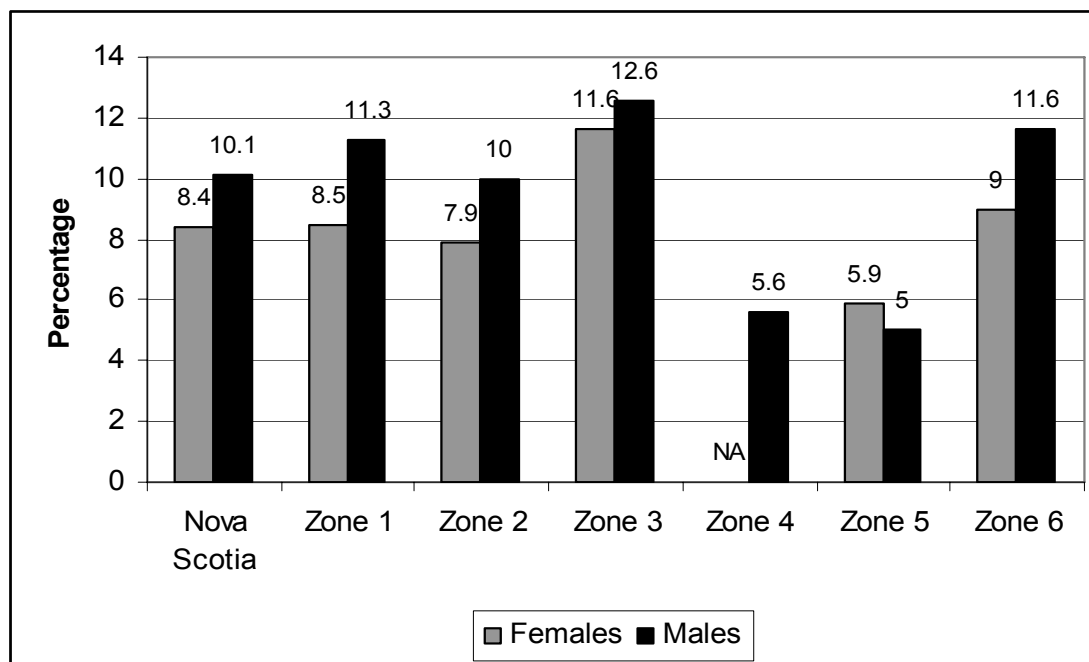
**Figure 20: Exposure to ETS in Motor Vehicles, Non-Smoking Population aged 12 and older, Nova Scotia, 2005**



Source: Statistics Canada. (2005). *Canadian Community Health Survey (Cycle 3.1)*. CANSIM Table No 105-0457. See Appendix A: Data Table 6. [online] Available at: [cansim2.statcan.ca/cgi-win/cnsmcgi.pgm](http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm). Accessed June 2007.

Interestingly, the relatively high exposure CBDHA residents have to ETS in private settings like homes and cars is not all the case in public places, where they have the lowest exposure rates in the province. As Figure 21 demonstrates, only 5.9% of CBDHA non-smoking males and 5% of non-smoking females aged 12 and older reported exposure to ETS in public places—considerably less than the provincial average of 10.1% for males and 8.4% for females. This may illustrate the effectiveness of regulatory systems—with CBDHA introducing a staged comprehensive by-law mandating smoke-free public places in 2003.

**Figure 21: Exposure to ETS in Public Places, Non-Smoking Population aged 12 and older, Nova Scotia, 2005**



Source: Statistics Canada. (2005) *Canadian Community Health Survey (Cycle 3.1)*. CANSIM Table No 105-0457. See Appendix A; Data Table 6. [online] Available at: [cansim2.statcan.ca/cgi-win/cnsmcgi.pgm](http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm). Accessed June 2007.

### ***Trends in Tobacco Sales: Nova Scotia***

As shown in Figure 22, legal cigarette sales in Nova Scotia declined steadily from 1.6 billion in 1989 to 1.12 billion in 1993 (a drop of 30%), but then rose dramatically (by 29%) in a single year in response to the government's sharp cut in tobacco taxes. Sales were 1.45 billion in 1994, rose further to 1.56 billion in 1996, and then stabilized at approximately 1.5 billion in 1997–2000, before falling sharply again in response to higher tobacco taxes.

Overall, from 1996 to 2005, cigarette sales in Nova Scotia declined by 35%. However, most of that drop occurred in the space of just two years, in direct response to the series of sharp increases in provincial and federal tobacco taxes that occurred between April 6, 2001, and January 9, 2003; during this period tobacco taxes went up by \$21.50 per carton. Between 2001 and 2003 cigarette sales fell by 23% from 1.34 billion to 1.04 billion. But since the end of these price increases, sales stabilized with only a 2% decline between 2003 and 2005 (from 1.04 billion to 1.01 billion).

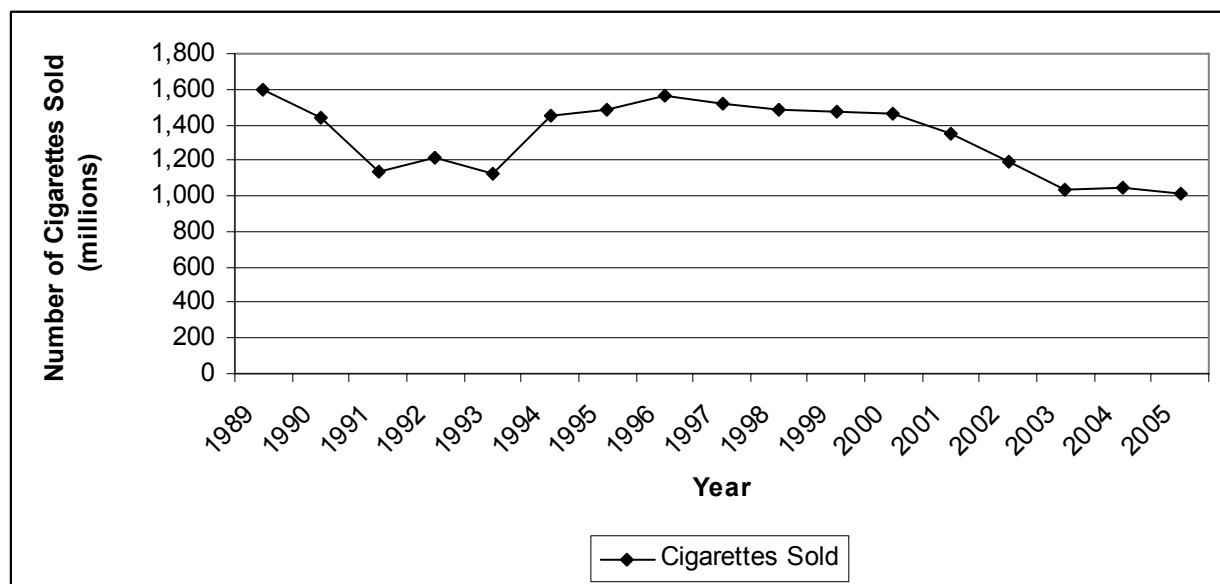
In sum, it can be misleading to take the high cigarette sale levels of 1994–2000 as a starting point for trend analysis, since sales were pushed sharply upward by the drastic cuts in tobacco taxes that occurred in February, 1994. Indeed the previous, ongoing decline in sales was thwarted and nipped in the bud by these tax cuts. Despite the sharp downward trend in sales between 2000 and 2003 indicated in Figure 22, therefore, it is also apparent that 2005 sales are down by less than



10% from 1993 levels—not a very impressive decline in consumption from a long-term perspective. Indeed, one billion cigarettes a year still represents approximately one pack of cigarettes for every man, woman, and child in Nova Scotia each week—a level that can still be considered unacceptably high in light of the reality that tobacco is the only product sold legally that causes sickness and death when used exactly as intended.<sup>32</sup>

On the positive side, the trend in Figure 22 dramatically demonstrates the powerful impact of tobacco taxes on cigarette consumption. It also confirms a detailed 1999 World Bank assessment of various tobacco control interventions throughout the world that concludes unequivocally that, “tax increases are by far the most cost-effective intervention” examined.<sup>33</sup> As the Nova Scotia evidence clearly indicates, further tax increases have the potential to curb cigarette consumption further and to resume the decline in cigarette sales that occurred between 2000 and 2003, and has stalled since that time.

**Figure 22: Cigarettes Sold in Nova Scotia, 1989–2005**



Source: Health Canada (2005) *Wholesale Sales Data*, Tobacco Control Program. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/indus/sales-ventes/ns\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/indus/sales-ventes/ns_e.html). Accessed May 2007. Data found in Appendix A: Table 7.

<sup>32</sup> Moore, M., and Mikhail, C. (1996). A New Attack on Smoking Using an Old-Time Remedy, *Public Health Reports*, May-June, Vol. 111, p. 1999.

<sup>33</sup> World Bank. (1999). *Curbing the Epidemic: Governments and the Economics of Tobacco Control*. The World Bank, Washington, DC, p. 77.

## Section 1: Summary of Key Observations

- There has been a wide range of tobacco reduction interventions influencing the demand for tobacco in Nova Scotia from 1999 to 2005 at the federal, provincial, municipal, community, and school levels, including a comprehensive tobacco reduction strategy, strong Smoke-free Places legislation, increases in tobacco taxes, warning labels on cigarettes, increased enforcement, community and school-based cessation programs, and prevention and reduction activities.
- Tobacco use has declined dramatically since 1999 in Nova Scotia, with smoking rates falling more than 7 percentage points from 29% in 1999 to 22% in 2006, a 24% decline.
- Tobacco use among young adults (age 20–24) dropped from 37% to 33% between 1999 and 2006, an 11% decline. In the same period, Nova Scotia experienced dramatic reductions in smoking rates among teens (age 15–19), with rates dropping from 30% to 15%, a decline of 50%.
- Nova Scotia has gone from having the second-highest tobacco use rate in the country (29%) in 1999 to one comparable with most Canadian provinces (22%) in 2006.
- The vast majority of Nova Scotians (78% of males and 79% of females) do not smoke. In 2005, 29% of Nova Scotian males and 40% of females reported they had never smoked, while 49% of males and 39% of females reported having quit.
- Former smokers may still experience negative health effects as a result of their earlier smoking behaviour even after they have quit smoking, as risks associated with smoking gradually diminish over time. In 2005, 71% of Nova Scotian males and 60% of females were either current or former smokers.
- In 2005, tobacco use rates for men and women in Nova Scotia were approximately equal—22% for males, 21% for females.
- Daily cigarette consumption among daily smokers has declined in Nova Scotia, from 17.7 cigarettes a day in 1999 to 16.4 in 2006, which is slightly higher than the 15.4 cigarettes a day average for Canadian daily smokers.
- Adult male daily smokers in Nova Scotia aged 25 and older smoked an average of 20 cigarettes each day in 2006, while youth generally, and young adult females particularly, smoke the fewest number of cigarettes of all daily smokers.
- Smoking rates have declined in all health zone areas in the province between 2000 and 2005, with the exception of the Capital District (which experienced a slight increase in rates between 2003 and 2005). The largest declines in smoking rates for this period were experienced in the South Shore-South West Health region.

- In 2005, smoking rates in each of Nova Scotia's health zones were relatively similar, ranging from a low of 20% to a high of 23.3%. Important gender differences in smoking rates are seen by health zone with the Colchester-East Hants-Cumberland region standing out as the only health zone with a considerably larger number of female than male smokers.
- Exposure of children (age 0–17) to ETS within the home has declined steadily in Nova Scotia over time, from 30% in 2000 to 14% in 2006.
- Exposure rates to ETS vary considerably by health zone across Nova Scotia, with the Cape Breton District Health Authority having the highest rate of exposure in private settings (homes and cars), but considerably lower than average exposure in public places—perhaps due to that region's pioneering smoke-free by-law.
- A greater proportion of Nova Scotia households, 66%, are restricting smoking in the home than the Canadian average (64%). Nevertheless, almost 34% of households in Nova Scotia are still not completely restricting smoking in the home.
- In 2005, 64% of Nova Scotians were employed in work places where tobacco use is completely restricted—a significant increase from 53% in 2000/01. However, this was still below the Canadian average of 68% in 2005.
- After a spike in cigarette sales following cuts to tobacco taxes in February, 1994, the number of cigarettes sold in the province declined from approximately 1.48 billion in 1999 to 1 billion in 2005—largely in response to sharp increases in tobacco taxes between 2001 and 2003.

## SECTION 2: THE COSTS OF TOBACCO USE

Tobacco use is on the decline in industrialized countries but is rising rapidly in the developing world. However, the burden of death from tobacco use lags behind trends in cigarette consumption by 30–60 years. So although tobacco use prevalence is on the decline in industrialized countries like Canada, death and illness resulting from its use are high and will remain high for years to come.<sup>34</sup>

The health effects of tobacco use are well documented, and therefore only a very brief summary is provided in this report. These health effects are physically and emotionally devastating, but they also carry economic costs—to the users of tobacco, to their families, and to society as whole. This chapter therefore briefly summarizes some key health effects of tobacco use and then examines its consequent economic costs to individuals and society in Nova Scotia.

Tobacco use has been proven to cause premature death and a wide range of illnesses. Smoking is the leading cause of preventable death in Canada and is the single most important preventable cause of lung cancer, which is the leading cause of cancer death in Canada.<sup>35</sup>

Nova Scotia has one of the highest cancer rates in the country. Of all Canadian provinces, Nova Scotia has the highest female cancer mortality rate (169/100,000) and the second-highest male cancer mortality rate (248/100,000). Lung cancer is the leading cause of cancer death among Nova Scotians, and Nova Scotia's female mortality rates from lung cancer are the second highest in the country.<sup>36</sup>

In addition to lung cancer, smoking also causes cancer of the mouth, throat, larynx, esophagus, bladder, stomach, kidney, and pancreas, and is a contributing cause of leukemia. Smoking can increase the risk of cervical cancer in women, hasten bone density loss, alter menstrual function, and increase risk for conception delay and infertility. Smoking causes chronic obstructive pulmonary diseases (COPD) – which refer to a range of respiratory illnesses that include emphysema, chronic bronchitis, and asthmatic bronchitis. It also causes general shortness of breath, coughing, and wheezing. Smoking also causes a range of cardiovascular diseases, including heart attacks, angina, strokes, and blood vessel blockages in the extremities.<sup>37</sup>

The evidence demonstrates that exposure to environmental tobacco smoke (ETS) also negatively affects health, increasing risks for heart problems, lung cancer, breathing problems, chest and ear

---

<sup>34</sup> Thun, M. and da Costa e Silva, V. Introduction and Overview of Global Tobacco Surveillance in Shafey, O., Dolwick, S. and Guindon, G. (eds) (2003). *Tobacco Control Country Profiles*, 2<sup>nd</sup> ed, p. 7 - 8. [online] Available at: [www.who.int/tobacco/global\\_data/country\\_profiles/Introduction.pdf](http://www.who.int/tobacco/global_data/country_profiles/Introduction.pdf). Accessed May 2007.

<sup>35</sup> Health Canada. (2005). *Health Effects of Smoking*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/body-corps/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/body-corps/index_e.html) and US CDC. 2006. *Health Effects of Cigarette Smoking*. [online] Available at: [www.cdc.gov/tobacco/data\\_statistics/Factsheets/health\\_effects.htm](http://www.cdc.gov/tobacco/data_statistics/Factsheets/health_effects.htm). Both accessed May 2007.

<sup>36</sup> Canadian Cancer Society (2007). *Canadian Cancer Statistics 2007*.

<sup>37</sup> Health Canada. (2005). *Health Effects of Smoking*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/body-corps/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/body-corps/index_e.html) and US CDC. (2006). *Health Effects of Cigarette Smoking*. [online] Available at: [www.cdc.gov/tobacco/data\\_statistics/Factsheets/health\\_effects.htm](http://www.cdc.gov/tobacco/data_statistics/Factsheets/health_effects.htm). Both accessed May 2007.

infections, coughing, and throat irritation. Children are especially sensitive to the harmful effects of ETS, including being at increased risk for asthma and ear infections.<sup>38</sup> Maternal smoking during pregnancy also has many adverse health effects, including increased risks for pre-term delivery, stillbirth, spontaneous abortion, placental abruption, low birth weight babies, and Sudden Infant Death Syndrome (SIDS).<sup>39</sup>

Use of tobacco products causes individuals to suffer unnecessary disease and premature death and bear economic and health costs. But, society also bears economic costs of tobacco use—including the costs of hospitalization, medications, physician fees, lost economic productivity due to missed work time, lost unpaid work time in the home and community, and so on. These societal costs are sometimes known as ‘externalities.’ Normally, people make choices based on their own personal costs, but they rarely consider these external costs borne by others and by society at large.

This section of the report estimates the number of deaths in Nova Scotia that can be attributed annually to tobacco use and exposure to ETS. Economic costs of tobacco use were estimated within these five categories:

1. Direct health care costs: physician services, medications, and hospitalization
2. Indirect costs: cost of productivity losses due to premature mortality and short and long term disability
3. Cost of fires due to smoking
4. Tobacco related prevention and research costs
5. Employer costs attributable to employing smokers.

Estimates of these mortality and costs attributable to tobacco use in Nova Scotia are summarized in Table 13. This section of the report also notes some of the challenges and limitations of cost estimations and it summarizes the findings of other Canadian tobacco cost studies.

## **2.1 Deaths Due to Tobacco Use in Nova Scotia**

### ***Calculating Smoking-attributable Mortality (SAM)***

In this report, deaths due to tobacco use in Nova Scotia are estimated using a disease-specific Smoking-attributable Mortality (SAM) approach.<sup>40</sup> Smoking-attributable Mortality (SAM) estimates the number of deaths that could theoretically be prevented for each smoking-related disease category if tobacco use were eliminated—essentially calculating the number of deaths due to tobacco use.

---

<sup>38</sup> Health Canada. (2005). *Second-hand Smoke: Does it Affect Health?* [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/body-corps/second/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/body-corps/second/index_e.html). Accessed April 2007.

<sup>39</sup> Health Canada. (2005). *Pregnancy*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/body-corps/preg-gros/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/body-corps/preg-gros/index_e.html). Accessed April 2007.

<sup>40</sup> See application of this method by Levin, M. (1953). The occurrence of lung cancer in man. *Acta Unio Internationalis Contra Cancrum*, Vol. 19, p. 531–541; and by Lilienfeld A and Lilienfeld, D. (1980). *Foundations of epidemiology*. 2<sup>nd</sup> ed. Nueva York: Oxford University Press.

Deaths due to tobacco use (SAM) were estimated in this report by multiplying the Smoking-attributable Fraction (SAF) for a range of smoking-related diseases by mortality data for those diseases in Nova Scotia. Mortality data for the SAM calculation are based on Statistics Canada (2003) *Mortality, Summary List of Causes*.<sup>41</sup> Mortality for chronic diseases does not tend to fluctuate significantly on a year-to-year basis, so it is reasonable to use this data source as a basis for current estimates. Mortality data used in this study are included in Appendix C, Table 1.

The SAF of 19 smoking-related diseases<sup>42</sup> was calculated by multiplying Nova Scotia sex-specific tobacco use prevalence rates<sup>43</sup> by Relative Risk (RR) ratios for current and former adult (age 35 and older) tobacco users. Relative risk values are derived from epidemiological evidence that links tobacco use with various illnesses. Essentially, RR ratios express the relative risk to the smoker of developing a particular disease compared with someone who does not use tobacco.

The SAF essentially estimates the effects of tobacco use on the prevalence of a given disease, and the extent to which the prevalence of each disease in a given population is attributable to smoking.<sup>44</sup> In theory, the SAF of a disease is therefore the proportion of each disease that could be prevented if tobacco use were eliminated.

SAFs for each disease and sex were derived in this report using the following formula:

$$\text{SAF} = \frac{[P_n + P_c(RR_c) + P_f(RR_f)] - 1}{[P_n + P_c(RR_c) + P_f(RR_f)]}$$

Where

Measure	Defined
$P_n$	Percentage of adult never-smokers in study group
$P_c$	Percentage of adult current smokers in study group
$P_f$	Percentage of adult former smokers in study group
$RR_c$	Relative risk of morbidity for adult current smokers relative to adult never-smokers

<sup>41</sup> Statistics Canada. (2003) *Mortality, Summary List of Causes*, Table84F0209XWE, Table 1-4 Deaths by selected grouped causes, sex and geography — Nova Scotia. [online] Available at: [www.statcan.ca/english/freepub/84F0209XIE](http://www.statcan.ca/english/freepub/84F0209XIE). Accessed August 2007.

<sup>42</sup> The smoking-related diseases used in this report are those identified by the US Centers for Disease Control, International Classification of Disease (ICD) list of smoking-related diseases, included as Appendix C, Table 2.

<sup>43</sup> Percentages of current, former and never-smokers in Nova Scotia were obtained from the Canadian Community Health Survey. Source: Statistics Canada (2005). *Canadian Community Health Survey* (CCHS 3.1)

<sup>44</sup> This method is originally described by Levin (1953). See also Lilienfeld and Lilienfeld (1980). Another excellent resource for similar work is that of Makomaski Illing and Kaiserman (2004), which includes Canada-wide and Atlantic Canada data, but not data for Nova Scotia.

$RR_f$ 

Relative risk of morbidity for adult former smokers relative to adult never-smokers

Limitations of the SAM and SAF estimation approaches are discussed in detail in Appendix D.

Age-adjusted Relative Risk (RR) factors for adults 35 and older were obtained from the second wave of the American Cancer Society's Cancer Prevention Study (CPS II)—the six year follow-up.<sup>45</sup> RR estimates from this source are based on a four-year study with 1.2 million participants. Although the data are American, there is a consensus among researchers that the Canadian and American populations are similar enough with respect to overall health, longevity, disease incidence, and socio-demographic variables that the American RR measures can reasonably be applied to Canada. These RR values for select tobacco-related diseases—in separate tables for males and females—are presented in Tables 3 and 4 in Appendix C.

### *SAM in Nova Scotia*

SAM estimates for Nova Scotia in 2005—i.e. the number of deaths in that year that can be attributed to tobacco use in Nova Scotia—are summarized in Table 7 below. These figures, which do not include deaths from diseases attributable to ETS, indicate that 1,722 deaths – 1,051 male and 671 female – in Nova Scotia in 2005 were attributable to cancers, cardiovascular diseases, and respiratory diseases caused by smoking.

As shown in Table 7, cancers of the trachea, bronchus and lung result in the highest smoking-attributable cancer mortality in Nova Scotia, with 2005 mortality estimates of 221 women (33% of total smoking-attributable deaths) and 363 men (34% of total smoking-attributable deaths). Ischemic heart disease among smokers and former smokers over age 65 killed 102 women and 121 men in Nova Scotia in 2005, accounting for more than 18% of total deaths attributable to smoking for males and more than 17% for females. Chronic airway obstruction killed 145 female smokers and former smokers (22% of smoking-attributable deaths) and 180 male smokers and former smokers (17% of deaths) in Nova Scotia in 2005.

Cancers accounted for 41% of smoking-attributable female deaths and 48% of smoking-attributable male deaths in Nova Scotia in 2005. Together, 366 female deaths (more than 54% of smoking-attributable deaths) and 543 male deaths (more than 51% of smoking-attributable deaths) resulted from cancers of the trachea, lungs or bronchus and from chronic airway obstructions.

<sup>45</sup> Source: US CDC Relative Risk Data, CPS-II (82-88) Unpublished estimates provided by American Cancer Society (ACS). See Thun M., Day-Lally C., Myers D., *et al.* Trends in tobacco smoking and mortality from cigarette use in Cancer Prevention Studies I (1959 through 1965) and II (1982 through 1988). In *Changes in cigarette-related disease risks and their implication for prevention and control*. Smoking and Tobacco Control Monograph 8. Bethesda, MD: US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute 1997; 305–382. NIH Publication no. 97–1213



**Table 7: Smoking-attributable Mortality (SAM), Male and Female, Nova Scotia, 2005**

Adult Diseases (35+ years of age)		
Disease Category	SAM Female	SAM Male
<b>Malignant Neoplasm</b>		
Lip, Oral Cavity, Pharynx	5	20
Esophagus	10	28
Stomach	4	14
Pancreas	17	20
Larynx	0	13
Trachea, Lung, Bronchus	221	363
Cervix Uteri	2	n/a
Kidney and Renal Pelvis	1	14
Urinary Bladder	7	19
Acute Myeloid Leukemia	6	12
<i>Total cancer deaths</i>	<i>273</i>	<i>503</i>
<i>Percent of total smoking-related deaths</i>	<i>41%</i>	<i>48%</i>
<b>Cardiovascular Diseases</b>		
Ischemic Heart Disease		
Persons Aged 35–64	18	78
Persons Aged 65+	102	121
Other Heart Disease	37	51
Cerebrovascular Disease		
Persons Aged 35–64	4	8
Persons Aged 65+	32	29
Atherosclerosis	2	6
Aortic Aneurysm	18	35
Other Arterial Disease	5	6
<i>Total cardiovascular disease deaths</i>	<i>218</i>	<i>334</i>
<i>Percent of total smoking-related deaths</i>	<i>32%</i>	<i>32%</i>
<b>Respiratory Diseases</b>		
Pneumonia, Influenza	28	24
Bronchitis, Emphysema	7	10
Chronic Airway Obstruction	145	180
<i>Total respiratory disease deaths</i>	<i>180</i>	<i>214</i>
<i>Percent of total smoking-related deaths</i>	<i>27%</i>	<i>20%</i>
<b>Total smoking-attributable deaths</b>	<b>671</b>	<b>1051</b>

Source: As calculated by the authors.



**2005 estimates show 1,051 male deaths and 671 female deaths from cancer, cardiovascular disease and respiratory disease as a direct result of tobacco use in Nova Scotia. The total number of deaths in Nova Scotia attributable to smoking was estimated at 1,722 for 2005.**

### ***Mortality Due to ETS in Nova Scotia***

Mortality estimates due to ETS in Nova Scotia are summarized from Table 8 of the *Cost of Substance Abuse in Canada 2002*, Canadian Centre on Substance Abuse (CCSA).<sup>46</sup> The CCSA includes only deaths from lung cancer and from ischaemic heart disease in its estimates of mortality attributable to passive smoking, as causal links with other diseases are suspected, but controversial.<sup>47</sup> According to CCSA estimates, environmental tobacco smoke was responsible for the deaths of at least 26 Nova Scotians in 2002 – 10 female deaths and 16 male deaths.

**Table 8: Mortality due to ETS Exposure, Males and Females, Nova Scotia, 2002**

Disease Category	Females	Males
Trachea, Lung, Bronchus	3	5
Ischemic Heart Disease	7	11
<b>Total</b>	<b>10</b>	<b>16</b>

Source: Rehm, J. *et al.* (2006). *The Cost of Substance Abuse in Canada 2002*. Canadian Centre on Substance Abuse. Table 1-S-9.

<sup>46</sup> Rehm, J. *et al.* (2006). *The Cost of Substance Abuse in Canada 2002*. Canadian Centre on Substance Abuse. Table 1-S-9.

<sup>47</sup> The CCSA derives its passive smoking-attributable morbidity estimates by applying age- and sex-specific relative risk ratios from the epidemiological evidence to rates of morbidity from lung cancer and ischaemic heart disease (IHD) in the population of Canadians who have never smoked, but who are exposed to ETS from spouses and other sources inside the home. Relative risk estimates were obtained from the most comprehensive meta-analyses available in Canada. See Rehm, J. *et al.* (2006). *The Cost of Substance Abuse in Canada 2002*. Canadian Centre on Substance Abuse, p. 20 -21. Based on U.S. epidemiological evidence cited in the *Economic Impact of Smoke-Free Places* (2002), Colman estimates deaths due to passive smoking as amounting to one death due to ETS for every eight direct smoking-related deaths. More recent and comprehensive SAF-based approaches to passive smoking calculations were not available at time of writing, so we have relied here on the more conservative CCSA estimates.

**Table 9: Total Deaths due to Tobacco Use in Nova Scotia, Males and Females, Nova Scotia, 2005**

	Female	Male
Deaths Due to Tobacco Use in Nova Scotia (2005)	671	1,051
Deaths Due to ETS in Nova Scotia (2002)	10	16
Total deaths by gender	681	1,067
Total estimated tobacco-related deaths <sup>48</sup>	1,748	
Total deaths in NS (2005)	8,378	
<i>Percentage of all NS deaths attributable to tobacco use</i>	21%	

Source: Summary table, as generated by authors. Deaths due to ETS from Rehm, J. *et al.* (2006). *The Cost of Substance Abuse in Canada 2002*. Canadian Centre on Substance Abuse. Table 1-S-9. Total deaths in Nova Scotia from: Province of Nova Scotia, Finance and Statistics. (2006). *Nova Scotia at a Glance: 2006*, p.3. [online] Available at: [www.gov.ns.ca/finance/publish/FACTS/2006/NS-At-A-Glance.PDF](http://www.gov.ns.ca/finance/publish/FACTS/2006/NS-At-A-Glance.PDF). Accessed May 2007.

As shown in Table 9 above, 1,748 Nova Scotian deaths in 2005 were estimated to be attributable to tobacco use.<sup>49</sup> Since there were 8,378 deaths in Nova Scotia in 2005, approximately 21% of all deaths in the province can be directly attributed to tobacco use. In other words, about one in every five Nova Scotian deaths is a result of tobacco use. Thus, smoking is the leading preventable cause of death in Nova Scotia.

### *Discussion of Mortality Estimates*

Estimates of Smoking-attributable Mortality and mortality due to passive smoking are highly dependent on a range of assumptions, and on the particular prevalence and exposure rates used in calculations. These rates vary yearly, vary by age cohort and gender, and can be the artefact of different classifications and survey questions. They also vary dramatically over time – particularly for passive smoking. In addition, Relative Risk (RR) estimates for different diseases vary in different studies, based on the sample population studied and research methodologies employed, also impacting results.

There are two main studies that have been widely used to generate mortality estimates due to tobacco use and ETS exposure in Canada: *The Cost of Substance Abuse in Canada 2002* (CCSA, 2006)<sup>50</sup> and *Mortality attributable to tobacco use in Canada and its regions* (Makomaski Illing and Kaiserman, 2004).<sup>51</sup> The widely differing mortality results from these sources are discussed below.

<sup>48</sup> Deaths due to direct tobacco use are for 2005; while deaths due to ETS are for 2002. For illustrative purposes, the 2002 ETS numbers are assumed here to apply to 2005.

<sup>49</sup> As noted above, deaths due to direct tobacco use are for 2005; while deaths due to ETS are for 2002, but they are aggregated here for illustrative purposes.

<sup>50</sup> Rehm, J. *et al.* (2006). *The Cost of Substance Abuse in Canada 2002*. Canadian Centre on Substance Abuse.

<sup>51</sup> Makomaski Illing, E. and Kaiserman, M. (2004). Mortality attributable to tobacco use in Canada and its regions. *Canadian Journal of Public Health*, Vol. 95 (1).

The Canadian Centre on Substance Abuse (CCSA) estimated tobacco-related mortality in 2002 for Nova Scotia at 826 males and 469 females, a total estimate of 1,294 deaths due to tobacco use.<sup>52</sup> This estimate is lower than the 1,748 deaths estimated in this report. There are several reasons which may account for the difference, including the fact that the CCSA data are from 2002, when smoking rates were higher and the prevalence (P) value would therefore be higher than in 2005—the reference year for this study. As well, the RR values used in the CCSA report are generated from multiple sources and not solely from the large-scale American Cancer Society study source used here.<sup>53</sup> As well, the CCSA list of tobacco-related illnesses is broken down differently than in the American Cancer Society estimates, and include several additional diagnostic and age categories. In addition, conditions arising during the perinatal period and deaths due to fires are included in the CCSA estimates. While some of these factors might be expected to raise mortality estimates, a review of comparable studies included in the *The Cost of Tobacco in Nova Scotia* (2000) indicated that the earlier CCSA estimates for 1992 tended to be conservative, and may possibly have underestimated tobacco-related mortality by at least 20% when compared for example to Health Canada estimates.

Makomaski Illing and Kaiserman provide smoking-attributable mortality estimates for the Atlantic provinces, (though not Nova Scotia alone), for males and females in 1994 and 1996. This estimate uses the ICD-9 disease codes, and calculates adult (35 and older) mortality for tobacco-related diseases, paediatric diseases, and fire deaths as well as deaths due to passive smoking. Using this approach, the authors estimated 2,865 male deaths and 1,471 female deaths attributable to smoking in Atlantic Canada in 1996. Nova Scotia represents approximately 40% of the population of Atlantic Canada. Since smoking rates are comparable in the four Atlantic provinces, we can extrapolate from the Makomaski Illing and Kaiserman data on a population basis to estimate smoking-related mortality in Nova Scotia at 1,146 for males and 588 for females—a total of 1,734 deaths. This result is very comparable to the SAM estimate of 1,748 calculated in this report. Perhaps explaining this similarity, it is noteworthy that the relative risk estimates used by those authors are from the same source used in this report, namely the Cancer Prevention Study (CPS) II from the American Cancer Society. This indicates that a key factor explaining disparities in different SAM estimates may be related to different RR estimates.

In *The Cost of Tobacco in Nova Scotia* (2000), GPI Atlantic estimated mortality due to tobacco use in Nova Scotia at 1,650 using data from 1999, and excluding deaths attributable to ETS. That estimate was not carried out using the SAF and SAM methodology used here, but was based on

---

<sup>52</sup> See Table I-S-9, CCSA (2006).

<sup>53</sup> The CCSA carries out a detailed process to estimate RR values. To identify malignant and non-malignant health conditions caused by smoking, the CCSA uses the *Health Consequences of Smoking: A Report from the Surgeon General* (US Department of Health and Human Services (2004)). A comprehensive search of current meta-analyses was also performed by the CCSA for each major disease category. If RRs for dose-response values were not available from the studies examined, the current/former/never smoker or ever/never smoker categories were used where available. Analyses that included age- and gender-stratified estimates of relative risk were preferred over more crude estimates. In cases where a more current meta-analysis did not exist, analyses from English *et al.* were used. When a meta-analysis was published later than 1995, there was usually only one that presented smoking dose-response data, so this was used as the source of relative risk. If there was more than one such meta-analysis presenting dose-response data, all were examined and the most comprehensive one based on age and smoking dose categories was chosen.

an examination of the results and methods of other studies, and is thus not directly comparable to the results in this report. The estimates presented in this report would, however, seem to indicate an increase in mortality due to tobacco use.

As explained by Makomaski Illing and Kaiserman (2004), high current rates of smoking-related mortality reflect high prior rather than present rates of smoking prevalence. Thus, the smoking behaviour of the population two or three decades earlier is now reflected in present rates of smoking-attributable mortality. For example, female smoking peaked in the late 1970s, and deaths from lung cancer among women are now nearly four times as high as 1969 rates. In other words, lung cancer rates among women were considerably lower at the time that their smoking rates peaked, than at present when female smoking rates have sharply declined—due to the time lags between cause (smoking) and actual morbidity and between illness onset and death. Smoking rates for men peaked in the mid 1960s and male lung cancer deaths peaked in the late 1980s, falling slightly since then.

Trends in mortality are also influenced by the growth and aging of the population. According to Makomaski Illing and Kaiserman: “As baby boomers age, it can be expected that large numbers of Canadians will continue to die from smoking-related causes, in particular from lung cancer, heart disease and cerebrovascular disease.”<sup>54</sup> Based on these time lags, Makomaski Illing and Kaiserman predict that, while smoking-attributable mortality for women is currently 36% lower than for men, female mortality due to smoking will continue to rise and may even exceed male levels, while male mortality will decline. In the near term, therefore, smoking-attributable mortality will continue to remain high and perhaps go even higher even as smoking rates decline, thus explaining the high estimate of more than 1,700 smoking-related deaths in Nova Scotia in this report, and the similarly high extrapolation from Makomaski Illing and Kaiserman. The sharp drop in provincial smoking rates seen in the last six years will see its full benefit in reduced smoking-attributable mortality twenty or more years from now.

## **2.2 Economic Costs Due to Tobacco Use in Nova Scotia**

As previously outlined, the economic costs of tobacco use are grouped, for the purposes of this report, into five main categories.

1. Direct smoking-attributable health care costs: ambulatory care (physician fees), family physician visits, acute care hospitalizations and prescription drugs
2. Direct tobacco-related prevention and research costs
3. Direct cost of fires due to smoking
4. Indirect costs: productivity losses due to premature death and to short and long term disability and morbidity costs
5. Employer costs attributable to employing smokers

---

<sup>54</sup> Thun *et al.* cited by Makomaski Illing, M. and Kaiserman, M. (2004). Mortality attributable to tobacco use in Canada and its regions. *Canadian Journal of Public Health*, Vol. 95 (1), p. 39.

## 1. Direct Health Care Costs

Direct health care costs due to tobacco use primarily include the costs of hospitalization, medication, and physician services (ambulatory and family physician visits).

Estimates for these direct health care costs are taken from the *Cost of Substance Abuse in Canada* (CCSA 2006) and are based on 2002 data. Results are summarized in Table 10 below. An investigation of several methodologies and potential sources and estimation methods revealed that the CCSA cost estimates are the most rigorous and reliable currently available for direct health care, prevention, and research cost estimates and for indirect productivity loss estimates. Different sources are referenced below for fire costs and employer costs.

As seen in Table 10, by far the greatest proportion of direct health care costs due to tobacco use in Nova Scotia is attributable to the costs of hospitalization, estimated at \$103.9 million. This is followed by the cost of medications at \$41.9 million, and the cost of all physician services (ambulatory and family physician visits) at \$15.6 million (\$2002), for a total of \$161 million (\$2002) in direct smoking-attributable health care costs. Converted to 2005 dollars,<sup>55</sup> the total direct annual hospital, drug, and physician costs that are attributable to tobacco use in Nova Scotia are estimated at \$171.3 million.

**Table 10: Direct Health Care Costs Attributable to Tobacco Use in Nova Scotia, 2002**

Cost category	CCSA Table Number	Cost (CAN\$2002)
Acute care hospitalizations <sup>56</sup>	D-HC-1	\$103,914,114
Ambulatory care (physician fees)	D-HC-5	\$6,944,994
Family physician visits	D-HC-6	\$8,664,450
Prescription drugs	D-HC-7	\$41,983,517
<b>Total cost (\$2002)</b>		<b>\$161.5 million</b>
<b>Total cost (\$2005)</b>		<b>\$171.3 million</b>

Source: Rehm, J. *et al.* (2006). *The Cost of Substance Abuse in Canada 2002*. Canadian Centre on Substance Abuse. Table numbers as indicated above.

## 2. Direct Prevention and Research Costs

There are many government and non-government organizations, agencies and individuals at all levels working on tobacco-related prevention and research in Nova Scotia. These include Nova Scotia Health Promotion and Protection, NS Department of Health, Health Canada, the First Nations and Inuit Health Branch of Health Canada, Canadian Cancer Society-NS Division, Cancer Care Nova Scotia, Smoke-Free Nova Scotia, Heart and Stroke Foundation of Nova Scotia, Doctors Nova Scotia, individual health districts and community health boards, school

<sup>55</sup> Values translated to 2005 Canadian dollars using Statistics Canada Consumer Price Index for Health Care, CANSIM Table 326-0002.

<sup>56</sup> Includes hospitalizations attributable to both active and passive smoking.

boards, university researchers, and so on. It is impossible to quantify precisely what portion of the spending of all these agencies is used specifically for tobacco prevention and research.

The Canadian Centre on Substance Abuse (2006) has conservatively estimated the direct costs of prevention and research on tobacco use in Canada at \$78.1 million (\$2002). The Quebec Coalition for Tobacco Control (2004) based its own estimate of Canada's prevention and research costs on the annual cost of Health Canada's Federal Strategy against smoking, which cost \$112 million in 2002. Since even that higher estimate does not include funds from provincial or non-governmental sources, even that estimate must be considered relatively conservative.

However, extrapolating from both the CCSA and Quebec estimates above on a population basis, and since Nova Scotia comprises about 3% of the population of Canada, this yields a prevention and research cost estimate of between \$2.1 million and \$3.4 million (\$2002). In 2005 dollars, this amounts to between \$2.3 million and \$3.6 million in direct prevention and research costs for Nova Scotia. This is similar to the \$2.3 million tobacco use prevention and research budget of Nova Scotia Health Promotion and Protection, which includes provincial expenditures and enforcement, marketing and communications funding from Health Canada to the province.<sup>57</sup>

### ***3. Other Direct Costs: Cost of Fires Due to Smoking***

The estimated cost of fires due to tobacco use in Nova Scotia was extrapolated from 2000 data available from the Council of Canadian Fire Marshals and Fire Commissioners.<sup>58</sup> This source estimates the cost of losses due to fires in Canada caused by smoking as \$56,720,971 (\$2000).<sup>59</sup> In 2005 dollars, this amounts to \$66,700,225.<sup>60</sup> Since Nova Scotia comprises about 3% of the Canadian population<sup>61</sup>, the annual value of losses due to fires caused by smoking can be estimated at about \$2 million annually (\$2005).

### ***4. Indirect Costs***

Indirect costs are those that do not tax the health care budget of the province directly, but nevertheless add to society's costs of tobacco use due to productivity losses, which in turn result in reduced GDP and tax revenues. Thus, in the case of premature mortality due to tobacco use, individuals in effect also prematurely leave the workforce, depriving society of economic output

---

<sup>57</sup> Personal communication, NS Department of Health Promotion and Protection, 2006.

<sup>58</sup> Costs are for property losses due to fires and do not include personnel and equipment costs of firefighting.

<sup>59</sup> Council of Canadian Fire Marshals and Fire Commissioners. (2000). *Annual Reports of Fire Losses in Canada (1986-2002)*. [online] Available at: [www.ccfmfc.ca/stats/stats\\_e.html](http://www.ccfmfc.ca/stats/stats_e.html). Accessed May 2007. This approach was used by Groupe D'Analyse (2004) in *Update on Smoking Costs to Society*.

<sup>60</sup> Values translated to 2005 using Statistics Canada. (2007) *Consumer Price Index*, Catalogue Number 62-001-X1B. [online] Available at: [www.statcan.ca/english/freepub/62-001-X1B/62-001-X1B2007004.pdf](http://www.statcan.ca/english/freepub/62-001-X1B/62-001-X1B2007004.pdf). Accessed May 2007.

<sup>61</sup> Nova Scotia's population is actually about 2.84% of the Canadian total. But since Nova Scotia has traditionally had a higher smoking rate than the national average, it is reasonable to use the 3% estimate for the purpose of extrapolations.



and the household of income. Economic costs to society are also incurred when work days are lost as a result of short and long term disability and illness.

The indirect costs estimated in this study are, therefore, the smoking-attributable productivity losses due to premature death, to long-term disability, and to short-term disability (including days in bed and days with reduced activity), and are based on a modified human capital approach. All indirect cost estimates in this report are extrapolated from the indirect cost estimates found in the *The Cost of Substance Abuse in Canada 2002*<sup>62</sup> which has been assessed as the most reliable estimate currently available for the country.<sup>63</sup> Unfortunately, indirect cost estimates by province are not provided by the CCSA. In the absence of provincial estimates, we have applied to Nova Scotia the indirect-to-direct cost ratio for CCSA's Canada-wide figures, on the assumption that this ratio will not vary greatly by jurisdiction since diseases, once incurred, have similar effects. This Canada-wide ratio was therefore applied to the direct cost figures that *are* provided for Nova Scotia by the CCSA, in order to estimate total smoking-attributable indirect costs for the province. Indirect costs by category for the province are then estimated as a percentage of total indirect costs, according to the national breakdowns.<sup>64</sup>

As shown in Table 11, the greatest annual indirect cost of tobacco use in Nova Scotia is productivity losses due to long-term disability, estimated at \$415.4 million (\$2002). This is followed by productivity losses due to premature mortality, estimated at \$73.9 million and productivity losses due to short-term disability, valued at \$2.39 million (all in \$2002). Converted to \$2005,<sup>65</sup> the total annual indirect cost of tobacco use in Nova Scotia was estimated at \$526 million.

**Table 11: Indirect Productivity Losses Costs Due to Tobacco Use, Nova Scotia, 2002 and 2005**

Indirect Costs (millions \$CAN)	
Productivity losses due to long-term disability (\$2002)	\$415.40
Productivity losses due to short-term disability (days in bed) (\$2002)	\$0.96
Productivity losses due to short-term disability (days with reduced activity) (\$2002)	\$1.43
Productivity losses due to premature mortality (\$2002)	\$73.90
Total indirect costs (\$2002)	\$491.70
<b>Total indirect costs (\$2005)</b>	<b>\$526.00</b>

Source: Rehm, J. *et al.* (2006). *The Cost of Substance Abuse in Canada 2002*. Canadian Centre on Substance Abuse. Extrapolated to Nova Scotia by the author, as above.

<sup>62</sup> Rehm, J. *et al.* (2006). *The Cost of Substance Abuse in Canada 2002*. Canadian Centre on Substance Abuse.

<sup>63</sup> See Rehm, J. *et al.* (2006). *Cost of Substance Abuse in Canada 2002*, CCSA. Methodological information for indirect cost calculations is found on pages 62–66.

<sup>64</sup> For more information, see Appendix G.

<sup>65</sup> Values translated to 2005 using Statistics Canada. (2007) *Consumer Price Index*, Catalogue Number 62-001-X1B. [online] Available at: [www.statcan.ca/english/freepub/62-001-X1B/62-001-X1B2007004.pdf](http://www.statcan.ca/english/freepub/62-001-X1B/62-001-X1B2007004.pdf). Accessed May 2007.

## 5. Employer Costs

A number of studies have estimated the costs of tobacco use to employers.<sup>66</sup> These costs generally include four main areas: absenteeism, on-the-job productivity loss, insurance premiums, and the cost of providing, cleaning, and maintaining designated smoking facilities. The Conference Board of Canada updated its earlier estimate of these costs in *Smoking and the Bottom Line: Updating the Cost of Smoking in the Workplace* (2006), in order to integrate into its earlier cost estimates the impact of changes such as new workplace smoking restrictions that affect employer costs. So, for example, although more workplaces are now smoke-free (thus reducing employer-paid smoking facility costs), employees must leave the premises for their smoke breaks, effectively increasing break times and reducing on-the-job productivity by comparison with non-smokers who do not take such smoke breaks. The Conference Board approach for calculating each of these costs is outlined below, with adjustments made for Nova Scotia as noted. A summary of these costs for Nova Scotia is presented in Table 12.

### *Increased Employee Absenteeism*

Abundant research shows that smokers are absent from work due to illness more frequently than are non-smokers, although estimates vary on the actual rates of absenteeism.<sup>67</sup> The Conference Board of Canada (2006) cites data from the Canadian Community Health Survey estimating that smokers miss, on average, two additional days of work per year compared with non-smokers. The cost of absenteeism is then calculated as the days lost multiplied by the average daily per-employee payroll cost.<sup>68</sup> This is a conservative estimate, since it is lower than the value of lost economic output, which could be assessed on a GDP per employee per day basis.

In 2005, according to Statistics Canada's *Survey of Employment, Payroll and Hours*, the average daily wage for a Nova Scotian worker was \$132.53.<sup>69</sup> Payroll taxes and benefit payments are estimated by the Conference Board of Canada to amount to an average of 12.5% of payroll.<sup>70</sup> Combining wages with payroll taxes and benefits produces an average daily per employee payroll cost for a Nova Scotian employee of \$149.10 in 2005. Given that smokers are absent from work, on average, two additional days per year, the annual cost to Nova Scotian employers of smoking-attributable absenteeism is \$298.20 (\$2005) for each smoking employee.

---

<sup>66</sup> See Colman, R. (2001). *The Economic Impact of Smokefree Workplaces: an Assessment for Nova Scotia*. GPI Atlantic for Tobacco Control Unit, Nova Scotia Department of Health; Conference Board of Canada (2006). *Smoking and the Bottom Line: Updating the Costs of Smoking in the Workplace*; and Quebec Coalition for Tobacco Control (2004). *Update on Smoking Costs to Society*.

<sup>67</sup> For example, the US CDC. (2004) *Surgeon General's Report on Tobacco* reviewed 320 studies on employee absenteeism to assess the rate of absenteeism among smokers.

<sup>68</sup> See Conference Board of Canada. (2006). *Smoking and the Bottom Line: Updating the Costs of Smoking in the Workplace*, p. 4. This payroll cost includes the daily wage plus payroll taxes and benefits paid by the employer.

<sup>69</sup> Calculation based on data from Statistics Canada (2005). *Survey of Employment, Payroll and Hours*, Table 281-0029.

<sup>70</sup> See Conference Board of Canada. (2006). *Smoking and the Bottom Line: Updating the Costs of Smoking in the Workplace*, p.5.



### *Reduced Employee Productivity*

The Conference Board of Canada (2006) updated earlier estimates of the cost of cigarette breaks taken by smoking employees in light of legislative changes that restrict workplace smoking. Based on an examination of research in the field, the Conference Board assumes that smokers take an average of two unsanctioned smoking breaks each day. It was also estimated that an employee takes 10 minutes to consume a cigarette. However, in light of legislative bans on smoking in public places and workplaces, the time allowed for smokers to reach an acceptable smoking site (generally outside buildings and sometimes entirely off the premises) was increased from earlier estimates to 10 minutes per break. Thus in total, an employee who smokes was estimated by the Conference Board to spend an additional 40 minutes each day on cigarette breaks, outside of sanctioned rest and meal time.

Dividing the average daily wage estimate for a Nova Scotian worker (\$132.53) by an eight hour workday indicates an average hourly wage of \$16.57 per hour in Nova Scotia in 2005. Adding payroll costs of 12.5% to this hourly wage means that the total estimated hourly cost of wages and benefits in Nova Scotia amounts to \$18.64 (\$2005). If, as assumed, each smoking employee spends 40 minutes per day consuming cigarettes and getting to and from smoking sites, the daily cost to a Nova Scotian employer of lost productivity due to smoking is \$12.30 per smoking employee. Assuming 227 work days in a year,<sup>71</sup> the annual cost of lost on-the-job productivity per smoking employee in Nova Scotia can be estimated at \$2,792.<sup>72</sup> As above, this can be considered a conservative estimate in so far as the actual value of lost economic output is greater than the value of lost wages and benefits.

### *Increased Insurance Costs*

Although there is solid evidence showing that smokers use health services more often than non-smokers and thus incur higher medical costs,<sup>73</sup> it is difficult to substantiate estimates of the actual financial impact of smoking on employer-sponsored insurance premiums. While the higher medical costs and higher rates of premature death attributable to smoking certainly raise medical and life insurance premiums, including group plans subsidised by employers, these additional

---

<sup>71</sup> Conference Board of Canada. (2006). *Smoking and the Bottom Line: Updating the Costs of Smoking in the Workplace*, p.6, which arrives at its estimate of 227 working days by subtracting from 365 calendar days – 104 days for weekends, 10 for holidays, 15 for vacation time, and nine for sick days.

<sup>72</sup> The Conference Board (p.7) acknowledges that this estimate assumes that an employee on a smoking break is not engaged in work-related tasks. In actual practice, this may or may not be true. For example, employees may be discussing work while on a cigarette break, or they may integrate their smoking with their work while operating equipment or in other forms of outdoor work (construction, road crews, logging etc.) Also, given that not only smoking rates but also cigarette consumption are declining, the Conference Board notes that these cost estimates will decline if smokers consume fewer than 12 cigarettes per day since more limited cigarette consumption will more likely be confined to accepted meal and rest breaks and to non-work times of day, and will require fewer additional, and unauthorized, smoke breaks. As noted in Chapter 1, average daily cigarette consumption among daily smokers in 2006 was 16.4 in Nova Scotia and 15.4 in Canada.

<sup>73</sup> US CDC. (2002). Annual Smoking-Attributable Mortality, Years of Potential Life Lost and Economic Costs—United States 1995–99. *Morbidity and Mortality Weekly Report*, Vol. 51 (14) as cited by Conference Board of Canada.

employer-borne costs have not been effectively quantified to date. As recommended by the Conference Board (2006), these costs are therefore not included here.

### *Cost of Smoking Facilities*

In the past, employers often allowed and made provision for the presence of designated smoking rooms and areas within work places and public buildings. Providing, maintaining, and particularly cleaning these smoking areas constituted an additional cost to employers. Legislative changes in Canada and Nova Scotia have increasingly prohibited smoking in the workplace in recent years, and, thus, most employers are no longer faced with these costs. Some employers may create outdoor shelters that can be used by smokers, but we have no information on the prevalence of this practice in Nova Scotia. In its 2006 report, the Conference Board takes a conservative approach and simply calculates the cost to an employer of providing outdoor ashtrays for smoking employees and of cleaning outdoor smoking areas in order to avoid unsightly cigarette butt litter. According to the Conference Board, the annual cost to an employer for such ashtrays and cleaning can be estimated at \$20 per smoking employee.

**Table 12: Annual Cost of Employing a Smoker per Smoking Employee, (NS, \$2005)**

Employee absenteeism	\$298.20
Employee on-the-job productivity loss	\$2,792.00
Insurance	n/a
Smoking facilities costs	\$20.00
<b>Total annual cost per smoking employee</b>	<b>\$3,110.20</b>

Source: Conference Board of Canada. (2006). *Smoking and the Bottom Line: Updating the Costs of Smoking in the Workplace*. [online] Available at: [www.conferenceboard.ca/documents.asp?rnext=1754](http://www.conferenceboard.ca/documents.asp?rnext=1754). Accessed May 2007. Extrapolated to Nova Scotian context by the authors.

Thus, based on the Conference Board of Canada's calculation methods and estimates for Canada, adjusted for Nova Scotia wage rates, the total cost to an employer of hiring a smoker in Nova Scotia can be estimated at \$3,110.20 (\$2005).

### *Total Annual Cost of Tobacco Use to Employers in Nova Scotia*

By multiplying the number of employees who smoke by the annual per employee cost of smoking we can estimate the total annual cost of tobacco use to employers in Nova Scotia. Nova Scotia Department of Finance estimates show 360,800 full-time and 85,500 part-time employees in Nova Scotia in 2005.<sup>74</sup> Applying the 2005 smoking rate of 21% to all Nova Scotia employees, we can estimate that 75,768 full-time employees and 17,955 part-time employees in Nova Scotia may be smokers. Multiplying the total annual cost of \$3,110.20 per smoking employee by the total estimated number of full-time Nova Scotian employees who may smoke (75,768) produces a total cost of \$235.7 million (2005).

<sup>74</sup> Nova Scotia Department of Finance. (2005). *Nova Scotia Employment Statistics*. [online] Available at: [www.gov.ns.ca/finance/communitycounts](http://www.gov.ns.ca/finance/communitycounts). Accessed May 2007.

The greatest proportion of smoking attributable costs borne directly by employers is attributable to lost on-the-job productivity, a calculation that in turn is based on the additional length of time that may be taken for unauthorized cigarette breaks in the course of an eight-hour work day. Using this calculation for part-time workers, then, is not entirely accurate. For the purpose of this study, we therefore assume that the total annual smoking-attributable cost to employers per part-time smoking employee is half the cost incurred by full-time workers who smoke—or \$1,555.10 per part-time smoking employee rather than \$3,110.20 for full-time workers. Multiplying the estimated 17,955 part-time workers who may smoke by \$1,555.10 produces a total employer cost for part-time smoking workers of \$27.9 million.

Thus—adding together these estimated employer-borne costs for full-time smoking employees (\$235.7 million) and for part-time smoking employees (\$27.9 million)— we see that, adapting Conference Board of Canada estimates and methods to Nova Scotia, it may be costing Nova Scotian employers a total of **\$263.6 million a year** (\$2005) to employ workers who smoke.

Needless to say, these estimates embody several key assumptions and adjustments as explained in both the text and footnotes above. As well, there has been no adjustment of smoking rates by either age group or employment status here in assuming that province-wide smoking prevalence applies to employed workers. While an age adjustment would likely show a higher rate for employed workers, an adjustment by employment status would likely show a lower rate, so these two factors may cancel each other out. However, it must be recognized that these employer-borne cost estimates are subject to several assumptions and must therefore be taken as approximate and provisional.

### **Summary of Economic Costs of Tobacco Use in Nova Scotia**

The total economic costs of tobacco use in Nova Scotia summarized in Table 13 can be estimated to total \$943.8 million for 2005. The total cost of smoking in Nova Scotia amounted to \$1,006.30 per capita.

Interestingly, the indirect costs of tobacco use, reflecting productivity losses to the economy, constitute the greatest economic burden of tobacco use in Nova Scotia, as they do nationwide. These costs are generally invisible in conventional accounting mechanisms, and receive considerably less attention than taxpayer funded health care costs.

Most of these indirect productivity-related costs—\$526 million (\$2005) a year or 55.7% of total smoking costs—reflect lost productivity due to long-term disability, premature death, and short-term disability. But, according to estimates based on Conference Board of Canada figures, Nova Scotia employers also lose an additional \$242.2 million a year (\$2005) or 25.7% of total smoking-attributable costs—mostly in on-the-job productivity losses resulting from unauthorized smoke breaks—as a result of employing smokers.

Direct taxpayer-funded health care costs attributable to tobacco use amounted to \$171.3 million in (\$2005) in 2005, or 18.2% of total smoking costs.

**Table 13: Total Costs of Tobacco Use in Nova Scotia, (\$2005)**

Cost items	Cost (millions \$2005)	Percent of total cost
1. Direct health care costs	\$171.30	18.20%
2. Direct prevention and research costs	\$2.30	00.24%
3. Other direct costs: fire damage	\$2.00	00.21%
4. Indirect costs	\$526.00	55.70%
5. Employer costs <sup>75</sup>	\$242.20	25.70%
<b>Total cost of smoking in Nova Scotia</b>	<b>\$943.80</b>	<b>100%</b>
Total per capita <sup>76</sup>		\$1,006.30
Total cost per smoker <sup>77</sup>		\$5,859
Total mortality (deaths) due to tobacco use (2005)		1,748

Sources: Rehm, J. *et al.* (2006). *The Cost of Substance Abuse in Canada 2002*. Canadian Centre on Substance Abuse; Council of Canadian Fire Marshals and Fire Commissioners. (2000). *Annual Reports of Fire Losses in Canada (1986 – 2002)*; Conference Board of Canada. (2006). *Smoking and the Bottom Line: Updating the Costs of Smoking in the Workplace*. Some results for Nova Scotia derived by the authors based on these national studies.

### *What's Not Included?*

This study attempts to calculate the social costs of tobacco use—the direct and indirect costs carried by society, including the costs to employers. There are other costs not included in this study. For example, tobacco use—and its resulting premature death and debilitating sickness—generates a tremendous burden of physical and emotional pain and suffering for individuals and their families and loved ones. This is an intangible cost not included in this study.

Tobacco use has also been shown to be harmful to the environment. Tobacco production requires high levels of fertilizer, herbicide, and pesticide use, and abundant cleared land.

Clearing of forests for tobacco cultivation globally, as well as burning of trees to cure (dry and flavour) tobacco leaves, has produced deforestation and suspected concomitant soil erosion, nutrient depletion, changes in microclimates, and land degradation, particularly in developing nations. According to research by Helmut Geist of the University of Louvain in Belgium,

<sup>75</sup> Total employer costs in Table 13 include only employee on-the-job productivity loss and provision, maintenance, and cleaning of smoking facilities, and are therefore less than the total employer costs described in the previous section. Even though employers generally foot the bill for worker absenteeism, this cost is not included in employer costs here in order to avoid double-counting, since absenteeism was counted previously as part of the indirect costs on the previous line. There, absenteeism is already counted within the long-term and short-term disability costs.

<sup>76</sup> Based on the population of Nova Scotia – 936,130 (Province of Nova Scotia (2007). *Community Counts*, Demographics, Total Population 2005 [online] Available at: [www.gov.ns.ca/finance/communitycounts](http://www.gov.ns.ca/finance/communitycounts). Accessed July 2007.

<sup>77</sup> Number of smokers in NS, 2005 = 161,076, based on 21% smoking rate (CTUMS, 2005 sourced previously) x 767,030 (population of Nova Scotia aged 15 and over (*Nova Scotia Community Counts*, [online] Available at: [www.gov.ns.ca/finance/communitycounts](http://www.gov.ns.ca/finance/communitycounts). Accessed September 2007). \$943.8 million/161,076 = \$5,859/smoker.

published in the journal *Tobacco Control*, an estimated 200,000 hectares of forests worldwide were removed annually between 1991 and 1995 to make way for tobacco farming, mostly in developing countries in Africa, Asia, and Latin America.<sup>78</sup> According to one estimate, the tobacco industry burns as much as one acre of forest for every acre of tobacco cured, using nearly 12% of all the timber felled in the world, while a cigarette manufacturing machine uses four miles of paper per hour to roll and package cigarettes.<sup>79</sup> Forest products are also used to make cigarette paper, packages, and shipping boxes, and forest fires are caused by careless disposal of cigarette butts.

More than 25 million pounds of pesticides are used annually in tobacco production in the US alone. These pesticides seep into the soil, pollute waterways, and poison fish, livestock and food crops. According to the Federal General Accounting Office (GAO), tobacco ranks sixth among agricultural commodities in the amount of pesticides applied per acre.<sup>80</sup>

Tobacco use also generates substantial amounts of garbage and litter, including cigarette butts, empty packages, and foil wrappers. Cigarette butts are very slow to degrade, taking an average of 25 years to decompose entirely. According to one estimate, more than 87,000 tons of cigarette butts were discarded in the U.S. in 2003.

In addition to the waste generated by cigarette consumers, the tobacco manufacturing process itself produces dangerous liquid and solid wastes. According to Thomas Novotny, a public health physician at the U.S. Centers for Disease Control and colleague Feng Zhao, worldwide tobacco manufacturing in 1995 produced 2.26 billion kilograms of solid waste and 209 million kilograms of chemical waste that may be considered a health hazard.<sup>81</sup> With the exception of fires, none of these environmental costs are estimated in this study. And the environmental costs themselves are just one example of the true costs of tobacco use that are missing from the cost estimates in this study.

### *Discussion of Economic Cost Estimates*

Although this present study was undertaken with the goal of updating the earlier (2000) GPI Atlantic study on *The Cost of Tobacco in Nova Scotia*, it is in fact not straightforward to compare the two sets of results and to ascertain whether or not they have increased or decreased. As

---

<sup>78</sup> *Environmental Health Perspectives* Volume 107, Number 12, December 1999. [online] Available at [www.ehponline.org/docs/1999/107-12/forum.html](http://www.ehponline.org/docs/1999/107-12/forum.html), Accessed 30 August, 2007, citing studies in the August 1999 issue of *Tobacco Control*. See also MacKay, J.(n.d.) *Tobacco, Development, and the Canadian Experience*, International Development Research Centre, Ottawa. [online] Available at [www.idrc.ca/en/ev-28805-201-1-DO\\_TOPIC.html](http://www.idrc.ca/en/ev-28805-201-1-DO_TOPIC.html). Accessed 30 August, 2007.

<sup>79</sup> City of Berkeley, Energy and Sustainable Development. [online] Available at [www.ci.berkeley.ca.us/sustainable/residents/TrueCosts/Smoking.html](http://www.ci.berkeley.ca.us/sustainable/residents/TrueCosts/Smoking.html). Accessed August, 2007.

<sup>80</sup> Ibid.

<sup>81</sup> Novotny, T. and F. Zhao. (1999) "Consumption and production waste: another externality of tobacco use," *Tobacco Control*, August; 8: 75-80. [online] Available at [tobaccocontrol.bmj.com/cgi/content/full/8/1/75](http://tobaccocontrol.bmj.com/cgi/content/full/8/1/75). Accessed 30 August, 2007; and *Environmental Health Perspectives*, Volume 107, Number 12, December 1999, [online] Available at [www.ehponline.org/docs/1999/107-12/forum.html](http://www.ehponline.org/docs/1999/107-12/forum.html). Accessed 30 August, 2007.



reported by the CCSA (2006),<sup>82</sup> it is difficult to compare cost studies over time for several reasons—estimation techniques have evolved; different data are available; and the rising cost of health care also has considerable impact on cost estimates. There have also been demographic changes, such as an aging population, which impact cost estimates. In the case of mortality estimates in particular, a key methodological difference between this study and the 2000 GPI Atlantic study is that the latter did not directly employ the SAM methodology used in this study, but derived mortality estimates for Nova Scotia from a range of other studies.

At first glance, it seems odd that smoking-attributable mortality and economic costs of smoking in Nova Scotia remain so high despite the sharp decline in smoking prevalence seen in the province in recent years. As previously discussed, these continuing high costs are a result of tobacco use in earlier periods, with the present burden of disease and premature death reflecting male and female smoking rates that peaked in the 1960s and 1970s respectively. In short, the health effects of earlier high smoking rates are only now being realized, while the benefits of the recent decline in smoking prevalence will only be fully experienced and realized in reduced smoking-related mortality, illness, and economic costs two or more decades from now.

Despite all these caveats, a simple cost comparison is provided here, though too much significance can not be attributed to the differences. In the 2000 report, direct smoking-attributable health care costs in Nova Scotia were estimated at \$168 million, while estimated productivity losses due to premature death, disability, and absenteeism totalled \$396 million. These estimates were separate from employer-borne costs. This \$564 million total for direct and indirect costs is equivalent to approximately \$648.6 million in \$2005.<sup>83</sup>

In this current report, direct and indirect productivity cost totals are estimated at \$697.3 million (\$2005)—8% higher than the \$648.6 million estimate in the earlier report. The total direct health care cost estimate in this report is \$171.3 million—9% lower than the direct health care cost estimate in the 2000 report after conversion to 2005 dollars (though the breakdown of cost categories is not entirely comparable). The indirect cost estimate in this report is \$526 million—15.5% higher than the indirect cost estimate in the 2000 report. Because of the caveats noted above, we have not here attempted an explanation of these differences, particular concerning why direct cost estimates are somewhat lower while indirect costs are somewhat higher than in the earlier report. Instead, it is more notable that the overall cost estimates between the reports do not diverge greatly, so that ***it is entirely reasonable for the Nova Scotia government to continue to use the figure of \$170 million to describe the annual health care costs attributable to smoking.***

It was estimated in the 2000 report that employing a smoker in Nova Scotia cost an employer \$2,280 per smoking employee. Converted to current 2005 dollars, this would equal approximately \$2,622. This study updates these costs, particularly in light of new workplace smoke bans that now require smokers to leave the building or premises for smoke breaks, and

---

<sup>82</sup> Rehm, J. *et al.* (2006). *The Cost of Substance Abuse in Canada*, Canadian Centre on Substance Abuse, p.5.

<sup>83</sup> Values translated to 2005 using Statistics Canada. (2007) *Consumer Price Index*, Catalogue Number 62-001-X1B. [online] Available at: [www.statcan.ca/english/freepub/62-001-XIB/62-001-XIB2007004.pdf](http://www.statcan.ca/english/freepub/62-001-XIB/62-001-XIB2007004.pdf). Accessed May 2007.

estimates the 2005 costs to an employer of hiring a smoker at \$3,110.20 per smoking employee – about 19% more than in the 2000 report.

However, it is noteworthy that, despite these increased *per smoker* costs that are largely attributable to the longer time it takes a smoking employee to reach a designated smoking site, the *total* costs to Nova Scotia employers of hiring smokers have dropped due to lower smoking rates. Thus the 2000 report estimate for total employer-borne smoking costs in Nova Scotia, based on an earlier Conference Board of Canada study, was \$286.4 million (converted to \$2005), while the total estimate in this report, based on the updated Conference Board figures, is \$242.2 million—a 15% decline.

Other studies have used entirely different approaches to estimating smoking costs. For example, a 2003 study by Harrison *et al* uses an econometric approach to calculating smoking attributable fractions (SAF), instead of the Relative Risk approach that is used to calculate the SAF of particular diseases in this report. Econometric studies express SAF as the “relative difference between two predictors of health care expenditure or use: (i) predicted based on actual behaviour and (ii) predicted use based on the assumption that no one has ever smoked, but their other characteristics remain the same.”<sup>84</sup> As the regression analysis used in an econometric approach requires a large data set, the large sample size of the 1995 Newfoundland Adult Health Survey, covering thousands of individuals, providing a snapshot of their socio-demographic, economic, and health characteristics, and linking to respondents' medical utilization records over a seven-year period, makes such calculations possible. Results from this research estimated that more than 12% of hospital use and 7% of physician visits are attributable to smoking, resulting in annual costs of \$110 to \$140 per capita in Newfoundland.

A 2004 study for the Quebec Coalition for Tobacco Control, Update on Smoking Costs to Society (2004) examines six categories of tobacco-attributable costs in Canada: direct health care costs (hospital care, medical care and drug expenses), costs incurred by employers (absenteeism, decreased productivity, increased life insurance premiums, and cost of smoking areas), prevention and research costs, cost of fires, costs linked to premature death, and costs specific to ETS. This report totals these cost estimates by category, resulting in a total estimate of smoking-attributable costs in Canada of \$15,847 million (\$2002). Adjusting for inflation using the CPI, this translates to \$16,956.5 million in \$2005.

On a per capita basis, this is a considerably more modest estimate of total smoking attributable costs than in this report—primarily because the Quebec Coalition for Tobacco Control study excludes most of the costs of productivity losses due to long-term and short-term disability, which together account for fully 47.4% of total smoking costs in this Nova Scotia report. Only a small portion of these disability-related smoking costs appear in the Quebec Coalition report, as part of the absenteeism costs incurred by employers, which amount to only 4.75% of total smoking-related costs in that report.

---

<sup>84</sup> Harrison, G., Feehan, J., Edwards, E. and Segovia, J. (2003). Cigarette Smoking and the cost of hospital and physician care. *Canadian Public Policy*. University of Toronto Press, March, Vol. 29 (1), p. 4. [online] Available at: [ideas.repec.org/a/cpp/issued/v29y2003i1p1-19.html](http://ideas.repec.org/a/cpp/issued/v29y2003i1p1-19.html). Accessed May 2007.

The disparities in costing results that can result from use of such different cost categories is apparent when one considers that the indirect costs (productivity losses) associated with premature death amount to 40.49% of total smoking-attributable costs in the Quebec Coalition report, but only 7.8% of total smoking costs in this Nova Scotia report. This is because productivity losses attributable to premature death account for only 15% of the indirect cost category in this report (and in the CCSA report on which our Nova Scotia numbers are based), while productivity losses attributable to disability account for the remaining 85% of indirect costs. Note that these productivity loss breakdowns do not include on-the-job productivity losses due to unauthorized smoke breaks, which are separately accounted for in the category of costs incurred by employers in both the Nova Scotia and Quebec Coalition reports (based on estimates from the Conference Board of Canada), but which are not included in the CCSA study.

While the difference in magnitude between total smoking-related cost results in the Quebec Coalition for Tobacco Control's study and our own is mostly attributable to the former's exclusion of most disability-related costs (the largest cost category in the CCSA study and in this report as noted), other statistical and methodological differences also play a role in producing different results. For example, part of the difference between per capita national results and per capita provincial results for Nova Scotia can be attributed simply to Nova Scotia's historically higher smoking rates. But different calculation methods also contribute to disparities in the results. For example, there are significant differences in the way certain costs are calculated in the Quebec Coalition for Tobacco Control's *Update on Smoking Costs to Society* (2004) compared to this report and to the CCSA study. For example, hospital and medical care expenses in the Quebec Coalition study are calculated using the econometric approach described by Harrison, while prescription drug costs are estimated using a 1997 study by Kaiserman.<sup>85</sup>

Costs associated with premature death are also calculated using Kaiserman's methodology which updates current and future lost income due to premature death using the number of people who died from smoking and the average salary they would have received for the remainder of their lives. Kaiserman's method is modified by also considering the proportion of workers in each age group. The productivity losses due to premature mortality in this report are extrapolated from CCSA cost estimates based on somewhat different methods. In short, this brief comparison illustrates the difficulties and challenges inherent in comparing different costing studies.

## 2.3 Who Pays for Tobacco Use in Nova Scotia?

Using the cost estimates from the previous section of this report, the proportion of total smoking costs borne by employers, smokers, and society can be estimated.<sup>86</sup> As noted, the estimated annual cost of tobacco use in Nova Scotia reached \$943.8 million in 2005. Of these total costs, \$171.3 million (\$2005) were for direct taxpayer funded health care expenses; \$73.9 million

---

<sup>85</sup> Kaiserman, M. (1997). The Cost of Smoking in Canada, 1991, *Chronic Diseases in Canada*, 18(1).

<sup>86</sup> This approach is based on a similar calculation from the Quebec Coalition for Tobacco Control's *Update on Smoking Costs to Society* (2004), p 12.



(\$2002) were for revenue losses due to premature death (\$79.1 million in \$2005),<sup>87</sup> \$415.4 million (\$2002) or \$444.5 million (\$2005) were for long-term disability costs; and \$242.2 million (\$2005) were for employer-borne costs.

As shown by the percentage breakdown of costs in Table 13 (above), employers carry 25.7% of the total economic burden of tobacco use, \$242.2 million (\$2005). The remainder of the total cost, \$701.6 million (\$943.8–\$242.2 million), is borne by society and the government. However, a portion of this burden is redeemed in the form of tobacco taxes paid by smokers. Total federal and provincial tobacco tax revenue generated from the province of Nova Scotia in 2005/06 is estimated at \$163.6 million, as shown in Table 16, Section 3. This means the cost shortfall carried by society equals \$538 million (\$701.6–\$163.6), or 57% of the total economic cost of tobacco use in Nova Scotia.

Cost to employers	\$242.2 million (25.7%)
Cost to smokers (taxes)	\$163.6 million (17.3%)
Cost to society	\$538 million (57%)
<b>Total</b>	<b>\$943.8 million</b>

Needless to say, the cost to smokers indicated here counts only the tax portion of cigarette purchases and not the full out-of-pocket costs of cigarette purchases paid by smokers, nor does it include the private health-related and caregiving costs incurred by smokers.

## Section 2: Summary of Key Observations

- The total number of deaths in Nova Scotia attributable to active smoking was estimated at 1,722 in 2005, with 1,051 males and 671 females dying that year from cancers, cardiovascular diseases, and respiratory diseases, as a direct result of tobacco use.
- In addition, ETS was estimated to be responsible for the deaths of at least 26 more Nova Scotians in 2005.
- Deaths from active and passive smoking together therefore accounted for an estimated 1,748 deaths in Nova Scotia in 2005. Since there were 8,378 deaths from all causes in Nova Scotia in 2005, one in five deaths in the province (21%) were attributable to tobacco use. Despite recent reductions in smoking prevalence in the province, the death toll due to smoking continues to be very high, reflecting previous high smoking rates.
- The total direct annual health care costs attributable to tobacco use in Nova Scotia were estimated at \$171.3 million (\$2005) in 2005.

---

<sup>87</sup> Values translated to 2005 using Statistics Canada. (2007) *Consumer Price Index*, Catalogue Number 62-001-X1B. [online] Available at: [www.statcan.ca/english/freepub/62-001-X1B/62-001-X1B2007004.pdf](http://www.statcan.ca/english/freepub/62-001-X1B/62-001-X1B2007004.pdf). Accessed May 2007.

- Annual indirect costs due to tobacco use in Nova Scotia were estimated at \$526 million (\$2005) in 2005, reflecting productivity losses due to long and short-term disability, and premature mortality.
- The value of losses due to fires caused by smoking in Nova Scotia was estimated at \$2 million (\$2005) in 2005.
- In 2005, prevention and research costs for tobacco use in Nova Scotia were estimated to range from \$2.3 million to \$3.6 million.
- The total annual cost to an employer of hiring a smoker in Nova Scotia was estimated at \$3,110.20, including absenteeism costs of \$298.20, on-the-job productivity losses of \$2,792 due to unauthorized smoke breaks, and the cost of ashtrays and cleaning at \$20. The total annual cost to Nova Scotia employers of hiring smokers was estimated at \$263.6 million in 2005.
- The total cost of tobacco use in Nova Scotia for 2005 is estimated at \$943.8 million (\$2005) or \$1,006.3 per capita. Indirect costs, valued at \$526 million (\$2005) accounted for the greatest proportion of total costs (55.7%), followed by the cost to employers of employing smokers at \$242.2 million (\$2005) (25.7% of the total cost), and direct health care costs at \$171.3 million (\$2005) (18.2% of the total cost).
- \$538 million (\$2005), or 57% of the total economic cost of tobacco use in Nova Scotia, is paid for by Nova Scotian society, more than four-fifths of whom (81%) are non-smokers.

### SECTION 3: TOBACCO REDUCTION INTERVENTIONS

This section summarizes key effectiveness, cost, and cost-effectiveness literature concerning some common interventions currently being used to achieve tobacco reduction goals in Nova Scotia. Recent studies from Ontario and British Columbia will be particularly drawn upon, as they reflect Canadian conditions and circumstances. Where possible, estimates from the literature will be extrapolated to the Nova Scotia context. Observations and recommendations based on evidence in other jurisdictions relevant to Nova Scotia are included throughout and summarized at the end of the section.

Canadian frameworks for tobacco reduction encourage interventions to achieve the following broad goals:

- increasing cessation—helping smokers quit, reducing tobacco use and preventing relapse
- protecting people from Environmental Tobacco Smoke (ETS)
- reducing smoking initiation, especially among youth.

The National Strategy to Reduce Tobacco Use in Canada also includes the goal of de-normalization. Health Canada’s Federal Tobacco Control Strategy also promotes harm reduction<sup>88</sup> and supports the use of public education campaigns. Priority groups under both strategies include youth and populations that currently have high smoking rates, such as Inuit and First Nations. Interventions and legislation implemented in Canada since 1999 flow from these goals and priority areas.

Common tobacco reduction strategies that will be examined in this section of the report include:

1. Smoke-free policy and programs
2. Increased tobacco taxes
3. Marketing bans
4. Mass media and public awareness
5. Cessation assistance
6. School-based programs
7. Community-based programs and education

Tobacco reduction interventions often achieve multiple goals. For example, media campaigns can make tobacco use seem less normal, reduce smoking initiation among youth, and also encourage motivated smokers to quit. Interventions have been demonstrated to be most effective when positioned within a comprehensive, multi-site, multi-level model.

*“No single intervention in the campaign to reduce smoking prevalence can account for the significant changes that have occurred since the 1960s. Each intervention, from*

---

<sup>88</sup> Harm reduction is a term that covers activities and services that acknowledge the continued drug use of individuals, but seek to minimise the harm that such behaviour causes. See [www.drugscope.org.uk/DS%20Media%20Project/media\\_terms.htm](http://www.drugscope.org.uk/DS%20Media%20Project/media_terms.htm).

*media advocacy to school programs to social support systems, is enhanced synergistically by the presence of other components.”<sup>89</sup>*

There is now considerable empirical evidence on the effectiveness of comprehensive, well-funded tobacco reduction programs. States in the US with the best-funded, most sustained tobacco prevention programs in the 1990s—Arizona, California, Massachusetts, and Oregon—saw more than twice the declines in cigarette sales compared to the country as a whole (43% versus 20%).<sup>90</sup> Well-funded programs combined with strong and comprehensive tobacco control policies and programs have also been shown to increase cessation rates. One wide-ranging study, for example, found that cessation rates were higher in communities that had both policy and program interventions, compared to those that relied on policy interventions alone.<sup>91</sup>

As shown in Section 2, tobacco use generates substantial economic costs to society. By the same token, tobacco reduction interventions have the potential to generate major future cost savings as smoking prevalence rates decline. Extensive literature now exists on the effectiveness of tobacco reduction interventions. Several studies also estimate the cost savings generated by a specific tobacco reduction interventions and the cost effectiveness of particular interventions. Cost effectiveness can be calculated as cost per quitter, cost per life-year saved and cost per quality-adjusted life year (QALY) or disability-adjusted life year (DALY) saved. According to one source, \$10,000 is an approximate per QALY gained standard beyond which interventions are not considered cost-effective.<sup>92</sup> For a summary of different broad approaches and methods used to assess tobacco reduction interventions in economic terms, see Appendix F.

### **3.1 Summary of Tobacco Reduction Interventions**

#### ***Smoke-free Policy and Programs***

Exposure to ETS, also known as Second Hand Smoke (SHS), has been proven to be a significant health risk. ETS contains more than 4,000 chemical compounds, 50 of which are associated with, or known to cause cancer. The United States Environmental Protection Agency (EPA) officially labels SHS as a Class ‘A’ carcinogen—the most dangerous of cancer agents for which there is no known safe level of exposure.<sup>93</sup> Health Canada reports that nearly two-thirds of toxic cigarette

---

<sup>89</sup> Krueger, H. (2005). *Risk Factor Interventions: An Overview of their Effectiveness*. Prepared for the BC Healthy Living Alliance, p.4. [online] Available at: [www.B.C.healthyliving.ca/resources/documents/risk\\_factor\\_effective\\_interventions\\_B.C.HLA.pdf](http://www.B.C.healthyliving.ca/resources/documents/risk_factor_effective_interventions_B.C.HLA.pdf). Accessed May 2007.

<sup>90</sup> Farrelly, M., et al. (2003). The Impact of Tobacco Control Program Expenditures on Aggregate Cigarette Sales: 1981–2000. *Journal of Health Economics*, Vol. 22, p. 843–849.

<sup>91</sup> Hyland A., et al. (2006). State and Community Tobacco-Control Programs and Smoking—Cessation Rates Among Adult Smokers: What Can We Learn From the COMMIT Intervention Cohort? *American Journal of Health Promotion*, March, Vol. 20 (4) p. 272–281.

<sup>92</sup> Krueger, H. (2005) *Resources for Health: A Cost-Effective Risk Factor Plan for British Columbia*, for the Health BC Healthy Living Alliance. [online] Available at: [www.B.C.healthyliving.ca/resources/documents/risk\\_factor\\_business\\_plan.pdf](http://www.B.C.healthyliving.ca/resources/documents/risk_factor_business_plan.pdf). Accessed May 2007.

<sup>93</sup> US Environmental Protection Agency. (1992). *Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders*, EPA/600/6-90/006F. The report is dated December 1992 and was publicly released January 6, 1993.

fumes are not inhaled by the smoker, instead enter the surrounding air. ETS has at least twice the nicotine and tar content of the inhaled portion of smoke. According to Health Canada, regular exposure to ETS by Canadians increases the risk of lung disease by 25% and of heart disease by 10%.<sup>94</sup> A comprehensive review of the literature by the Ontario Medical Association (OMA) concluded:

*“The overwhelming body of medical evidence contained in hundreds of scientific studies and six internationally recognized comprehensive reviews undertaken during the last decade, clearly demonstrates the direct causes and linkages between exposure to second-hand smoke and serious health effects among non-smokers.”<sup>95</sup>*

Early-life exposure to ETS can result in increased risk of cancer, childhood asthma, and developmental delays. One recent study of births in New York city estimated the annual ETS-related cost of early intervention services—just one impact of ETS-related developmental delays in children—at \$50 million per year (\$US 2005) for births paid for Medicaid, and \$99 million per year (\$US 2005) for all city births.<sup>96</sup>

Evidence from many jurisdictions therefore indicates clearly that smoke-free policies and programs can serve to protect non-smoking Nova Scotians, especially children and hospitality workers, from harmful exposure to ETS. Interventions to restrict exposure to ETS can target public places, workplaces, and even homes, vehicles, and other private settings. Research also suggests smoke-free public places are an effective deterrent to youth smoking.<sup>97</sup> They can serve to make tobacco use seem less normal and can therefore also encourage smokers to quit when used in combination with high cigarette prices and other interventions.<sup>98</sup> In the United States, banning public tobacco use and strict enforcement of smoke-free legislation has been estimated to reduce overall tobacco consumption by 4 to 10% and to motivate significant numbers of smokers to quit.<sup>99</sup>

According to the World Health Organization (WHO), the effectiveness of smoking restrictions depends on enforcement and on whether public opinion is mobilized through comprehensive information campaigns—indicating again that multi-faceted tobacco reduction programs are more effective than single interventions. The WHO estimated the average cost per disability-

---

<sup>94</sup> Health Canada. (2004). *Cigarette Smoke: It's Toxic*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/second/fact-fait/tox/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/second/fact-fait/tox/index_e.html). Accessed July 2007.

<sup>95</sup> Gosevitz, R. (2003). *The Duty to Protect: Eliminating Second-Hand Smoke from Public Places and Workplaces in Ontario*. Ontario Medical Association (OMA). Position Paper, Feb. [online] Available at: [www.oma.org/phealth/2ndsmoke03.pdf](http://www.oma.org/phealth/2ndsmoke03.pdf) Accessed May 2007.

<sup>96</sup> Millet, T. *et al.* (2006). The economic impact of early life environmental tobacco smoke exposure: early intervention for developmental delay. *Environmental Health Perspectives* October, Vol, 114 (10), p. 1585–8.

<sup>97</sup> Wakefield M. *et al.* (2000). Do restrictions on smoking at home, at school and in public places influence teenage smoking? *ImpacTeen Research Paper Series, No.3*. Chicago, IL: University of Illinois at Chicago.

<sup>98</sup> Stephens, T., *et al.* (1997). The Relationship of Cigarette Prices and No-Smoking By-laws to the Prevalence of Smoking in Canada. *American Journal of Public Health*, Vol. 87, p. 1519 – 1521.

<sup>99</sup> World Bank. (1999) *Curbing the epidemic: Governments and the economics of tobacco control* as cited by World Health Organization (2004). *European Strategy for Smoking Cessation Policy*, p. 8. [online] Available at: [www.euro.who.int/Document/E80056.pdf](http://www.euro.who.int/Document/E80056.pdf). Accessed June 2007.

adjusted life year (DALY) saved of enforcing clean indoor air laws at just \$358 – a small investment considering the benefit gained.<sup>100</sup>

Contrary to statements made by the tobacco industry, research shows no significant impacts of smoke-free legislation on restaurant and bar sales.<sup>101</sup> For example, a review of evidence by Scollo *et al* (2003) reports that well-designed studies show either no impact or a positive impact of smoke-free restaurant and bar laws on employment and sales.<sup>102</sup> This evidence, mostly from U.S. sources, has been confirmed by a study in the City of Ottawa, where a smoke-free by-law prohibiting smoking in workplaces and public places such as restaurants and bars was implemented in 2001. Researchers examined retail sales data from 1998 to 2002, and results showed no abrupt permanent, abrupt temporary or gradual permanent changes in restaurant and bar sales with the implementation of the legislation.<sup>103</sup>

Smoke-free legislation and policies can be implemented at all levels and have been federal, provincial, municipal, and organizational/employer responsibilities. Smoke-free legislation is a key element of Nova Scotia's comprehensive tobacco control strategy, implemented through strong community partnerships, through a province-wide smoke-free public places policy and through public awareness campaigns, such as *Smoke-free Around Me*. In 2003, Nova Scotia's Smoke-free Places Act was implemented, requiring all indoor workplaces and public places to be smoke-free, though with some allowances for designated smoking rooms. A 2006 amendment to the Act makes it even more restrictive—prohibiting smoking entirely in indoor public areas, workplaces (no designated smoking rooms allowed) and outdoor eating and drinking establishments across the province (see Appendix B for an overview of the legislation).<sup>104</sup>

As of 2006, 12 Nova Scotian municipalities had also implemented comprehensive smoke-free municipal by-laws (see Appendix B for a list), and all nine provincial District Health Authorities (DHAs) banned smoking in all outdoor properties, including hospital parking lots. However, as of July 2003, only 11 of Nova Scotia's 55 municipalities had by-laws requiring public places to be 100% smoke-free. The 12<sup>th</sup> municipality, Halifax Regional Municipality (HRM), has not yet fully implemented its municipal by-law..<sup>105</sup>

<sup>100</sup> World Health Organization. (2004). *European Strategy for Smoking Cessation Policy*, p7. [online] Available at: [www.euro.who.int/Document/E80056.pdf](http://www.euro.who.int/Document/E80056.pdf). Accessed June 2007.

<sup>101</sup> See Stanley, S. (2006). Business as usual for smoke-free places. *Bulletin of the World Health Organization*, 84 (12). For a review of evidence, see also Colman, R. (2002). *The Economic Impact of Smoke-free Places in Nova Scotia*. GPI Atlantic. [online] Available at: [www.gpiatlantic.org](http://www.gpiatlantic.org). Accessed June 2007.

<sup>102</sup> Scollo, M., Lal, A., Hyland A. and Glantz, S. (2003). Review of the quality of studies on the economic effects of smoke-free policies on the hospitality industry. *Tobacco Control*, Vol. 12, p. 13–20.

<sup>103</sup> Luk, R., Ferrence, R. and Gmel, G. (2006). The economic impact of a smoke-free by-law on restaurant and bar sales in Ottawa, Canada. *Addiction*. May, Vol. 101 (5), p. 738–45.

<sup>104</sup> Designated smoking rooms are still allowed in health-care facilities for the acute or long-term care of veterans, in licensed nursing homes and residential care facilities and in homes for aged and disabled persons.

<sup>105</sup> According to Steve Machat, manager of tobacco control with the Nova Scotia Department of Health Promotion and Protection, although provincial legislation may supersede municipal legislation and bans, the latter are still important. In practice, the province uses its ability to enforce legislation more stringently than municipalities are generally able to do, especially in relation to licensed areas and workplaces in general. However, there are examples where certain municipal by-law provisions may be stronger than the provincial legislation (e.g. specifying proximity to a doorway within which smoking is prohibited as a prime example), indicating that municipal by-laws may play an important role in specifying particulars on which the provincial legislation is more general and less specific. (Personal communication, Steve Machat, May 2007)



In the face of differing municipal restrictions, province-wide legislation also serves to ensure consistent implementation and enforcement of smoke-free restrictions across Nova Scotia. Currently, Nova Scotia's Smoke-free Places legislation is among the strongest and most restrictive in Canada, and can be credited with at least some of the reduction in tobacco use and ETS exposure achieved in recent years.

### ***Increasing Tobacco Taxes***

Increased tobacco pricing and taxation policies have been demonstrated to be the single most effective way to reduce the demand for tobacco products—though they are again most effective when used in combination with other strategies. Pricing and taxation policies target cessation, prevent initiation of use, reduce relapse among those who have quit and reduce consumption among continuing users.<sup>106</sup> The literature points to four main benefits that have been found to result from increasing tobacco taxes: reduced consumption and prevalence, reduced burden of disease on the poorest populations, improved overall public health and higher tax revenues.<sup>107</sup>

Increasing tobacco taxes on legal cigarette sales leads to an increase in the price of cigarettes, which thus reduces consumer demand. For example, the WHO estimates that a worldwide tax increase raising the real price of cigarettes by 10% would cause 42 million smokers to quit and prevent a minimum of 10 million tobacco-related deaths.<sup>108</sup> The relationship between how much consumption changes in relation to changes in the price of a good or service is known as the price elasticity of demand. For Western countries such as Canada, estimates of the price elasticity of adult demand range from -0.3 to -0.5.<sup>109</sup> This means a 10% increase in the price of legally sold cigarettes can be expected to result in a 3% to 5% drop in consumption. At the same time, tobacco tax increases encourage increased selling of smuggled cigarettes. It is important to track and monitor smuggling in relation to tobacco taxes.

Figure 23 illustrates the close connection between the real price of cigarettes (in constant dollars) and per capita consumption of cigarettes in Canada. As the price of cigarettes began to rise in Canada in the 1980s, per capita consumption of cigarettes began to fall. Figure 23 also shows clearly the dramatic increase in consumption that resulted from a massive federal tobacco tax rollback along with provincial tax rollbacks in five Canadian provinces (Ontario, Quebec, New Brunswick, Nova Scotia and PEI) in February, 1994. Although all Canadian jurisdictions have increased tobacco taxes substantially in recent years, it is noteworthy that—in inflation-adjusted terms—the January 1994 price level of cigarettes has only recently been surpassed (not shown in

---

<sup>106</sup> Guindon, G, Tobin, S. and Yach, D. (2002) Trends and affordability of cigarette prices: ample room for tax increases and related health gains. *Tobacco Control*, Vol. 11, p. 35–43.

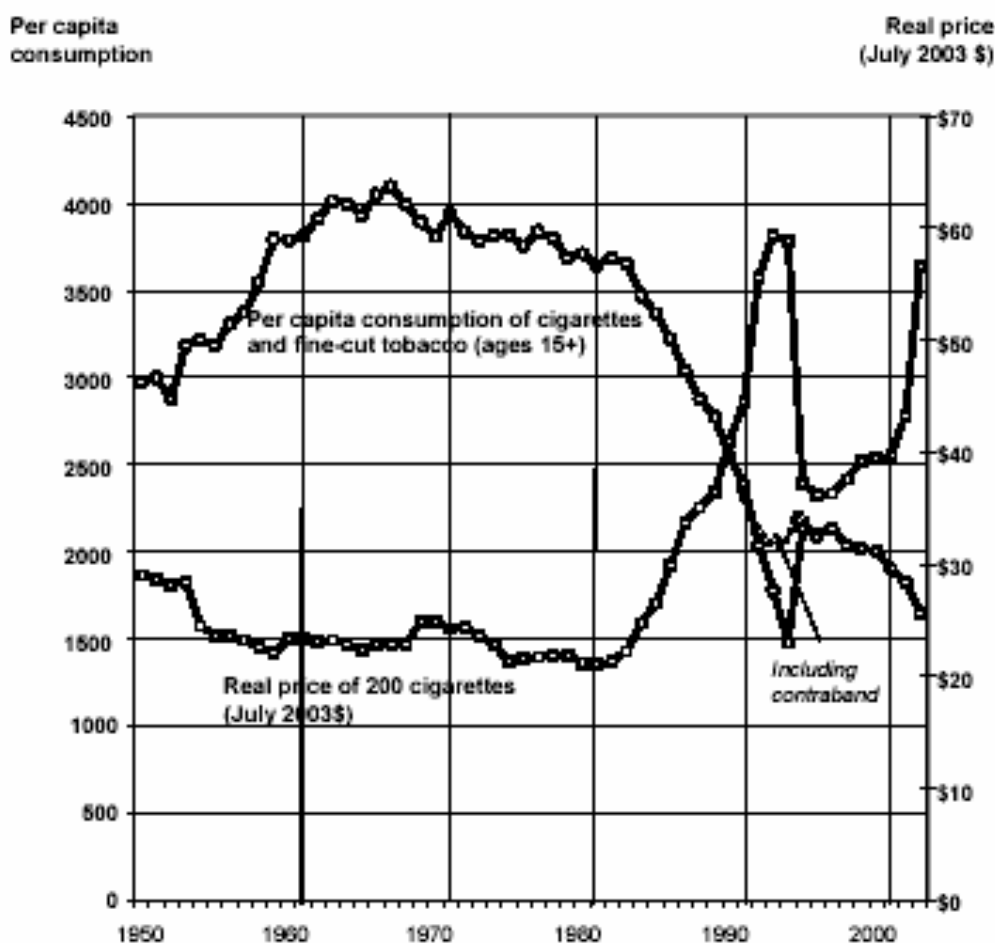
<sup>107</sup> Ceraso, M., Ahrens, D. and Remington, P. (2005). Increasing tobacco taxes: an evidence-based measure to reduce tobacco use. *Wisconsin Medical Journal*, Vol. 104 (4).

<sup>108</sup> As cited by Guindon, G, Tobin, S. and Yach, D. (2002) Trends and affordability of cigarette prices: ample room for tax increases and related health gains. *Tobacco Control*, Vol. 11, p. 35–43.

<sup>109</sup> Gallet, C and List, J. (2003). Cigarette demand: a meta-analysis of elasticities. *Health Economics*, Vol. 12 (10), p. 821–35

Figure 23, which goes only to 2002).<sup>110</sup> This indicates that not too much satisfaction can yet be drawn from the tobacco tax increases of 2001-03, and there is still ample scope for further tax and price increases that would continue to reduce demand.

**Figure 23: Real Price in Relation to per Capita Consumption of Cigarettes, Canada, 1949–2002**



Source: Canadian Coalition for Action on Tobacco Control (2004). *A Win-Win: Enhancing Public Health and Public Revenue: Recommendations to Increase Tobacco Taxes*. [online] Available at: [www.smoke-free.ca/pdf\\_1/2004taxreport.pdf](http://www.smoke-free.ca/pdf_1/2004taxreport.pdf). Accessed May 2007.

Studies show that certain population subgroups—including adolescent males and low-income smokers—are more responsive to price changes than others.<sup>111</sup> A recent study by the US

<sup>110</sup> Canadian Coalition for Action on Tobacco Control. (2004). *A Win-Win: Enhancing Public Health and Public revenue: Recommendations to Increase Tobacco Taxes*, p4. [online] Available at: [www.smoke-free.ca/pdf\\_1/2004taxreport.pdf](http://www.smoke-free.ca/pdf_1/2004taxreport.pdf). Accessed May 2007.

<sup>111</sup> For example, see US Office of Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention. (1998). Responses to cigarette prices by race/ethnicity, income and age groups, US 1976–1993. *Morbidity and Mortality Weekly*, Vol. 47 (29), p 605.



National Bureau of Economic Research, for example, indicates that increases in the price of cigarettes significantly reduce the number of adolescents who start smoking.<sup>112</sup> Studies by Chaloupka and colleagues (2001, 2003) show that youth may be up to three times more price-sensitive than adults.<sup>113</sup>

In fact, price elasticity has been found to increase inversely with age—with teenagers most responsive to increases in cigarette prices. Thus, a 10% increase in price was found to produce an 8.3% decline in smoking prevalence among 15–17 year-olds, a 5.2% decline among 18–20 year-olds, a 3.7% decline among 21–23 year-olds and a 2% decline among 24–26 year-olds.<sup>114</sup> Another study found that a 10% increase in the price of cigarettes would reduce the number of teenagers who smoke by 7% and daily consumption of cigarettes among teenagers by 6%—well in excess of estimates for the general population.<sup>115</sup>

A recent California study used a 75-year dynamic computer simulation model to estimate the health and economic outcomes of several tax increase options. Results showed that a 20% increase in tobacco prices through taxes would reduce smoking prevalence from 17% to 11.6%, with gains of 14 million cumulative life years and 16 million QALYs over 75 years. As a result, total smoking-related medical costs in California would be reduced by \$188 billion in that span.<sup>116</sup>

Ahmad and Billimek (2007) used the same 75-year computer simulation model to compared the long-term health benefits to society of tax increases with raising the purchasing age for tobacco products to 21. Their results showed that, in general, the health benefits deriving from large tax increases are greater and accrue faster than the health benefits of raising the smoking age. However, the authors note that most U.S. tobacco tax increases have been modest, resulting in only a 15% average cigarette price increase, and the authors therefore conclude that if the political climate continues to favour only moderate tobacco tax increases, consideration should be given to increasing the legal purchasing age. Thus, enforcing a higher smoking age was found to reduce long-term adult smoking prevalence (75 years in the future) by 13.6%—an amount comparable to that resulting from a 40% tax-based price increase, and to produce a cumulative gain of 109 million quality-adjusted life years (QALYs)—comparable to a 20% tax-induced price increase.<sup>117</sup>

---

<sup>112</sup> Markowitz, S and Tauras, J. (2006). Even for teenagers, money does not grow on trees: Teenage substance use and budget constraints, *NBER Working Papers 12300*, US National Bureau of Economic Research, Inc.

<sup>113</sup> See Chaloupka F, and Pacula, R. (2001) The impact of price on youth tobacco use. In *Changing Adolescent Smoking Prevalence*. Monograph No. 14, National Cancer Institute, 2001 and Ross, H. and Chaloupka, F. (2003). The effect of cigarette prices on youth smoking. *Health Economics*. Vol. 12, p 217-30.

<sup>114</sup> Harris, J. and Chan, S. (1999), The Continuum of Addiction: Cigarette smoking in relation to price among Americans aged 15–29. *Health Economics*, 8, p. 81–86. For further information on price elasticity in relation to tobacco consumption and prevalence, see Colman, R. (2000). *The Cost of Tobacco in Nova Scotia*, p. 45-50.

<sup>115</sup> Grossman, M. and Chaloupka, F. (1997). Cigarette Taxes: The straw to break the camel's back. *Public Health Reports*. July–August, Vol. 112, p. 291-297.

<sup>116</sup> Ahmad, S. (2005) Increasing excise taxes on cigarettes in California: a dynamic simulation of health and economic impacts. *Preventive Medicine*, July, Vol. 41 (1), p 276–83.

<sup>117</sup> Ahmad, S. and Billimek, J. (2007). Limiting youth access to tobacco: comparing the long term health impacts of increasing cigarette excise taxes and raising the legal smoking age to 21 in the United States. *Health Policy*, March, Vol. 80 (3), p. 378–91.

A 2006 study from the Netherlands estimated the cost-effectiveness of tobacco tax increases from a health care perspective, specifically, in relation to the medical costs saved per quality-adjusted life years (QALYs) gained. The study concluded that tax increases are a cost effective way to improve public health and recommended that this tool be used as a health intervention.<sup>118</sup>

Although tobacco tax hikes have been proven effective in reducing tobacco use prevalence, the literature indicates tobacco tax increases should be considered in relation to their potential impact on the demand for other “sin” products. For example, some evidence suggests higher cigarette taxes could lead to an increased demand for liquor, or to higher consumption of smokeless tobacco, if these products become relatively cheaper by comparison with cigarette prices.<sup>119</sup>

As well, nicotine-addicted smokers living on low incomes will be hit hardest financially by tobacco taxes. The evidence indicates that, to be effective, tobacco tax increases are best undertaken in tandem with financially assisting low socio-economic status (SES) users with cessation supports such as counselling and free nicotine replacement therapy (NRT).<sup>120</sup>

The cumulative evidence therefore points to the need for a balanced approach to tobacco control, in which tax increases are only one (though very key) policy and program tool that is used in tandem with other tobacco reduction strategies.<sup>121</sup>

The final retail price of a carton of cigarettes is derived by first adding provincial tobacco taxes and federal excise duty to the product cost. To this subtotal, 6% GST plus provincial sales tax (or the combined HST—14% in Nova Scotia) are then added to the product cost to calculate the final retail price. How much of the price of a carton of 200 cigarettes is tax in Nova Scotia? According to a 2004 calculation by the Canadian Coalition for Action on Tobacco,<sup>122</sup> taxes comprised 71% of the cost of a carton of cigarettes, totalling \$57.50/carton on a final retail price of \$81.35. This tax total was made up of \$31.04 in provincial tobacco taxes, \$15.85 in federal excise duty, \$5.66 for PST and \$4.95 for GST. The pre-tax product cost of a carton of cigarettes was \$23.85.

Table 14 highlights select tobacco tax increases on a carton of 200 cigarettes and on fine cut tobacco in Nova Scotia since 1980 (in current dollars).<sup>123</sup> As shown in the table, federal and provincial tobacco taxes have increased greatly since the 1980s. In current dollars, provincial taxes increased from \$2/carton \$33.04 from 1980 to 2007. In the same period, federal excise duty

---

<sup>118</sup> VanBaal, P *et al.* (2007). Increasing tobacco taxes: A cheap tool to increase public health, *Health Policy*, July, Vol. 82 (2), p. 142-52.

<sup>119</sup> International Development Research Centre (IDRC) (2003). *At What Cost? The Economic Impact of Tobacco Use on National Health Systems, Societies, and Individuals*, chapter 5. [online] Available at: [www.idrc.ca/en/ev-106418-201-1-DO\\_TOPIC.html](http://www.idrc.ca/en/ev-106418-201-1-DO_TOPIC.html). Accessed April 2007.

<sup>120</sup> Ceraso, M., D. Ahrens and P. Remington (2005). Increasing tobacco taxes: an evidence-based measure to reduce tobacco use. *Wisconsin Medical Journal*, Vol. 104 (4).

<sup>121</sup> See, for example, Sugarman, S. (2003). A balanced tobacco control policy. *American Journal of Public Health*, March, Vol. 93 (3), p. 416-418.

<sup>122</sup> Canadian Coalition for Action on Tobacco. (2004) *Enhancing Public Health and Public Revenue: Recommendations to Increase Tobacco Taxes*. [online] Available at: [www.nsra-adnf.ca/cms/file/pdf/taxreport2004.pdf](http://www.nsra-adnf.ca/cms/file/pdf/taxreport2004.pdf). Accessed May 2007.

<sup>123</sup> Full month-by-month data on tax rate increases are included in Appendix A: Data Table 9.

has increased from \$1/carton to \$16.41/carton in current dollars. In 2004, the federal excise tax on tobacco products was removed and federal excise duties were increased proportionately.

Comparing the 1988 to 2007 period (which includes the periods both before and after the introduction of Nova Scotia's comprehensive tobacco strategy in October 2001), these tobacco tax increases are still substantial when adjusted for inflation. Provincial tobacco tax rates were \$9.04 in 1988 (\$14.10 in \$2007) and increased over time in constant dollars to \$33.04 (\$2007). Federal rates increased from \$5.49 in 1988 (\$8.57 in constant \$2007) and more than doubled over this time period into \$16.41 in 2007—almost doubling in constant dollar terms.

**Table 14: Federal and Provincial Tobacco Taxes, (carton and fine-cut), Nova Scotia, Selected Months, 1980–2007 (Current Dollars)**

	Carton of 200 cigarettes			Fine cut tobacco		
	Provincial tax (\$/carton)	Federal Excise Tax (\$/carton)	Federal Excise Duty (\$/carton)	Provincial Tax (\$/200g)	Federal Excise Tax (\$/200g)	Federal Excise Duty (\$/200g)
March 1980	2.0000	1.2000	1.0000	25% retail price	0.3960	0.2200
May 1982	2.8000	1.3392	1.3616	35% retail price	0.4419	0.3148
April 1984	4.0000	1.7904	1.8202	50% retail price	0.5908	0.4208
May 1986	7.0000	4.1108	2.0240	50% retail price	1.2508	0.4678
May 1987	9.0000	4.2752	2.1050	50% retail price	1.3008	0.4866
May 1990	13.6000	4.2752	5.4950	10.5000	2.8508	3.6666
Feb 1994	13.6000	6.7838 <sup>124</sup>	5.4950	10.5000	3.5582 <sup>125</sup>	3.6666
April 1994	10.1000	4.3552 <sup>126</sup>	5.4950	7.7300 <sup>127</sup>	1.8596 <sup>128</sup>	3.6666
May 1994	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Dec 1995	9.8800	3.3552	5.4950	7.7800	1.5896	3.6666
Dec 1996	10.5800	4.0552	5.4950	8.3400	2.1296	3.6666
May 1997	8.4400	4.0552	5.4950	6.7000	2.1296	3.6666
March 1988	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
April 2001	12.8900	5.3385	5.4950	8.9667	2.9629	3.6666
May 2001	13.5400	5.3552	5.4950	9.4200	3.1296	3.6666
Nov 2001	15.9567	6.8052	5.4950	11.8367	4.5796	3.6666
Dec 2001	16.0400	6.8552	5.4950	11.9200	4.6296	3.6666
April 2002	20.3733	6.8552	5.4950	18.0387	4.6296	3.6666
May 2002	21.0400	6.8552	5.4950	18.9800	4.6296	3.6666
Feb 2003	26.0400	10.3552	5.4950	23.4800	7.1296	3.6666
April 2004 <sup>129</sup>	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
June 2007	33.0400	0.0000	16.4100	30.0000	0.0000	11.1800

Source: Government of Canada, Department of Finance (personal communication, 2007). See Appendix A: Table 8 for all monthly data.

Table 15 provides a comparison of cigarette carton prices in Canada's provinces and territories in May 2007. As shown, Nova Scotia's retail price for a carton of cigarettes is the 6<sup>th</sup> highest in the country, after Newfoundland, the Northwest Territories, Nunavut, Saskatchewan and Manitoba.

<sup>124</sup> The federal rate reductions that took effect Feb. 9, 1994 differed by province. Maximum federal excise tax following the reduction was \$0.13388 per five cigarettes.

<sup>125</sup> The federal rate reductions that took effect Feb. 9, 1994 differed by province. Maximum rate following the reduction was \$10.648 per kilogram

<sup>126</sup> The federal rate reductions that took effect Feb. 9, 1994 differed by province. Effective April 15, 1994, the new rate in Nova Scotia rate was reduced to \$0.08388 per

<sup>127</sup> The federal rate reductions that took effect Feb. 9, 1994 differed by province. Effective April 15, 1994, the rate in Nova Scotia rate was reduced to 7.948 per kilogram five cigarettes (or \$3.3552 per carton of 200 cigarettes), which is reflected in the May, 1994 rate in the following line.

<sup>128</sup> The federal rate reductions that took effect Feb. 9, 1994 differed by province. Effective April 15, 1994, the rate in Nova Scotia rate was reduced to \$7.948 per kilogram. This is reflected in the May, 1994, rate in the following line, where the rate of \$1.8596 per 200 grams equates to \$7.948 per kilogram.

<sup>129</sup> The federal excise tax was reduced to zero in July, 2003, and the federal excise duty correspondingly increased

**Table 15: Prices for a Carton of 200 Cigarettes in Canada, May 2007**

Province/territory	Price/carton (\$2007)
Newfoundland	\$93.08
Northwest Territories	\$92.91
Nunavut	\$92.91
Saskatchewan	\$91.30
Manitoba	\$91.13
<b>Nova Scotia</b>	<b>\$89.71</b>
Alberta	\$87.61
British Columbia	\$86.34
Prince Edward Island	\$85.38
New Brunswick	\$78.83
Yukon	\$76.37
Ontario	\$74.57
Quebec	\$70.23

Source: Smoking and Health Action Foundation (2007). *Cigarette Prices in Canada*. [online] Available at: [www.nsra-adnf.ca/cms/file/pdf/cigarette\\_prices\\_Canada\\_1\\_May\\_2007.pdf](http://www.nsra-adnf.ca/cms/file/pdf/cigarette_prices_Canada_1_May_2007.pdf). Accessed May 2007.

Table 16 shows federal and provincial tobacco tax revenues in current dollars for all provinces including Nova Scotia, from 1990 to 2006. Constant dollar amounts for Nova Scotia (\$2006) are also included. It is important to keep in mind that tax revenue totals are influenced both by tobacco tax rates and by smoking rates and cigarette consumption. For example, revenues could decline even with higher taxes if smoking rates and cigarette consumption were to decline sufficiently. In Nova Scotia, between 2000 and 2006, however, tobacco tax revenues rose by nearly 90% in real terms as a result of higher taxes even while smoking rates declined and they have remained considerably higher than pre-2001 levels despite the sharp drop in smoking prevalence.

The lowest tobacco tax revenues in Nova Scotia (\$75,324 million \$2006) were collected in the 1994-1995 period. This is due to the fact that in February 1994, cigarette taxes were cut by the federal government in an effort to curb smuggling, with Quebec, Ontario, and the three Maritime provinces, including Nova Scotia, following suit with cuts to provincial taxes. Taxes were increased in the years that followed. In 2000-01, tax revenue generated from tobacco sales in Nova Scotia was \$86,488 million (\$2006). In 2005-2006, this number had risen to \$163.6 million dollars (\$2006).

Since 2001, tobacco taxes have been regularly, and sometimes sharply, increased as part of Nova Scotia's comprehensive tobacco control strategy. In 2000-01, tax revenue generated from tobacco sales in Nova Scotia was \$86,488 million (\$2006), rising to \$126,011 million in real terms the following year, then to \$154,456 million in 2003-04, and \$182,926 million in 2004-05 (all in \$2006). By 2005-2006, the decline in smoking rates and cigarette consumption had begun to reverse this trend, with revenues falling back to \$163.6 million dollars (\$2006) as the decline in cigarette sales began to offset earlier tobacco tax increases.

**Table 16: Federal and Provincial Tobacco Tax Revenues (Current \$ '000's) 1990–2006**

	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
NL	54,140	55,311	61,733	67,806	67,567	65,805	63,619	64,000
PEI	17,111	18,297	18,077	17,839	12,363	13,486	13,858	13,008
NS	117,811	104,992	102,004	90,150	60,422	67,711	86,343	75,800
NB	75,190	59,600	50,300	43,500	34,900	37,000	39,000	42,357
Quebec	585,800	513,100	411,300	288,200	184,000	264,591	283,112	323,000
Ontario	875,000	1,028,000	969,000	773,000	324,000	337,000	356,000	425,000
Manitoba	116,109	129,861	128,174	123,212	116,119	112,425	109,638	112,917
Sask.	100,977	104,617	115,270	110,812	115,587	114,180	116,869	123,631
Alberta	275,080	322,078	313,114	312,000	322,078	311,041	317,000	330,000
BC	346,500	433,000	483,200	482,400	516,700	482,300	487,900	486,000
Canada	2,417,679	3,312,002	2,980,040	2,569,993	1,914,350	1,941,050	2,031,000	2,049,057
<b>Total</b>	<b>4,981,399</b>	<b>6,080,860</b>	<b>5,632,212</b>	<b>4,878,914</b>	<b>3,668,089</b>	<b>3,746,590</b>	<b>3,904,340</b>	<b>4,044,772</b>
NS Revenue (\$2006)	155,366	136,384	130,160	114,808	75,324	83,056	104,237	90,666
% decrease/increase from previous year	n/a	-12.2%	-4.6%	-11.8%	-34.4%	10.26%	25.5%	-13%
	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
NL	64,000	65,100	65,500	79,500	90,500	92,500	116,400	125,200
PEI	13,400	14,233	14,297	17,487	21,838	26,000	29,262	26,923
NS	74,598	77,685	77,500	105,751	145,420	161,715	178,285	163,617
NB	46,678	47,808	49,783	69,672	91,912	101,300	96,500	90,500
Quebec	490,000	498,000	483,000	652,000	867,000	923,000	901,235	751,591
Ontario	447,000	481,000	504,000	703,000	1,215,000	1,350,000	1,453,000	1,379,000
Manitoba	114,919	112,531	121,479	135,500	178,000	190,400	203,469	191,637
Sask.	123,000	123,866	122,012	120,049	158,472	176,747	187,029	171,107
Alberta	341,333	339,339	340,000	373,000	618,000	670,502	697,655	723,000
BC	505,100	468,000	460,000	470,000	610,000	647,000	699,000	690,000
Canada	2,230,187	2,111,158	2,157,657	2,509,545	3,111,054	3,349,878	3,029,140	2,773,816
<b>Total</b>	<b>4,450,215</b>	<b>4,337,578</b>	<b>4,395,228</b>	<b>5,235,504</b>	<b>7,085,358</b>	<b>7,689,544</b>	<b>4,561,835</b>	<b>4,312,575</b>
NS Revenue (\$2006)	87,694	88,909	86,488	126,011	154,456	168,593	182,926	163,617
% decrease/increase from previous year	-3.3	1.4	-2.7	45.7%	22.6%	9.2%	8.5%	-10.6%

Source: Physicians for a Smoke-Free Canada. (2006). *Tax Revenue from Tobacco Sales* [online] Available at: [www.smoke-free.ca/factsheets/pdf/totalex.pdf](http://www.smoke-free.ca/factsheets/pdf/totalex.pdf). Accessed May 2007.

As noted, Table 16 clearly shows the massive increases in taxation revenues that followed from the series of large federal and provincial tobacco tax increases legislated from 2001 to 2006.



These increases have continued to the present with provincial tax increases to \$33.04 (\$2007) a carton and federal excise duty increases to \$16.41 (\$2007) a carton in 2007. After the first round of tax increases, federal and provincial tobacco tax revenues rose substantially, by 45.7% in real terms in 2001/02 and then by a further 22.6% in 2002/03. Revenues continued to rise in 2003–05, albeit in smaller increments, with an 9.2% increase in 2003/04 and a further 8.5% increase in 2004/05. Between 2004/05 and 2005/06, however, tobacco tax revenues declined by -10.6%.

As noted, declining revenues may be the result of reductions in smoking rates, reductions in the number of cigarettes smoked. They may also be the result of a change in the type of tobacco products sold (with customers switching to lower-priced products like roll-your-own and the increasingly popular discount cigarettes). They may also be due to tobacco products becoming relatively cheaper in real terms if taxes do not continue to increase on a regular basis. As well, such tax increases may be most effective when first implemented. Unlike sales taxes imposed as a percentage of the price of a good or service, tobacco taxes are levied as lump-sum amounts that remain the same until government deliberately decides to change them. Some tobacco tax proponents suggest tobacco taxes should instead be determined by a formula that relates taxes to price and indexes them to inflation.<sup>130</sup> Others suggest a combination of specific taxes (the traditional fixed tax rate per unit) and *ad valorem* taxation (a percent mark-up of the pre-tax price of cigarettes), as used in the European Union.<sup>131</sup>

As shown in Figure 22 of Section 1, the number of domestic and imported cigarettes sold in the province declined from 1.6 billion in 1989 to 1 billion in 2005, though this decline was not steady and was punctuated by a major fluctuation in the mid-1990s. Cigarette sales declined steadily to 1993, and then increased sharply in 1994 (when taxes were cut and prices declined). There were further cigarette sales increases in 1995 and 1996. Since 1997, cigarette sales have declined steadily in the province—first modestly and then sharply, following the major tobacco tax increases of 2001–03. A slight increase in sales was seen in 2004, followed by a 2.8% decline in 2005.

A recent evaluation of Nova Scotia's Tobacco Strategy shows that tax increases implemented in 2001–03 have been effective in reducing tobacco consumption. A second intended outcome of the strategy—to make tax rates proportionately equal across all tobacco products by 2003—was not realized, however. The unequal taxation of tobacco products remains an issue of concern across the country. Federal and provincial taxes are highest on cigarettes and tobacco sticks, but are proportionately lower on fine-cut tobacco (used by those who roll their own cigarettes) and on cigars, allowing consumers simply to switch to lower-priced tobacco products to avoid the high taxes on cigarettes.<sup>132</sup>

---

<sup>130</sup> Sugarman, S. (2003). A Balanced Tobacco Control Policy. *American Journal of Public Health*, March, Vol. 93 (3), p. 417.

<sup>131</sup> Thompson, F. (2004) *Tax policy to address tobacco market failures*. Non-Smoker's Rights Association. [online] Available at: [www.nsra-adnf.ca/cms/file/pdf/F.T.taxpolicypaper31.03.04.pdf](http://www.nsra-adnf.ca/cms/file/pdf/F.T.taxpolicypaper31.03.04.pdf). Accessed June 2007.

<sup>132</sup> Nova Scotia Health Promotion and Protection. (2006). *Nova Scotia Tobacco Control Strategy Evaluation*. Pyra Management Consulting Services, p 9. [online] Available at: [www.gov.ns.ca/hpp/repPub/TC/NS-Tobacco-Control-Strategy-Evaluation.pdf](http://www.gov.ns.ca/hpp/repPub/TC/NS-Tobacco-Control-Strategy-Evaluation.pdf). Accessed May 2007.



## Observations and Recommendations

Tobacco taxation has been found to be the single most effective tobacco reduction strategy available—particularly when implemented in conjunction with other tobacco control measures—and it generates revenue at minimal cost. Ideally, that revenue, or at least a considerable portion of it, will be re-invested in further tobacco control interventions, though in practice only a small proportion of it is actually used for this purpose. It is now widely recognized that tobacco tax increases need to be proportionately equal across all tobacco products in order to avoid simple switching to cheaper products, and that these taxes must be raised regularly to keep pace with inflation and to ensure that real tobacco prices do not drop over time.

Based on the evidence examined and using it in support, the following four recommendations are made here for Nova Scotia.

- Raise provincial tobacco taxes to equal the highest taxes in the country (at least to current levels in Manitoba and Saskatchewan)
- Ensure proportionately equal taxes across all tobacco products
- Institute regular tobacco tax increases (\$2/year has been suggested) in addition to indexing total tobacco taxes to inflation
- Support cessation programs particularly for low-income smokers, including free nicotine replacement therapy and counselling, to ensure that low-income groups are not disproportionately affected by tobacco tax increases. Increased tobacco tax revenues can be used to provide such financial supports to quitters.

## Marketing Bans

According to the WHO, cigarettes are probably the most marketed product in the world.<sup>133</sup> In 2001, \$11.22 billion was spent by the industry on tobacco promotion in the United States alone.<sup>134</sup> The WHO Framework Convention on Tobacco Control obliges signatory countries to implement comprehensive bans on tobacco advertising, promotion, and sponsorship, as far as their constitutions permit.

With increasing restrictions on advertising, the tobacco industry markets its deadly products in North America through venues such as point-of-sale promotion and event sponsorships. Examination of tobacco industry documents shows that tobacco companies have increased spending on point-of-sale advertising to build brand loyalty and identity.<sup>135</sup> One source estimates the industry pays retailers \$100 million each year for tobacco product displays,<sup>136</sup> an amount that has been rising steadily over the past decade. In fact, research shows that the industry pays large

---

<sup>133</sup> World Health Organization. (2004). *Building Blocks for Tobacco Control: A Handbook*. Available at: [www.who.int/tobacco/resources/publications/tobaccocontrol\\_handbook/en](http://www.who.int/tobacco/resources/publications/tobaccocontrol_handbook/en). Accessed September 2004.

<sup>134</sup> Dewhirst, T. (2004). POP goes the power wall? Taking aim at tobacco promotional strategies utilised at retail, *Tobacco Control*, Vol. 13, p. 209-210.

<sup>135</sup> Lavack A. and Toth, G. (2006). Tobacco point-of-purchase promotion: examining tobacco industry documents, *Tobacco Control*, Vol. 15, p. 377-384.

<sup>136</sup> Personal communication, Cunningham, R. 2006

sums to compete for prime, visible locations for tobacco products—particularly in the vicinity of cash registers.<sup>137</sup>

Point-of-sale displays make tobacco products seem exciting and make tobacco purchases appear commonplace, so that consumption seems “normal” to youth. Such displays also make it easier to buy tobacco products, especially as impulse purchases, since they are generally located very near to cash registers. Such displays are especially tempting for those who have decided to quit.

An econometric study by Saffer and Chaloupka found comprehensive advertising bans could reduce tobacco use by 5.4% and cigarette use by 7.4% in 22 Organization for Economic Cooperation and Development (OECD) countries.<sup>138</sup> Marketing bans have also been found to be most effective when implemented as part of a comprehensive tobacco reduction strategy.

New legislation in March 2007 in Nova Scotia required store owners to conceal cigarettes and tobacco products at point-of-sale. In addition, it expands the list of retailers prohibited from selling tobacco to recreational facilities, bowling alleys, fitness centres, gymnasiums, pools and rinks, libraries, community colleges and universities, community centres and halls, among others. Tobacconist shops where 100% of revenues are generated through sale of tobacco products and accessories are exempt from the ban, although they are not permitted to display advertising in a manner that is visible from outside the store.

### ***Mass Media and Public Awareness***

Large, well-funded anti-tobacco campaigns such as “The Truth” (Florida), especially those focused on “denormalization,” have been shown to be effective in reducing demand for tobacco products. A Health Canada analysis notes: “Tobacco industry denormalization campaigns usually point out negative traits of the tobacco industry, such as manipulative or unethical activities in which the tobacco industry may engage. This educates both smokers and non-smokers about the motives and tactics of the tobacco industry.”<sup>139</sup> According to Mahood, “there is now sufficient evidence to conclude that tobacco industry denormalization is a ‘best practice’ tobacco control tool.”<sup>140</sup>

The United States Centers for Disease Control and Prevention (US CDC) include “counter-marketing” as one of a number of best practice strategies for tobacco control. Counter-marketing includes anti-tobacco advertising, media advocacy, and public relations events such as press

---

<sup>137</sup> Feighery E, Ribisl, K., Clark, P. and Haladjian, H. (2003). How tobacco companies ensure prime placement of their advertising and products in stores: interviews with retailers about tobacco company incentive programmes. *Tobacco Control*, Vol. 12, p. 184-188. [online] Available at: [www.tobaccocontrol.com](http://www.tobaccocontrol.com). Accessed November 2005.

<sup>138</sup> Saffer, H. and Chaloupka, F. (2000) Tobacco Advertising: Economic Theory and International Evidence. *National Bureau of Economic Research, NBER Working Papers* 6958.

<sup>139</sup> Lavack, A. (2001). *Tobacco Industry Denormalization Campaigns: A Review and Recommendations*. Health Canada [online] Available at: [www.hc-sc.gc.ca/hl-vs/pubs/tobac-tabac/media/tidc-cdit\\_e.html](http://www.hc-sc.gc.ca/hl-vs/pubs/tobac-tabac/media/tidc-cdit_e.html). Accessed October 2005.

<sup>140</sup> Mahood, G. (2004). *Tobacco Industry denormalization: Telling the truth about the tobacco industry's role in the tobacco epidemic*. Non-Smokers Rights Association. [online] Available at: [www.nsra-adnf.ca/cms/index.cfm?group\\_id=1350](http://www.nsra-adnf.ca/cms/index.cfm?group_id=1350). Accessed April 2007.

releases, local events, health promotion activities, and efforts to reduce or replace industry sponsorship and promotion. According to the CDC, these activities have been found to promote smoking cessation and to decrease the number of youth who start using tobacco products. They also foster public support for tobacco reduction at all levels.<sup>141</sup> Again, such strategies may be partly funded by increased tobacco tax revenues.

Hyland *et al* (2006) estimated the relative chance of quitting as being 10% higher for every 5,000 units of exposure<sup>142</sup> to state anti-tobacco television advertising over a two-year period, although this result did not quite achieve statistical significance. The association was even larger among those who reported that the level of information in the media about the dangers of smoking had increased ‘a lot’ between 1993 and 2001. These results were consistent with the finding that increased exposure to state anti-tobacco media increases smoking cessation rates.<sup>143</sup>

Wakefield *et al* (2003) found that 88% of viewers retained anti-tobacco messages from a mass media campaign. Campaign advertising was consistently thought by about half of smokers who had seen it to make them more likely to quit (49% in 2000).<sup>144</sup>

One study of media advertising by Hu *et al* in California found an anti-tobacco media campaign permanently reduced tobacco consumption by 11%.<sup>145</sup> Another study by Goldman and Glantz found that an extensive California media campaign reduced annual per capita cigarette consumption by 3.9 packs, at a cost of just \$0.50 per person per year. A similar media campaign in Massachusetts, however, cost \$2.42 annually per capita, but reduced annual per capita cigarette consumption by only 0.5 packs. Thus, the Massachusetts campaign cost nearly five times as much as the California one but achieved only approximately one-eighth the result. The study concluded that the advertising message determines effectiveness. Industry manipulation and second-hand smoke are the most effective strategies for denormalizing smoking and reducing cigarette consumption. Addiction and cessation can be effective when used with industry manipulation and second-hand smoke strategies. Youth access, short-term effects, long-term health effects, and romantic rejection were found to be not effective.<sup>146</sup>

---

<sup>141</sup> US CDC. (1999). *Best Practices for Comprehensive Tobacco Control Program*, Atlantic GA. [online] Available at: [www.cdc.gov/tobacco/tobacco\\_control\\_programs/stateandcommunity/best\\_practices/index.htm](http://www.cdc.gov/tobacco/tobacco_control_programs/stateandcommunity/best_practices/index.htm). Accessed April 2007.

<sup>142</sup> Using a combination of diary measurement and television set devices that monitor television channel and time, rating estimates for television programs are obtained in a given media market. Advertisements appearing in a given program are assigned audience ratings for that program. Ratings provide an estimate of the percentage of households with televisions watching a program or advertisement in a given media market. Rating points for a program are summed over a specified time interval are called gross rating points (GRPs), which provide estimates of audience size for all households. GRPs are often expressed in exposures where 100 GRPs is equal to an average of one exposure per person in the target population.

<sup>143</sup> Hyland, A. *et al.* (2006). Anti-tobacco television advertising and indicators of smoking cessation in adults: a cohort study. *Health Education Research*, Vol. 21 (3). [online] Available at: [her.oxfordjournals.org/cgi/content/abstract/21/3/348?etoc](http://her.oxfordjournals.org/cgi/content/abstract/21/3/348?etoc). Accessed April 2007.

<sup>144</sup> Wakefield, M., Freeman, J., and Donovan, R. (2003). Recall and response of smokers and recent quitters to the Australian National Tobacco Campaign. *Tobacco Control*, Vol. 12 (ii), p.15.

<sup>145</sup> Hu, T-W, Sung, H-Y. and Keeler, T. (1995). The state antismoking campaign and the industry response: The effects of advertising on cigarette consumption in California. *American Economic Review*, Vol. 85, p. 85–90.

<sup>146</sup> Goldman, L and Glantz, S. (1998). Evaluation of antismoking advertising campaigns. *Journal of the American Medical Association*, Vol. 279, p. 772–777.

As part of Nova Scotia's comprehensive tobacco strategy, the province has implemented several media-based anti-tobacco campaigns through television, the print media, the Internet, and a media literacy curriculum for Nova Scotian schools. A recent evaluation of this component of the tobacco control strategy found media and public awareness activities and campaigns were successful in reaching target Nova Scotian audiences, in promoting relatively high recall rates, and in raising awareness of second-hand smoke and other tobacco issues.<sup>147</sup> In Nova Scotia, it is important to target denormalization messages so that they are appropriate to local contexts.

## **Observations and Recommendations**

Based on the evidence examined, it is seen that broad-based, targeted anti-tobacco media campaigns are effective when included as part of a comprehensive tobacco reduction strategy. Recommendations that flow from the evidence are to:

- Continue the present broad-based anti-tobacco public education and media campaign, including a locally-appropriate denormalization message; and
- Target messages and delivery vehicles appropriately to have the greatest impact on targeted tobacco users and priority groups (adolescent males and females, for example).

## ***Cessation Assistance***

The best way to avoid the staggering health and economic costs of tobacco use is to encourage people not to smoke in the first place. However, there are also tremendous health and economic benefits to cessation, both to the smoker and to society. There is an extensive, international body of research analyzing effectiveness of smoking cessation interventions. A few representative studies on the benefits of cessation, the cost-effectiveness of interventions and particular types of interventions will be reviewed here for their relevance to Nova Scotia.

## ***Benefits of Cessation***

The health benefits of smoking cessation are well documented. They include the immediate benefits of reduced blood pressure and improved lung capacity and circulation, as well as longer-term benefits such as reduced risk of lung, mouth, esophageal, throat, pancreatic, and bladder cancer and heart disease. Lung cancer risk has been shown to decline steadily after quitting—a former smoker reduces the risk of lung cancer to between 30 and 50% of that of a never-smoker after 10 tobacco-free years. The excess risk of Coronary Heart Disease (CHD) caused by smoking is reduced by approximately half after one year of smoking abstinence and then declines gradually. After 15 years of abstinence, the risk of CHD is similar to that of persons who have never smoked.<sup>148</sup> Given smoking causes irreversible lung tissue damage, the decline in

---

<sup>147</sup> Province of Nova Scotia. (2006). *Nova Scotia Tobacco Control Strategy Evaluation*, Prepared for Nova Scotia Health Promotion and Protection by Pyra Management Consulting Services Inc. p.45 [online] Available at: [www.gov.ns.ca/hpp/repPub/TC/NS-Tobacco-Control-Strategy-Evaluation.pdf](http://www.gov.ns.ca/hpp/repPub/TC/NS-Tobacco-Control-Strategy-Evaluation.pdf).

<sup>148</sup> US Department of Health and Human Services. (1990). *The health benefits of smoking cessation: A report of the Surgeon General*. DHHS Publication No. (CDC) 90-8416. [online] Available at: [profiles.nlm.nih.gov/NN/B/B/C/W/\\_/nnbB.C.w.pdf](http://profiles.nlm.nih.gov/NN/B/B/C/W/_/nnbB.C.w.pdf). See also Colman, R. (2000). *The Cost of Tobacco in Nova Scotia*, Section 8.2, p 33-39, for different rates of risk reduction for light and heavy smokers.

risk of Chronic Obstructive Pulmonary Disease (COPD) is not nearly as dramatic as the declines in lung cancer and heart disease risk.

As reported by GPI Atlantic in 2000, the benefits of smoking cessation accrue gradually, and can be measured in terms of the differences in the relative risks of illness incurred by current and former smokers. Those differences are assessed according to both the duration and the intensity of smoking habits. Thus former heavy smokers incur higher relative risks of illness for a longer period than light smokers who quit. Conversely, because the relative risks of illness are significantly greater for heavy smokers, the greatest economic savings to the health care system accrue from early cessation by heavy smokers.

For COPD, Oster (1984) estimates that light smokers reduce their risk of COPD by approximately 50% compared to continuing light smokers; former moderate smokers by approximately 62% compared to continuing moderate smokers; and heavy smokers by approximately 70% compared to continuing heavy smokers. However, risk levels in this category never return to those of non-smokers.<sup>149</sup>

A huge American Cancer Society study of one million men and women found that within two to four years, light smokers had reduced their risk of lung cancer death by two-thirds and heavy smokers by 13%. After five years, former light smokers had no greater risk of lung cancer than those who had never smoked, while former heavy smokers had their risk cut by half. After 10 years, former heavy smokers had reduced their risk of lung cancer death to only 1% of the risk of current smokers. These findings are confirmed by a very large UK study.<sup>150</sup>

The same American Cancer Society study also found that former light smokers reduced their risk of death from coronary heart disease by half within five years, with a complete return to non-smoker risk levels after the 10<sup>th</sup> year of cessation. By contrast, former heavy smokers took far longer to reduce their risk of death from heart disease; it took seven years to reduce the risk by one-third, and more than 10 years to reduce it by two-thirds.<sup>151</sup>

These results are confirmed by Peto *et al* (2000), who find smoking cessation, even late in life, eliminates most of the lung cancer risk, and the risk is decreased more than 90% for those who quit before they turn 35. The study found, “mortality in the near future and throughout the first half of the 21<sup>st</sup> century could be substantially reduced by current smokers giving up the habit.”<sup>152</sup> Cost savings from cessation for Nova Scotia are analysed in Section 3 of this report.

Aside from reducing the risks of premature death and illness and avoiding health care costs and productivity losses, smokers who quit also spend less money immediately. With the current price

---

<sup>149</sup> Oster, G., Colditz, G. and Kelly, N. (1984). *The Economic Costs of Smoking and Benefits of Quitting*, Lexington Books, D.C. Heath and Company, Lexington, Massachusetts and Toronto.

<sup>150</sup> Oster, op. cit., p. 96-97, citing American Cancer Society study; Peto, R. *et al.* (2000), Smoking, Smoking Cessation, and Lung Cancer in the UK since 1950: Combination of national statistics with two case-control studies, *British Medical Journal*, August, Vol. 321 (7527), p. 323-329.

<sup>151</sup> Oster, G., Colditz, G. and Kelly, N. (1984), *The Economic Costs of Smoking and Benefits of Quitting*, Lexington Books, D.C. Heath and Company, Lexington, Massachusetts and Toronto.

<sup>152</sup> Peto, R. *et al.* (2000). Smoking, Smoking Cessation, and Lung Cancer in the UK since 1950: Combination of national statistics with two case-control studies. *British Medical Journal*, August, Vol. 321 (7527), p. 323-329.



of a package of cigarettes in Nova Scotia (2005) at \$10.75<sup>153</sup>, a pack-a-day smoker will save approximately \$3,923.75 per year by quitting. Given the average age of smoking initiation is 11.8 years,<sup>154</sup> a pack-a-day smoker will spend \$207,959<sup>155</sup> over a lifetime if he or she lives to age 65, and will save increasing proportions of that sum the sooner he or she quits. Cessation therefore not only has benefits for the economy as a whole in avoided health care costs and productivity losses, but also means money not spent on cigarettes can be spent by Nova Scotians on more productive activities.

### *Cessation Interventions*

There is a wide range of tried and tested cessation interventions, all with varying degrees of effectiveness. Because different groups of smokers have different profiles and different motivations for smoking, these cessation interventions have been shown to be most effective when targeted by gender, income, ethnicity, age and so on. The evidence also indicates the effectiveness of cessation approaches is enhanced by other tobacco reduction interventions, such as smoke-free public places and increased taxation, for example. Taxation itself has been shown to increase cessation rates. It is also important to acknowledge many cessation interventions are designed for smokers who are motivated to quit. Smokers not yet motivated to quit can be targeted through appropriate messaging in public education/media campaigns, increased tobacco taxes, motivational messages and counselling from health care providers, and so on.

As noted in GPI Atlantic's 2000 report, intensive interventions in clinical settings involving at least four to seven counselling sessions over several weeks have remarkably high quit rates—often more than 20%. Their main limitation is that they currently reach only approximately 5% of the smoking population. Population health approaches have the potential to reach much larger population groups (up to 80% of smokers) but register lower quit rates (5%–15%).<sup>156</sup>

Certain minimal intervention approaches have also been proven effective, such as brief counselling by primary health care providers. Studies have found smokers who receive advice from their physician to quit smoking decrease their average daily cigarette consumption by between five to six cigarettes per day compared to smokers who do not receive such advice.<sup>157</sup> As cited by Krueger (2005),<sup>158</sup> major health events and crises, when patients feel more vulnerable than usual, also provide a window of opportunity for enhancing motivation to quit.

---

<sup>153</sup> Price from Sobey's Tobacco Shop, Halifax, June 2007.

<sup>154</sup> Health Canada. (2007). *Summary of Results of the 2004-05 Youth Smoking Survey*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/survey-sondage/2004-2005/result\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/survey-sondage/2004-2005/result_e.html). Accessed June 2007.

<sup>155</sup> 53 years of smoking at a cost of \$3,923.75 per year, not accounting for inflation.

<sup>156</sup> Health Canada. (2000). *Guide to Tobacco Use Cessation Programs in Canada*. [online] Available at: [www.hc-sc.gc.ca/index\\_e.html](http://www.hc-sc.gc.ca/index_e.html). Accessed May 2007.

<sup>157</sup> Liang, L. (2003). The Impact of Physician Intervention and Tobacco Control Policies on Average Daily Cigarette Consumption Among Adult Smokers. *NBER Working Papers 9790*, National Bureau of Economic Research, Inc.

<sup>158</sup> Krueger, H. (2005). *Risk Factor Interventions: An Overview of their Effectiveness*. Prepared for the BC. Healthy Living Alliance. [online] Available at: [www.B.C.healthyliving.ca/resources/documents/risk\\_factor\\_effective\\_interventions\\_B.C.HLA.pdf](http://www.B.C.healthyliving.ca/resources/documents/risk_factor_effective_interventions_B.C.HLA.pdf). Accessed May 2007.

One extensive literature review of cessation interventions found that telephone support lines and self-help materials have only a marginal effect on cessation rates.<sup>159</sup> Nevertheless, a recent study by Stead (2006) shows proactive telephone counselling does assist smokers who are interested in quitting. Quit success rates were shown to increase with frequency of calls, with three or more calls increasing the odds of quitting compared with use of self-help materials, pharmacotherapy or brief advice.<sup>160</sup>

Cost effectiveness literature examined by Krueger (2005) indicates group counselling is the most cost-effective form of cessation counselling but also tends to be the least well-attended of counselling cessation options. The literature indicated that the cost in \$US (2001) per QALY saved was \$4,666 for minimal counselling (\$7,810 \$CAN2005), \$2,117 (\$3,534 \$CAN2005) for intensive individual counselling, and \$1,288 (\$2,150 \$CAN2005) for group counselling. Several studies estimate the cost-effectiveness of cessation aids like nicotine gum or patches, which can be used on their own or combined with minimal, intensive, or group counselling and self-help materials. The patch was found to be more cost effective than gum, regardless of the counselling approach used. Costs in \$US 2001 for the patch plus minimal counselling cost \$2,795 (\$4,666 \$CAN2005) per QALY saved versus \$5,278 (\$8,813 \$CAN2005) for gum plus minimal counselling. The patch plus group counselling cost \$1,361 (\$2,272 \$CAN2005) QALY gained versus \$2,117 (\$3,535 \$CAN2005) for gum plus group counselling.<sup>161</sup>

All these cost options are under the \$10,000 per QALY gained limit, beyond which interventions are not considered cost-effective, and thus Nicotine Replacement Therapy (NRT) is assessed as a cost effective intervention.<sup>162</sup>

### *Cessation and Pregnant/Postpartum Women*

The negative health effects of maternal smoking during pregnancy and in the postpartum period are widely known. A pregnant woman who smokes is between 1.5 and 3.5 times more likely than a non-smoker to have a Low Birth Weight (LBW) baby.<sup>163</sup> Infants whose mothers smoked during pregnancy have 2.3 times the risk of sudden infant death syndrome (SIDS) as infants of non-smoking pregnant mothers. For infants exposed to maternal smoking both during pregnancy and after birth, the risk of SIDS is 3 times higher than for infants not exposed.<sup>164</sup>

---

<sup>159</sup> As above, p. 46.

<sup>160</sup> Stead, L., Perera, R. and Lancaster, T. (2006). Telephone counselling for smoking cessation. *Cochrane Database of Systematic Reviews*, Issue 3. Art. No.: CD002850. DOI: 10.1002/14651858.CD002850.pub2.

<sup>161</sup> Conversion from \$US to \$Canadian from Bank of Canada *Currency Converter* ([www.bankofcanada.ca/cgi-bin/famecgi\\_fdps](http://www.bankofcanada.ca/cgi-bin/famecgi_fdps)) Conversion to \$2006 currency using Statistics Canada's Consumer Price Index for Health Care, CANSIM Table 326-0002.

<sup>162</sup> Krueger, H. (2005). *Risk Factor Interventions: An Overview of their Effectiveness*. Prepared for the BC Healthy Living Alliance, p 46. [online] Available at: [www.B.C.healthyliving.ca/resources/documents/risk\\_factor\\_effective\\_interventions\\_B.C.HLA.pdf](http://www.B.C.healthyliving.ca/resources/documents/risk_factor_effective_interventions_B.C.HLA.pdf). Accessed May 2007.

<sup>163</sup> US Department of Health and Human Services. (2001). *Women and Smoking: a Report of the Surgeon General*. Rockville, MD: US Department of Health and Human Services, Public Health Service, Office of the Surgeon General, Washington D.C.

<sup>164</sup> Gavin N, Wiesen, C. and Layton, C. (2001). *Review and Meta-Analysis of the Evidence on the Impact of Smoking on Perinatal Conditions Built into SAMMEC II, Final Report to the National Center for Chronic Disease Prevention and Health Promotion, Research Triangle Institute (RTI), RTI Project NO. 7171-010, September.*



Infants born to mothers who smoke during pregnancy also more often require neonatal intensive care and can suffer long-term impairment to physical and intellectual development. Pregnant women who smoke are 1.8 times more likely than non-smokers to have ectopic pregnancies and are 1.6 times more likely than non-smokers to suffer spontaneous abortions.<sup>165</sup>

These maternal and infant health effects have economic costs. As noted in *The Cost of Tobacco in Nova Scotia* (2000), one US study estimated maternal conditions due to smoking during pregnancy, such as placenta previa, placenta abrupta, ectopic pregnancy, premature rupture of membranes and spontaneous abortion produced medical costs in excess of \$220 million (\$CAN1999) a year or \$250 million (\$CAN2005). This does not include the effects of smoking on infant health care costs. A second US study found that excess direct medical costs per live birth for each pregnant smoker amounted to \$759 (\$CAN 1999) or \$863 (\$CAN2005), for a total of \$393 million (\$CAN1999) a year or \$447 million (\$CAN 2005) in the United States.<sup>166</sup>

A more recent study of neonatal health care costs related to smoking during pregnancy, with a sample size of 25,000 women in the US, showed maternal smoking during pregnancy increased the relative risk of admission to a Neonatal Intensive Care Unit (NICU) by almost 20%. For infants who were admitted to the NICU, maternal smoking was found to increase their length of stay by 1.1%. Smoking was found to add more than \$700 (\$US1996) or \$1,141 (\$CAN 2005) in neonatal costs per smoking mother, totalling \$35 million (\$US1996) per year, or \$57 million (\$CAN 2005) for the US as a whole. The study points out that these are avoidable costs, and represent amounts saved in the short-term even if smoking cessation is only temporary during pregnancy.<sup>167</sup> In fact, Kirkland, Dodds, and Brosky (2000) found that health benefits (or avoided complications and costs) accrue even if cessation takes place during the third trimester.<sup>168</sup>

A 1997 study of Nova Scotian women found that the overall rate of smoking before pregnancy among pregnant women was 33.1%—the latest date for which published data are available for the entire province. Of the 2,822 women who were smokers before pregnancy, 1,973 (69.9%) remained smokers throughout the pregnancy.<sup>169</sup> Current and detailed data regarding smoking during pregnancy are in fact collected by the Reproductive Care Program of Nova Scotia. Unfortunately, these data had not been published at the time this report was prepared. Given the high health and economic costs of tobacco use during pregnancy and the cessation supports (such as counselling) available to pregnant mothers, it is important to regularly monitor, publish and make accessible tobacco use prevalence statistics in this priority population.

What does tobacco use during pregnancy cost Nova Scotia? In the absence of direct current data, we can only approximate this cost by extrapolating from other evidence. In 2004, there were

---

<sup>165</sup> Castles A. *et al.* (1999). Effects of smoking during pregnancy. Five meta-analyses. *American Journal of Preventive Medicine*, Vol. 16 (3), p. 208-15.

<sup>166</sup> Colman, R. (2000). *The Cost of Tobacco in Nova Scotia*. GPI Atlantic. p. 61. Conversion to \$2005 using Statistics Canada, Consumer Price Index for Health Care, CANSIM Table 326-0002.

<sup>167</sup> Adams, E. *et al.* (2002). Neonatal health care costs related to smoking during pregnancy. *Health Economics*. April, Vol. 11 (3), p. 193-206.

<sup>168</sup> Kirkland, S., Dodds, L. and Brosky, G. (2000). The natural history of smoking during pregnancy among women in Nova Scotia. *Canadian Medical Journal*, August, Vol. 163 (3), p. 281-282.

<sup>169</sup> *Ibid.*

8,528 live births in the province with a female smoking rate for Nova Scotia of 21%<sup>170</sup>). This implies that there may have been approximately 1,791 women smoking before pregnancy. If 69.9% of these remained smokers throughout their pregnancy (as reported in 1997) this means approximately 1,251 babies were born to pregnant women smokers in 2004. If, to provide a lower-end estimate, approximately half (50%) of these 1,791 smoking women remained smokers throughout their pregnancy, approximately 896 babies would have been born to pregnant women smokers in 2005.

If excess neonatal costs attributable to smoking during pregnancy were the same per smoking mother in Nova Scotia as in the US study cited above, then the province would incur an additional \$US700 (\$US1996), or \$1,141 (\$CAN2005) in neonatal medical costs per smoker.<sup>171</sup> Thus the additional neonatal costs due to maternal smoking during pregnancy can be estimated to range from about \$1.1 million (\$CAN2005) if 50% of smoking mothers continued to smoke during pregnancy to \$1.5 million (\$CAN 2005) if 69.9% continued to smoke, as reported in the 1997 study cited above. This estimate is only for infant neonatal medical costs and does not include additional costs for maternal health conditions attributable to smoking, such as ectopic pregnancy and pre-eclampsia.

The Canadian Centre on Substance Abuse (2006) report on *The Costs of Substance Abuse in Canada 2002* estimate that the actual number of LBW, short gestation and SIDS diagnoses attributable to smoking was 263 for Nova Scotia in 2002.<sup>172</sup> Makomaski Illing and Kaiserman (2004), however, provide a much lower estimate, and give the incidence of smoking attributable LBW infants, infant respiratory distress, newborn respiratory conditions and SIDS attributable to smoking as just 9 for all of Atlantic Canada, based on 1996 data.<sup>173</sup>

How can smoking rates among pregnant women be reduced? Some insight is contained in the publication, *Expecting to Quit: A Best Practice Review of Smoking Cessation Interventions for Pregnant and Postpartum Girls and Women*.<sup>174</sup> A thorough analysis of the literature outlined in this study concludes effective programs targeting pregnant and postpartum women are actually hard to find. This is especially true for population subgroups such as teenagers, ethnic minorities, heavy smokers, and so on. Intervention recommendations in the report include focusing on the health of the mother instead of the unborn child, harm reduction,<sup>175</sup> tailoring approaches to particular sub-groups of pregnant women, stigma reduction, and using a women-centred approach.

---

<sup>170</sup> Statistics Canada, Canadian Community Health Survey (CCHS 3.1), January to June 2005 (see data Appendix A: Table 7).

<sup>171</sup> Converting to Canadian dollar values using Canada–US Exchange Rate data (CANSIM Table 176-0064) and Consumer Price Index for Health Care (Statistics Canada, CANSIM Table 326-0002.)

<sup>172</sup> Rehm, J. *et al.* (2006). *The Costs of Substance Abuse in Canada 2002*, Table D-HC-S-9, p.2. Canadian Centre on Substance Abuse.

<sup>173</sup> Makomaski Illing E., Kaiserman M., (2004). Mortality attributable to tobacco use in Canada and its regions, 1998. *Canadian Journal of Public Health*, Vol. 95 (1), p. 38-44.

<sup>174</sup> Greaves, L., Cormier, R., Devries, K. and Bottorff, J. (2006). *Expecting to Quit: A Best Practice Review of Smoking Cessation Interventions for Pregnant and Postpartum Girls and Women*.

<sup>175</sup> Harm reduction is a term that covers activities and services that acknowledge the continued drug use of individuals, but seek to minimise the harm that such behaviour causes. See [www.drugscope.org.uk/DS%20Media%20Project/media\\_terms.htm](http://www.drugscope.org.uk/DS%20Media%20Project/media_terms.htm).

What could such interventions potentially save in economic terms? A 10% reduction in the smoking rate of pregnant mothers in Nova Scotia (from 14.7% to 13.2% based on the available 1997 statistics) would mean approximately 125 fewer smokers among pregnant mothers in 2004. At a cost of \$1,141 (\$CAN2005) in neonatal costs per smoking mother (\$CAN2005), such a reduction would save the province approximately \$143,000 a year in neonatal costs alone. It is noteworthy that, unlike cost savings stemming from reduced cancer, heart disease, and COPD risk, savings derived from reducing smoking among pregnant mothers are realized almost immediately in reduced rates of LBW babies, SIDS and a range of neonatal conditions.

### *Cessation and Low-Income Smokers*

Smoking and mortality rates for tobacco-specific diseases such as lung cancer and COPD are highest among the poorest populations. For example, the evidence indicates lung cancer rates decline as median income increases. Research shows that increasing tobacco taxes (and thus raising the price of cigarettes) is an effective way to motivate cessation among low-income smokers if implemented with appropriate, affordable cessation supports.<sup>176</sup>

Reimbursement for cessation treatment has been found to increase, and in some cases double, the number of successful quitters.<sup>177</sup> Although free Nicotine Replacement Therapy (NRT), such as nicotine patches and gum, is offered through some provincial group cessation programs, many smokers attempt quitting with little or no support and not through any formal programs. Ensuring that low-income Nova Scotians have access to free NRT through Pharmacare would therefore be a good investment from several perspectives—health, economics, and social equity—and could be funded through the higher tobacco tax revenues accruing to government. The increased quit rates that—based on existing evidence—can be expected from the provision of free NRT for low-income Nova Scotians, will likely yield a substantial return on investment in avoided health care costs and productivity losses.

### *Cessation and Youth*

A recent review by Grimshaw and Stanton (2006) examined the literature on effective approaches to youth smoking cessation. Fifteen trials met the authors' inclusion criteria. Three of these used the trans-theoretical model (stages of change)<sup>178</sup> approach, two used pharmacological aids and the remaining trials used various psycho-social interventions such as motivational

---

<sup>176</sup> Ceraso, M., Ahrens, D. and Remington, P. (2005). Increased tobacco taxes: An evidenced-based measure to reduce tobacco use. *Wisconsin Medical Journal*, Vol. 104 (4).

<sup>177</sup> Kaper, J., Wagena, E., Willemsen, M. and vanSchayck, C. (2005). Reimbursement for smoking cessation treatment may double the abstinence rate: results of a randomized control trial. *Addiction*, July Vol. 100 (7), p. 1012 – 20.

<sup>178</sup> Stages of change, or the Transtheoretical Model (TTM) suggests that an individual can be in one of five stages of motivational readiness to change: precontemplation; contemplation; preparation; action and maintenance. Tailoring interventions to the stage of change of the smoker is important. For more information, see Velicer, W., Prochaska, J., Fava, J., Norman, G. and Redding, C. (1998). Smoking cessation and stress management: Applications of the Transtheoretical Model of behavior change. *Homeostasis*, Vol. 38, p. 216-233.

enhancement or behavioural management. The authors concluded complex approaches to youth cessation show the greatest promise, especially those incorporating stages of change approaches. Few trials had evidence on the use of NRT and none showed effectiveness with youth smokers. The authors also found that psycho-social interventions have not yet proven to be effective in getting youth to quit.<sup>179</sup>

### *Cessation and Diverse Populations*

Insufficient data are presently available on tobacco use rates and effective cessation strategies among diverse populations in Nova Scotia, including pregnant/postpartum women; low-income Nova Scotians; cultural, racial, visible, and ethnic minority groups; and the gay, lesbian, bisexual, transgendered and intersex (GLBTI) community. As with any approach, interventions for each of these groups must be tailored appropriately, in partnership using a lens of inclusion and cultural competence.

The importance of such tailored approaches was highlighted in the 2000 GPI Atlantic report, *The Cost of Tobacco in Nova Scotia*, which noted conventional educational materials on smoking cessation emphasizing disease risks had only limited effectiveness among many teenage girls whose motivations for smoking (such as stress reduction and weight loss) might be quite different from those of other population groups. Similarly, cessation programs among other population sub-groups will be effective to the degree that they take into account the particular conditions and circumstances of those groups.

### *Who is the “Average” Nova Scotian Smoker?*

What do we know about Nova Scotians who currently use tobacco? CTUMS data (2005) provide a profile of the average smoker in Nova Scotia. While it does not obviate the need to target particular sub-groups in specific ways, as noted above, this information is also necessary and useful in order to design educational materials and target interventions that effectively reach the vast majority of Nova Scotian smokers. The following information is summarized from the CTUMS (2005) presentation, *The Average Nova Scotia Smoker*.

Characteristic	Female	Male
Average age?	39.6	39.4
Language spoken at home	English	
Urban or rural?	Urban	
Allows smoking at home?	No	
Age of initiation?	15.4 years	15.1
Age initiation of daily smoking?	18.5 years	17.8

<sup>179</sup> Grimshaw, G. and Stanton, A. (2003). Tobacco cessation interventions for young people. *Cochrane Database of Systemic Reviews*, Issue 4: Art No.: CD003289. DOI: 10.1002/14651858.CD003289.pub4.

<i>Average years as a smoker?</i>	24.1 years	24.1
<i>Average daily smoking?</i>	11.4 cigarettes per day	15.3
<i>Level of nicotine addiction (time of first cigarette)?</i>	Within 30 minutes of waking or after one hour	Within 30 minutes of waking
<i>Education?</i>	Completed secondary or more	
<i>Employed?</i>	Yes	
<i>Employment sector?</i>	Sales/service Business/finance/administration	Sales/service Trades/transport
<i>Considering quitting?</i>	Yes, in next 6 months	
<i>Tried to quit in past 2 years?</i>	No	
<i>Pregnant?</i>	Not pregnant in last 5 years	
<i>Source of cigarettes?</i>	Store, not discount cigarettes, First Nations cigarettes, or smuggled cigarettes	
<i>Visits to health care providers?</i>	Has seen a doctor in the past 12 months but may or may not have been advised to quit; has seen a dentist in the past 12 months but wasn't advised to quit; has not spoken to a pharmacist about quitting	
<i>Other substances used?</i>	Not cigars/cigarillos in past 30 days; hasn't tried pipe or smokeless tobacco; has tried marijuana (mean age 17.8) and used more than once	
<i>Opinions on smoking</i>	Supports smoking sections in bars and workplaces	
<i>SHS exposure</i>	Exposed in vehicles and homes (and males on sidewalks)	

Source: Information summarized from Snider, J. (2007). *The Last Remaining Smokers in Nova Scotia*. Health Canada, Office of Research, Surveillance and Evaluation Healthy Environments and Consumer Safety Branch., PowerPoint presented to CHPNA 2007.

Using this information to target smoking cessation programs and to design educational materials and media campaigns can potentially enhance program effectiveness and increase quit rates, as illustrated below.

### *Workplace Cessation Programs*

Given the employment sector of this “average Nova Scotia smoker” is provided by CTUMS, workplace smoking cessation programs within those specific sectors (such as sales and service) might be particularly effective in reaching large numbers of smokers in the province. A recent literature review of effective cessation programs finds that proven cessation approaches such as advice from a health care provider, group therapy, individual counselling and NRT are equally effective when offered in a workplace setting. The evidence is less clear for self-help materials, competitions and social and environmental support.<sup>180</sup>

<sup>180</sup> Moher, M., Hey, K. and Lancaster, T. (2004). *Workplace Interventions for Smoking Cessation*. Cochrane Review, Art. No.: CD003440. DOI: 10.1002/14651858.CD003440.pub2. [online] Available at: [www.cochrane.org/reviews/en/ab003440.html](http://www.cochrane.org/reviews/en/ab003440.html). Accessed May 2007.



According to Health Canada, the main reasons why employers should support workplace cessation programs include improved employee health, increased productivity, reduced costs, enhanced job satisfaction, and a better corporate image.<sup>181</sup> Employees who quit smoking are less likely than their smoking counterparts to take sick days, go on disability leave, and retire early due to poor health. Given non-smokers take, on average, fewer sick days and live longer than smokers, their health and life insurance premiums are also lower. There are also proven productivity losses due to smoke breaks, especially as employees now need to travel further (generally outside buildings) to non-smoking areas.<sup>182</sup>

Based on existing evidence, Cancer Care Nova Scotia notes that \$9 in long-term benefits result for every dollar invested in employee smoking cessation programs.<sup>183</sup>

### *Cessation in Nova Scotia*

Depending on the year and the particular DHA, 18.75% to 35.9% of smokers who attended DHA treatment programs were still smoke-free 12 months later. NRT was found to be an important component of these cessation programs. Brief cessation intervention training and implementation were implemented sporadically throughout the province, with the greatest effort shown in Cape Breton. Unfortunately, no systematic quantification of these efforts took place, and evidence of follow-up referrals to Addictions Services is anecdotal only.<sup>184</sup>

The 1-800 Smokers' Helpline was launched in November 2002, funded by Health Canada and coordinated by the Canadian Cancer Society, Nova Scotia Division. 2005 results showed that 70% of callers to the helpline had cut down the amount they smoked by time of the follow-up survey and 90% had taken some action toward quitting six months after use of the helpline.

## **Observations and Recommendations**

A wide range of cessation approaches have been shown—in the literature, in many jurisdictions, and in Nova Scotia's own experience—to be effective and cost-effective. These approaches include minimal counselling, individual and group counselling, physician advice in clinical settings, workplace programs, telephone helplines, and cessation aids such as nicotine gum and the patch. Use of the patch for cessation was found to be more cost effective than gum. Minimal interventions and motivational enhancement provided by front line health care providers have

---

<sup>181</sup> Health Canada. (2005). *Smoking Cessation in the Workplace: A guide to helping your employees quit smoking*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/alt\\_formats/hecs-sesc/pdf/pubs/tobac-tabac/cessation-renoncement/cessation-renoncement\\_e.pdf](http://www.hc-sc.gc.ca/hl-vs/alt_formats/hecs-sesc/pdf/pubs/tobac-tabac/cessation-renoncement/cessation-renoncement_e.pdf). Accessed May 2007.

<sup>182</sup> See, as previously discussed in Section 2, Conference Board of Canada. (2006). *Smoking and the Bottom Line: Updating the Costs of Smoking in the Workplace*. [online] Available at: [www.conferenceboard.ca/documents.asp?nnext=1754](http://www.conferenceboard.ca/documents.asp?nnext=1754). Accessed May 2007.

<sup>183</sup> Cancer Care Nova Scotia. (undated). *Cost of Tobacco in Your Workplace*. [online] Available at: [www.cancercare.ns.ca/media/documents/TobaccoInWorkplace.pdf](http://www.cancercare.ns.ca/media/documents/TobaccoInWorkplace.pdf). Accessed May 2007.

<sup>184</sup> Nova Scotia Health Promotion and Protection. (2006). *Nova Scotia Tobacco Control Strategy Evaluation*. Pyra Management Consulting Services. [online] Available at: [www.gov.ns.ca/hpp/repPub/TC/NS-Tobacco-Control-Strategy-Evaluation.pdf](http://www.gov.ns.ca/hpp/repPub/TC/NS-Tobacco-Control-Strategy-Evaluation.pdf). Accessed May 2007.

been shown to be effective in motivating smokers to quit, especially if used during the window of a health event or crisis. Proven cessation techniques are also effective in a workplace setting, where interventions have been shown to yield a substantial return on investment particularly in avoided sick leave and disability and improved productivity.

The following recommendations emerge from the evidence examined:

- Begin data collection on tobacco use prevalence among priority populations where more information is needed and design culturally sensitive cessation programs targeted to these populations
- Provide targeted cessation support for low-income smokers, pregnant/postpartum women, and youth (where stages of change approaches have been found to be most effective)
- Ensure free or low cost access to NRT, especially for low-income groups
- Institute workplace smoking cessation, especially for key economic sectors where smoking rates are high: sales/services and business/finance/administration (women) and sales/service and trades/transportation (men)
- Continue mass media efforts and enforcement of smoke-free public places legislation to denormalize tobacco use
- Work with health care providers on training and use of minimal intervention and motivational enhancement approaches.

### ***School-Based Programs***

A fundamental strategy in reducing the long term mortality and costs associated with tobacco use is promoting prevention. Research indicates children who grow up in an environment where tobacco use is seen as unusual and not commonplace are much less likely to start smoking than those exposed to tobacco use at a young age. Recent smoke-free public places and point-of-sale bans as well as movements such as Tobacco-free Sport and Recreation are supporting the denormalization of tobacco. Additional youth prevention interventions that have demonstrated effectiveness include high tobacco taxes and well-enforced sales-to-minors legislation.

A literature review on effective youth smoking prevention and cessation programs suggested best practices for youth tobacco control require programs that respect and empower youth. Evidence indicates that, for youth prevention and cessation programs to be effective, youth must be genuinely involved and participate actively and the programs must be goal oriented, manageable for participants and produce concrete, demonstrable results.<sup>185</sup>

According to evidence found in the literature review, effective youth prevention and cessation programs must also:

- consider the diverse needs of youth (i.e. gender, age, culture, ethnicity, income level, geography, and smoking behaviour),
- consider adult support and guidance,
- provide opportunities and venues for youth to meet and exchange ideas,

---

<sup>185</sup> Toronto Public Health. (2005). *Youth Tobacco Use Reduction Programming in the City of Toronto: Literature Review and Program Recommendations*. Prepared by Diane Finkle.



- have a clear vision and a well branded message,
- be well funded, ongoing, and within both school and community,
- include media support, particularly targeting tobacco industry denormalization,<sup>186</sup>
- include IT as an important tool,
- include training and ongoing support for youth and adults involved,
- include adequate and sustainable resources for program support, and
- undergo ongoing monitoring and review.

The evidence also indicates a comprehensive approach to youth tobacco reduction is far more effective than single ad hoc measures and should incorporate a wide range of programming options, including:

- School-based educational interventions
- Peer based interventions
- Community interventions
- Broad based public education programs
- Tobacco advertising restrictions
- Youth access restrictions, including penalties for possession and use
- Restrictions and penalties on the sale and marketing of tobacco products
- Advocacy for tobacco tax increases
- Direct restrictions on smoking
- Youth oriented smoking cessation programs
- Anti-tobacco advertising campaigns
- School no-smoking policies
- Computer based programs.

In addition, it is important to support school-based health promotion, as exemplified by the World Health Organization's (WHO) Global School Health Initiative, designed to increase the number of health promoting schools— defined as schools that constantly strengthen their capacity as healthy settings for living, learning and working.<sup>187</sup>

*Smoke-free for Life*,<sup>188</sup> Nova Scotia's school-based smoking prevention curriculum, was described in a 2000 assessment funded by Health Canada as an "exemplary program" that exceeded minimum requirements for effectiveness by 80% when evaluated by number and length of sessions.<sup>189</sup> A study by Stephens *et al* (2000)<sup>190</sup> estimated the cost of program development and implementation of this important resource. Costs for implementation of a minimal school-based program were estimated at \$70 (\$CAN2000 or \$79 CAN2005) per student exposed, while the "preferred program" (*Smoke-free for Life*) costs were estimated at \$125

---

<sup>186</sup> Denormalization works to dispel the myth that smoking is a normal activity and the tobacco industry is a normal industry. In reality, most Canadians don't smoke. Although the industry presents itself to the public as credible, it sells a product designed to kill and continues to search for ways to market this deadly product to young and vulnerable members of society.

<sup>187</sup> World Health Organization. (2007) *Global School Health Initiative*. [online] Available at: [http://www.who.int/school\\_youth\\_health/gshi/en/](http://www.who.int/school_youth_health/gshi/en/). Accessed September 2007.

<sup>188</sup> Nova Scotia Department of Health. (1996) *Smoke-free for Life*. Nova Scotia Department of Supply and Services.

<sup>189</sup> As cited by Colman, R. (2000) *The Cost of Tobacco in Nova Scotia*, GPI Atlantic, p 57.

<sup>190</sup> Stephens, T., Kaiserman, M., McCall, D. and Sutherland-Brown, C. (2000). School-based Smoking Prevention: Economic Costs versus Benefits, *Chronic Diseases in Canada*, 2000, Vol. 21 (2).

(\$CAN2000 or \$140 \$CAN2005) per student for a four-year delivery period.<sup>191</sup> Costs included consulting fees, staff time, teacher training, administration, materials, and evaluation costs.<sup>192</sup>

Stephens *et al* also estimated the benefits of an initial reduction of youth smoking cessation by 6% and a longer-term 4% reduction for those exposed to the minimum curriculum. Lifetime health care and productivity savings were estimated at \$15.40 for every \$1 spent on program development and delivery. The same ratio of benefits to costs can be expected for the more expensive but preferred and effective Nova Scotia Smoke-free for Life curriculum, assuming a 10.5% initial decline and a longer-term 7% decline in smoking in proportion to the additional investment and classroom sessions.

Costs and anticipated benefits and cost-savings estimates for implementation of both the minimum school-based program and Nova Scotia's preferred *Smoke-free for Life* curriculum are included as Table 17. In 2006, there were 55,982 students in Nova Scotia aged 10 – 14, prime age for smoking initiation.<sup>193</sup> Based on the delivery of Nova Scotia's *Smoke-free for Life* curriculum to all these students, the province would save an estimated \$120 million over the lifetimes of these students in avoided health care costs and productivity losses.

**Table 17: Cost-Effectiveness of School-based Smoking Prevention Programs and Estimated Annual Savings to Nova Scotia (\$2006)**

4-year program cost: minimum program/student	\$82
4-year program cost: full Smoke-free for Life program/student	\$148
Benefit-cost ratio (minimum program): 6% decline, to 4% after 4 years	15.4: 1
Benefit-cost ratio (full program): 10.5% decline, to 7% after 4 years	15.4: 1
Cost savings : minimum program to 50% of students (27,991)	\$33 million
Cost savings : minimum program to all students (55,982)	\$66 million
Cost savings : full program to 50% of students (27,991)	\$60 million
Cost savings : full program to all students (55,982)	\$120 million

Unfortunately, no statistics are presently collected on the actual classroom usage of *Smoke-Free for Life* within the Nova Scotia school system, so we cannot ascertain what proportion of Nova Scotia's students are reached by this program. It is not a required part of the curriculum in the province. As well, the resource has not been updated since 2002.

<sup>191</sup> This is based on a minimal program of 10 sessions over four years for grades 6–9: grades 6–8 at 30 minutes a session and grade 9 at 45 minutes a session. The preferred program estimate is based on 18 half-hour sessions in grades 4 –7.

<sup>192</sup> \$2000 Values translated to 2006 using Statistics Canada. (2007) *Consumer Price Index*, Catalogue Number 62-001-X1B. [online] Available at: [www.statcan.ca/english/freepub/62-001-XIB/62-001-XIB2007004.pdf](http://www.statcan.ca/english/freepub/62-001-XIB/62-001-XIB2007004.pdf). Accessed May 2007.

<sup>193</sup> Statistics Canada Table 051-0036 *Estimates of population, by sex and age group, census divisions and census metropolitan areas, 2001 Census boundaries, annual*, Nova Scotia, 2006 for ages 10–14.

The recent (2006) evaluation of Nova Scotia's Tobacco Strategy found that planned youth prevention outcomes were not achieved.<sup>194</sup> In-service training for tobacco reduction curricula such as *You Choose* (a media literacy supplement), *Smoke-free for Life* and the cessation program *No More Butts* was carried out inconsistently, partly due to unavailability of teachers. Use of these resources is therefore inconsistent throughout classrooms in the province. There is also a lack of clarity and information regarding youth use of NRT in school settings.

## **Observations and Recommendations**

High quality youth cessation and preventive education curriculum resources of proven effectiveness are available in Nova Scotia. However, they are not used consistently, and their implementation is not systematically monitored. Components of effective youth tobacco reduction strategies are known, and include the concepts of youth engagement and stages of change. Delivering school-based prevention and cessation programs in partnership with educators has been demonstrated to be highly cost effective and can deliver substantial savings in avoided health care costs and productivity losses. Based on the available evidence, it is therefore recommended that the province:

- Design and implement a strategy to increase the use of school-based prevention and cessation resources consistently throughout provincial schools, to monitor this implementation and to ensure the curricula and programs reach all students in the province.
- Continue to support and encourage health promoting schools.

## ***Community-Based Tobacco Control Programs and Education***

The US Centers for Disease Control (CDC) include community-based programs among the recommended best practices tobacco control. These programs focus on youth prevention, cessation, protection from ETS and elimination of disparities in tobacco use among populations. Strategies to achieve these goals, according to the CDC, include increasing involvement and strengthening partnerships and collaboration opportunities, implementing counter-marketing campaigns and promoting policy change.<sup>195</sup>

The province of Nova Scotia has implemented a number of strategies in partnership with communities to enhance community-based tobacco control programs and education, including:

- organizing and supporting 2001 and 2005 tobacco control conferences involving community partners;
- hiring tobacco coordinators in each of the 9 District Health Authorities (DHAs);

---

<sup>194</sup> Province of Nova Scotia. (2006). *Nova Scotia Tobacco Control Strategy Evaluation*, Prepared for Nova Scotia Health Promotion and Protection by Pyra Management Consulting Services Inc. [online] Available at: [www.gov.ns.ca/hpp/repPub/TC/NS-Tobacco-Control-Strategy-Evaluation.pdf](http://www.gov.ns.ca/hpp/repPub/TC/NS-Tobacco-Control-Strategy-Evaluation.pdf).

<sup>195</sup> US Centers for Disease Control and Prevention. (1999). *Best Practice for Comprehensive Tobacco Control* [online] Available at [www.cdc.gov/tobacco/tobacco\\_control\\_programs/stateandcommunity/best\\_practices/00\\_pdfs/bpchap1.pdf](http://www.cdc.gov/tobacco/tobacco_control_programs/stateandcommunity/best_practices/00_pdfs/bpchap1.pdf). Accessed May 2007.

- increasing community group involvement, especially among sport and recreation, First Nations groups, within the health care sector and municipalities;
- Action in your Community against Tobacco (ACT) helped develop and support community networks for tobacco control;
- focusing on partnerships and collaboration with First Nations communities; and,
- assisting in the development of tobacco control strategies for DHAs.

The breadth and variety of community-based programming makes comparative cost-effectiveness assessments of these programs difficult. However, it is interesting to note that California—arguably the most pioneering and pro-active North American jurisdiction in the field of tobacco control—has decided to focus on community-based strategies in order to implement further tobacco reduction in the state. The State of California’s support for community-based programs will include provision of competitive grants to community organizations. Results from the state have shown that community level efforts have been very effective in producing policy changes, such as the elimination of self-service tobacco sales and smoking bans in public places. A recent report by Krueger (2005) for the BC Healthy Alliance<sup>196</sup> makes recommendations for community level interventions to support tobacco reduction and healthy eating, including:

- targeted media advocacy providing consistent messages over time;
- support for community action coordinators to mobilize for risk factor reduction; and,
- funding for community groups to enhance broad-based community involvement and support.

## Recommendations

The following recommendations, applicable to Nova Scotia, emerge from the available evidence:

- Provide funding for community groups implementing tobacco reduction activities, in partnership with the ACT initiative
- Mobilize community development staff at both the municipal and provincial levels around tobacco reduction initiatives
- Consider ways to combine risk factor interventions for chronic disease reduction at the community level
- Continued targeted community-based media messages for tobacco denormalization.

## 3.2 Benefits of Investing in Tobacco Reduction

What are the benefits of investing in tobacco reduction through targeted interventions? This section includes information from two recent Canadian studies, British Columbia and Ontario, discusses the successes achieved in California and estimates the benefits of further investment in tobacco reduction interventions in Nova Scotia.

---

<sup>196</sup> Krueger, H. (2005). *Resources for Health: A Cost-Effective Risk Factor Plan for British Columbia. Report* Prepared for the BC Healthy Living Alliance. [online] Available at: [www.B.C.healthyliving.ca/resources/documents/risk\\_factor\\_business\\_plan.pdf](http://www.B.C.healthyliving.ca/resources/documents/risk_factor_business_plan.pdf) . Accessed May 2007.

## ***Ontario and British Columbia***

Two recent Canadian studies warrant mention, as they examine the economic implications of tobacco reduction in a Canadian context. These recent reports are the *Fiscal Impact of a Comprehensive Tobacco Control Program in Ontario*, Ontario Tobacco Research Unit (2003) and *Resources for Health: A Cost-Effective Risk Factor Plan for British Columbia* from the BC Healthy Living Alliance (2005).

The authors of the Ontario report calculate the net present value of investing in a five-year comprehensive tobacco reduction program. They ask whether public fiscal benefits, in the form of reduced health care expenditures as well as higher income and sales tax revenues, justify program investments. Using a benchmark of a 15% reduction in smoking prevalence over five years, and including only health care savings as the benefit, the report concludes that the net present value to the Ontario Government of investing in proposed tobacco reduction interventions is \$900 million. Thus, for every \$1 spent, the report predicts the province will save more than \$3 in public health care spending. When changes in provincial sales tax, income tax, and tobacco tax revenues were added, the net present value of the proposed tobacco reduction strategy rose to \$16 billion and the fiscal benefit-cost ratio grew to more than 28:1.

The report concludes that investing in this comprehensive intervention program would produce immediate gains in tobacco tax revenues (since raising tobacco taxes is recommended as part of the strategy), and short-term reductions in smoking-attributable costs due to pregnancy complications and cardiovascular disease. The investment was also expected to prevent more than 3,000 premature deaths and eliminate 140,000 hospital days in the ten years following inception.

Ontario's tobacco taxes of \$74.57/carton of 200 cigarettes (\$2007) are the second lowest in the country after Quebec's (\$70.23), 17% less than Nova Scotia's (\$89.71), 18% less than Manitoba's (\$91.13) and Saskatchewan's (\$91.30), and 14% less than British Columbia's (\$86.34). So raising tobacco taxes is an obvious element of any comprehensive tobacco control strategy in Ontario, and partially explains why the benefit-cost ratio rises dramatically when this is included in the analysis.

The BC Healthy Living Alliance examined effectiveness and cost-effectiveness literature on smoking, unhealthy eating, physical inactivity, and overweight/obesity to set targets for reducing chronic disease in the province. Following this review, the alliance chose to focus on tobacco and obesity. With respect to tobacco reduction, a thorough effectiveness literature review led the alliance to endorse five core tobacco control initiatives:

- increasing the price of tobacco products (typically through taxation)
- creating smoke-free public places (as part of a series of "clean air" initiatives)
- reducing opportunities to promote tobacco products
- counter-advertising/information dissemination
- primary care-based smoking cessation programs, including pharmacotherapy.

As mentioned throughout the tobacco reduction literature, the research also indicates that combining interventions through a comprehensive approach increases effectiveness. The BC

study therefore also recommends interventions at multiple levels and sites, including community, workplace and school-based interventions, and targeted interventions for specific populations.

A cost-effectiveness approach was then used by the BC Healthy Living Alliance to analyse the projected benefits of combining the alliance's five recommended core interventions. The study extrapolated costs from GPI Atlantic's *The Cost of Tobacco Use in New Brunswick*<sup>197</sup> and from Makomaski Illing and Kaiserman's (2004)<sup>198</sup> data. The BC report estimated that spending on its five recommended core interventions would cost \$274 per QALY saved (\$2005)—which means the five interventions together are more than 90 times more cost-effective than an average medical procedure, which costs approximately \$25,000 per QALY saved (\$2005).

## California

The passing of Proposition 99 in 1988 established California as the first US state to implement a comprehensive tobacco education and prevention program, the California Tobacco Control Program (CTCP). This was 12 years before Nova Scotia implemented its comprehensive strategy in 2000/1. The California strategy was originally well-funded and included increases in tobacco taxes, emphasized a comprehensive approach to tobacco control, prevention and education, and included strategies to change social norms related to tobacco use. California pioneered some of the first state-wide smoke-free legislation, initially covering restaurants and expanding it to include bars and other places. In fact, a portion of the tobacco tax increase was dedicated by-law towards the implementation of the comprehensive strategy.<sup>199</sup> Proposition 99 increased the state cigarette tax by 25 cents per pack and added an equivalent amount on other tobacco products. The new revenues were earmarked for programs to reduce smoking, to provide health care services to indigents, to support tobacco-related research and to fund resource programs for the environment.<sup>200</sup>

As a pioneering state posing a huge threat to tobacco industry interests, California's approaches were met with resistance and interference on the part of tobacco companies and suffered funding cuts in later years. Nevertheless, the strategy has realized dramatic reductions in tobacco use prevalence in the state, with smoking rates in California declining more rapidly than the rest of the country since the late 1980s. Adult smoking in California declined from 22.8% in 1988 to 14% in 2005—signifying two million fewer smokers in the state.<sup>201</sup> Between 1998 and 2003, cigarette consumption in California declined by 60%, compared to a decline of 38% in the US as

---

<sup>197</sup> Colman, R., Rainer, R. and Wilson, J. (2003). *The Cost of Smoking in New Brunswick and the Economics of Tobacco Control*. GPI Atlantic. [online] Available at: [www.gpiatlantic.org/publications/pubs.htm](http://www.gpiatlantic.org/publications/pubs.htm). Accessed July 2007.

<sup>198</sup> Makomaski Illing, E. and Kaiserman, M. (2004). Mortality attributable to tobacco use in Canada and its regions. *Canadian Journal of Public Health*, Vol. 95 (1).

<sup>199</sup> US CDC. (2000). Declines in Lung Cancer Rates, California, 1988—1997. *MMWR Weekly Review*, Vol. 49 (47), p 1066-9. [online] Available at: [www.cdc.gov/mmwr/preview/mmwrhtml/mm4947a4.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4947a4.htm). Accessed April 2007.

<sup>200</sup> State of California (2004). *About the Tobacco Control Section: Prop. 99 and the Legislative Mandate*. [online] Available at: [www.dhs.ca.gov/tobacco/html/about.htm](http://www.dhs.ca.gov/tobacco/html/about.htm). Accessed July 2007.

<sup>201</sup> California Department of Health Services, Tobacco Control Section. (2006). *Adult Smoking Prevalence*. [online] Available at: [www.dhs.ca.gov/tobacco](http://www.dhs.ca.gov/tobacco). Accessed May, 2007.



a whole.<sup>202</sup> From 1996 to 2004, youth smoking in California declined by more than 60% among eighth grade students and by more than half among tenth grade students.<sup>203</sup>

There is clearly a significant time lag between implementation of a comprehensive tobacco control program and the realization of positive health outcomes and health care savings. However, strong evidence is now emerging that reductions in smoking rates that resulted from Proposition 99 and the state's comprehensive tobacco control strategy are positively affecting long-term health outcomes in California. According to the California Department of Health Services:

*The decrease in smoking rates is having a profound effect on the health of Californians. As a result of fewer Californians smoking, rates of cancer of the lung or bronchus in California are going down at three times the rate of the rest of the country.*<sup>204</sup>

The US Centers for Disease Control give credit to California's tobacco control strategy: "The difference in the rate of decline in lung and bronchus cancer incidence rates between California and other US regions may be related, in part, to the significant declines in smoking rates as a result of California tobacco control initiatives."<sup>205</sup>

After 18 years of vigorous anti-tobacco activity in California, smoking is no longer seen as a socially acceptable activity in that state. Yet, the California Department of Health Services acknowledges there are still challenges to be met: "Although smoking has declined among all age groups, 18 to 24 year olds continue to have the highest smoking rate of any age group in California."<sup>206</sup>

A 2004 report estimates the total costs of smoking in California at \$15.9 billion, \$475 per resident, and \$3,331 per smoker (\$US1999) using the SAF approach. Direct costs were \$8.6 billion (54% of the total), indirect costs due to lost productivity from smoking-attributable illness were \$1.5 billion (10%), and indirect costs due to smoking-related premature deaths were \$5.7 billion (36%). The cost of smoking in California was estimated at \$9.4 billion for men and \$6.3 billion for women (\$US1999). There were 43,137 deaths annually attributed to smoking in the state.<sup>207</sup>

---

<sup>202</sup> California Department of Health Services, Tobacco Control Section. (2005). *Cigarette Consumption*, [online] Available at: [www.dhs.ca.gov/tobacco](http://www.dhs.ca.gov/tobacco). Accessed May, 2007.

<sup>203</sup> California Department of Health Services, Tobacco Control Section. (2004). *California Tobacco Control Update*, [online] Available at: [www.dhs.ca.gov/tobacco/documents/2004TCSupdate.pdf](http://www.dhs.ca.gov/tobacco/documents/2004TCSupdate.pdf). Accessed May, 2007.

<sup>204</sup> California Department of Health Services, State Public Health Records. (2005). *California Smoking Rates Drop 33 Percent*.

<sup>205</sup> US CDC. (2000). Declines in Lung Cancer Rates, California, 1988—1997. *MMWR Weekly Review*, Vol. 49 (47), p. 1066-9.

<sup>206</sup> California Department of Health Services, State Public Health Records. (2005). *California Smoking Rates Drop 33 Percent*. [online] Available at: [www.dhs.ca.gov/tobacco/documents/press/PressRelease05-22-05.pdf](http://www.dhs.ca.gov/tobacco/documents/press/PressRelease05-22-05.pdf). Accessed May 2007.

<sup>207</sup> Max, W. *et al.* (2004). The economic burden of smoking in California. *Tobacco Control*, Vol. 13, p. 264-67.



The 43,137 deaths in California due to smoking indicate a mortality rate of 129 deaths per 100,000 individuals.<sup>208</sup> In our study, mortality due to tobacco use in Nova Scotia was estimated at 1,748, or approximately 187 deaths per 100,000 individuals.<sup>209</sup> It is important to note that in 1999 (the year in which the California data were sourced), Californian smoking prevalence was 17.1<sup>210</sup> versus a tobacco use prevalence rate of 21.4% in Nova Scotia. This comparison not only acts as a sensitivity test for the results reported in this study, but indicates further reductions in smoking rates in Nova Scotia will also lead to reduced mortality, as the Californian example demonstrates.

Studies of the California data suggest that other jurisdictions could achieve similar health benefits to those seen in California if tobacco use were to drop proportionately. An American Cancer Society report comments:

*The results from California tobacco control efforts are exactly what you would expect. If states invest sufficient resources and implement comprehensive tobacco control programs, then fewer people will smoke and consequently fewer people will die of smoking related diseases. It's unfortunate that only a few states have allocated funds from the tobacco settlement that would support efforts on the same scale as those in California.*<sup>211</sup>

The current approach to tobacco reduction in California warrants much more detailed examination and discussion than is possible here. Limited resources have meant the state has had to focus on population-level interventions. Key current interventions in California include mass media campaigns, tobacco control initiatives by local health departments and competitive grants to community organizations. Results have shown that community level efforts in California have been particularly effective in changing policy and ensuring effective implementation, such as the elimination of self-service tobacco sales and the enforcement of smoking bans in public places.

It is noteworthy that smoking prevalence data in California are available by race, ethnicity and socioeconomic status. This makes it much more possible to tailor interventions to meet the particular needs of priority populations and thereby to effectively reduce smoking and help relieve the burden of chronic disease in these population sub-groups.

The California Tobacco Control Program is currently taking a social norm change approach to tobacco control by creating a social climate where tobacco use is widely regarded as less

---

<sup>208</sup> 43,137 deaths attributed to smoking divided by the 33,417,000 population of California in 1999 = 0.00129, which is a rate of 129 per 100,000 population. (Source: *Total Population of California, 1970 – 2001*. [online] Available at: [countingcalifornia.cdlib.org/pdfdata/csa02/B03](http://countingcalifornia.cdlib.org/pdfdata/csa02/B03). Accessed May 2007.

<sup>209</sup> Population of Nova Scotia 934,405 (Source: Province of Nova Scotia (2007) Community Counts. [online] Available at: [www.gov.ns.ca/finance/communitycounts](http://www.gov.ns.ca/finance/communitycounts). Accessed July 2007. 1,748 deaths/934,405.

<sup>210</sup> California Department of Health Services. (2006). *Smoking Rates in California Fall to an All-Time Low*. [online] Available at: [www.dhs.ca.gov/tobacco/documents/press/PressRelease04-10-06.pdf](http://www.dhs.ca.gov/tobacco/documents/press/PressRelease04-10-06.pdf). Accessed July 2007.

<sup>211</sup> American Cancer Society. (2000). California Lung Cancer Rates Drop Significantly. *ACS News Center*. [online] Available at: [www.cancer.org/docroot/NWS/content/NWS\\_1\\_1x\\_California\\_Lung\\_Cancer\\_Rates\\_Drop\\_Significantly\\_.asp](http://www.cancer.org/docroot/NWS/content/NWS_1_1x_California_Lung_Cancer_Rates_Drop_Significantly_.asp). Accessed May 2007.

desirable, acceptable, and accessible.<sup>212</sup> Given the strength of recent Nova Scotia point-of-sale and smoke-free places legislation, this province is similarly paving the way to further denormalize tobacco use and to change social norms accordingly.

### ***The Benefits of Tobacco Reduction for Nova Scotia***

Given the tremendous costs of tobacco use, there are clear economic and social benefits to reducing smoking rates and ETS exposure. This takes the form of lives saved, reduced suffering and hardship as well as cost savings. This is an achievable goal, given all that is known about effective tobacco reduction interventions and the success to date of Nova Scotia's tobacco reduction strategy and results from other jurisdictions, such as California. Here we examine the implications of a hypothetical 27% reduction in the number of current tobacco users in Nova Scotia, from 22% to 16%, a tobacco use prevalence rate comparable to British Columbia.

This extrapolation was completed using cost data from the Canadian Centre on Substance Abuse (CCSA).<sup>213</sup> In 2002, the smoking rate for the population 15 and older was 16% in British Columbia and 25% in Nova Scotia.<sup>214</sup> The CCSA reports the total cost of tobacco use at \$563 per-capita for BC and \$662 per-capita for Nova Scotia in 2002. Given that productivity loss estimates will be higher in BC as workers earn higher wages there than in Atlantic Canada, cost estimates must be first adjusted to take this difference into account. According to Statistics Canada,<sup>215</sup> average annual weekly earnings in NS were only 84% of those in BC (\$558 versus \$668) in 2002. Adjusting the BC cost of use (\$563 per capita) downward by 16% to account for differences in earnings results in a comparative figure of \$472.90 per capita.<sup>216</sup>

We can then extrapolate to suggest that a decline of 27% in tobacco use prevalence in Nova Scotia to 16%, a rate equivalent to that in BC in 2002, would save Nova Scotia approximately \$189 per capita (\$2002) (\$662 – \$472.90) or \$206.50 per capita (\$2006). This implies a potential cost saving of \$193 million (\$2006) using the previous cited population estimate for the province of 934,405.

Calculating anticipated cost savings in this manner has limitations. As previously discussed, former smokers have increased risk of tobacco-related illness and mortality as compared to never-smokers. This calculation does not take into consideration the lower percentage of former smokers in BC as compared with Nova Scotia. Given that Nova Scotia's smoking rates have been higher over time than those in BC, Nova Scotia has a higher percentage of costs associated with former smokers.

---

<sup>212</sup> California Department of Health Services, Tobacco Control Section. (2006). *California Tobacco Control Update 3006: The Social Norm Change Approach*. [online] Available at: [www.dhs.ca.gov/tobacco/documents/rfps/RFP05-45204.PDF](http://www.dhs.ca.gov/tobacco/documents/rfps/RFP05-45204.PDF). Accessed April 2007.

<sup>213</sup> Rehm, J. et al. (2006). *The Cost of Substance Abuse in Canada 2002*. Canadian Centre on Substance Abuse.

<sup>214</sup> Canadian Tobacco Use Monitoring Survey. (2002). *Supplementary Tables, Table 2*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2002/at-ta2\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2002/at-ta2_e.html). Accessed July 2007.

<sup>215</sup> Statistics Canada. (2007) *Labour Force Historical Review 2006*. Catalogue no. 71F0004XCB

<sup>216</sup> Calculation as follows: 16% x \$563 per capita = \$90.10, \$563 - \$90.10 = \$472.90.

## *Funding Requirements*

The substantial literature on tobacco control directly relates adequate funding and the effectiveness of tobacco reduction strategies. To achieve success, tobacco reduction campaigns must be adequately funded.

A recent study by Taurus *et al* (2005) found that the level of per capita spending on tobacco control had a significant impact on youth smoking prevalence and on the average number of cigarettes smoked. The authors report that if each US state had spent the US CDC minimum recommended funding on tobacco control, national youth smoking rates would have been 3.3% to 13.5% lower from 1991—2000 than they were.<sup>217</sup> This would have prevented nearly two million American youth from starting to smoke, saving 600,000 of them from premature death, and saving \$23.4 billion in long-term smoking-related health care costs.<sup>218</sup>

As previously noted, the US states with the best-funded and most sustained tobacco prevention programs in the 1990s—Arizona, California, Oregon, and Massachusetts—saw cigarettes sales drop more than twice as much as in the rest of the country. Between 1990 and 2000, sales fell by an average of 43% in these states compared to 20% in the rest of the country. Farrelly *et al* estimates that had all states implemented fully funded tobacco reduction programs, cigarette sales nationwide would have declined by 18% instead of 9% between 1994 and 2000.<sup>219</sup>

The US Centers for Disease Control (CDC) recommended benchmark funding of \$7 to \$20 per capita (\$US1999) for populations of less than three million people, equivalent to \$12 to \$35 (\$CAN 2005).<sup>220</sup> No Canadian strategy is currently funded adequately according to this benchmark, including Nova Scotia (see Table 18, below). However, it is important to note there are clear differences between tobacco reduction legislation and taxation in Canada compared to the US.

Nova Scotia's tobacco control strategy is currently funded at \$2.3 million, or \$2.45 per capita (\$CAN2005), lower than the Canadian average of \$2.68 per-capita<sup>221</sup> and lower than per-capita funding in the Northwest Territories (\$5.82), Quebec (\$4.36), Alberta (\$3.86), the Yukon (\$3.37)

---

<sup>217</sup> Taurus, J. *et al.* (2005). State tobacco control spending and youth smoking. *American Journal of Public Health*, Vol. 95 (2). [online] Available at: [www.rwjf.org/files/research/Taurus%20-%20Youth%20Smoking%201-26-05.pdf](http://www.rwjf.org/files/research/Taurus%20-%20Youth%20Smoking%201-26-05.pdf). Accessed June 2007.

<sup>218</sup> Gallogly, M. (2006). *Comprehensive Tobacco Prevention and Cessation Programs Effectively Reduce Tobacco Use*. For the Campaign for Tobacco Free Kids. [online] Available at: [tobaccofreekids.org/research/factsheets/pdf/0045.pdf](http://tobaccofreekids.org/research/factsheets/pdf/0045.pdf). Accessed June 2007.

<sup>219</sup> Farrelly, M., *et al.* (2003). The Impact of Tobacco Control Program Expenditures on Aggregate Cigarette Sales: 1981-2000. *Journal of Health Economics*, Vol. 22, p 843-859.

<sup>220</sup> US Centers for Disease Control. (1999). *Best practices for comprehensive tobacco control programs: Executive Summary*. [online] Available at: [www.sen.parl.gc.ca/ckenny/cdc\\_executive\\_summary.htm](http://www.sen.parl.gc.ca/ckenny/cdc_executive_summary.htm). Accessed June 2007. Conversion to Canadian and 2005\$ completed using the Bank of Canada (2007) *Exchange rates*. [online] Available at: [www.bankofcanada.ca/cgi-bin/famecgi\\_fds](http://www.bankofcanada.ca/cgi-bin/famecgi_fds). Accessed July 2007 Values translated to constant dollars using Statistics Canada. (2007) *Consumer Price Index*, Catalogue Number 62-001-X1B. [online] Available at: [www.statcan.ca/english/freepub/62-001-XIB/62-001-XIB2007004.pdf](http://www.statcan.ca/english/freepub/62-001-XIB/62-001-XIB2007004.pdf). Accessed May 2007.

<sup>221</sup> Average includes Nova Scotia

and Ontario (\$2.48). Supporters of tobacco reduction in the province<sup>222</sup> advocate for minimal funding of \$5 per capita (\$2005), a total of approximately \$4.7 million, to be increased annually.

**Table 18: Per Capita Tobacco Control Funding in Canada, by Province and Territory, 2004-2005**

Select Jurisdictions	2004-05 funding (\$CAN)	Population	Per Capita Funding
Northwest Territories	\$250,000	42,925	\$5.82
Quebec	\$33,000,000*	37,560,592	\$4.36
Alberta	\$12,400,00	3,212,813	\$3.86
Yukon	\$105,000***	31,167	\$3.37
Ontario	\$30,800,000	12,439,755	\$2.48
Nova Scotia	\$2,300,000	938,134	\$2.45
Nunavut	\$60,000	29,624	\$2.03
British Columbia	\$4,000,000	4,209,856	\$0.95
Saskatchewan	\$584,000*	996,194	\$0.59
Manitoba	\$668,000	1,173,164	\$0.57
Newfoundland and Labrador	\$200,000**	516,875	\$0.39
New Brunswick	Not available		
Prince Edward Island	Not available		
Total (n=11)	\$83,567,000	31,151,099	\$2.68

\*Estimate does not include staff time for tobacco control

\*\*Estimate includes only provincial money given to the Alliance for the Control of Tobacco (ACT) and not provincial funding for collaborating partners

\*\*\*Yukon estimate does not include staffing for tobacco control

Source: Ontario Tobacco Research Unit (2006). *The Tobacco Control Environment: Ontario and Beyond*, p3. [online] Available at: [www.otru.org/pdf/11mr/11mr\\_no1\\_final.pdf](http://www.otru.org/pdf/11mr/11mr_no1_final.pdf). Accessed May 2007.

## Recommendations

- Based on the abundant evidence relating funding levels to program effectiveness, it is recommended that Nova Scotia increase funding for tobacco control to a minimum of \$5 per capita, to be increased annually. This would require program funding of a minimum of \$4.7 million—approximately double current spending.

At the same time, this recommended minimum funding amounts to just 3% of current federal and provincial tobacco control tax and excise duty revenues earned from the sale of cigarettes in Nova Scotia (\$163,617 million in 2005-06), and should therefore be deemed affordable—especially in light of the fact that these tax revenues have more than doubled since 2000. Funding at this level (approximately twice current levels) would likely go a long way to reducing Nova Scotia's smoking rate by 27%—from 22% to 16%, a rate equal to that of BC.

<sup>222</sup> Personal communication, Smoke-free Nova Scotia.

Again, it is important to recall that this funding should be regarded not as a cost but rather as an investment that will yield a significant return to the province in avoided future health care costs and productivity losses.

### **Section 3: Summary of Key Observations**

- Tobacco taxation is the single most effective tobacco reduction strategy available and it generates revenue at minimal cost. Ideally, that revenue, or at least a considerable portion of it, will be re-invested in further tobacco control interventions, though in practice only a small proportion of it is actually used for this purpose. It is now widely recognized that tobacco tax increases need to be proportionately equal across all tobacco products in order to avoid simple switching to cheaper products, and that these taxes must be raised regularly to keep pace with inflation and ensure that real tobacco prices do not drop over time. Although all Canadian jurisdictions have increased tobacco taxes substantially in recent years, it is noteworthy that—in inflation-adjusted terms—the January 1994 price level of cigarettes has only recently been surpassed. Recommendations:
  - Raise provincial tobacco taxes to equal the highest taxes in the country (at least to current levels in Manitoba and Saskatchewan)
  - Ensure proportionately equal taxes across all tobacco products
  - Institute regular tax increases (\$2/year has been suggested)
  - Consider taxation alternatives to combat the increasing market share of discount cigarettes.
  - Support cessation programs particularly for low-income smokers, including free nicotine replacement therapy, to ensure low-income groups are not disproportionately affected by tobacco tax increases. Increased tobacco tax revenues can be used to provide such financial support to quitters.
- Based on the evidence examined, it is seen that broad-based, targeted anti-tobacco media campaigns are effective when included as part of a comprehensive tobacco reduction strategy. Recommendations include:
  - Continue the present broad-based anti-tobacco public education and media campaign, including a deonormalization message; and
  - Target messages and delivery vehicles appropriately to have the greatest impact on targeted tobacco users and priority groups (adolescent males and females, for example).
- A wide range of cessation approaches have been shown—in the literature, in many jurisdictions, and in Nova Scotia’s own experience—to be effective and cost effective. These approaches include minimal counselling, individual counselling and group counselling, physician advice in clinical settings, workplace programs, telephone helplines and cessation aids such as nicotine gum and the patch. Use of the patch for cessation was found to be more cost effective than gum. Minimal interventions and motivational enhancement provided by front line health care providers have been shown to be effective in

motivating smokers to quit, especially if used during the window of a health event or crisis. Proven cessation techniques are also effective in a workplace setting, where interventions have been shown to yield a substantial return on investment particularly in avoided sick leave and disability and improved productivity. Recommendations include:

- Begin data collection on tobacco use prevalence among priority populations where more information is needed, and design culturally sensitive cessation programs targeted to these populations
  - Provide targeted cessation support for low-income smokers, mental health consumers, pregnant/postpartum women, and youth (where stages of change approaches have been found to be most effective)
  - Ensure free or low cost access to NRT, especially for low-income Nova Scotians
  - Institute workplace smoking cessation, especially for key economic sectors where smoking rates are high: sales/services and business/finance/administration (women) and sales/service and trades/transportation (men)
  - Continue mass media efforts and enforcement of smoke-free public places legislation to denormalize tobacco use
  - Work with health care providers on training and use of minimal intervention and motivational enhancement approaches.
- High quality youth cessation and preventive education curriculum resources of proven effectiveness are available in Nova Scotia. However, they are not used consistently, and their implementation is not systematically monitored. Components of effective youth tobacco reduction strategies are known, and include the concepts of youth engagement and stages of change. Delivering school-based prevention and cessation programs in partnership with educators has been demonstrated to be highly cost effective and can deliver substantial savings in avoided health care costs and productivity losses. Recommendations include:
  - Design and implement a strategy to increase the use of school-based prevention and cessation resources consistently throughout provincial schools, to monitor this implementation, and to ensure the curricula and programs reach all students in the province.
  - Continue to support and encourage health promoting schools.
- Community-based programs are an important component of a comprehensive tobacco reduction strategy. They enable mobilization and support for broad-based tobacco reduction. Recommendations include:
  - Continue funding for community groups implementing tobacco reduction activities, in partnership with the ACT initiative
  - Continued mobilization of community development staff at municipal and provincial level around tobacco reduction
  - Consider ways to combine risk factor interventions for chronic disease reduction at the community level
  - Continued locally appropriate community-based media messages for tobacco denormalization.



- There are enormous benefits to investing in tobacco reduction, in terms of lives saved, better long-term health outcomes and cost savings. A decline of 36% in tobacco use prevalence from 25% to 16% would save Nova Scotia approximately \$206.50 per capita (\$2006), for a total of \$193 million (\$2006)

Based on the abundant evidence relating funding levels to program effectiveness, it is recommended that Nova Scotia increase funding for tobacco control to a minimum of \$5 per capita, to be increased annually. This would require program funding of a minimum of \$4.7 million—approximately double current spending. This is merely 3% of current federal and provincial tobacco control tax and excise duty revenues earned from the sale of cigarettes in Nova Scotia and should therefore be deemed affordable—especially in light of the fact that these tax revenues have more than doubled since 2000. Funding at this level (approximately twice current levels) would likely go a long way to reducing Nova Scotia’s smoking rate by 27%—from 22% to 16%. This funding should be regarded not as a cost but rather as an investment that will yield a significant return to the province in avoided future health care costs and productivity losses.



## APPENDIX A: DATA TABLES

**Data Table 1: Smoking Rates in Canada and Provinces, Age Group 15- 24 years (1999 – 2005)**

	1999	2000	2001	2002	2003	2004	2005
<b>CANADA</b>	32	29	27	26	25	23	22
<b>NFLD</b>	33	34	31	29	28	27	24
<b>PEI</b>	33	29	27	27	26	24	22
<b>NS</b>	33	31	29	27	27	26	20
<b>NB</b>	32	33	32	24	27	25	24
<b>QUE</b>	38	34	30	34	31	29	27
<b>ONT</b>	29	27	25	24	22	20	19
<b>MAN</b>	31	31	32	28	25	23	26
<b>SASK</b>	32	30	32	32	31	27	30
<b>ALB</b>	33	27	29	24	25	22	23
<b>BC</b>	25	23	22	18	17	20	19

Source: Health Canada. (2006) *Canadian Tobacco Use Monitoring Survey, Annual Results, 1999 - 2005*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index_e.html). Accessed June 2007

**Data Table 2: Smoking Rates in Canada and Provinces, Age group 25+ years (1999 – 2005)**

	1999	2000	2001	2002	2003	2004	2005
<b>CANADA</b>	24	24	21	20	20	19	18
<b>NFLD</b>	27	26	24	23	22	21	20
<b>PEI</b>	24	25	25	22	20	21	19
<b>NS</b>	28	30	24	25	21	19	21
<b>NB</b>	25	25	24	20	24	24	21
<b>QUE</b>	29	27	23	24	23	21	21
<b>ONT</b>	22	22	19	19	19	18	16
<b>MAN</b>	22	25	24	20	20	20	21
<b>SASK</b>	24	28	24	19	22	21	20
<b>ALB</b>	24	22	24	22	19	20	20
<b>BC</b>	19	19	16	16	16	14	14

Source: Health Canada. (2006). *Canadian Tobacco Use Monitoring Survey, Annual Results, 1999 - 2005*. . [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index_e.html). Accessed June 2007.

**Data Table 3: Percentage decline in Smoking Rates in Canada and Provinces, Age Groups 15–24 and 25+ years (1999–2005)**

	15-24	25+
<b>CANADA</b>	31	25
<b>NFLD</b>	27	26
<b>PEI</b>	33	21
<b>NS</b>	39	25
<b>NB</b>	25	16
<b>QUE</b>	29	27
<b>ONT</b>	34	27
<b>MAN</b>	16	5
<b>SASK</b>	16	17
<b>ALB</b>	30	17
<b>BC</b>	24	26

Source: Health Canada. (2006) *Canadian Tobacco Use Monitoring Survey, Annual Results, 1999 - 2005*. . [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index_e.html). Accessed June 2007.

**Data Table 4: Male and Female Smoking Status (%) by Age, Nova Scotia 2005.**

Age	Never smoker (%)		Former smoker (%)		Current/daily smoker (%)	
	Female	Male	Female	Male	Female	Male
12 – 19 years	75.9	74.5	15.8 <sup>E</sup>	14.3 <sup>E</sup>	8.4 <sup>E</sup>	10.7 <sup>E</sup>
20 -34 years	35.8	22.7	34.2	40.5	29.9	36.8
35 – 44 years	29.2	22.7	41.5	40.5	29.3	36.8
45 – 64 years	36.9	16.7	41.9	60.7	21.2	22.0
65 and over	40.0	16.3	47.0	71.5	12.9	11.2

Source: Statistics Canada (2006).

E= use with caution

**Data Table 5: Exposure to ETS in the Home, NS and Canada (2000–2006)**

Year	% of Children Age 0–11 regularly exposed	% of Children Age 12–17 regularly exposed	% of Children Age 0–17 regularly exposed
2000 (NS)	28	34	30
2001 (NS)	22	31	25
2002 (NS)	21	24	22
2003 (NS)	16	23	19
2004 (NS)	13	22	16
2005 (NS)	13	22	17
2006 (NS)	11	18	14
2006(Canada)	9	14	11

Source: Health Canada. *CTUMS Annual results, 2000 - 2006, Supplementary tables*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2005/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2005/index_e.html). Accessed July 2007.

**Data Table 6: Exposure of Non-Smokers Age 12 and older to Second-hand Smoke in the Home, Vehicles, and Public Places, Nova Scotia, 2003, 2005**

	Home		Motor Vehicles		Public Places	
	Male	Female	Male	Female	Male	Female
<b>Zone 1 2005</b>	14.4	9.7	13.6e	8.8e	11.3e	8.5e
<b>2003</b>	13.1e	12.1e	10.4e	13.7e	11.1e	16.1e
<b>Zone 2 2005</b>	13.8	7.6	11e	N/A	10e	7.9e
<b>2003</b>	12.9e	11.9e	8.5e	7.1e	12.8e	11.1e
<b>Zone 3 2005</b>	7.6	11.4	6.1e	12.8e	12.6e	11.6e
<b>2003</b>	16.9e	14.3e	12.5e	18e	12.4e	9.6e
<b>Zone 4 2005</b>	10	6.5	9.1e	8.3e	5.6e	N/A
<b>2003</b>	12.9e	9.2e	22.9	7.5e	8.6e	8.2e
<b>Zone 5 2005</b>	17.1	15.6	14.5e	12.2	5e	5.9e
<b>2003</b>	21.5e	13.8e	26.7e	15.4e	21.3e	14e
<b>Zone 6 2005</b>	9.9	8.9	8.4e	6.5e	11.6	9e
<b>2003</b>	14.0e	7.9e	14.8	8.7e	24.6	14.2
<b>NS 2005</b>	11.5	9.8	9.9	8.3	10.1	8.4
<b>2003</b>	15	10.4	15.9	10.9	18.4	13.0

e = use with caution, limited data and high sampling variability make these results less reliable

Estimates from the past month, by age group and sex, non-smoking household population aged 12 and older

Sources: For vehicles/public places: Statistics Canada. (2005) *Canadian Community Health Survey* (Cycle 3.1)

CANSIM Table no. 105-0457. For exposure at home: Statistics Canada. (2005) *Canadian Community Health Survey* (Cycle 3.1), CANSIM Table no. 105-0456. [online] Available at: [cansim2.statcan.ca/cgi-win/cnsmcgi.pgm](http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm).

Accessed June 2007.

**Data Table 7: Imported and Domestic Cigarettes Sales, NS (1989 – 2005)**

Year	Number of units sold	% change
<b>1989</b>	1,599,023,000	
<b>1990</b>	1,440,458,000	-9.9%
<b>1991</b>	1,139,742,000	-20.9%
<b>1992</b>	1,213,236,000	6.1%
<b>1993</b>	1,123,432,600	-7.4%
<b>1994</b>	1,449,985,000	29.1%
<b>1995</b>	1,486,649,400	2.5%
<b>1996</b>	1,563,552,600	5.2%
<b>1997</b>	1,519,368,400	-2.8%
<b>1998</b>	1,481,769,000	-2.5%
<b>1999</b>	1,475,762,800	-0.4%
<b>2000</b>	1,455,817,550	-1.35%
<b>2001</b>	1,346,776,400	-7.5%
<b>2002</b>	1,191,664,820	-11.5%
<b>2003</b>	1,038,096,815	-12.9%
<b>2004</b>	1,044,085,608	0.6%
<b>2005</b>	1,014,866,995	-2.8%

Source: Health Canada, Tobacco Control Program, *Wholesale Sales Data: Domestic and Fine-Cut Sales Charts Nova Scotia - 1980 to 2005*. (Percent change calculated by author) [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/indust/sales-ventes/ns\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/indust/sales-ventes/ns_e.html). Accessed May 2007.

**Data Table 8: Federal and Provincial Tobacco Tax Rates, Nova Scotia, 1980–2006 (current dollars)**

	Nova Scotia					
	Cigarette			Fine Cut		
	Provincial Tax (\$/carton)	Federal Excise Tax (\$/carton)	Federal Excise Duty (\$/carton)	Provincial Tax (\$/200 g)	Federal Excise Tax (\$/200 g)	Federal Excise Duty (\$/200 g)
Jan/1980	2.0000	1.2000	1.0000	25% of retail price	0.3960	0.22
Feb/1980	2.0000	1.2000	1.0000	25% of retail price	0.3960	0.22
Mar/1980	2.0000	1.2000	1.0000	25% of retail price	0.3960	0.22
Apr/1980	2.0000	1.2000	<b>1.0660</b>	25% of retail price	0.3960	<b>0.2386</b>
May/1980	2.0000	1.2000	1.2200	25% of retail price	0.3960	0.2820
Jun/1980	2.0000	1.2000	1.2200	25% of retail price	0.3960	0.2820
Jul/1980	2.0000	1.2000	1.2200	25% of retail price	0.3960	0.2820
Aug/1980	2.0000	1.2000	1.2200	25% of retail price	0.3960	0.2820
Sep/1980	2.0000	1.2000	1.2200	25% of retail price	0.3960	0.2820
Oct/1980	2.0000	1.2000	1.2200	25% of retail price	0.3960	0.2820
Nov/1980	2.0000	1.2000	1.2200	25% of retail price	0.3960	0.2820
Dec/1980	2.0000	1.2000	1.2200	25% of retail price	0.3960	0.2820
Jan/1981	2.0000	1.2000	1.2200	25% of retail price	0.3960	0.2820
Feb/1981	2.0000	1.2000	1.2200	25% of retail price	0.3960	0.2820
Mar/1981	2.0000	1.2000	1.2200	25% of retail price	0.3960	0.2820
Apr/1981	2.0000	<b>1.2372</b>	<b>1.2578</b>	25% of retail price	<b>0.4083</b>	<b>0.2908</b>
May/1981	2.0000	1.2372	1.2578	25% of retail price	0.4083	0.2908
Jun/1981	2.0000	1.2372	1.2578	25% of retail price	0.4083	0.2908
Jul/1981	2.0000	1.2372	1.2578	25% of retail price	0.4083	0.2908
Aug/1981	2.0000	1.2372	1.2578	25% of retail price	0.4083	0.2908
Sep/1981	2.0000	<b>1.3392</b>	<b>1.3616</b>	25% of retail price	<b>0.4419</b>	<b>0.3148</b>
Oct/1981	2.0000	1.3392	1.3616	25% of retail price	0.4419	0.3148
Nov/1981	2.0000	1.3392	1.3616	25% of retail price	0.4419	0.3148
Dec/1981	2.0000	1.3392	1.3616	25% of retail price	0.4419	0.3148
Jan/1982	2.0000	1.3392	1.3616	25% of retail price	0.4419	0.3148
Feb/1982	2.0000	1.3392	1.3616	25% of retail price	0.4419	0.3148
Mar/1982	2.0000	1.3392	1.3616	25% of retail price	0.4419	0.3148
Apr/1982	2.0000	1.3392	1.3616	25% of retail price	0.4419	0.3148
May/1982	<b>2.8000</b>	1.3392	1.3616	<b>35% of retail price</b>	0.4419	0.3148
Jun/1982	2.8000	1.3392	1.3616	35% of retail price	0.4419	0.3148
Jul/1982	2.8000	1.3392	1.3616	35% of retail price	0.4419	0.3148
Aug/1982	2.8000	1.3392	1.3616	35% of retail price	0.4419	0.3148
Sep/1982	2.8000	<b>1.5456</b>	<b>1.5714</b>	35% of retail price	<b>0.5100</b>	<b>0.3632</b>
Oct/1982	2.8000	1.5456	1.5714	35% of retail price	0.5100	0.3632
Nov/1982	2.8000	1.5456	1.5714	35% of retail price	0.5100	0.3632
Dec/1982	2.8000	1.5456	1.5714	35% of retail price	0.5100	0.3632
Jan/1983	2.8000	1.5456	1.5714	35% of retail price	0.5100	0.3632
Feb/1983	2.8000	1.5456	1.5714	35% of retail price	0.5100	0.3632
Mar/1983	2.8000	1.5456	1.5714	35% of retail price	0.5100	0.3632
Apr/1983	2.8000	1.5456	1.5714	35% of retail price	0.5100	0.3632
May/1983	2.8000	1.5456	1.5714	35% of retail price	0.5100	0.3632
Jun/1983	2.8000	1.5456	1.5714	35% of retail price	0.5100	0.3632
Jul/1983	2.8000	1.5456	1.5714	35% of retail price	0.5100	0.3632

Aug/1983	2.8000	1.5456	1.5714	35% of retail price	0.5100	0.3632
Sep/1983	2.8000	<b>1.7904</b>	<b>1.8202</b>	35% of retail price	<b>0.5908</b>	<b>0.4208</b>
Oct/1983	2.8000	1.7904	1.8202	35% of retail price	0.5908	0.4208
Nov/1983	2.8000	1.7904	1.8202	35% of retail price	0.5908	0.4208
Dec/1983	2.8000	1.7904	1.8202	35% of retail price	0.5908	0.4208
Jan/1984	2.8000	1.7904	1.8202	35% of retail price	0.5908	0.4208
Feb/1984	2.8000	1.7904	1.8202	35% of retail price	0.5908	0.4208
Mar/1984	<b>2.9806</b>	1.7904	1.8202	<b>37.26% of retail price</b>	0.5908	0.4208
Apr/1984	4.0000	1.7904	1.8202	50% of retail price	0.5908	0.4208
May/1984	4.0000	1.7904	1.8202	50% of retail price	0.5908	0.4208
Jun/1984	4.0000	1.7904	1.8202	50% of retail price	0.5908	0.4208
Jul/1984	4.0000	1.7904	1.8202	50% of retail price	0.5908	0.4208
Aug/1984	4.0000	<b>1.8780</b>	<b>1.9094</b>	50% of retail price	<b>0.6197</b>	<b>0.4414</b>
Sep/1984	4.0000	1.8780	1.9094	50% of retail price	0.6197	0.4414
Oct/1984	4.0000	1.8780	1.9094	50% of retail price	0.6197	0.4414
Nov/1984	4.0000	1.8780	1.9094	50% of retail price	0.6197	0.4414
Dec/1984	4.0000	1.8780	1.9094	50% of retail price	0.6197	0.4414
Jan/1985	4.0000	1.8780	1.9094	50% of retail price	0.6197	0.4414
Feb/1985	4.0000	1.8780	1.9094	50% of retail price	0.6197	0.4414
Mar/1985	4.0000	1.8780	1.9094	50% of retail price	0.6197	0.4414
Apr/1985	<b>4.2933</b>	1.8780	1.9094	50% of retail price	0.6197	0.4414
May/1985	4.8000	<b>2.4586</b>	<b>1.9094</b>	50% of retail price	<b>0.7824</b>	<b>0.4414</b>
Jun/1985	4.8000	3.8780	1.9094	50% of retail price	1.1800	0.4414
Jul/1985	4.8000	3.8780	1.9094	50% of retail price	1.1800	0.4414
Aug/1985	4.8000	3.8780	1.9094	50% of retail price	1.1800	0.4414
Sep/1985	4.8000	3.8780	1.9094	50% of retail price	1.1800	0.4414
Oct/1985	4.8000	3.8780	1.9094	50% of retail price	1.1800	0.4414
Nov/1985	4.8000	3.8780	1.9094	50% of retail price	1.1800	0.4414
Dec/1985	4.8000	3.8780	1.9094	50% of retail price	1.1800	0.4414
Jan/1986	4.8000	3.8780	1.9094	50% of retail price	1.1800	0.4414
Feb/1986	4.8000	<b>4.094171429</b>	<b>2.015814286</b>	50% of retail price	<b>1.245742857</b>	<b>0.465914286</b>
Mar/1986	4.8000	4.1108	2.0240	50% of retail price	1.2508	0.4678
Apr/1986	<b>5.6800</b>	4.1108	2.0240	50% of retail price	1.2508	0.4678
May/1986	7.0000	4.1108	2.0240	50% of retail price	1.2508	0.4678
Jun/1986	7.0000	4.1108	2.0240	50% of retail price	1.2508	0.4678
Jul/1986	7.0000	4.1108	2.0240	50% of retail price	1.2508	0.4678
Aug/1986	7.0000	4.1108	2.0240	50% of retail price	1.2508	0.4678
Sep/1986	7.0000	4.1108	2.0240	50% of retail price	1.2508	0.4678
Oct/1986	7.0000	4.1108	2.0240	50% of retail price	1.2508	0.4678
Nov/1986	7.0000	4.1108	2.0240	50% of retail price	1.2508	0.4678
Dec/1986	7.0000	4.1108	2.0240	50% of retail price	1.2508	0.4678
Jan/1987	7.0000	4.1108	2.0240	50% of retail price	1.2508	0.4678
Feb/1987	7.0000	<b>4.169514286</b>	<b>2.052928571</b>	50% of retail price	<b>1.268657143</b>	<b>0.474514286</b>
Mar/1987	7.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Apr/1987	<b>8.3333</b>	4.2752	2.1050	50% of retail price	1.3008	0.4866
May/1987	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Jun/1987	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Jul/1987	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Aug/1987	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Sep/1987	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866

Oct/1987	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Nov/1987	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Dec/1987	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Jan/1988	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Feb/1988	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Mar/1988	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Apr/1988	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
May/1988	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Jun/1988	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Jul/1988	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Aug/1988	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Sep/1988	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Oct/1988	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Nov/1988	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Dec/1988	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Jan/1989	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Feb/1989	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Mar/1989	9.0000	4.2752	2.1050	50% of retail price	1.3008	0.4866
Apr/1989	9.0000	4.2752	<b>2.444</b>	50% of retail price	<b>1.3968</b>	<b>0.7446</b>
May/1989	9.0000	4.2752	5.4950	<b>7.0000</b>	2.2608	3.0666
Jun/1989	9.0000	4.2752	5.4950	7.0000	2.2608	3.0666
Jul/1989	9.0000	4.2752	5.4950	7.0000	2.2608	3.0666
Aug/1989	9.0000	4.2752	5.4950	7.0000	2.2608	3.0666
Sep/1989	9.0000	4.2752	5.4950	7.0000	2.2608	3.0666
Oct/1989	9.0000	4.2752	5.4950	7.0000	<b>2.8508</b>	<b>3.6666</b>
Nov/1989	9.0000	4.2752	5.4950	7.0000	2.8508	3.6666
Dec/1989	9.0000	4.2752	5.4950	7.0000	2.8508	3.6666
Jan/1990	9.0000	4.2752	5.4950	7.0000	2.8508	3.6666
Feb/1990	9.0000	4.2752	5.4950	7.0000	2.8508	3.6666
Mar/1990	9.0000	4.2752	5.4950	7.0000	2.8508	3.6666
Apr/1990	<b>9.4600</b>	4.2752	5.4950	<b>7.3500</b>	2.8508	3.6666
May/1990	13.6000	4.2752	5.4950	10.5000	2.8508	3.6666
Jun/1990	13.6000	4.2752	5.4950	10.5000	2.8508	3.6666
Jul/1990	13.6000	4.2752	5.4950	10.5000	2.8508	3.6666
Aug/1990	13.6000	4.2752	5.4950	10.5000	2.8508	3.6666
Sep/1990	13.6000	4.2752	5.4950	10.5000	2.8508	3.6666
Oct/1990	13.6000	4.2752	5.4950	10.5000	2.8508	3.6666
Nov/1990	13.6000	4.2752	5.4950	10.5000	2.8508	3.6666
Dec/1990	13.6000	4.2752	5.4950	10.5000	2.8508	3.6666
Jan/1991	13.6000	<b>4.3552</b>	5.4950	10.5000	<b>3.0428</b>	3.6666
Feb/1991	13.6000	<b>4.7838</b>	5.4950	10.5000	<b>3.3347</b>	3.6666
Mar/1991	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Apr/1991	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
May/1991	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Jun/1991	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Jul/1991	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Aug/1991	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Sep/1991	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Oct/1991	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Nov/1991	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666



Dec/1991	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Jan/1992	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Feb/1992	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Mar/1992	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Apr/1992	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
May/1992	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Jun/1992	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Jul/1992	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Aug/1992	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Sep/1992	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Oct/1992	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Nov/1992	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Dec/1992	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Jan/1993	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Feb/1993	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Mar/1993	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Apr/1993	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
May/1993	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Jun/1993	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Jul/1993	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Aug/1993	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Sep/1993	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Oct/1993	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Nov/1993	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Dec/1993	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Jan/1994	13.6000	10.3552	5.4950	10.5000	7.1296	3.6666
Feb/1994	13.6000	<b>6.7838</b>	5.4950	10.5000	<b>3.5582</b>	3.6666
Mar/1994	13.6000	5.3552	5.4950	10.5000	2.1296	3.6666
Apr/1994	<b>10.1000</b>	<b>4.3552</b>	5.4950	<b>7.7300</b>	<b>1.8596</b>	3.6666
May/1994	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Jun/1994	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Jul/1994	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Aug/1994	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Sep/1994	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Oct/1994	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Nov/1994	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Dec/1994	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Jan/1995	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Feb/1995	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Mar/1995	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Apr/1995	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
May/1995	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Jun/1995	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Jul/1995	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Aug/1995	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Sep/1995	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Oct/1995	6.6000	3.3552	5.4950	4.9600	1.5896	3.6666
Nov/1995	<b>9.3333</b>	3.3552	5.4950	<b>7.3100</b>	1.5896	3.6666
Dec/1995	9.8800	3.3552	5.4950	7.7800	1.5896	3.6666
Jan/1996	9.8800	3.3552	5.4950	7.7800	1.5896	3.6666

Feb/1996	9.8800	3.3552	5.4950	7.7800	1.5896	3.6666
Mar/1996	9.8800	3.3552	5.4950	7.7800	1.5896	3.6666
Apr/1996	9.8800	3.3552	5.4950	7.7800	1.5896	3.6666
May/1996	9.8800	3.3552	5.4950	7.7800	1.5896	3.6666
Jun/1996	9.8800	3.3552	5.4950	7.7800	1.5896	3.6666
Jul/1996	9.8800	3.3552	5.4950	7.7800	1.5896	3.6666
Aug/1996	9.8800	3.3552	5.4950	7.7800	1.5896	3.6666
Sep/1996	9.8800	3.3552	5.4950	7.7800	1.5896	3.6666
Oct/1996	9.8800	3.3552	5.4950	7.7800	1.5896	3.6666
Nov/1996	<b>9.9267</b>	<b>3.4019</b>	5.4950	<b>7.8173</b>	<b>1.6256</b>	3.6666
Dec/1996	10.5800	4.0552	5.4950	8.3400	2.1296	3.6666
Jan/1997	10.5800	4.0552	5.4950	8.3400	2.1296	3.6666
Feb/1997	10.5800	4.0552	5.4950	8.3400	2.1296	3.6666
Mar/1997	10.5800	4.0552	5.4950	8.3400	2.1296	3.6666
Apr/1997	<b>8.4400</b>	4.0552	5.4950	<b>8.4400</b>	2.1296	3.6666
May/1997	8.4400	4.0552	5.4950	6.7000	2.1296	3.6666
Jun/1997	8.4400	4.0552	5.4950	6.7000	2.1296	3.6666
Jul/1997	8.4400	4.0552	5.4950	6.7000	2.1296	3.6666
Aug/1997	8.4400	4.0552	5.4950	6.7000	2.1296	3.6666
Sep/1997	8.4400	4.0552	5.4950	6.7000	2.1296	3.6666
Oct/1997	8.4400	4.0552	5.4950	6.7000	2.1296	3.6666
Nov/1997	8.4400	4.0552	5.4950	6.7000	2.1296	3.6666
Dec/1997	8.4400	4.0552	5.4950	6.7000	2.1296	3.6666
Jan/1998	8.4400	4.0552	5.4950	6.7000	2.1296	3.6666
Feb/1998	<b>8.7614</b>	<b>4.3766</b>	5.4950	6.7000	2.1296	3.6666
Mar/1998	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Apr/1998	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
May/1998	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Jun/1998	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Jul/1998	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Aug/1998	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Sep/1998	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Oct/1998	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Nov/1998	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Dec/1998	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Jan/1999	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Feb/1999	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Mar/1999	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Apr/1999	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
May/1999	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Jun/1999	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Jul/1999	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Aug/1999	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Sep/1999	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Oct/1999	9.0400	4.6552	5.4950	6.7000	2.1296	3.6666
Nov/1999	<b>9.5400</b>	<b>5.1552</b>	5.4950	6.7000	2.1296	3.6666
Dec/1999	9.6400	5.2552	5.4950	6.7000	2.1296	3.6666
Jan/2000	9.6400	5.2552	5.4950	6.7000	2.1296	3.6666
Feb/2000	9.6400	5.2552	5.4950	6.7000	2.1296	3.6666
Mar/2000	9.6400	5.2552	5.4950	6.7000	2.1296	3.6666

Apr/2000	9.6400	5.2552	5.4950	6.7000	2.1296	3.6666
May/2000	9.6400	5.2552	5.4950	6.7000	2.1296	3.6666
Jun/2000	9.6400	5.2552	5.4950	6.7000	2.1296	3.6666
Jul/2000	9.6400	5.2552	5.4950	6.7000	2.1296	3.6666
Aug/2000	9.6400	5.2552	5.4950	6.7000	2.1296	3.6666
Sep/2000	9.6400	5.2552	5.4950	6.7000	2.1296	3.6666
Oct/2000	9.6400	5.2552	5.4950	6.7000	2.1296	3.6666
Nov/2000	9.6400	5.2552	5.4950	6.7000	2.1296	3.6666
Dec/2000	9.6400	5.2552	5.4950	6.7000	2.1296	3.6666
Jan/2001	9.6400	5.2552	5.4950	6.7000	2.1296	3.6666
Feb/2001	9.6400	5.2552	5.4950	6.7000	2.1296	3.6666
Mar/2001	9.6400	5.2552	5.4950	6.7000	2.1296	3.6666
Apr/2001	<b>12.8900</b>	<b>5.3385</b>	5.4950	<b>8.9667</b>	<b>2.9629</b>	3.6666
May/2001	13.5400	5.3552	5.4950	9.4200	3.1296	3.6666
Jun/2001	13.5400	5.3552	5.4950	9.4200	3.1296	3.6666
Jul/2001	13.5400	5.3552	5.4950	9.4200	3.1296	3.6666
Aug/2001	13.5400	5.3552	5.4950	9.4200	3.1296	3.6666
Sep/2001	13.5400	5.3552	5.4950	9.4200	3.1296	3.6666
Oct/2001	13.5400	5.3552	5.4950	9.4200	3.1296	3.6666
Nov/2001	<b>15.9567</b>	<b>6.8052</b>	5.4950	<b>11.8367</b>	<b>4.5796</b>	3.6666
Dec/2001	16.0400	6.8552	5.4950	11.9200	4.6296	3.6666
Jan/2002	16.0400	6.8552	5.4950	11.9200	4.6296	3.6666
Feb/2002	16.0400	6.8552	5.4950	11.9200	4.6296	3.6666
Mar/2002	16.0400	6.8552	5.4950	11.9200	4.6296	3.6666
Apr/2002	<b>20.3733</b>	6.8552	5.4950	<b>18.0387</b>	4.6296	3.6666
May/2002	21.0400	6.8552	5.4950	18.9800	4.6296	3.6666
Jun/2002	21.0400	<b>8.3719</b>	5.4950	18.9800	<b>5.7129</b>	3.6666
Jul/2002	21.0400	10.3552	5.4950	18.9800	7.1296	3.6666
Aug/2002	21.0400	10.3552	5.4950	18.9800	7.1296	3.6666
Sep/2002	21.0400	10.3552	5.4950	18.9800	7.1296	3.6666
Oct/2002	21.0400	10.3552	5.4950	18.9800	7.1296	3.6666
Nov/2002	21.0400	10.3552	5.4950	18.9800	7.1296	3.6666
Dec/2002	21.0400	10.3552	5.4950	18.9800	7.1296	3.6666
Jan/2003	<b>24.7497</b>	10.3552	5.4950	<b>22.3187</b>	7.1296	3.6666
Feb/2003	26.0400	10.3552	5.4950	23.4800	7.1296	3.6666
Mar/2003	26.0400	10.3552	5.4950	23.4800	7.1296	3.6666
Apr/2003	26.0400	10.3552	5.4950	23.4800	7.1296	3.6666
May/2003	26.0400	10.3552	5.4950	23.4800	7.1296	3.6666
Jun/2003	26.0400	10.3552	5.4950	23.4800	7.1296	3.6666
Jul/2003	26.0400	0.0000	15.8502	23.4800	0.0000	10.7962
Aug/2003	26.0400	0.0000	15.8502	23.4800	0.0000	10.7962
Sep/2003	26.0400	0.0000	15.8502	23.4800	0.0000	10.7962
Oct/2003	26.0400	0.0000	15.8502	23.4800	0.0000	10.7962
Nov/2003	26.0400	0.0000	15.8502	23.4800	0.0000	10.7962
Dec/2003	26.0400	0.0000	15.8502	23.4800	0.0000	10.7962
Jan/2004	26.0400	0.0000	15.8502	23.4800	0.0000	10.7962
Feb/2004	26.0400	0.0000	15.8502	23.4800	0.0000	10.7962
Mar/2004	<b>28.4594</b>	0.0000	15.8502	<b>25.6671</b>	0.0000	10.7962
Apr/2004	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
May/2004	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962

Jun/2004	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Jul/2004	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Aug/2004	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Sep/2004	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Oct/2004	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Nov/2004	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Dec/2004	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Jan/2005	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Feb/2005	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Mar/2005	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Apr/2005	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
May/2005	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Jun/2005	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Jul/2005	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Aug/2005	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Sep/2005	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Oct/2005	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Nov/2005	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Dec/2005	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Jan/2006	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Feb/2006	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Mar/2006	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Apr/2006	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
May/2006	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Jun/2006	31.0400	0.0000	15.8502	28.0000	0.0000	10.7962
Jul/2006	31.0400	0.0000	16.4100	28.0000	0.0000	11.1800
Aug/2006	31.0400	0.0000	16.4100	28.0000	0.0000	11.1800
Sep/2006	31.0400	0.0000	16.4100	28.0000	0.0000	11.1800
Oct/2006	31.0400	0.0000	16.4100	28.0000	0.0000	11.1800
Nov/2006	31.0400	0.0000	16.4100	28.0000	0.0000	11.1800
Dec/2006	31.0400	0.0000	16.4100	28.0000	0.0000	11.1800
Jan/2007	31.0400	0.0000	16.4100	28.0000	0.0000	11.1800
Feb/2007	31.0400	0.0000	16.4100	28.0000	0.0000	11.1800
Mar/2007	31.5561	0.0000	16.4100	28.5161	0.0000	11.1800
Apr/2007	33.0400	0.0000	16.4100	30.0000	0.0000	11.1800
May/2007	33.0400	0.0000	16.4100	30.0000	0.0000	11.1800
Jun/2007	33.0400	0.0000	16.4100	30.0000	0.0000	11.1800

**Source:** Government of Canada, Department of Finance (personal communication, 2007). Data disclaimer: Best efforts have been made to ensure the accuracy of this data, although this information should not be considered authoritative for citation purposes. Reference should be made to the enabling statute if authoritative data from an official source is required.

## **APPENDIX B: SUMMARY OF NOVA SCOTIA'S SMOKE-FREE PLACES LEGISLATION**

### **Smoke-free Public Places Act 2003**

Bans workplace smoking and employers are not to permit workplace smoking

Prohibits smoking in: a daycare or pre-school; a school, community college or university; a library, art gallery or museum; a health-care facility; grounds of a school; a cinema or theatre; a video arcade or pool hall; a recreational facility (such as a bowling alley, fitness centre, gymnasium, pool or rink); a multi-service centre, community centre or hall, arena, fire hall or church hall; a meeting or conference room or hall, ballroom or conference centre; a retail shop, boutique, market or store or shopping mall; a laundromat; a ferry, ferry terminal, bus, bus station or shelter, taxi, taxi shelter, limousine or vehicle carrying passengers for hire; the common area of a commercial building or multi-unit residential building; offices of the Government of the Province, a municipality, a village or a school board, or any agency thereof; a provincial jail, prison, detention centre, lock-up or reformatory or another provincial penal institution; or any building or facility designated by the regulations.

Prohibits smoking in an outdoor area within four metres of an intake for a building ventilation system, an open window of a place of employment or an entrance to a place of employment.

The Act:

- Amends the Workers' Compensation Act to compensate non-smoking workers with lung cancer exposed to environmental tobacco smoke for 20 years or more; and
- Does not affect the rights of aboriginal people respecting traditional aboriginal spiritual or cultural practices or ceremonies

### **Smoke-free Public Places Act Amendment 2006**

Smoking not permitted in all indoor workplaces and public places, including restaurants/lounges and beverage rooms/private clubs/cabarets/ bingos and casinos and on outdoor areas of restaurants/lounges and beverage rooms/private clubs/cabarets/bingos and casinos if that area is used for serving or consumption of food or beverages

Smoking is not permitted in designated smoking rooms except in long-term care facilities, where designated smoking rooms for the use by only residents (and not staff) are still permitted.

Ashtrays are not allowed where smoking is not permitted.

**Municipalities with 100 % Smoke-Free Public Places By-laws**

<b>Municipality</b>	<b>By-law Effective Date</b>
Town of Wolfville	January 2002
Town of Berwick	April 2002
Municipality of the County of Inverness	January 2003
Municipality of the County of Richmond	January 2003
Municipality of the County of Victoria	January 2003
Town of New Glasgow	January 2003
Town of Port Hawkesbury	February 2003
Town of Mulgrave	February 2003
Municipality of the County of Antigonish	April 2003
County of Antigonish	May 2003
Cape Breton Regional Municipality	Phased in over 3 years ending in July 2003
Halifax Regional Municipality	To be fully implemented January 2008

Source: Smoke-Free Nova Scotia [online] Available at: [www.smokefreens.ca](http://www.smokefreens.ca). Accessed June 2007.



## APPENDIX C: MORTALITY, SMOKING-RELATED DISEASES, RR AND SAF TABLES

**Table 1: Mortality Data for Nova Scotia (2003)**

CAUSE OF DEATH	Male	Female
Malignant neoplasms of lip, oral cavity and pharynx	26	9
Malignant neoplasm of oesophagus	36	15
Malignant neoplasm of stomach	42	25
Malignant neoplasm of pancreas	73	50
Malignant neoplasm of larynx	15	0
Malignant neoplasms of trachea, bronchus and lung	400	277
Malignant neoplasms of kidney and renal pelvis	30	15
Malignant neoplasm of bladder	35	18
Acute rheumatic fever and chronic rheumatic heart diseases	7	19
Hypertensive heart disease	7	91
Hypertensive heart and renal disease	1	1365
Ischaemic heart diseases	794	6
Acute myocardial infarction	389	23
Other acute ischaemic heart diseases	3	4
Other forms of chronic ischaemic heart disease	402	635
Atherosclerotic cardiovascular disease, so described	7	269
All other forms of chronic ischaemic heart disease	395	5
Other heart diseases	219	361
Acute and subacute endocarditis	3	8
Diseases of pericardium and acute myocarditis	1	353
Heart failure	73	269
All other forms of heart disease	142	0
Essential (primary) hypertension and hypertensive renal disease	23	6
Cerebrovascular diseases	227	129
Atherosclerosis	18	134
Other diseases of circulatory system	83	41
Aortic aneurysm and dissection	51	322
Other diseases of arteries, arterioles and capillaries	32	15
Other disorders of circulatory system	7	50
Other acute lower respiratory infections	3	29
		21

Acute bronchitis and bronchiolitis	2	Other disorders of circulatory system	10
Unspecified acute lower respiratory infection	1	Other acute lower respiratory infections	3
Chronic lower respiratory diseases	212	Acute bronchitis and bronchiolitis	3
		Unspecified acute lower respiratory infection	0
Bronchitis, chronic and unspecified	4	Chronic lower respiratory diseases	174
Emphysema	7	Bronchitis, chronic and unspecified	2
Asthma	4	Emphysema	6
Other chronic lower respiratory diseases	197	Asthma	9
		Other chronic lower respiratory diseases	157

Source: Statistics Canada. (2003) *Mortality, Summary List of Causes*, Table84F0209XWE, Table 1-4 “Deaths by selected grouped causes, sex and geography — Nova Scotia.” [online] Available at: [www.statcan.ca/english/freepub/84F0209XIE](http://www.statcan.ca/english/freepub/84F0209XIE). Accessed August 2007.

**Table 2: US CDC Disease Classifications of Smoking-Related Diseases**

Disease Category	ICD-10	ICD-9	Comparability Ratio
<b>Malignant Neoplasm</b>			
Lip, Oral Cavity, Pharynx	C00–C14	140–149	0.960
Oesophagus	C15	150	0.997
Stomach	C16	151	1.006
Pancreas	C25	157	0.998
Larynx	C32	161	1.005
Trachea, Lung, Bronchus	C33–C34	162	0.984
Cervix Uteri	C53	180	0.987
Kidney and Renal Pelvis	C64–C65	189	1.000
Urinary Bladder	C67	188	0.997
Acute Myeloid Leukemia	C92.0	205	1.012
<b>Cardiovascular Diseases</b>			
Ischemic Heart Disease	I20–I25	410–414, 429.2	0.999
Other Heart Disease	I00–I09, I26–I51	390–398, 415–417, 420–429.1, 429.3–429.9	0.969
Cerebrovascular Disease	I60–I69	430–438	1.059
Atherosclerosis	I70	440	0.964
Aortic Aneurysm	I71	441	1.001
Other Arterial Disease	I72–I78	442–448	0.850
<b>Respiratory Diseases</b>			
Pneumonia, Influenza	J10–J18	480–487	0.698
Bronchitis, Emphysema	J40–J42, J43	490–492	0.894
Chronic Airway Obstruction	J44	496	1.097

Source: US CDC [online] Available at: [www.cdc.gov/nchs/about/major/dvs/icd10des.htm](http://www.cdc.gov/nchs/about/major/dvs/icd10des.htm).

Note: This table provides a list of diseases known to be attributable to smoking. The ICD is revised periodically to incorporate changes in the medical field. To date, there have been 10 revisions of the ICD. The information included in the table above are the 9<sup>th</sup> and 10<sup>th</sup> revisions, which reflect changes from 1979–1998 and 1999–present, respectively. The comparability ratios between the two sets of data are similar and included above.

**Table 3: Relative Risk Values for Selected Diseases (NS Female)**

Disease Category	<b>Female</b>	
	Current Smoker	Former Smoker
<b>Malignant Neoplasm</b>		
Lip, Oral Cavity, Pharynx	5.08	2.29
Esophagus	7.75	2.79
Stomach	1.36	1.32
Pancreas	2.25	1.55
Larynx	13.02	5.16
Trachea, Lung, Bronchus	12.69	4.53
Cervix Uteri	1.59	1.14
Kidney and Renal Pelvis	1.29	1.05
Urinary Bladder	2.22	1.89
Acute Myeloid Leukemia	1.13	1.38
<b>Cardiovascular Diseases</b>		
Ischemic Heart Disease		
Persons Aged 35–64	3.08	1.32
Persons Aged 65+	1.60	1.20
Other Heart Disease	1.49	1.14
Cerebrovascular Disease		
Persons Aged 35–64	4.00	1.30
Persons Aged 65+	1.49	1.03
Atherosclerosis	1.83	1.00
Aortic Aneurysm	7.07	2.07
Other Arterial Disease	2.17	1.12
<b>Respiratory Diseases</b>		
Pneumonia, Influenza	2.17	1.10
Bronchitis, Emphysema	12.04	11.77
Chronic Airway Obstruction	13.08	6.78

Source: US CDC Relative Risk Data, CPS–II (82–88) Unpublished estimates provided by American Cancer Society (ACS). See Thun M., Day-Lally, C., Myers D., *et al.* Trends in tobacco smoking and mortality from cigarette use in Cancer Prevention Studies I (1959 through 1965) and II (1982 through 1988). In: *Changes in cigarette-related disease risks and their implication for prevention and control*. Smoking and Tobacco Control Monograph 8. Bethesda, MD: US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute 1997; 305–382. NIH Publication no. 97–1213.

**Table 4: Relative Risk Values for Selected Diseases (NS Male)**

Disease Category	Male	
	Current Smoker	Former Smoker
<b>Malignant Neoplasms</b>		
Lip, Oral Cavity, Pharynx	10.89	3.40
Esophagus	6.76	4.46
Stomach	1.96	1.47
Pancreas	2.31	1.15
Larynx	14.6	6.34
Trachea, Lung, Bronchus	23.26	8.70
Kidney and Renal Pelvis	2.72	1.73
Urinary Bladder	3.27	2.09
Acute Myeloid Leukemia	1.86	1.33
<b>Cardiovascular Diseases</b>		
<i>Ischemic Heart Disease</i>		
Persons Aged 35–64	2.80	1.64
Persons Aged 65+	1.51	1.21
Other Heart Disease	1.78	1.22
<i>Cerebrovascular Disease</i>		
Persons Aged 35–64	3.27	1.04
Persons Aged 65+	1.63	1.04
Atherosclerosis	2.44	1.33
Aortic Aneurysm	6.21	3.07
Other Arterial Disease	2.07	1.01
<b>Respiratory Diseases</b>		
Pneumonia, Influenza	1.75	1.36
Bronchitis, Emphysema	17.1	15.64
Chronic Airway Obstruction	10.58	6.8

Source: US CDC Relative Risk Data, CPS–II (82–88) Unpublished estimates provided by American Cancer Society (ACS). See Thun M., Day-Lally C., Myers, D., *et al.* Trends in tobacco smoking and mortality from cigarette use in Cancer Prevention Studies I (1959 through 1965) and II (1982 through 1988). In: *Changes in cigarette-related disease risks and their implication for prevention and control*. Smoking and Tobacco Control Monograph 8. Bethesda, MD: US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute 1997; 305–382. NIH Publication no. 97–1213

**Table 5: Smoking-attributable Fractions in Nova Scotia, 2005**

Adult Diseases (35+ years of age)		
Disease Category	SAF Female	SAF Male
<b>Malignant Neoplasm</b>		
Lip, Oral Cavity, Pharynx	0.586	0.787
Oesophagus	0.686	0.773
Stomach	0.177	0.335
Pancreas	0.334	0.279
Larynx	0.812	0.864
Trachea, Lung, Bronchus	0.799	0.907
Cervix Uteri	0.155	n.a.
Kidney and Renal Pelvis	0.076	0.455
Urinary Bladder	0.392	0.541
Acute Myeloid Leukemia	0.163	0.283
<b>Cardiovascular Diseases</b>		
Ischemic Heart Disease		
Persons Aged 35–64	0.364	0.443
Persons Aged 65+	0.175	0.196
Other Heart Disease	0.140	0.237
Cerebrovascular Disease		
Persons Aged 35–64	0.430	0.349
Persons Aged 65+	0.103	0.143
Atherosclerosis	0.147	0.345
Aortic Aneurysm	0.634	0.709
Other Arterial Disease	0.228	0.198
<b>Respiratory Diseases</b>		
Pneumonia, Influenza	0.223	0.280
Bronchitis, Emphysema	0.875	0.926
Chronic Airway Obstruction	0.835	0.851



## APPENDIX D: DATA LIMITATIONS

### *Smoking-attributable Deaths*

The methodology used to calculate smoking-attributable deaths has limitations. The attributable-fraction (AF) methodology calculates smoking-attributable deaths using smoking prevalence and number of deaths for the given year. However, most smoking-attributable deaths are the result of smoking in previous decades, during which smoking rates may have been higher or lower. During periods where smoking prevalence is declining, the AF methodology will tend to understate the number of deaths caused by smoking. Conversely, when smoking prevalence is increasing, the AF formula may overstate the number of deaths caused by smoking. Nova Scotia currently finds itself in the former state. Therefore calculations done by studies over the next several years will continue to underestimate the true smoking-attributable deaths.

Certainly, a limiting factor for most diagnoses related to smoking is the fact that age-specific measures of relative risks (RR) are unavailable. However, for most diagnoses, the RRs associated with smoking remain stable across age categories. That is to say, for most diagnoses, tobacco users have a relatively constant increased rate of death regardless of age. Thus, for such diagnoses, applying a single SAF estimate to all age categories is not problematic. However, where this is not the case separate RRs have been calculated by the ACS. For example, the RRs for death from ischemic heart disease and cerebrovascular disease decline substantially after the age of 65. In this work as well as most of the major studies on the economic costs of tobacco and smoking, separate SAMs are calculated for the two age groups.

The data for this report are as recent and reliable as possible. While current from this perspective, this in fact presents a significant challenge in this field of study. Since data are constantly forthcoming and are being obtained from different sources over slightly different time intervals, a certain amount of homogeneity is missing. As researchers and policy makers move forward and attempt to track progress, certain data sets are kept and others are modified. New surveys are taken and older ones are shelved. This can present significant problems for the statistician.

For instance, The Centers for Disease Control and Prevention has issued an updated disease classification system which is denoted ICD-10. For the most part the disease categories match very closely to the “old” classification of ICD-9. The relative risk categories are those of ICD-9 while mortality is categorized via the ICD-10. The latest edition of the *Economic Burden of Illness in Canada* (EBIC) data used for this study is also ICD-9. Although these disease codes do not match exactly, comparability ratios of diseases would suggest the two systems are very similar and for the purposes of this study are very adequate. Appendix B provides the comparability ratios as calculated by the National Center for Health Statistics of the Centers for Disease Control and Prevention. This work was completed in 1999 after the release of the ICD-10 nearly doubled the diagnostic categories and made comparisons over time very challenging.

## APPENDIX E: INDIRECT COST CALCULATIONS

### Canada-wide to Nova Scotia Costs, \$2002

	Canada (\$2002 million)	Nova Scotia estimates (millions)
<b>Total Direct Costs (Tobacco)</b>	<b>\$4,525.30</b>	<b>\$175.60</b>
<b>Indirect/direct ratio</b> (12470.9/4525.3)	<b>2.80</b>	
<b>Total Indirect Costs (Tobacco)</b>	<b>\$12,470.90</b>	<b>\$491.70</b>
<i>Long-term disability</i>	\$10,536.80	\$415.40
<i>Short-term disability (days in bed)</i>	\$24.40	\$0.96
<i>Short-term disability (days of reduced activity)</i>	\$36.20	\$1.43
<i>Premature mortality</i>	\$1,873.50	\$73.90

Sources: Canada-wide data: Rehm *et al* (2006), CCSA, Table 16, page 101; Nova Scotia Direct Cost estimate from current report.

## APPENDIX F: ECONOMIC COST LITERATURE GUIDE

**Cost of Illness (COI):** measures all costs associated with a specific disease, including direct, indirect and intangible costs.

**Cost-Effectiveness Analysis (CEA):** compares at least two interventions or programs with a common health outcome. Assesses the efficiency of spending relative to effectiveness.  
Limitation: it is hard to compare interventions with different clinical outcomes or effects

**Cost Minimalization Analysis (CMA):** Similar to CEA, but a measure of health outcome is not selected and only program costs are compared. Programs are assumed to be equally as effective and thus only costs are compared.

**Cost Utility Analysis (CUA):** an adaptation of CEA, provides information on costs per health effect gained. Health effect gained is measured by a standard measure such as quality-adjusted life year (QALY), disability-adjusted life year (DALY). CEA and CUA calculate cost the same way. CUA is helpful as it provides standardized outcomes.

**Cost-Benefit Analysis (CBA):** measures costs and benefits, usually in monetary terms, so that diverse interventions can be compared.<sup>223</sup>

**Cost-Utility Analysis (CUA) criteria:** how to judge if a program is effective?

Assessments of cost-utility can be judged using these five levels:<sup>224</sup>

Grade A – Intervention is both more effective and cheaper than the existing one

Grade B – Intervention is more effective and costs less than \$20,000 per QALY

Grade C – Intervention is more effective and costs between \$20,000 and \$100,000 per QALY

Grade D – Intervention is more effective and costs more than \$100,000 per QALY

Grade E – Intervention is less or equally effective but costs more than the existing one

Interventions that cost less than \$10,000 per QALY are considered highly cost effective.

---

<sup>223</sup> See International Development Research Centre. (2003). *At What Cost? The Economic Impact of Tobacco Use on National Health Systems, Societies, and Individuals*. Research for International Tobacco Control (RITC) monograph series 1. [online] Available at: [www.idrc.ca/es/ev-105942-201-1-DO\\_TOPIC.html](http://www.idrc.ca/es/ev-105942-201-1-DO_TOPIC.html).

<sup>224</sup> Laupacis A, Feeny, D., Detsky, A. and Tugwell, P. (1992). How attractive does a new technology have to be to warrant adoption and utilization? Tentative guidelines for using clinical and economic evaluations. *Canadian Medical Association Journal*, Vol. 146(4), p 473-81.

## BIBLIOGRAPHY OF WORKS CITED

Adams, E., Miller, V., Ernst, C., Nishimura, B., Melvin, C. and Merritt, R. (2002). Neonatal health care costs related to smoking during pregnancy. *Health Economics*, April, Vol. 11 (3), p. 193-206.

Ahmad, S. (2005). Increasing excise taxes on cigarettes in California: a dynamic simulation of health and economic impacts. *Preventive Medicine* July, Vol. 41 (1), p. 276 – 83.

Barnoya, J. and Glantz, S. (2004). Association of the California tobacco control program with declines in lung cancer incidence. *Cancer Control*, Vol. 5, p. 689-695.

California Department of Health Services. (2006). *California Tobacco Control Update 2006: The Social Norm Change Approach*. [online] Available at: [www.dhs.ca.gov/tobacco/documents/pubs/CTCUpdate2006.pdf](http://www.dhs.ca.gov/tobacco/documents/pubs/CTCUpdate2006.pdf). Accessed May 2007.

Canadian Cancer Society. (2007). *Canadian Cancer Statistics 2007*.

Canadian Coalition for Action on Tobacco. (2004) *Enhancing Public Health and Public Revenue: Recommendations to Increase Tobacco Taxes*. [online] Available at: [www.nsra-adnf.ca/cms/file/pdf/taxreport2004.pdf](http://www.nsra-adnf.ca/cms/file/pdf/taxreport2004.pdf). Accessed May 2007.

Cancer Care Nova Scotia. (undated). *Cost of Tobacco in Your Workplace*. [online] Available at: [www.cancercare.ns.ca/media/documents/TobaccoInWorkplace.pdf](http://www.cancercare.ns.ca/media/documents/TobaccoInWorkplace.pdf). Accessed May 2007.

Castles A., Adams, E., Melvin, C., Kelsch, C. and Boulton, M. (1999). Effects of smoking during pregnancy. Five meta-analyses. *American Journal of Preventive Medicine*, Vol. 16(3), p. 208-15.

Cawley, J., Markowitz, S. and Tauras, J. (2004). Lighting up and slimming down: the effects of body weight and cigarette prices on adolescent smoking initiation. *Journal of Health Economics*, March, Vol. 23 (2), p. 293-311.

Ceraso, M., Ahrens, D. and Remington, P. (2005). Increasing tobacco taxes: an evidence-based measure to reduce tobacco use. *Wisconsin Medical Journal*, Vol. 104 (4).

Chaloupka F, and Pacula, R. (2001). The impact of price on youth tobacco use. *Changing Adolescent Smoking Prevalence*. Monograph No. 14, National Cancer Institute.

Council of Canadian Fire Marshals and Fire Commissioners. (2000). *Annual Reports of Fire Losses in Canada (1986 - 2002)* [online] Available at: [www.ccfmfc.ca/stats/stats\\_e.html](http://www.ccfmfc.ca/stats/stats_e.html).

Colman, R. (2000). *The Cost of Tobacco in Nova Scotia*. GPI Atlantic, prepared for Cancer Care Nova Scotia.

Colman, R. (2001). *The Economic Impact of Smokefree Workplaces: an Assessment for Nova Scotia*. GPI Atlantic for Tobacco Control Unit, Nova Scotia Department of Health, Committee for the National Strategy to Reduce Tobacco Use in Canada (NSTRTU). (1999). [online] Available at: [www.hc-sc.gc.ca/hl-vs/pubs/tobac-tabac/ns-sn/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/pubs/tobac-tabac/ns-sn/index_e.html). Accessed May 2007.

Conference Board of Canada. (2006). *Smoking and the Bottom Line: Updating the Costs of Smoking in the Workplace*. [online] Available at: [www.conferenceboard.ca/documents.asp?rnext=1754](http://www.conferenceboard.ca/documents.asp?rnext=1754). Accessed May 2007.

Cowling, D. *et al.* (2000). Declines in lung cancer rates: California, 1988- 1997. *Morbidity and Mortality Weekly Report*, Vol. 49, p. 066- 069.

Dalhousie University: Community Health and Epidemiology and NS Department of Health: Addiction Services. (2003). *Nova Scotia Student Drug Use 2002: Highlights Report*. [online] Available at: [www.gov.ns.ca/health/downloads/2002\\_NSDrugHighlights.pdf](http://www.gov.ns.ca/health/downloads/2002_NSDrugHighlights.pdf). Accessed May 2007.

Dewhirst, T. (2004). POP goes the power wall? Taking aim at tobacco promotional strategies utilised at retail. *Tobacco Control*, Vol. 13, p. 209-210.

Farrelly, M. *et al.* (2003). The Impact of Tobacco Control Program Expenditures on Aggregate Cigarette Sales: 1981-2000. *Journal of Health Economics*, Vol. 22, p. 843-849.

Feighery E., Ribisl, K., Clark, P. and Haladjian, H. (2003). How tobacco companies ensure prime placement of their advertising and products in stores: interviews with retailers about tobacco company incentive programmes. *Tobacco Control*, Vol. 12, p. 184-188. [online] Available at: [tc.bmjournals.com](http://tc.bmjournals.com). Accessed November 2005.

Frieden, T. and Blakeman, D. (2005). The Dirty Dozen: 12 Myths that Undermine Tobacco Control. *American Journal of Public Health*, September, Vol. 95 (9).

Gallet, C and List, J. (2003). Cigarette demand: a meta-analysis of elasticities. *Health Economics*, Vol. 12 (10), p. 821-35.

Gallogly, M. (2006). *Comprehensive Tobacco Prevention and Cessation Programs Effectively Reduce Tobacco Use*. For the Campaign for Tobacco Free Kids. [online] Available at: [tobaccofreekids.org/research/factsheets/pdf/0045.pdf](http://tobaccofreekids.org/research/factsheets/pdf/0045.pdf). Accessed June 2007.

Gavin N., Wiesen, C. and Layton, C. (2001). *Review and Meta-Analysis of the Evidence on the Impact of Smoking on Perinatal Conditions Built into SAMMEC II*. Final Report to the National Center for Chronic Disease Prevention and Health Promotion, Research Triangle Institute (RTI), RTI Project NO. 7171-010.

Goldman, L and Glantz, S. (1998). Evaluation of antismoking advertising campaigns. *Journal of the American Medical Association*, Vol. 279, p. 772-777.

Gosevitz, R. (2003). *The Duty to Protect: Eliminating Second-Hand Smoke from Public Places and Workplaces in Ontario*. OMA Position Paper, Feb 2003. [online] Available at: [www.oma.org/phealth/2ndsmoke03.pdf](http://www.oma.org/phealth/2ndsmoke03.pdf). Accessed May 2007.

Greaves, L. Cormier, R. Devries, K. and Bottorff, J. (2006). *Expecting to Quit: A Best Practice Review of Smoking Cessation Interventions for Pregnant and Postpartum Girls and Women*. CCHS, Table No 105-0457, June 2005. [online] Available at: [cansim2.statcan.ca](http://cansim2.statcan.ca).

Grimshaw, G. and Stanton, A. (2003). Tobacco cessation interventions for young people. *Cochrane Database of Systemic Reviews*, Issue 4: Art No.: CD003289. DOI: 10.1002/14651858.CD003289.pub4.

Guindon, G, Tobin, S. and Yach, D. (2002). Trends and affordability of cigarette prices: ample room for tax increases and related health gains. *Tobacco Control*, Vol. 11, p. 35–43.

Harrison, G., Feehan, J., Edwards, A. and Segovia, J. (2003). Cigarette Smoking and the Cost of Hospital and Physician Care. *Canadian Public Policy*. University of Toronto Press, March, Vol. 29 (1). [online] Available at: [ideas.repec.org/a/cpp/issued/v29y2003i1p1-19.html](http://ideas.repec.org/a/cpp/issued/v29y2003i1p1-19.html). Accessed May 2007.

Health Canada. (1999). *Federal Tobacco Control Strategy*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/about-apropos/role/federal/strateg/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/about-apropos/role/federal/strateg/index_e.html). Accessed May 2007.

Health Canada. (2002). *The Economic Burden of Illness in Canada 1998*. Policy Research Division, Strategic Policy Directorate, Population and Public Health Branch, Health Canada. [online] Available at: [www.phac-aspc.gc.ca/publicat/ebic-femc98/pdf/ebic1998.pdf](http://www.phac-aspc.gc.ca/publicat/ebic-femc98/pdf/ebic1998.pdf). Accessed April 2007.

Health Canada. (2005). *Summary of Results of the 2004-05 Youth Smoking Survey*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/survey-sondage/2004-2005/result\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/survey-sondage/2004-2005/result_e.html). Accessed May 2007.

Health Canada. (2005). *Health Effects of Smoking*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/body-corps/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/body-corps/index_e.html).

Health Canada. (2005). *Second-hand Smoke: Does it affect Health?* [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/body-corps/second/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/body-corps/second/index_e.html).

Health Canada. (2005). *Pregnancy*. [online] Available at: [www.hc-sc.gc.ca/hl-vs/tobac-tabac/body-corps/preg-gros/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/body-corps/preg-gros/index_e.html). Accessed May 2007.

Health Canada. (2006). *Canadian Tobacco Use Monitoring Survey (CTUMS), Annual Results*. [online] Available at [www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2006/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2006/index_e.html). Accessed July 2007.



Hu, T-W, Sung, H-Y. and Keeler, T. (2005). The state antismoking campaign and the industry response: The effects of advertising on cigarette consumption in California. *American Economic Review*, Vol. 85, p. 85–90.

Hyland, A., Wakefield, M., Higbee, C., Szczypka, G. and Cummings, K. (2006). Anti-tobacco television advertising and indicators of smoking cessation in adults: a cohort study. *Health Education Research*, Vol. 21(2), p. 296-302.

Hyland A, *et al.* (2006). State and Community Tobacco-Control Programs and Smoking – Cessation Rates Among Adult Smokers: What Can We Learn From the COMMIT Intervention Cohort? *American Journal of Health Promotion*, March, Vol. 20 (4) p. 272–281.

Johnson, J. *et al.* (2005). Reimbursement for smoking cessation treatment may double the abstinence rate: results of a randomized control trial. *Addiction* July, Vol. 100 (7), p. 1012–20.

Kelsey *et al.* (1996). *Methods in Observational Epidemiology*.

Kirkland, S., Dodds, L. and Brosky, G. (2000). The natural history of smoking during pregnancy among women in Nova Scotia. *Canadian Medical Journal*, August, Vol. 163 (3), p. 281-282.

Krueger, H. (2005). *Resources for Health: A Cost-Effective Risk Factor Plan for British Columbia*, Prepared for the Health BC Healthy Living Alliance. [online] Available at: [www.BChealthyliving.ca/resources/documents/risk\\_factor\\_business\\_plan.pdf](http://www.BChealthyliving.ca/resources/documents/risk_factor_business_plan.pdf). Accessed May 2007.

Krueger, H. (2005) *Risk Factor Interventions: An Overview of their Effectiveness*. Prepared for the BC Healthy Living Alliance. [online] Available at: [www.BChealthyliving.ca/resources/documents/risk\\_factor\\_effective\\_interventions\\_BCHLA.pdf](http://www.BChealthyliving.ca/resources/documents/risk_factor_effective_interventions_BCHLA.pdf). Accessed May 2007.

Lavack, A. (2001). *Tobacco Industry Denormalization Campaigns: A Review and Recommendations*. Health Canada. [online] Available at: [www.hc-sc.gc.ca/hl-vs/pubs/tobac-tabac/media/tidc-cdit\\_e.html](http://www.hc-sc.gc.ca/hl-vs/pubs/tobac-tabac/media/tidc-cdit_e.html). Accessed October 2005.

Lavack A. and Toth, G. (2006). Tobacco point-of-purchase promotion: examining tobacco industry documents. *Tobacco Control*, Vol. 15, p.377-384.

Levin, M. (1953). The occurrence of lung cancer in man. *Acta Unio Internationalis Contra Cancrum*, Vol. 19, p. 531–541.

Liang, L. (2003). *The Impact of Physician Intervention and Tobacco Control Policies on Average Daily Cigarette Consumption Among Adult Smokers*. NBER Working Papers 9790, National Bureau of Economic Research, Inc.

Lilienfeld A and Lilienfeld, D. (1980). *Foundations of epidemiology*. 2<sup>nd</sup> ed. Nueva York: Oxford University Press.



Luk, R., Ferrence, R. and Gmel, G. (2006). The economic impact of a smoke-free by-law on restaurant and bar sales in Ottawa, Canada. *Addiction*, May, Vol. 101 (5), p. 738–45.

Mahood, G. (2004). *Tobacco Industry denormalization: Telling the truth about the tobacco industry's role in the tobacco epidemic*. Non-smokers Rights Association.

Makomaski Illing, E. and Kaiserman, M. (1999). Mortality attributable to tobacco use in Canada and its regions. *Chronic Diseases in Canada*, Vol. 20 (3), p.111-117.

Makomaski Illing E. and Kaiserman, M. (2004). Mortality attributable to tobacco use in Canada and its regions. *Canadian Journal of Public Health*, Vol. 95(1), p. 39.

Markowitz, S. and Tauras, J. (2006). *Even For Teenagers, Money Does Not Grow on Trees: Teenage Substance Use and Budget Constraints*. NBER Working Papers 12300, National Bureau of Economic Research, Inc.

Markowitz, S. and Tauras, J. (2004). Lighting up and slimming down: the effects of body weight and cigarette prices on adolescent smoking initiation. *Journal of Health Economics*, Vol. 23(2), p. 293-311.

Max W, Rice, D., Zhang, X. and Miller, L. (2004). The economic burden of smoking in California. *Tobacco Control*, Vol. 13, p. 264-67.

McVey, D. and Stapleton, J. (2000). Can anti-smoking television advertising affect smoking behaviour? Controlled trial of the Health Education Authority for England's anti-smoking TV campaign. *Tobacco Control*, Vol. 9, p. 273-282.

Millet, T., Rauh, V. Glied, S., Hattis, D., Rundle, A., Andrews, H. and Perera, F. (2006). The economic impact of early life environmental tobacco smoke exposure: early intervention for developmental delay. *Environmental Health Perspectives*, October, Vol. 114 (10), p.1585–8.

Nova Scotia Department of Finance and Statistics. (2006). *Nova Scotia at a Glance: 2006*, [online] Available at: [www.gov.ns.ca/finance/publish/FACTS/2006/NS-At-A-Glance.PDF](http://www.gov.ns.ca/finance/publish/FACTS/2006/NS-At-A-Glance.PDF). Accessed May 2007.

Nova Scotia Department of Finance. (2005). *Nova Scotia Employment Statistics*. [online] Available at: [www.gov.ns.ca/finance/communitycounts](http://www.gov.ns.ca/finance/communitycounts). Accessed May 2007.

Nova Scotia Department of Finance (2005). [online] Available at: [www.gov.ns.ca/finance/statistics/agency/index.asp](http://www.gov.ns.ca/finance/statistics/agency/index.asp). Accessed May 2007

Nova Scotia Department of Health. (2001). *A Comprehensive Tobacco Strategy for Nova Scotia*.

Nova Scotia Department of Health. (2006). *Nova Scotia Mortality Rates for Selected Causes*. Prepared by the Information Analysis and Reporting Division: Information Management Branch,

Nova Scotia Department of Health, data from Statistics Canada. [online] Available at: [www.gov.ns.ca/health/downloads/NS\\_Mortality\\_rate\\_95\\_04.pdf](http://www.gov.ns.ca/health/downloads/NS_Mortality_rate_95_04.pdf). Accessed June 2007.

Nova Scotia Department of Health Promotion and Protection. (2006). *Nova Scotia Tobacco Control Strategy Evaluation*. Pyra Management Consulting Services. [online] Available at: [www.gov.ns.ca/hpp/repPub/TC/NS-Tobacco-Control-Strategy-Evaluation.pdf](http://www.gov.ns.ca/hpp/repPub/TC/NS-Tobacco-Control-Strategy-Evaluation.pdf). Accessed May 2007.

Oster, G., Colditz, G. and Kelly, N. (1984). *The Economic Costs of Smoking and Benefits of Quitting*, Lexington Books, D.C. Heath and Company, Lexington, Massachusetts and Toronto.

Peto, R., Darby, S., Silcocks, P., Whitely, E. and Doll, R. (2000). Smoking, Smoking Cessation, and Lung Cancer in the UK since 1950: Combination of national statistics with two case-control studies. *British Medical Journal*, August, Vol. 321 (7527), p. 323-329.

Quebec Coalition for Tobacco Control. (2004), *Update on Smoking Costs to Society*.

Rehm, J. *et al.* (2004). *The Costs of Substance Abuse in Canada: 2002 Highlights*. Canadian Centre on Substance Abuse. [online] Available at: [www.ccsa.ca/CCSA/EN/Publications](http://www.ccsa.ca/CCSA/EN/Publications). Accessed April 2007.

Rehm, J. *et al.* (2006). *The Cost of Substance Abuse in Canada 2002*. Canadian Centre on Substance Abuse.

Rehm, J. *et al.* (2006). *The Costs of Substance Abuse in Canada 2002*, Table D-HC-S-9, p2. Canadian Centre on Substance Abuse.

Ross, H. and Chaloupka, F. (2003). The effect of cigarette prices on youth smoking. *Health Economics*, Vol. 12, p. 217-30.

Saffer, R. and Chaloupka, F. (2000). Tobacco Advertising: Economic Theory and International Evidence. *National Bureau of Economic Research*, NBER Working Papers 6958.

Silcocks, E. and Doll, R. (2000). Smoking, Smoking Cessation, and Lung Cancer in the UK since 1950: Combination of national statistics with two case-control studies. *British Medical Journal*, Vol. 321 (7527), p. 323-329.

Shopland, D. (1995). Environmental Health Issues. *Environmental Health Perspectives*, Vol. 103 (Suppl 8).

Smoking and Health Action Foundation. (2006). *Cigarette Prices in Canada*. [online] Available at [www.nsra-adnf.ca](http://www.nsra-adnf.ca). Accessed May 2007.

Snider, J. (2007). *The Last Remaining Smokers in Nova Scotia*. Health Canada, Office of Research, Surveillance and Evaluation Healthy Environments and Consumer Safety Branch, PowerPoint presented to CHPNA 2007.

Statistics Canada. (2003) *Mortality, Summary List of Causes*, Table84F0209XWE, Table 1-4 “Deaths by selected grouped causes, sex and geography — Nova Scotia.” [online] Available at: [www.statcan.ca/english/freepub/84F0209XIE](http://www.statcan.ca/english/freepub/84F0209XIE). Accessed August 2007.

Statistics Canada. (2000/01). *Canadian Community Health Survey (Cycle 1.1)*. CANSIM Table no. 105-0027. [online] Available at: [cansim2.statcan.ca/cgi-win/cnsmcgi.pgm](http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm). Accessed June 2007.

Statistics Canada. (2003). *Canadian Community Health Survey (Cycle 2.1)*. CANSIM Table no. 105-0227. [online] Available at: [cansim2.statcan.ca/cgi-win/cnsmcgi.pgm](http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm). Accessed June 2007.

Statistics Canada. (2005). *Canadian Community Health Survey (Cycle 3.1)*. CANSIM Table no. 105-0456, 105-0457, 105-0327. [online] Available at: [cansim2.statcan.ca/cgi-win/cnsmcgi.pgm](http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm). Accessed June 2007.

Statistics Canada. (2005) *Health Regions in Canada*,. [online] Available at: [www.statcan.ca/english/freepub/82-221-XIE/2005001/regionstable1.htm](http://www.statcan.ca/english/freepub/82-221-XIE/2005001/regionstable1.htm). Accessed June 2007.

Statistics Canada. (2006) *Smoking and Diabetes Care: Results from the CCHS Cycle 3.1* (2005). [online] Available at: [www.statcan.ca/english/research/82-621-XIE/82-621-XIE2006002.pdf](http://www.statcan.ca/english/research/82-621-XIE/82-621-XIE2006002.pdf). Accessed June 2007.

Statistics Canada. (2007) *Labour Force Historical Review 2006*. Catalogue no. 71F0004XCB

Statistics Canada. (2007) *Consumer Price Index*, Catalogue Number 62-001-X1B. [online] Available at: [www.statcan.ca/english/freepub/62-001-XIB/62-001-XIB2007004.pdf](http://www.statcan.ca/english/freepub/62-001-XIB/62-001-XIB2007004.pdf). Accessed May 2007.

Statistics Canada. (2007) *Health Reports*, Vol. 18, no. 3. Catalogue no. 82-003.

Stanley, S. (2006). Business as usual for smoke-free places. *Bulletin of the World Health Organization*, Vol. 84 (12).

Stead, L., Perera, R. and Lancaster, T. (2006). Telephone counselling for smoking cessation. *Cochrane Database of Systematic Reviews*, Issue 3. Art. No.: CD002850. DOI: 10.1002/14651858.CD002850.pub2.

Stephens, T., Kaiserman, M. McCall, D. and Sutherland-Brown, C. (2000). School-based Smoking Prevention: Economic Costs versus Benefits. *Chronic Diseases in Canada*, Vol. 21 (2).

Stephens, T., Pederson, L. Koval, J. and Kim, C. (1997). The Relationship of Cigarette Prices and No-Smoking By-laws to the Prevalence of Smoking in Canada, *American Journal of Public Health*, Vol. 87, p. 1519–1521.

Sugarman, S. (2003). A balanced tobacco control policy. *American Journal of Public Health*, March, Vol. 93 (3), p. 416 – 418.

Taurus *et al.* (2005). State tobacco control spending and youth smoking. *American Journal of Public Health*, Vol. 95 (2). [online] Available at: [www.rwjf.org/files/research/Taurus%20-%20Youth%20Smoking%201-26-05.pdf](http://www.rwjf.org/files/research/Taurus%20-%20Youth%20Smoking%201-26-05.pdf). Accessed June 2007.

Thompson, F. (2004) *Tax policy to address tobacco market failures*. Non-Smoker's Rights Association. [online] Available at: [www.nsra-adnf.ca/cms/file/pdf/F.T.taxpolicypaper31.03.04.pdf](http://www.nsra-adnf.ca/cms/file/pdf/F.T.taxpolicypaper31.03.04.pdf). Accessed June 2007.

Thun, M. and da Costa e Silva, V. (2003). Introduction and Overview of Global Tobacco Surveillance, in Shafey, O., Dolwick, S. and Guindon, G. (eds) *Tobacco Control Country Profiles*, 2nd ed, p. 7-8. [online] Available at: [www.who.int/tobacco/global\\_data/country\\_profiles/Introduction.pdf](http://www.who.int/tobacco/global_data/country_profiles/Introduction.pdf). Accessed May 2007.

Thun M., Day-Lally, C. and Myers, D. *et al.* (1997). Trends in tobacco smoking and mortality from cigarette use in Cancer Prevention Studies I (1959 through 1965) and II (1982 through 1988). In *Changes in cigarette-related disease risks and their implication for prevention and control*. Smoking and Tobacco Control Monograph 8. Bethesda, MD: US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute 1997; 305–382. NIH Publication no. 97–1213

Toronto Public Health. (2005). *Youth Tobacco Use Reduction Programming in the City of Toronto: Literature Review and Program Recommendations*. Prepared by Diane Finkle.

US Centers for Disease Control and Prevention. (1999). *Best practices for comprehensive tobacco control programs: Executive Summary*. [online] Available at: [www.sen.parl.gc.ca/ckenny/cdc\\_executive\\_summary.htm](http://www.sen.parl.gc.ca/ckenny/cdc_executive_summary.htm). Accessed June 2007.

US Centers for Disease Control and Prevention. (1999). *Best Practice for Comprehensive Tobacco Control* [online] Available at [www.cdc.gov/tobacco/tobacco\\_control\\_programs/stateandcommunity/best\\_practices/00\\_pdfs/bp\\_chap1.pdf](http://www.cdc.gov/tobacco/tobacco_control_programs/stateandcommunity/best_practices/00_pdfs/bp_chap1.pdf). Accessed May 2007.

US Centers for Disease Control and Prevention (CDC) (2000). *Surgeon General's Report: Reducing Tobacco Use, Comprehensive Programs: Highlights, 2000*. [online] Available at: [www.cdc.gov/tobacco/data\\_statistics/sgr/sgr\\_2000highlights/highlight\\_comprehensive.htm](http://www.cdc.gov/tobacco/data_statistics/sgr/sgr_2000highlights/highlight_comprehensive.htm). Accessed May 2007

US Centers for Disease Control and Prevention (CDC) (2002). “Annual Smoking-Attributable Mortality, Years of Potential Life Lost and Economic Costs—United States 1995 – 99. *Morbidity and Mortality Weekly Report*, Vol. 51 (14).

US Centers for Disease Control and Prevention (CDC) (2006). *Health Effects of Cigarette Smoking*. [online] Available at: [www.cdc.gov/tobacco/data\\_statistics/Factsheets/health\\_effects.htm](http://www.cdc.gov/tobacco/data_statistics/Factsheets/health_effects.htm). Accessed May 2007.

US Department of Health and Human Services. (1990). *The health benefits of smoking cessation: A report of the Surgeon General*. DHHS Publication No. (CDC) 90-8416.

US Department of Health and Human Services (2001). . *Women and Smoking: a Report of the Surgeon General*. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General; Washington D.C.: For sale by the Supt of Docs., U.S. G.P.O.

US Department of Health, Education and Welfare (1979). *Smoking and Health: A Report of the Surgeon General*. Rockville, Maryland: U.S. Department of Health, Education and Welfare, Public Health Service, Office of the Assistant Secretary for Health, Office on Smoking and Health.

US Institute of Medicine (2000). *State Programs Can Reduce Tobacco Use*. Washington DC: National Cancer Policy Board, Institute of Medicine and National Research Council.

US Office of Smoking and Health, National Centre for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention. (1998). Responses to cigarette prices by race/ethnicity, income and age groups—US 1976 – 1993. *Morbidity and Mortality Weekly*, Vol. 47 (29), p. 605.

vanBaal, P., Brouwer, W. Hoogenveen, R. and Feenstra, T. (2006). Increasing tobacco taxes: A cheap tool to increase public health. *Health Policy* 10.1016/j.healthpol.2006.09.004.

Wakefield, M., Freeman, J. and Donovan, R. (2003). Recall and response of smokers and recent quitters to the Australian National Tobacco Campaign. *Tobacco Control*, Vol. 12 (ii15).

Wakefield M., Chaloupka, F. Kaufman, N., Orleans, C., Barker, D. and Ruel. (2000). *Do restrictions on smoking at home, at school and in public places influence teenage smoking?* ImpacTeen Research Paper Series, No.3. Chicago, IL: University of Illinois at Chicago.

World Bank. (1999). Curbing the epidemic: Governments and the economics of tobacco control as cited by World Health Organization (2004). *European Strategy for Smoking Cessation Policy* [online] Available at: [www.euro.who.int/Document/E80056.pdf](http://www.euro.who.int/Document/E80056.pdf). Accessed June 2007.

World Health Organization. (2004). *Building Blocks for Tobacco Control: A Handbook*. Available at: [www.who.int/tobacco/resources/publications/tobaccocontrol\\_handbook/en/](http://www.who.int/tobacco/resources/publications/tobaccocontrol_handbook/en/). Accessed September 2004.

World Health Organization. (2004). *European Strategy for Smoking Cessation Policy*. [online] Available at: [www.euro.who.int/Document/E80056.pdf](http://www.euro.who.int/Document/E80056.pdf). Accessed June 2007.

World Health Organization. (2006). *Global Framework Convention on Tobacco Control: Mobilizing the world for global public health*. 1-3. [online] Available at: [www.who.int/tobacco/publications/FctcBroE\\_F-FINAL-31JAN06.pdf](http://www.who.int/tobacco/publications/FctcBroE_F-FINAL-31JAN06.pdf). Accessed April 2007.

World Health Organization. (2007) *Global School Health Initiative*. [online] Available at: [http://www.who.int/school\\_youth\\_health/gshi/en/](http://www.who.int/school_youth_health/gshi/en/). Accessed September 2007.