Report on Smoking Prevalence in Canada, 1985 to 1999

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Statistics Canada
Health Statistics Division

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by Jason Gilmore
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Highlights

This report examines the trends in smoking prevalence in Canada from 1985 to 1999 by determining the statistical significance of data from comparable surveys on smoking conducted by Statistics Canada over this time period. This report, the first in a series, analyzes both the end-points and the intervening time periods to assess the statistical significance and magnitude of any changes in smoking prevalence.

For example:

- Current smoking prevalence among Canadians aged 15 and older significantly declined by 10.3 percentage points from 1985 to 1999. However, the statistical error associated with this decline indicates the decrease likely fell between 7.9 and 12.6 percentage points, where the value '10.3' is just the midpoint in this error range. About two-fifths of this overall decline occurred between 1985 and 1991, and the remainder occurred after 1994.

Although some analytical highlights follow, details of statistical significance and error ranges are found in the main body of this paper.

- Although current smoking prevalence among men aged 15 and older experienced a larger overall decrease than that of women between 1985 and 1999, current smoking prevalence remains higher for men (26.8% for men versus 22.9% for women in 1999). Similar results held when comparing daily smoking prevalence of men and women over the same time period.

- There was a significant and large increase (6.5 percentage points) in current smoking prevalence for 15- to 19-year-olds between 1991 and January 1, 1994. Since 1994, there has been no significant change in current smoking prevalence of youth.

- Over the 15 year period, current smoking prevalence of Canadians aged 45 to 64 dropped by 14.7 percentage points (35.5% to 20.8%). About two-fifths of the decline happened between 1985 and 1991 and another two-fifths of the decline occurred between 1996/97 and the first half of 1999.

- About 10% of adults who smoked daily in 1994/95 quit by 1996/97. A full 6% of the people classified as former smokers in 1994/95 resumed smoking in 1996/97 (3% occasionally and 3% daily), and 2% of adults who did not smoke in 1994/95 started smoking in 1996/97.

- While almost 800,000 adults who were daily smokers in 1994/95 were no longer classified as such in 1996/97, almost 600,000 adults who were occasional, former or never-smokers in 1994/95 became daily smokers by 1996/97.

- Adults who smoke occasionally (about one million Canadians in 1994/95) were one of the most volatile of all smoking status groups. By 1996/97, 28% had become daily smokers, 32% remained occasional smokers and 38% became non-smokers.

- Switching status was concentrated among youth. Of the 244,000 young people who smoked daily in 1994/95 and were between the ages of 15 and 19 in 1996/97, 79% remained daily smokers. Of the 166,000 young people who smoked occasionally in 1994/95, 59% were smoking every day by 1996/97, compared with the corresponding adult rate of 28%.

Further research in all aspects of smoking prevalence will lead to greater insight into trends and patterns and can help others more thoroughly interpret these trends. The Health Statistics Division of Statistics Canada intends to provide updates on smoking issues when new data are available to contribute to the understanding gained from this analysis.

Overview

This working paper analyzes the comparability of surveys conducted by Statistics Canada on smoking prevalence undertaken between 1985 and 1999. It also examines the statistical significance and changes in the data between survey years. The aim of the paper is to clarify any confusion regarding comparability and actual trends in smoking prevalence over this period.

The paper highlights the methodology, sampling strategies and relevant smoking questions asked in each survey and explains how they affect comparability. It also includes smoking prevalence data on current smokers (plus the sub-categories of daily and occasional smokers) for each year according to the following groupings:

- by total (Canada), age groups 15 to 19, 20 to 24, 25 to 44, 45 to 64, and 65 and over
- by total, male, female
- by province (and region), age group 15 to 19

Each data item provides the point estimate, error range and sample size. Data on smoking transitions from 1994/95 to 1996/97 are also included.

This paper examines the issues surrounding smoking prevalence. Estimates concerning the quantity or volume of cigarettes smoked will be reserved for any future updates to this working paper series.

Definitions[1]

Prevalence of smoking: The number of smokers in a specified group divided by the total population of that group. Also referred to as "smoking rate".

Current smoking: Includes both daily and non-daily smoking.

Daily smoking: Refers to smoking at least one cigarette per day *for each of the 30 days* preceding the survey.

Non-daily smoking: Often referred to as occasional smoking, this more precise term describes smoking at least one cigarette during the past 30 days, but not every day. The terms "non-daily" and "occasional" are used interchangeably in this paper.

Former smoker: Someone who used to smoke daily or non-daily, but has since quit.

Never-smoker: Someone who has never smoked more than 100 cigarettes in their lifetime.

Non-smoker: Former smokers and never-smokers combined.

Cross-sectional: A survey that is conducted at least once, and represents a snapshot in time. If the survey is repeated, it may or may not have the same respondents (generally, such surveys do not have the same respondents).

Longitudinal: A series of surveys with the same respondents in each cycle to study transitions over time.

Survey Comparability: Methodology and Questions Asked

Many factors can influence the final results of a smoking prevalence survey. "Main influence factors" are the *methodology* (which includes the *sampling strategy* used) and the *questions asked*. This paper uses variance estimation, which accounts for sampling error by providing estimates of variance and standard error. Nonetheless, when comparing the final estimates of smoking data from two different surveys, it is also important to examine the main influence factors of each survey. The less similar the factors, the less reliable the comparison. For example, data from two different surveys should not be compared if the main influence factors of each survey are markedly different. Only by rigorous analysis and comparing each influence factor can the actual *degree* of influence of the difference in factors be determined. Such analysis cannot be performed on the surveys presented in this paper, because it requires testing the same sample with the differing methodologies and/or questions asked about smoking. In other words, caution should be used when comparing data results from two surveys that happen to ask questions of a similar nature but use different sampling strategies or collection methodologies. This paper profiles each national survey that asked about smoking between 1985 and 1999, and whether or not the surveys are comparable.

A tabular overview of the comparability of national surveys conducted by Statistics Canada that asked smoking questions is found in *Appendix A*, which is loosely based on the textual section that follows.

Surveys conducted by Statistics Canada from 1985 to 1999 that contained questions about smoking

General Social Survey, 1985 (GSS)
National Alcohol and Drug Survey, 1989 (NADS)
Health Promotion Survey, 1990 (HPS)
General Social Survey, 1991 (GSS)
Canadian Alcohol and Drugs Survey, 1994 (CADS)
Survey on Smoking in Canada, 1994/95 (SoSiC)
National Population Health Survey, 1994/95 (NPHS)
General Social Survey, 1995 (GSS)
General Social Survey, 1996 (GSS)
National Population Health Survey, 1996/97 (NPHS)
Canadian Tobacco Use Monitoring Survey (CTUMS, 1st wave)

General Social Survey, 1985

The target population of the 1985 GSS consisted of all persons 15 years of age and older living in the 10 provinces, except full-time residents of institutions.[2] Two sample selection and interview methods were used to survey this population. The population aged 15 to 64 was sampled using random-digit dialling techniques and interviewed by telephone. Those aged 65 and over were interviewed in person in order to increase the sample size over what could be economically achieved using telephone techniques.[3]

The data were collected between September and October 1985. Of the 11,200 people interviewed, 8,070 respondents aged 15 to 64 were contacted by telephone and 3,130 respondents aged 65 and over were questioned in person. The total sample size was large enough to allow extensive analysis at the national level, some analysis at the regional level, and limited analysis at the provincial level.[4]

The 1985 GSS asked: "At the present time, do you smoke cigarettes daily, occasionally, or not at all?" This question format follows what was later endorsed by the Workshop on Data for Monitoring Tobacco Use in March 1994 (see *Appendix B* for details). Workshop participants came from a cross-section of agencies that actively produce and/or use tobacco statistics for planning and developing programs and policies.[5] Although not everyone agreed with each nuance of the conclusions, participants committed to the terms, definitions and methods described in the report and recommended their general adoption by tobacco researchers across Canada. Most Statistics Canada surveys that have asked questions about smoking since 1985 have followed this same question format endorsed by the Workshop.

CONCLUSION: Although both telephone and personal interviews were employed, similarity in basic methodology and questions about smoking make the survey reasonably comparable with other GSS surveys, the Survey on Smoking in Canada, the National Population Health Surveys and the CTUMS.

National Alcohol and Drugs Survey, 1989

The target population for NADS was the same as the 1985 GSS (people aged 15 and older in all 10 provinces excluding those in institutions). The survey was conducted in March 1989 and data were collected through telephone interviews from a sample of 11,634 Canadians.[6]

The survey asked:
- "Have you ever been a cigarette smoker?"
- If yes, "How old were you when you started smoking?"
- "At the present time do you smoke cigarettes?"
- If yes, "How many cigarettes do you usually smoke per day?" (can state that they do/did not smoke every day)

In other words, answering "Yes" to questions 1 and 3 makes you a current smoker. Assigning a value to question 4 classifies someone as a daily smoker. Stating that "they do/did not smoke every day" classifies the person as an occasional smoker.

This form of questioning is very different from 1985 GSS and also differs from what was later endorsed by the Workshop in March 1994. According to some researchers, first asking about *current* behaviour (GSS, SoSiC, NPHS, CTUMS) appears to produce dramatically different estimates of current smokers compared with first asking about *past* behaviour (NADS 1989, HPS 1990, CADS 1994, GSS 1995). The greatest difference occurs in the sub-group of "occasional" smokers.[7] When question 1 is asked, occasional smokers or those just beginning to experiment with smoking may misinterpret the question and have a tendency to answer no, thereby screening themselves out of all subsequent smoking questions.[8] This has potential effects on both occasional smoker and current smoker data (since current is daily plus non-daily). *Because of these observations, data collected from NADS on current and occasional smokers have been excluded from this study*. NADS data about daily smokers should be compared *cautiously* with other data years in light of the distinction made about questions involving current behaviour versus questions asked about past behaviour.

CONCLUSION: Although the NADS questions differed from the ones posed in the GSS surveys, the SoSiC, the NPHS cycles and the CTUMS, the data on daily smokers are roughly comparable. Variable-specific variance could not be estimated for the 1989 NADS. The approximate errors are therefore presented in Tables 4 and 6, but are not referred to in the text. Data on current and occasional smokers from the 1989 NADS should not be compared with the other surveys and have been removed from this analysis.

Health Promotion Survey, 1990

The target population for the 1990 Health Promotion Survey (HPS) was the same as the 1985 GSS and the 1989 NADS (people aged 15 and older, in all 10 provinces excluding those in institutions). The 13,792 people interviewed by telephone included an extra 1,500 interviews purchased by Alberta Health. The survey was conducted in June 1990.[9]

The questions about smoking asked:
- "Have you ever smoked cigarettes?"
- If yes, "At the present time, do you smoke cigarettes?"
- If yes, "Do you usually smoke cigarettes every day?"
- If yes, then daily smoker, if no, then occasional smoker.

This mode of questioning about past behaviour makes the HPS susceptible to the same weaknesses found in the 1989 NADS. The data from 1990 HPS on occasional smokers were therefore removed from this analysis.

CONCLUSION: Although the smoking questions asked in the 1990 HPS differed from the ones posed in the GSS surveys, the SoSiC, the NPHS cycles and the CTUMS, these data on daily smokers can be compared with caution. Variable-specific variance analysis could not be done. Approximate errors are presented in Tables 4 and 6, but are not referred to in the text. The data on current and occasional smokers from the 1990 HPS should not be compared with the other surveys and have been removed from this analysis.

General Social Survey, 1991

The target population was the same as the other surveys: Canadians aged 15 and older in all 10 provinces, excluding those in institutions. The 1985 and 1986 GSSs collected data in the fall starting in September. Subsequent cycles (1988 to 1990) started mid-January and ended mid-March. Since some variables in the GSS are subject to seasonality (e.g., health), the 1991 survey conducted monthly interviews with approximately 960 respondents.[10] Telephone interviews were conducted with 11,924 respondents. The introduction of computer edits at the time of capture was expected to improve data quality over previous GSS surveys.[11]

The question about smoking status was consistent with the other GSS cycles and with the NPHS cycles. The 1991 survey was also the first GSS cycle to accept proxy interviews (proxies accounted for 4% of the total sample), although they were only allowed where the

intended respondent was in poor health or spoke limited English or French. Proxy reporting may result in an under-estimation of smoking prevalence, particularly among younger age groups.[12,13] Since proxy rates accounted for approximately 1% of 15- to 19- year olds and 20- to 24-year olds, care should be taken when comparing 1991 youth/young adult smoking rates with the other data years. Although proxy reporting for smoking was low, any under-reporting could affect the prevalence estimate and the variable-specific variance estimation in this paper. See Appendix D for further details.

CONCLUSION: The 1991 GSS can be reasonably compared with the other GSS surveys, the NPHS cycles and the CTUMS, although because of proxy reporting, the values (especially among younger age groups) may be slightly under-estimated.

The Canadian Alcohol and Drugs Survey, 1994

The Canadian Alcohol and Drugs Survey (CADS) interviewed 12,155 respondents by telephone. The target population was Canadians aged 15 and older in all 10 provinces, excluding residents in institutions, and was conducted from September 7 to November 5, 1994.[14] Questions on smoking were the same as the 1989 NADS and therefore suffer from the same limitations as NADS. Since both the SoSiC and the 1994/95 NPHS covered roughly the same period and asked the Workshop-endorsed questions on cigarette smoking, CADS was excluded from this analysis. Health Canada does not use this survey when examining smoking trends.

CONCLUSION: CADS 1994 should not be compared with other surveys because of the large difference in how the questions about smoking were asked. Since the SoSiC and NPHS 1994/95 were conducted around the same time period, 1994 data were aptly represented by these latter surveys.

The Survey on Smoking in Canada, 1994/95

The target population was Canadian adults aged 15 and older in all 10 provinces, excluding those in institutions. The survey differed from other surveys in that it was longitudinal. The SoSiC was collected in 4 cycles: April to June 1994 (Cycle 1), August to September 1994 (Cycle 2), November to December 1994 (Cycle 3), and February to March 1995 (Cycle 4).[15] The respondents from the initial interview were contacted during each cycle. The survey used Computer-assisted Telephone Interviewing (CATI), and 15,804 respondents participated in Cycle 1. The response rate fell to 13,398 or 85% of Cycle 1 respondents in Cycle 2, and 12,808 people or 81% of Cycle 1 respondents answered in Cycle 3. Only 12,424 or 79% of Cycle 1 respondents participated in Cycle 4. Cycle 4 results were excluded from this analysis, because of concern over the effects of seasonality and repeated interviewing.[16]

The question on the prevalence of smoking is consistent with what was asked in the 1985 and the 1991 GSS, and what was adopted by the Workshop on Data for Monitoring Tobacco Use and with the NPHS cycles. An additional variable, “smoking status on January 1, 1994”, was created by Statistics Canada analysts/methodologists and is derived from a few questions asked during Cycle 1. This variable is applicable to current smoker data only, and is considered roughly comparable with other current smoker data points.

However, because variable-specific variance estimate programs were not available, the SoSiC data are presented in this paper but not discussed at length. While results are still comparable with other data periods, the results should be interpreted with some degree of caution.

CONCLUSION: the 1994/95 SoSiC can be reasonably compared with the GSS surveys, the NPHS cycles and the CTUMS, although there was some overlap in the collection period with the 1994/95 NPHS. Because variable-specific variance estimate programs were not available, data from Cycles 1 to 3 and “Jan. 1, 1994” should be cautiously compared with other data points. Cycle 1 and “Jan.1, 1994” data are presented in all relevant tables.

General Social Survey, 1995

Data for Cycle 10 were collected monthly between January and December 1995 by telephone interview and the sample was distributed evenly over the 12 months.[17] Quebec sponsored an additional sample of 1,250 respondents in May which was spread equally over the remaining months. There were 10,749 respondents to the survey. The target population was Canadians aged 15 and older from all 10 provinces, excluding full-time residents of institutions.

The questions about smoking in the 1995 GSS asked:

- "Now, I am going to ask you a few questions about your exposure to smoke from cigarettes"
- "Have you ever smoked cigarettes?"
- if yes, "At the present time, do you smoke cigarettes?"
- if yes, "Do you usually smoke cigarettes every day?".

Because the questions follow the current versus past behaviour problem discussed earlier, the 1995 GSS survey was excluded from this analysis. As with CADS, Health Canada does not use the 1995 GSS survey data when examining smoking trends.

CONCLUSION: The 1995 GSS should not be compared with the other surveys because of the large difference in how the questions on smoking were asked. Because there was some overlap in the collection period with the 1994/95 NPHS, data for 1995 are reasonably represented by this latter survey.

General Social Survey, 1996

The target population for the 1996 GSS was all persons 15 years of age and over residing in the 10 provinces, excluding residents of the Yukon and the Northwest Territories and full-time residents of institutions. All respondents were contacted by telephone. Data for the 1996 GSS were collected monthly from February to December 1996 inclusive.[18] The sample was evenly distributed over the 11 months to represent the seasonal variation in the information gathered with two exceptions. First, an additional sample of approximately 1,250 seniors aged 65 and over (sponsored by the Senior's Directorate of Health Canada) were added, along with 700 seniors oversampled from Quebec (sponsored by the Quebec Bureau of Statistics). In addition, 25% of the regular sample was determined in a way that allowed for more reliable estimates for seniors aged 65 and over. There were 12,756 respondents to the 1996 GSS.

Questions on smoking status were consistent with the other GSS surveys, the SoSiC, the two NPHS cycles and the CTUMS. There was some degree of overlap in the collection period with the NPHS 1996/97.

CONCLUSION: The 1996 GSS can be reasonably compared with the other GSS surveys, the SoSiC, both cycles of the NPHS and the CTUMS. There was a partial overlap in the collection period between the 1996 GSS and the 1996/97 NPHS.

National Population Health Survey, 1994/95 and 1996/97

The National Population Health Survey (NPHS) 1994/95 was the first cycle of a new longitudinal survey on health issues. Interviews were conducted in four quarters: June, August and November 1994, and March 1995. The target population of the NPHS was persons aged 12 and older in all provinces and territories and residents of institutions. The 1994/95 NPHS was also integrated with the National Longitudinal Survey of Children and Youth (NLSCY), which captured data for children under the age of 12.[19] Data on smoking were only collected on respondents aged 12 and older. However, for this analysis, those aged 15 and older in all provinces were considered to remain consistent with the target populations of the other surveys.

In Cycle 1 in 1994/95, a personal interview was conducted at the respondent's dwelling, using Computer-assisted Interviewing technology. This method of interviewing (i.e., person-to-person) differs from the other surveys (except for the 1985 GSS, where respondents aged 65 and older were interviewed in person). In fact, some research indicates that person-to-person interviews about smoking provides a more reliable estimate than data collected over the telephone.[20] This different collection method should be considered when comparing data with the other surveys.

Only randomly selected individuals were followed up every second year for longitudinal purposes. For the 1994/95 Health component (i.e., the section where health and smoking questions were asked), there were 16,982 respondents aged 15 and older.[21] The 1996/97 Health component consisted of 70,884 respondents aged 15 and older. About 5% of all interviews in 1996/97 were conducted in person and the remainder were collected by telephone interview. The core sample was divided into four quarters: June, August and November 1996, and February 1997. Efforts to locate NPHS respondents who moved between cycles without notifying Statistics Canada have generally been successful. Only 1.7% of longitudinal respondents could not be found for Cycle 2.[22]

The questions on smoking for both NPHS cycles did allow for a small percentage of proxy reporting in both survey cycles. The questions on smoking were consistent with the GSS, SoSiC and CTUMS surveys.

CONCLUSION: Both NPHS cycles can be reasonably compared with the GSS surveys, the SoSiC and CTUMS. Variable-specific variances for differences between Cycle 1 and Cycle 2 NPHS cannot be easily determined because of a partial common sample (the longitudinal respondents). Research is underway to develop such techniques.

Canadian Tobacco Use Monitoring Survey, 1999

The target population for the 1999 CTUMS was all persons 15 years of age and over residing in the 10 provinces, excluding residents of the Yukon and the Northwest Territories and full-time residents of institutions. All respondents were contacted by telephone. Data for the first wave of the 1999 CTUMS were collected monthly from February to June 1999 inclusive.[23] The second wave, from July to December 1999, will be published separately as well as combined with the first wave for annual statistics. One of the main objectives of the survey was to collect sufficient results for youths aged 15 to 24. Sample size was divided equally across all 10 provinces, and involved oversampling of youth and young adults. There were 11,164 respondents to the 1999 (1st wave) CTUMS.

Questions on smoking status were consistent with the GSS surveys, the SoSiC and the two NPHS cycles.

CONCLUSION: The 1999 (1st wave) CTUMS can be reasonably compared with the GSS surveys, the SoSiC and both cycles of the NPHS.

Survey Estimates

Survey estimates are precisely that-*estimates*. They are based on the information from a *sample* of respondents, not the total population. The precision of the estimates depends on the size of the sample taken as well as the methodology used to select and process the sample.

The quality or precision of the estimates can be expressed statistically by what is called a *confidence interval*. This is simply the band of uncertainty surrounding an estimate. It is the explicit recognition of the accuracy of the survey. The point estimate provided by the survey is only the best statistical calculation of the true number. Statistically, one is confident only that this true value lies in a *range* around the point estimate. For this report, the point estimate is the mid-point of the confidence interval, which is computed from the sample, and so is itself random. If another sample was drawn, the confidence interval would generally be different from the first. The phrase "95% confidence interval" means that if one drew many samples of the same size by the same sample design and computed confidence intervals from all the samples by the same formula, then about 95% of the intervals would contain the true value, although we would not know which intervals did and which ones did not. The results would differ between two samples, because the samples are drawn from the same population using some form of randomization, so the confidence interval describes the effect that the randomization has on the estimates.

An analogy can be drawn between a game of ring-toss and a survey-based estimate of the confidence interval. The true value can be thought of as equivalent to the target pin in the game. Each time the survey is made, a confidence interval is estimated. This is analogous to tossing the ring at the pin. Sometimes, the ring is exactly centred on the pin. Other times, the pin is very close to one side or the other. And occasionally (1 time in 20), the ring does not bracket the true pin.

Of course, with surveys, the problem is that we cannot observe the actual pin. We can only observe the centre of the ring. The estimate provided by the survey is only this mid-point of the confidence interval. We are only confident that the true value is also somewhere inside the ring as well.

For most of the surveys referred to in this analysis (the 1985, 1991, and 1996 GSSs,the 1994/95, 1996/97

Some statistical definitions

Confidence limit: The range around the point estimate that is considered to encompass the true value, in this report, 19 times out of 20. Calculated by multiplying the standard error by the confidence interval (95%) and subtracting from (or adding it to) the estimate to give the range (lower and upper limit). Mainly referred to as the "error range" or "error" in this paper.

Standard error: The degree of sampling error associated with the variable estimate, calculated by the determining the square root of the sampling variance.

Point estimate: The mid-point of the confidence interval, and the statistical approximation as to where the true value (in this case, of smoking prevalence) lies. More commonly called the "estimate".

Statistical significance: Whether the point estimate or comparison between point estimates indicate something that represents a "real" value or "real" difference (respectively). In this report, the term "significance" will refer to **statistical significance** and *not* to **quantitative significance** (i.e., the size of the estimate or the size of the difference in estimates). See *Appendix D* to find out how to calculate statistical significance.

Coefficient of variation tables: These are tables generally presented with survey microdata files, allowing the reader to determine the approximate coefficient of variation (CV) and, if desired, the approximate confidence interval. Their accuracy, while sufficient for simple analysis, is of a lower quality (because they are approximated) than CVs produced using variable-specific variance computer programs (which is what has been done for most of the surveys presented here).

High sampling variability: Any result with a CV over 16.5% has high sampling variability. If the CV is between 16.5% and 33.3%, the rate is published but should be interpreted with caution.

Suppression: Any result where the CV is 33.3% or over and/or the sample size is extremely low, the result is deemed to be very poor quality and not released in this report.

Sample size: The number of **unweighted respondents** found in the relevant data cell. Not to be confused with the weighted population estimates or the total sample size.

NPHS and the 1999 CTUMS), Statistics Canada computed variable-specific variance estimates (referred to as Bootstrap or jackknife techniques) of the confidence limits for the various prevalence estimates. The others (1989 NADS, 1990 HPS and 1994/95 SoSiC) could only be calculated by using approximate coefficient of variation (CV) tables that were supplied with the public microdata files. As such, only crude error ranges could be derived for these surveys, so they were left out of Tables 2, 5 and 8. Tables 1, 3, 4, 6, 7 and 9 show the point estimate (i.e., the mid-point of the confidence interval) of smoking prevalence, the width of the 95% confidence interval, and the sample size that the estimates are based on. Tables 2, 5 and 8 illustrate whether or not there was a significant difference in the prevalence result from one data year to another. Because of the shared sample of NPHS 1994/95 and 1996/97 (i.e., the longitudinal component), statistical significance tests of the difference in these two estimates could not be calculated in the same way. See *Appendix C* for further information on how to analyze statistical significance and information on Bootstrap and jackknife techniques.

The results for "not stated" category were included in all analysis for this paper. In other words, the total population by smoking status is made up of four main groups: daily smokers, occasional smokers, non-smokers, and those who did not state their smoking status. As such, the point estimates may or may not differ slightly from previously published results. An explanation of why the "not stated" category is included in this analysis can be found in *Appendix C*.

Since surveys on smoking were not conducted by Statistics Canada every year from 1985 to 1999, there are obvious data gaps. This report only focuses on the points for which survey data were available. For example, there were no data on smoking collected in 1992 or 1993. If there is a statement inthis report stating that there was a significant increase in smoking prevalence from 1991 to 1994, there is no intention to imply that these same changes occurred in 1992 and 1993.

The numbers presented within brackets {} represent the range of error associated with the difference between the two survey estimates. For example, a 2.0 percentage point drop {1.3% to 2.7%} essentially means that the estimate dropped 2.0%, with an error range around that estimate between 1.3% and 2.7% (i.e., 2.0% plus or minus 0.7%).

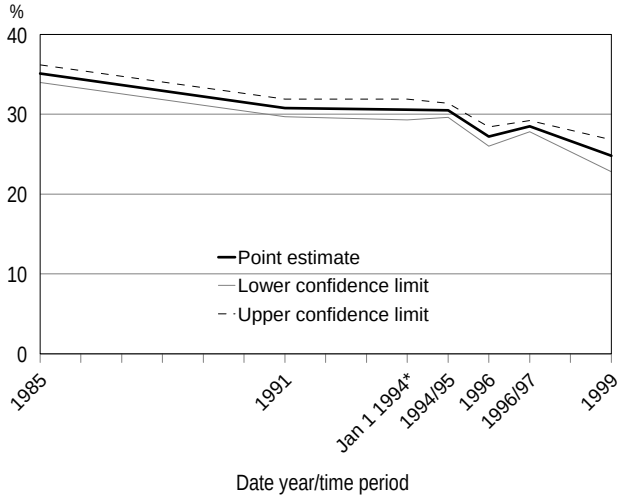
Results: Current smokers, 1985 to 1999

There are many personal, social and legislative factors that can affect the level of smoking prevalence from year to year. The following prevalence rates are presented without a situational analysis of how these "environmental" factors may or may not have influenced these rates in any particular year or years-that is up to the reader to determine

Overall changes in current smoking prevalence

There have been **statistically significant decreases** in the current smoking prevalence of Canadian adults aged 15 and older between 1985 and 1999. Current smoking prevalence fell by 4.3 percentage points {2.6% to 5.8%} from 1985 to 1991. That is to say, the rate dropped from 35.1% in 1985 to 30.8% in 1991, representing a 4.3 percentage point drop with an error range indicating the drop was likely between 2.6 percentage points and 5.8 percentage points. While there was no significant change from 1991 to any data point in 1994, there was a **significant decrease** of 5.8 percentage points {3.4% to 8.2%} from January 1, 1994 to the first half of 1999. See Chart 1 for the 15-year overall trend, or Tables 1 and 2 for the estimates along with the error range and significance tests associated with each data point or points.

Chart 1
Estimated current smoking rate, Canadians aged 15 and older, 1985 to 1999 (including error margin)



Source: *1985 GSS, 1991 GSS, 1994 SoSiC, 1994/95 NPHS, 1996 GSS, 1996/97 NPHS, 1999 CTUMS (1st wave)*
** Error ranges for this data point were determined through approximate CV tables. Other error ranges were determined using variable-specific variance estimation techniques. Exercise caution when comparing the values that were produced via these two different techniques.*

Changes in current smoking prevalence, by sex

Men

Between most data years from 1985 to 1999, there were **significant decreases** in the current smoking prevalence of Canadian men aged 15 and older. Current smoking prevalence for men fell by 6.0 percentage points {3.6% to 8.4%} from 1985 to 1991, representing a much larger decrease between those two data years than for women (see below). While there was **no significant change** from 1991 to any data point in 1994, there was a **significant decrease** of 5.2 percentage points {1.8% to 8.6%} from January 1, 1994 to the first half of 1999.

Women

There were **significant declines** in current smoking prevalence of women aged 15 and older between most data years from 1985 to 1999. Current smoking prevalence of women dropped by 2.5 percentage points {0.5% to 4.5%} from 1985 to 1991. There were no significant changes in the smoking prevalence of women from 1991 to any point in 1994. However, current smoking prevalence did **significantly decrease** by 6.4 percentage points {2.3% to 9.5%} from January 1, 1994 to the first half of 1999.

Although male current smoking prevalence sustained a larger decrease (11.2 percentage points) from 1985 to the first half of 1999 compared with female prevalence (9.3 percentage points), male current smoking prevalence still remains significantly higher

Table 1

Estimated prevalence, error range and sample size of current smokers, total, by sex and age group, 1985 to 1999**

	Sex			Age Groups				
	Total	Men	Women	15-19	20-24	25-44	45-64	65+
GSS 1985	**35.1%**	**38.0%**	**32.2%**	**26.6%**	**42.7%**	**38.9%**	**35.5%**	**20.8%**
Error +/-	1.1	1.8	1.5	3.9	3.7	1.8	2.6	1.8
Sample size	3748	1829	1919	174	472	1682	784	636
GSS 1991	**30.8%**	**32.0%**	**29.7%**	**22.6%**	**39.7%**	**35.8%**	**30.0%**	**16.0%**
Error +/-	1.1	1.6	1.4	3.7	4.1	1.7	2.2	1.5
Sample size	3503	1617	1886	166	358	1697	734	548
SoSiC (Jan. 1) 1994	**30.6%**	**32.0%**	**29.3%**	**29.1%**	**39.8%**	**35.0%**	**29.0%**	**15.7%**
Error +/-*	1.3	1.9	2.0	2.3	2.7	3.2	3.8	1.4
Sample size	4516	2177	2339	894	999	1333	580	710
SoSiC (Cycle 1) 1994	**30.4%**	**31.8%**	**29.2%**	**27.4%**	**39.5%**	**35.1%**	**28.7%**	**15.9%**
Error +/-*	1.3	1.9	2.0	2.1	2.7	3.2	3.8	1.4
Sample size	4447	2134	2313	841	990	1321	573	722
SoSiC (Cycle 2) 1994	**29.9%**	**31.0%**	**28.9%**	**28.5%**	**38.2%**	**34.0%**	**28.5%**	**15.8%**
Error +/-*	1.3	2.1	2.0	2.2	2.6	3.1	3.7	1.4
Sample size	3530	1634	1896	704	705	1068	465	588
SoSiC (Cycle 3) 1994	**29.5%**	**30.8%**	**28.2%**	**27.8%**	**36.3%**	**33.2%**	**29.5%**	**14.8%**
Error +/-*	1.3	2.1	1.9	2.2	2.5	3.0	3.9	1.3
Sample size	3392	1611	1781	701	679	1050	460	502
NPHS 1994/95	**30.5%**	**32.9%**	**28.3%**	**28.5%**	**35.5%**	**36.6%**	**28.7%**	**14.6%**
Error +/-	0.9	1.4	1.2	3.6	3.4	1.5	1.7	1.5
Sample size	5417	2643	2774	378	544	2668	1352	475
GSS 1996	**27.2%**	**28.8%**	**25.5%**	**25.2%**	**35.7%**	**32.2%**	**24.5%**	**13.5%**
Error +/-	1.2	1.7	1.5	4.0	4.6	1.9	2.1	1.2
Sample size	2975	1438	1537	147	223	1166	572	867
NPHS 1996/97	**28.5%**	**31.3%**	**25.9%**	**29.1%**	**35.0%**	**33.4%**	**26.4%**	**14.8%**
Error +/-	0.7	1.1	0.9	2.9	2.9	1.0	1.4	1.3
Sample size	20204	10263	9941	1299	1800	9992	5257	1856
CTUMS 1999 (1st wave)	**24.8%**	**26.8%**	**22.9%**	**28.1%**	**33.7%**	**30.0%**	**20.8%**	**11.6%**
Error +/-	2.0	2.8	2.3	2.8	3.8	3.6	3.7	3.3
Sample size	3215	1573	1642	900	923	811	458	123

** **Note**: Error ranges for these data points were determined through approximate CV tables. Other error ranges were determined using variable-specific variance estimation techniques. Exercise caution when comparing the values that were produced via these two different techniques.*

*** In tables 1, 3, 4, 6, 7 and 9, sample size refers to the number of unweighted respondents found in the relevant data cell and should not be confused with the weighted population estimates or the total sample size.*

Table 2
Statistically significant changes in current smoking prevalence, total, by sex and by age group, 1985 to 1999

	Sex			Age Groups				
	Total	**Men**	**Women**	**15-19**	**20-24**	**25-44**	**45-64**	**65+**
GSS 1985	**35.1%**	**38.0%**	**32.2%**	**26.7%**	**42.7%**	**38.9%**	**35.5%**	**20.8%**
GSS 1991	**30.8%**	**32.0%**	**29.7%**	**22.6%**	**40.0%**	**35.8%**	**30.1%**	**16.0%**
Significant difference from 1985?*	YES	YES	YES	NO	NO	YES	YES	YES
Change from 1985 to 1991	2.6 to 5.8↓	3.6 to 8.4↓	0.5 to 4.5↓			0.7 to 5.6↓	2.0 to 8.8↓	2.4 to 7.1↓
SoSiC Jan. 1 1994*	**30.6%**	**32.0%**	**29.3%**	**29.1%**	**39.8%**	**35.0%**	**29.0%**	**15.7%**
Significant difference from 1985?*	YES*	YES*	YES*	NO	NO	YES*	YES*	YES*
Change from 1985 to Jan 1. 1994	2.7 to 6.2↓	3.4 to 8.6↓	0.4 to 5.4↓			0.4 to 7.6↓	1.9 to 11.1↓	2.8 to 7.3↓
Significant difference from 1991?*	NO	NO	NO	YES*	NO	NO	NO	NO
Change from 1991 to Jan.1 1994				2.1 to 10.8↑				
SoSiC Cycle 1 1994*	**30.4%**	**31.8%**	**29.2%**	**27.4%**	**39.5%**	**35.1%**	**28.7%**	**15.9%**
Significant difference from 1985?*	YES*	YES*	YES*	NO	NO	YES*	YES*	YES*
Change from 1985 to Cycle 1	2.9 to 6.4↓	3.7 to 8.8↓	0.6 to 5.6↓			0.3 to 7.5↓	2.3 to 11.4↓	2.6 to 7.1↓
Significant difference from 1991?*	NO	NO	NO	YES*	NO	NO	NO	NO
Change from 1991 to Cycle 1				0.5 to 9.1↑				
NPHS 1994/95	**30.5%**	**32.9%**	**28.3%**	**28.5%**	**35.5%**	**36.6%**	**28.7%**	**14.6%**
Significant difference from 1985?	YES	YES	YES	NO	YES	YES	YES	YES
Change from 1985 to 1994/95	3.0 to 6.0↓	2.8 to 7.4↓	2.0 to 5.9↓		2.1 to 12.2↓	0.0 to 4.7↓	3.7 to 9.9↓	3.9 to 8.5↓
Significant difference from 1991?	NO	NO	NO	YES	NO	NO	NO	NO
Change from 1991 to 1994/95				0.8 to 11.1↑				
Significant difference from Jan.1 1994?*	NO	NO	NO	NO	NO	NO	NO	NO
Change from Jan. 1 1994								
Significant difference from Cycle 1?*	NO	NO	NO	NO	NO	NO	NO	NO
Change from Cycle 1 to 1994/95								
GSS 1996	**27.2%**	**28.8%**	**25.5%**	**25.2%**	**35.7%**	**32.2%**	**24.5%**	**13.5%**
Significant difference from 1985?	YES	YES	YES	NO	YES	YES	YES	YES
Change from 1985 to 1996	6.2 to 9.5↓	6.7 to 11.6↓	4.6 to 8.9↓		1.1 to 12.9↓	4.1 to 9.3↓	7.7 to 14.3↓	5.2 to 9.4↓
Significant difference from 1991?	YES	YES	YES	NO	NO	YES	YES	YES
Change from 1991 to 1996	2.0 to 5.2↓	0.8 to 5.5↓	2.2 to 6.3↓			1.1 to 6.1↓	2.6 to 8.6↓	0.6 to 4.4↓
Significant difference from Jan.1 1994?*	YES*	YES*	YES*	NO	NO	NO	YES*	YES*
Change from Jan. 1 1994 to 1996	1.6 to 5.2↓	0.6 to 5.7↓	1.3 to 6.3↓				0.2 to 8.8↓	0.4 to 4.0↓
Significant difference from Cycle 1?*	YES*	YES*	YES*	NO	NO	NO	NO	YES*
Change from Cycle 1 to 1996	1.4 to 5.0↓	0.4 to 5.5↓	1.1 to 6.2↓					0.6 to 4.2↓
Significant difference from 1994/95?	YES	YES	YES	NO	NO	YES	YES	NO
Change from 1994/95 to 1996	1.8 to 4.8↓	1.9 to 6.3↓	0.9 to 4.7↓			2.0 to 6.8↓	1.5 to 6.9↓	
NPHS 1996/97	**28.5%**	**31.3%**	**25.9%**	**29.1%**	**35.0%**	**33.4%**	**26.4%**	**14.8%**
Significant difference from 1985?	YES	YES	YES	NO	YES	YES	YES	YES
Change from 1985 to 1996/97	5.2 to 7.9↓	4.7 to 8.8↓	4.6 to 8.1↓		3.1 to 12.4↓	3.5 to 7.6↓	6.2 to 12.1↓	3.8 to 8.2↓
Significant difference from 1991?	YES	NO	YES	YES	NO	YES	YES	NO
Change from 1991 to 1996/97	1.0 to 3.5↓		2.2 to 5.5↓	1.9 to 11.3↑		0.4 to 4.4↓	1.1 to 6.3↓	
Significant difference from Jan.1 1994?*	YES*	NO	YES*	NO	YES*	NO	NO	NO
Change from Jan. 1 1994 to 1996/97	0.6 to 3.5↓		1.2 to 5.6↓		0.8 to 8.8↓			
Significant difference from Cycle 1?*	YES*	NO	YES*	NO	YES*	NO	NO	NO
Change from Cycle 1 to 1996/97	0.4 to 3.3↓		1.0 to 5.4↓		0.6 to 8.5↓			
Significant difference from 1996?	NO	YES	NO	NO	NO	NO	NO	NO
Change from 1996 to 1996/97		0.5 to 4.4↑						
CTUMS (1st wave) 1999	**24.8%**	**26.8%**	**22.9%**	**28.1%**	**33.7%**	**30.0%**	**20.8%**	**11.6%**
Significant difference from 1985?	YES	YES	YES	NO	YES	YES	YES	YES
Change from 1985 to mid-1999	7.9 to 12.6↓	7.8 to 14.5↓	6.6 to 12.1↓		3.7 to 14.3↓	4.9 to 13.0↓	10.2 to 19.2↓	5.4 to 12.9↓
Significant difference from 1991?	YES	YES	YES	YES	YES	YES	YES	YES
Change from 1991 to mid-1999	3.7 to 8.3↓	1.9 to 8.4↓	4.1 to 9.6↓	0.9 to 10.2↑	0.4 to 11.5↓	1.8 to 9.8↓	5.0 to 13.6↓	0.7 to 8.1↓
Significant difference from Jan.1 1994?*	YES*	YES*	YES*	NO	YES*	YES*	YES*	YES*
Change from Jan. 1 1994 to mid-1999	3.4 to 8.2↓	1.8 to 8.6↓	3.3 to 9.5↓		1.4 to 10.7↓	0.1 to 9.8↓	2.9 to 13.5↓	0.5 to 7.7↓
Significant difference from Cycle 1?*	YES*	YES*	YES*	NO	YES*	YES*	YES*	YES*
Change from Cycle 1 to mid-1999	3.2 to 8.0↓	1.6 to 8.4↓	3.2 to 9.3↓		1.1 to 10.4↓	0.2 to 9.9↓	2.6 to 13.1↓	0.7 to 7.9↓
Significant difference from 1994/95?	YES	YES	YES	NO	NO	YES	YES	NO
Change from 1994/95 to mid-1999	3.5 to 8.0↓	2.9 to 9.3↓	2.8 to 8.0↓			2.7 to 10.5↓	3.8 to 12.0↓	
Significant difference from 1996?	YES	NO	NO	NO	NO	NO	NO	NO
Change from 1996 to mid-1999	0.5 to 4.8↓							
Significant difference from 1996/97?	YES	YES	YES	NO	NO	NO	YES	NO
Change from 1996/97 to mid-1999	1.6 to 5.9↓	1.4 to 7.5↓	0.5 to 5.5↓				1.6 to 9.6↓	

**Error ranges for SoSiC were produced using approximate CV tables, not by variable-specific programs, and should be viewed and compared with caution.*

than female smoking prevalence (26.8% versus 22.9% in the first half of 1999).

Changes in current smoking prevalence, by age group

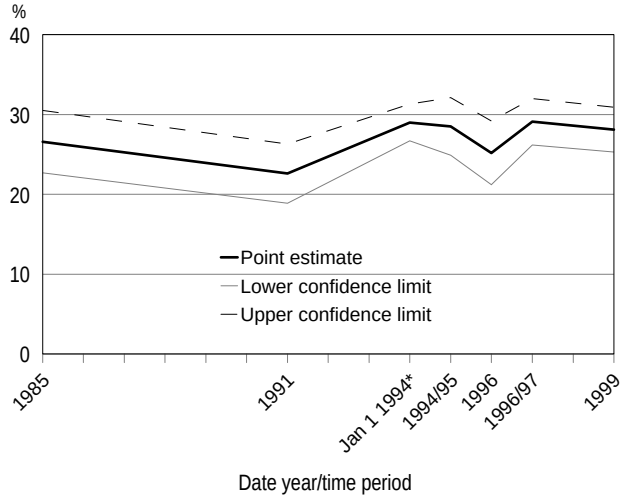
Age 15 to 19

Between most data years from 1985 to 1999, there were **no significant changes** in the current smoking prevalence of Canadian youths aged 15 to 19. While there was **no significant change** in youth current smoking prevalence from 1985 to 1991, there was a **significant and large increase** of 6.5 percentage points {2.1% to 10.8%} from 1991 to January 1, 1994. There were **no significant changes** in youth current smoking prevalence from January 1, 1994 to the first half of 1999. Refer to Chart 2 to see the overall trend from 1985 to 1999.

Age 20 to 24

Over the 15-year span, current smoking prevalence of young adults **significantly declined**. From 1985 to early 1994, there were **no significant changes** in the current smoking prevalence of young adults aged 20 to 24. The change was gradual, however, because the current smoking prevalence **dropped** by 7.2 percentage points {2.1% to 12.2%} from 1985 to 1994/95. There were **no significant changes** in young adult current smoking prevalence after 1994/95.

Chart 2
Estimated current smoking rate of youth (aged 15 to 19), 1985 to 1999 (including error margin)



Source: *1985 GSS, 1991 GSS, 1994 SoSiC, 1994/95 NPHS, 1996 GSS, 1996/97 NPHS, 1999 CTUMS (1st wave)*
** Error ranges for this data point were determined through approximate CV tables. Other error ranges were determined using variable-specific variance estimation techniques. Exercise caution when comparing the values that were produced via these two different techniques.*

Age 25 to 44

There have been **statistically significant decreases** in the current smoking prevalence of Canadian adults aged 25 to 44 from 1985 to 1999. Prevalence significantly declined by 3.1 percentage points {0.7% to 5.6%} from 1985 to 1991. There were **no significant changes** from 1991 to any data points from 1994. However, the current smoking prevalence of Canadians aged 25 to 44 **fell** by 6.6 percentage points {2.7% to 10.5%} from 1994/95 to the first half of 1999.

Age 45 to 64

There were **significant declines** in current smoking prevalence among adults aged 45 to 64 between most data years from 1985 to 1999. There was a **statistically significant decrease** of 5.4 percentage points {2.0% to 8.8%} from 1985 to 1991. Although current smoking prevalence **did not change significantly** from 1991 to data points in 1994, prevalence did **significantly decrease** by 8.2 percentage points {2.9% to 13.5%} from January 1, 1994 to the first half of 1999.

Age 65 and older

There were **significant decreases** in the current smoking prevalence of seniors aged 65 and over between some data years from 1985 to 1999. There was a **statistically significant decrease** of 4.8 percentage points {2.4% to 7.1%} from 1985 to 1991. There was **no significant change** from 1991 to any data points in 1994. However, the current smoking prevalence of seniors **significantly decreased** by 4.1 percentage points {0.5% to 7.7%} from January 1, 1994 to the first half of 1999.

Changes in current smoking prevalence of youths aged 15 to 19, by province/region

The trends in youth (aged 15 to 19) current smoking prevalence at a national level have already been discussed. In the surveys covered by this report, provincial smoking prevalence data on youth have generally smaller sample sizes, especially when results are split into the daily and non-daily smoker sub-categories. Small sample size can often result in high variability of the estimates, or even extremely high variability, which in the latter case requires suppression of the estimates. As such, results from trend analyses of youth smoking prevalence within provinces or regions are not as robust as the national estimates for youth and should be viewed with caution.

Although a cursory examination of the estimates in Table 3 seems to indicate that there were major changes within each province and region over various periods between 1985 and 1999, taking into account the error ranges of each estimate reveals that this is not the case. At the regional level, some of the differences between periods could be identified as statistically significant. At the provincial level, some data points were suppressed due to extreme variability and/or small sample size, and thus no comparison could be made with those years. In cases where the provincial data were not suppressed, there were no statistically significant changes between any periods in time from 1985 to 1999, although the small sample sizes and high variability of many of these data points means that these results should be viewed with extreme caution. As such, no additional table was created to illustrate this lack of change.

Atlantic region

There was **no significant change** in the current smoking prevalence of youths in the Atlantic region from 1985 to 1991. However, there was a **significant increase** of 8.8 percentage points {1.0% to 16.6%} from 1991 to the first half of 1999.

Prairie region

There was **no significant change** in the current smoking prevalence of youths in the Prairie region from 1985 to 1991. However, there was a **significant increase** in prevalence of 8.6 percentage points {0.9% to 16.3%} from 1991 to January 1, 1994.

Table 3
Estimated prevalence, error range and sample size of current smokers aged 15 to 19, by province/region, 1985 to 1999

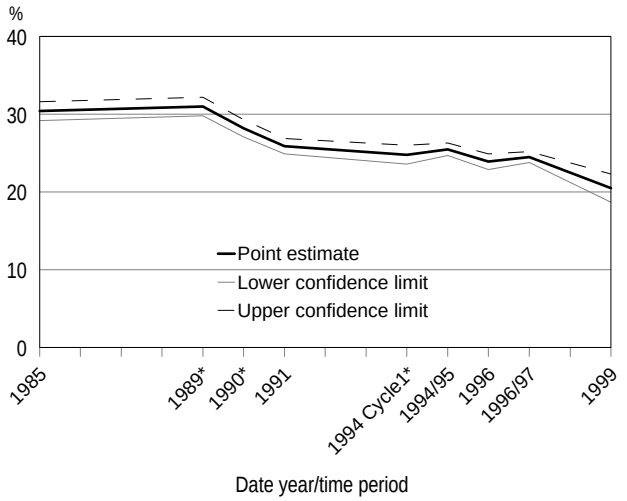
	ATLANTIC	NF	PEI	NS	NB	QC	ON	PRAIRIE	MB	SK	AB	BC
GSS 1985	**27.6%**	**32.3%***	**#**	**#**	**27.4%***	**33.5%**	**20.9%**	**31.4%**	**35.3%***	**33.6%***	**28.8%***	**21.0%***
Error +/-	7.7	12.8			11.8	9.2	6.6	8.7	17.3	19.1	11.7	10.3
Sample size	40	19	3	8	10	36	36	48	15	12	21	14
GSS 1991	**20.3%***	**22.2%***	**#**	**#**	**#**	**27.7%**	**19.6%***	**22.4%**	**27.9%***	**#**	**25.4%**	**23.4%***
Error +/-	7.3	11.4				8.9	6.9	6.0	13.3		8.7	9.3
Sample size	34	13	5	8	8	33	29	47	15	6	26	23
SoSiC (Jan. 1)1994	**26.0%**	**27.2%**	**#**	**26.6%**	**24.4%**	**31.4%**	**28.2%**	**31.0%**	**33.0%**	**35.7%**	**28.3%**	**26.3%**
Error +/-**	3.7	7.5		6.4	6.5	4.1	4.1	4.8	9.8	10.6	5.9	4.3
Sample size	205	88	16	51	50	192	157	203	61	61	81	137
SoSiC (Cycle 1)1994	**25.4%**	**27.4%**	**#**	**25.6%**	**24.1%**	**30.2%**	**26.4%**	**28.5%**	**31.6%**	**32.4%**	**25.7%**	**24.2%**
Error +/-**	3.6	7.6		6.4	6.7	4.0	3.9	4.5	9.8	10.2	5.8	4.3
Sample size	200	88	14	49	49	185	146	187	59	55	73	123
SoSiC (Cycle 2)1994	**27.1%**	**27.1%**	**#**	**26.4%**	**23.0%**	**30.2%**	**26.6%**	**30.0%**	**36.4%**	**29.7%***	**24.5%**	**23.8%**
Error +/-**	3.7	7.5		6.4	6.4	4.0	3.9	4.6	9.9	9.8	5.9	4.2
Sample size	176	78	15	40	43	161	123	149	57	41	51	95
SoSiC (Cycle 3)1994	**23.4%**	**25.3%**	**#**	**20.5%**	**25.4%**	**32.1%**	**27.1%**	**28.4%**	**36.0%**	**30.4%**	**24.3%**	**23.9%**
Error +/-**	3.7	7.3		5.8	6.7	4.2	4.0	4.5	9.8	9.8	5.8	4.2
Sample size	161	72	13	34	42	165	134	146	55	37	54	95
NPHS 1994/95	**25.5%**	**26.8%***	**30.4%***	**20.2%***	**30.7%***	**34.6%**	**24.2%**	**29.6%**	**38.1%***	**31.4%***	**25.6%***	**28.6%***
Error +/-	6.2	10.7	14.6	10.6	10.8	9.2	4.9	7.6	13.5	12.8	11.2	9.4
Sample size	76	22	15	16	23	68	100	81	31	21	29	53
GSS 1996	**22.1%***	**#**	**#**	**#**	**26.4%***	**25.5%***	**24.4%**	**29.3%**	**#**	**40.0%***	**31.8%***	**23.3%***
Error +/-	8.0				16.4	9.7	7.5	8.9		16.7	13.5	10.0
Sample size	26	8	2	7	9	24	38	37	5	14	18	22
NPHS 1996/97	**27.8%**	**29.8%***	**32.0%***	**25.8%***	**27.3%***	**36.0%**	**24.5%**	**30.0%**	**28.8%**	**33.7%***	**29.0%**	**28.9%***
Error +/-	7.1	12.7	16.2	15.9	12.3	9.1	2.2	3.9	5.9	14.0	3.3	10.1
Sample size	74	23	15	14	22	70	605	523	211	19	293	27
CTUMS (1st wave) 1999	**29.1%**	**30.4%**	**27.2%**	**30.6%**	**26.4%**	**36.0%**	**24.5%**	**27.8%**	**30.1%**	**33.6%**	**29.8%**	**23.5%**
Error +/-	2.8	6.2	4.3	5.9	4.3	6.6	4.6	3.5	5.6	5.7	4.8	5.3
Sample size	386	112	88	105	81	108	70	266	82	103	81	70

** High variability; interpret with caution.*

*** **Note**: Error ranges for these data points were determined through approximate CV tables. Other error ranges were determined using variable-specific variance estimation techniques. Exercise caution when comparing the values that were produced via these two different techniques.*

 # Suppressed due to extreme variability/small sample size

Chart 3
Estimated daily smoking prevalence, Canadians aged 15 and older, 1985 to 1999 (including error margin)



Source: *Statistics Canada: 1985 GSS, 1989 NADS, 1990 HPS, 1991 GSS, 1994 SoSiC, 1994/95 NPHS, 1996 GSS, 1996/97 NPHS, 1999 CTUMS (1st wave).*
**Error ranges for these data points were determined through approximate CV tables. Other error ranges were determined using variable-specific variance estimation techniques. Exercise caution when comparing the values that were produced via these two different techniques.*

Results: Daily smokers, 1985 to 1999

Overall changes in daily smoking prevalence

There have been **statistically significant decreases** in the daily smoking prevalence of Canadian adults aged 15 and older between 1985 and 1999. The overall decrease between 1985 and 1999 was 9.9 percentage points {error range: 7.8% to 12.1%}. See Chart 3 for the 15-year overall trend or Tables 4 and 5 for the estimates along with the error range associated with each data year.

Almost half of this decline in overall prevalence occurred between 1985 and 1991, when the drop was 4.5 percentage points {range of 3.0% to 6.0%}. Smoking prevalence in the final survey observation (CTUMS 1999 1st wave) was 5.4 percentage points lower {3.3% to 7.5%} than the 1991 estimate.

Changes in daily smoking prevalence, by sex

Men

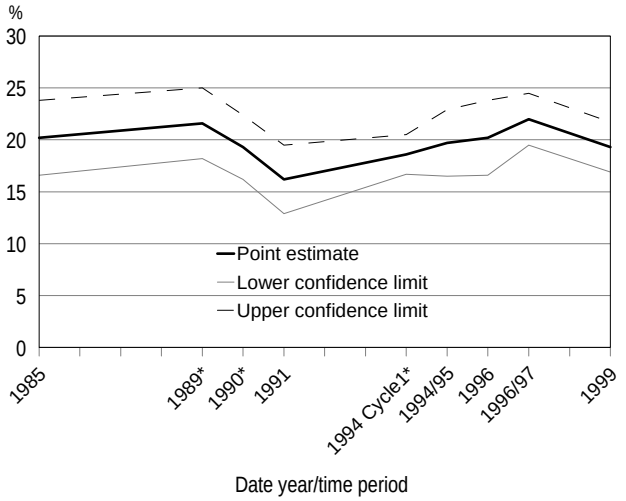
Between most data years between 1985 and 1999, there were **significant decreases** in the daily smoking prevalence of Canadian men aged 15 and older. The daily smoking rate for men fell by 6.9 percentage points {error range: 4.6% to 9.2%} from 1985 to 1991, representing a much larger decrease between those two data years than for women. The decrease in the daily smoking of men contributed more to the overall decline in the smoking rate from 1985 to 1991 than the decrease in the daily smoking rate for women. Although the data are not shown, this decrease in the daily smoking rate of men from 1985 to 1991 was evident within every age group except for men aged 20 to 24. A variety of socio-economic factors may explain this gender difference in the daily smoking rate between these two data years.

There was no significant change from 1991 to any data points from 1994 to 1996/97. However, male daily smoking prevalence fell by 5.0 percentage points {2.5% to 7.5%} from 1996/97 to the first half of 1999.

Women

There were **significant declines** in the daily smoking prevalence of Canadian women aged 15 and older between most data years from 1985 to 1999. There was a significant decline of 2.2 percentage points {0.2% to 4.2%} from 1985 to 1991, and another significant decline of 2.2 percentage points {0.1% to 4.3%} from 1991 to Cycle 1, 1994. The remainder of the overall decline in daily smoking prevalence of

Chart 4
Estimated daily smoking prevalence of youth (aged 15-19), 1985 to 1999 (including error margin)



Source: *Statistics Canada: 1985 GSS, 1989 NADS, 1990 HPS, 1991 GSS, 1994 SoSiC, 1994/95 NPHS, 1996 GSS, 1996/97 NPHS, 1999 CTUMS (1st wave).*
**Error ranges for these data points were determined through approximate CV tables. Other error ranges were determined using variable-specific variance estimation techniques. Exercise caution when comparing the values that were produced via these two different techniques.*

women occurred between Cycle 1, 1994 to the first half of 1999: a 4.2 percentage point drop {1.3% to 7.1%}. While daily smoking prevalence among men seems to have experienced a larger overall decrease between 1985 and 1999, the rate of daily smoking remains slightly higher for men (22.0% for men versus 19.6% for women in the first half of 1999). The reasons for the continued difference between the daily smoking rates of men and women could be any or all of the following: personal, psychological, social, economic and legislative factors, or the willingness of a respondent to answer such health questions.

Changes in daily smoking prevalence, by age group

Age 15 to 19

Between *most* data years from 1985 to 1999, there were **no significant changes** in the daily smoking rate of Canadian youths. While there was no change from 1985 to 1991, there was a **significant and large increase** of 5.8 percentage points {error range: 1.7% to 9.9%} in the youth daily smoking rate between 1991 and 1996/97. The 1999 prevalence of youth smoking is **not statistically different** from any preceding year.

Table 4
Estimated prevalence, error range and sample size of daily smokers, total, by sex and age group, 1985 to 1999

	Sex			Age Groups				
	Total	Men	Women	15-19	20-24	25-44	45-64	65+
GSS 1985	**30.4%**	**33.1%**	**27.8%**	**20.2%**	**35.0%**	**34.3%**	**32.0%**	**18.2%**
Error +/-	1.2	1.7	1.4	3.6	3.6	1.8	2.5	1.4
Sample size	3228	1581	1647	128	387	1460	700	553
NADS 1989	**31.0%**	**32.6%**	**29.4%**	**21.6%**	**36.9%**	**35.2%**	**31.9%**	**17.8%**
Error +/-**	1.2	1.7	1.6	3.4	3.9	1.9	2.4	2.5
Sample size	3704	1804	1900	221	414	1952	812	305
HPS 1990	**28.2%**	**29.8%**	**26.7%**	**19.3%**	**31.6%**	**34.0%**	**27.3%**	**15.1%**
Error +/-**	1.1	1.5	1.4	3.1	4.0	1.7	2.1	2.2
Sample size	4024	1930	2094	204	409	2107	927	314
GSS 1991	**25.9%**	**26.2%**	**25.6%**	**16.2%**	**27.6%**	**31.4%**	**26.3%**	**13.3%**
Error +/-	1.0	1.5	1.3	3.3	3.5	1.6	2.1	1.4
Sample size	2998	1382	1616	120	272	1480	655	471
SoSiC (Cycle 1) 1994	**24.8%**	**26.1%**	**23.4%**	**18.6%**	**29.7%**	**29.6%**	**23.5%**	**12.9%**
Error +/-**	1.2	1.8	1.7	1.9	2.7	2.7	3.2	1.3
Sample size	3516	1713	1803	575	752	1125	490	574
SoSiC (Cycle 2) 1994	**24.0%**	**25.4%**	**22.6%**	**20.0%**	**27.8%**	**28.8%**	**22.1%**	**12.9%**
Error +/-**	1.3	1.8	1.6	1.8	2.6	2.7	3.1	1.3
Sample size	2764	1295	1469	486	526	893	392	467
SoSiC (Cycle 3) 1994	**24.6%**	**26.5%**	**22.8%**	**20.2%**	**28.4%**	**29.0%**	**24.2%**	**12.2%**
Error +/-**	1.2	1.9	1.6	1.8	2.6	2.7	3.3	1.2
Sample size	2766	1329	1437	518	540	906	395	407
NPHS 1994/95	**25.5%**	**27.5%**	**23.6%**	**19.7%**	**28.6%**	**31.0%**	**25.0%**	**12.2%**
Error +/-	0.8	1.3	1.2	3.2	3.2	1.4	1.6	1.4
Sample size	4635	2273	2362	1210	1395	2301	1203	402
GSS 1996	**23.9%**	**25.4%**	**22.4%**	**20.2%**	**30.1%**	**28.2%**	**22.6%**	**12.1%**
Error +/-	1.0	1.5	1.4	3.6	4.4	1.8	1.9	1.1
Sample size	2629	1268	1361	123	188	1025	526	767
NPHS 1996/97	**24.5%**	**27.0%**	**22.1%**	**22.0%**	**28.1%**	**29.1%**	**23.8%**	**12.3%**
Error +/-	0.7	1.1	0.9	2.5	2.9	1.0	1.3	1.2
Sample size	17394	8863	8531	991	1435	8661	4721	1586
CTUMS (1st wave) 1999	**20.5%**	**22.0%**	**19.2%**	**19.3%**	**27.5%**	**24.9%**	**17.7%**	**10.7%***
Error+/-	1.8	2.3	2.3	2.2	3.0	3.6	2.9	3.5
Sample size	2545	1253	1292	616	749	681	396	103

** High variability; interpret with caution.*
******Note**: Error ranges for NADS 1989, HPS 1990 and SoSiC 1994/95, were produced using approximate CV tables, not by variable-specific variance programs, and should be viewed and compared to other results with caution.*

Refer to Chart 4 to see the trends from 1985 to the first half of 1999.

Something interesting appears to have happened in 1991 that no other data year seemed to replicate. Between 1985 and 1991, daily smoking prevalence for young men dropped from 19.6% in 1985 to 12.4% in 1991—a **significant decrease** of between 0.7 and 13.7 percentage points (data not shown). Meanwhile, the daily smoking for young women **did not exhibit any significant change** during that period (data not shown). The daily smoking rate for young men

Table 5
Statistically significant changes in daily smoking prevalence, total, by sex and age group, 1985 to1999

	Sex			Age Groups				
	Total	Men	Women	15-19	20-24	25-44	45-64	65+
GSS 1985	**30.4%**	**33.1%**	**27.8%**	**20.2%**	**35.0%**	**34.3%**	**32.0%**	**18.2%**
GSS 1991	**25.9%**	**26.2%**	**25.6%**	**16.2%**	**27.6%**	**31.4%**	**26.3%**	**13.3%**
Significant difference from 1985?	YES	YES	YES	NO	YES	YES	YES	YES
Change from 1985-1991	3.0-6.0↓	4.6-9.2↓	0.2-4.2↓		2.3-12.4↓	0.6-5.4↓	2.5-9.1↓	3.0-6.9↓
SoSiC (Cycle 1) 1994	**24.8%**	**26.1%**	**23.4%**	**18.6%**	**29.7%**	**29.6%**	**23.5%**	**12.9%**
Significant difference from 1985?*	YES*	YES*	YES*	NO	YES*	YES*	YES*	YES*
Change from 1985 to Cycle 1	4.0-7.3↓	4.5-9.6↓	2.2-6.6↓		0.9-9.9↓	1.5-8.0↓	4.5-12.6↓	3.4-7.2↓
Significant difference from 1991?*	NO	NO	YES*	NO	NO	NO	NO	NO
Change from 1991 to Cycle 1			0.1-4.3↓					
NPHS 1994/95	**25.5%**	**27.5%**	**23.6%**	**19.7%**	**28.6%**	**31.0%**	**25.0%**	**12.2%**
Significant difference from 1985?	YES	YES	YES	NO	YES	YES	YES	YES
Change from 1985 to 1994/95	3.5-6.4↓	3.5-7.8↓	2.4-6.1↓		1.6-11.2↓	1.1-5.6↓	4.1-10.1↓	4.1-8.0↓
Significant difference from 1991?	NO	NO	YES	NO	NO	NO	NO	NO
Change from 1991 to 1994/95			0.2-3.7↓					
Significant difference from Cycle 1?*	NO	NO	NO	NO	NO	NO	NO	NO
Change from Cycle 1 to 1994/95								
GSS 1996	**23.9%**	**25.4%**	**22.4%**	**20.2%**	**30.1%**	**28.2%**	**22.6%**	**12.1%**
Significant difference from 1985?	YES	YES	YES	NO	NO	YES	YES	YES
Change from 1985 to 1996	5.0-8.1↓	5.4-10↓	3.4-7.4↓			3.6-8.6↓	6.3-12.6↓	4.4-7.9↓
Significant difference from 1991?	YES	NO	YES	NO	NO	YES	YES	NO
Change from 1991 to 1996	0.6-3.4↓		1.3-5.1↓			0.7-5.6↓	0.8-6.5↓	
Significant difference from Cycle 1?*	NO	NO	NO	NO	NO	NO	NO	NO
Change from Cycle 1 to 1996								
Significant difference from 1994/95?	YES	YES	NO	NO	NO	YES	NO	NO
Change from 1994/95 to 1996	0.3-2.9↓	0.1-4.1↓				0.5-5.1↓		
NPHS 1996/97	**24.5%**	**27.0%**	**22.1%**	**22.0%**	**28.1%**	**29.1%**	**23.8%**	**12.3%**
Significant difference from 1985?	YES	YES	YES	NO	YES	YES	YES	YES
Change from 1985 to 1996/97	4.6-7.2↓	4.1-8.1↓	4.1-7.4↓		2.3-11.5↓	3.2-7.3↓	5.4-11.1↓	4.1-7.7↓
Significant difference from 1991?	YES	NO	YES	YES	NO	YES	NO	NO
Change from 1991 to 1996/97	0.2-2.6↓		1.9-5.1↓	1.7-9.9↑		0.3-4.2↓		
Significant difference from Cycle 1?*	NO	NO	NO	YES*	NO	NO	NO	NO
Change from Cycle 1 to 1996/97				0.3-6.6↑				
Significant difference from 1996?	NO	NO	NO	NO	NO	NO	NO	NO
Change from 1996 to 1996/97								
CTUMS (1st wave) 1999	**20.5%**	**22.0%**	**19.2%**	**19.3%**	**27.5%**	**24.9%**	**17.7%**	**10.7%**
Significant difference from 1985?	YES	YES	YES	NO	YES	YES	YES	YES
Change from 1985 to mid-1999	7.8-12.1↓	8.2-14.0↓	5.9-11.4↓		2.4-12.6↓	5.6-13.2↓	10.0-18.7↓	3.8-11.2↓
Significant difference from 1991?	YES	YES	YES	NO	NO	YES	YES	NO
Change from 1991 to mid-1999	3.3-7.5↓	1.5-7.0↓	3.7-9.1↓			2.7-10.2↓	4.4-12.7↓	
Significant difference from Cycle 1?*	YES*	YES*	YES*	NO	NO	YES*	YES*	NO
Change from Cycle 1 to mid-1999	2.2-6.4↓	1.1-7.0↓	1.3-7.1↓			0.4-9.0↓	1.0-10.6↓	
Significant difference from 1994/95?	YES	YES	YES	NO	NO	YES	YES	NO
Change from 1994/95 to mid-1999	3.0-7.0↓	2.8-8.1↓	1.8-7.0↓			2.4-9.8↓	3.4-11.1↓	
Significant difference from 1996?	YES	YES	YES	NO	NO	NO	YES	NO
Change from 1996 to mid-1999	1.3-5.5↓	0.6-6.2↓	0.5-5.9↓				0.9-8.9↓	
Significant difference from 1996/97?	YES	YES	YES	NO	NO	YES	YES	NO
Change from 1996/97 to mid-1999	2.1-5.9↓	2.5-7.5↓	0.4-5.4↓			0.7-7.7↓	0.2-9.9↓	

**Error ranges for SoSiC Cycle 1 were produced using approximate CV tables, not by variable-specific programs, and should be viewed and compared with caution.*

advanced to 21.3% in 1996/97, a **significant increase** of 9.0 percentage points {3.8% to 14.1%} over 1991. Meanwhile the female youth rate had **not changed significantly** (data not shown) from 1991 to 1996/97.

Age 20 to 24

Between most data years from 1985 to 1999, there was a **significant drop** in the daily smoking rate of young Canadian adults age 20 to 24. The **largest decrease** occurred between 1985 and 1991, when the rate dropped by 7.4 percentage points {2.3% to 12.4%}.

A major contributing factor to the decrease from 1985 to 1991 was a **large and significant decline** in the young adult (aged 20-24) *female* daily smoking rate (data not shown). This rate dropped by somewhere between 3.9 to 17.5 percentage points from 1985 to 1991 (37.9% in 1985 compared with 27.2% in 1991), while the young adult *male* daily smoking rate **did not change significantly** during this period (data not shown). There was **no significant change** in young adult daily smoking prevalence from 1991 to all data points up to and including the first half of 1999.

Age 25 to 44

There was a **significant decrease** in the daily smoking prevalence of Canadian adults age 25 to 44

Table 6
Estimated prevalence, error range and sample size: daily smokers aged 15-19, by province/region, 1985 to 1999

	ATLANTIC	NF	PEI	NS	NB	QC	ON	PRAIRIE	MB	SK	AB	BC
GSS 1985	**21.7%**	**27.2%***	**#**	**#**	**21.7%***	**29.2%**	**13.5%***	**25.9%**	**27.1%***	**#**	**24.3%***	**#**
Error +/-	6.6	12.0			11.1	9.1	5.6	8.4	16.0		11.2	
Sample size	31	16	2	6	7	30	22	38	12	10	16	7
NADS 1989	**28.9%**	**36.6%**	**#**	**30.9%**	**#**	**26.9%**	**#**	**27.3%**	**#**	**#**	**#**	**#**
Error +/-**	5.3	9.2		9.1		7.4		6.1				
Sample size	97	34	19	33	11	31	29	55	22	13	20	9
HPS 1990	**18.0%**	**25.4%**	**#**	**#**	**#**	**27.2%**	**#**	**17.5%**	**#**	**#**	**19.6%**	**#**
Error +/-**	4.4	8.1				7.9		4.1			6.3	
Sample size	68	31	13	16	8	34	26	63	15	13	35	13
GSS 1991	**14.3%***	**19.6%***	**#**	**#**	**#**	**22.1%***	**15.4%***	**14.0%***	**19.8%***	**#**	**15.7%***	**11.5%***
Error +/-	5.7	11.1				8.3	6.2	4.8	11.6		7.0	6.5
Sample size	26	11	3	6	6	26	23	32	11	3	18	13
SoSiC (Cycle 1) 1994	**17.5%**	**18.9%***	**#**	**16.1%***	**18.0%**	**22.8%**	**16.8%**	**19.4%**	**18.6%***	**24.2%***	**17.9%**	**14.5%**
Error +/-**	3.3	6.4		5.4	5.8	3.9	3.4	4.0	7.9	9.2	5.0	3.4
Sample size	141	63	11	31	36	139	94	127	34	40	53	74
SoSiC (Cycle 2) 1994	**18.7%**	**20.1%**	**#**	**#**	**#**	**24.3%**	**17.8%**	**20.6%**	**25.2%***	**#**	**18.7%**	**17.4%**
Error +/-**	3.2	6.5				3.6	3.6	3.9	9.0		5.2	3.7
Sample size	118	52	10	29	27	117	83	99	36	25	38	69
SoSiC (Cycle 3) 1994	**17.5%**	**22.4%**	**#**	**#**	**#**	**23.9%**	**18.6%**	**21.9%**	**25.5%***	**25.5%***	**18.9%**	**17.1%**
Error +/-**	3.3	6.9				3.6	3.7	4.1	9.1	9.4	5.3	3.7
Sample size	125	64	9	23	29	123	94	108	37	30	41	68
NPHS 1994/95	**16.4%**	**19.2%***	**25.2%***	**14.1%***	**15.7%***	**25.3%***	**16.5%**	**21.3%**	**30.2%***	**18.9%***	**18.5%***	**17.4%***
Error +/-	5.0	9.3	12.9	8.2	8.6	8.6	4.0	6.6	13.2	10.8	9.6	7.9
Sample size	53	16	12	12	13	51	74	60	25	14	21	40
GSS 1996	**17.9%***	**#**	**#**	**#**	**#**	**20.8%***	**19.8%***	**23.7%***	**#**	**35.0%***	**24.3%***	**17.2%***
Error +/-	7.3					8.9	6.7	8.4		16.3	12.3	7.4
Sample size	21	6	2	6	7	20	32	31	5	12	14	19
NPHS 1996/97	**18.5%**	**14.7%***	**19.1%***	**#**	**20.4%***	**28.3%**	**18.4%**	**22.6%**	**21.9%**	**24.7%***	**22.1%**	**21.8%***
Error +/-	5.7	8.2	12.3		10.1	7.8	2.0	3.5	5.5	12.5	3.1	8.3
Sample size	49	11	10	11	17	56	472	392	156	14	222	22
CTUMS (1st wave) 1999	**19.9%**	**22.6%**	**17.5%**	**19.6%**	**18.5%**	**23.8%**	**17.4%**	**20.6%**	**21.3%**	**22.3%**	**19.7%**	**14.2%**
Error +/-	2.7	6.6	4.0	5.0	3.8	5.6	4.4	2.9	5.4	4.6	4.6	4.4
Sample size	261	80	55	105	59	70	52	191	63	67	61	42

** High variability: interpret with caution.*
*** **Note:** Error ranges for 1989 NADS, 1990 HPS and 1994/95 SoSiC were produced by approximate CV tables, not by variable-specific variance programs. Thus, exercise caution when comparing these values to those calculated by variable-specific variance estimation.*
 # Suppressed due to extreme variability/small sample size

between most data years from 1985 to 1999. Daily smoking prevalence **decreased** by 2.9 percentage points {0.6% to 5.4%} from 1985 to 1991. From 1991 to the final survey observation (CTUMS 1999, 1st wave), prevalence **dropped** by 6.5 percentage points {2.7% to 10.2%}.

Age 45 to 64

There was a **significant decrease** in the daily smoking prevalence of Canadian adults age 45 to 64 between most data years from 1985 to 1999. Prevalence dropped by 5.7 percentage points {2.5% to 9.1%} from 1985 to 1991. Prevalence further declined by 8.6 percentage points {4.4% to 12.7%} from 1991 to the first half of 1999.

Age 65 and over

There was a **significant decrease** in the daily smoking prevalence of persons aged 65 and over between most data years from 1985 to 1999. Daily smoking prevalence **significantly declined** by 4.9 percentage points {3.0% to 6.9%} from 1985 to 1991. After 1991, there were **no significant changes** in the daily smoking prevalence of seniors aged 65 and over.

Changes in daily smoking prevalence of youths aged 15 to 19, by province/region

As mentioned previously, results of trend analysis of youth smoking prevalence within provinces or regions should be done cautiously due to small sample sizes.

Although a cursory examination of the estimates in Table 6 appear to indicate that there were major changes within each province and region over various periods between 1985 and 1999, taking into account the error ranges of each estimate reveals that this is not the case. At the regional level, some of the differences between periods in the Prairie region (but not the Atlantic region) could be identified as statistically significant. At the provincial level, some data points were suppressed due to extreme variability and/or small sample size, and thus no comparison could be made with those years. In cases where the provincial data were not suppressed, there were no statistically significant changes between any periods in time from 1985 to 1999, although the small sample sizes and high variability of many of these data points means that these results should be viewed with extreme caution. As such, no additional table was created to illustrate this lack of significant change.

Prairie region

Comparing 1991 data with other data years illustrates periods of **significant decreases** and **significant increases** in the Prairies. The largest **decrease** appears to have occurred between 1985 and 1991, when the rate fell by 11.9 percentage points {2.2% to 21.5%}. The largest **increase** occurred between 1991 and 1996, when the rate rose by 9.7 percentage points {0.03% to 19.4%}. There was **no significant change** in the Prairie region daily smoking prevalence from 1996 to the first half of 1999.

Results: Non-daily (occasional) smokers, 1985 to 1999

Overall changes in non-daily (occasional) smoking prevalence

There was **a significant but small increase** of 1.1 percentage points {0.3% to 1.9%} in the occasional smoking prevalence of Canadians aged 15 and older from 1985 to Cycle 1, 1994. There was a **significant decrease** of 2.4 percentage points {1.6% to 3.2%} from Cycle 1 1994 to 1996, followed by a **significant but small increase** of 1.0 percentage points {0.0% to 2.0%} from 1996 to the first half 1999. Refer to Tables 7 and 8 for estimates, error ranges and significance tests associated with each data year or comparison of data years.

Changes in non-daily (occasional) smoking prevalence, by sex

Men

There was **no significant change** in the non-daily smoking prevalence of Canadian men aged 15 and older between 1985 and 1994/95. However, there was a **significant decrease** in the male occasional smoking prevalence of 2.2 percentage points {1.1% to 3.3%} from Cycle 1 1994 to 1996, followed by a **significant but small** 0.8 percentage point **increase** {0.1% to 1.6%} from 1996 to 1996/97. There was **no significant change** in male occasional smoking prevalence from 1996/97 to the first half of 1999.

Women

There was **no significant change** in the occasional smoking rate of Canadian women aged 15 and older from 1985 to 1991. However, there was a **significant increase** in women's occasional smoking rate from 1991 to Cycle 1 1994 of 1.6 percentage points {0.5% to 2.6%}. What followed was a 2.5 percentage point **decrease** {1.4% to 3.6%} from Cycle 1 1994 to 1996. **No significant changes** in female occasional smoking prevalence occurred after 1996.

Changes in non-daily (occasional) smoking prevalence, by age group

Age 15 to 19

There was **no significant change** in the non-daily smoking prevalence of Canadian youths age 15 to 19 between all data years from 1985 to 1994/95. However, there was a **significant decrease** in the occasional smoking rate of youths from Cycle 1 1994 to 1996 of 3.8 percentage points {1.3% to 6.3%}, which was followed by a 3.8 percentage point increase from 1996 to the first half of 1999. In other words, youth non-daily smoking prevalence was **not statistically different** from any previous data year, with the exception of 1996.

Age 20 to 24

There was a **significant increase** of 4.3 percentage points {0.8% to 7.9%} in the occasional smoking prevalence of young adults aged 20 to 24 from 1985 to 1991. This was largely driven by **a significant and large increase** in the rate of occasional smoking for young adult males from 1985 to 1991, of between 1.3 and 13.5 percentage points (8.4% in 1985 and 15.8% in 1991 - data not shown). There was **no significant change** in the occasional smoking rate of young adult women between 1985 and 1991.

There was a **significant 5.1 percentage point decrease** {1.6% to 8.6%} in occasional smoking prevalence of 20 to 24-year olds from 1991 to 1994/95. Again, this was mainly due to the change in young

Table 7
Estimated prevalence, error range and sample size of occasional smokers, total, by sex and age group, 1985 to 1999

	Sex			Age Groups				
	Total	Men	Women	15-19	20-24	25-44	45-64	65+
GSS 1985	**4.6%**	**4.9%**	**4.4%**	**6.4%***	**7.7%**	**4.6%**	**3.5%**	**2.5%**
Error +/-	0.5	0.8	0.6	2.1	2.0	0.7	0.9	0.8
Sample size	520	248	272	46	85	222	84	83
GSS 1991	**4.9%**	**5.7%**	**4.1%**	**6.3%**	**12.0%**	**4.5%**	**3.8%**	**2.7%**
Error +/-	0.5	0.9	0.6	2.0	3.0	0.7	1.0	0.8
Sample size	505	235	270	46	86	217	79	77
SoSiC (Cycle 1) 1994	**5.7%**	**5.6%**	**5.7%**	**8.8%**	**9.8%**	**5.4%**	**5.1%**	**3.0%**
Error +/-**	0.6	0.9	0.9	1.4	1.6	1.4	1.8	0.7
Sample size	931	421	510	266	238	196	83	148
SoSiC (Cycle 2) 1994	**6.0%**	**5.6%**	**6.3%**	**8.6%**	**10.3%**	**5.3%**	**6.4%**	**2.9%**
Error +/-**	0.6	0.9	1.0	1.4	1.7	1.4	1.9	0.6
Sample size	766	339	427	218	179	175	73	121
SoSiC (Cycle 3) 1994	**4.9%**	**4.3%**	**5.5%**	**7.6%**	**7.9%**	**4.2%**	**5.3%***	**2.7%**
Error +/-**	0.7	0.8	0.9	1.2	1.5	1.2	1.8	0.6
Sample size	626	282	344	183	139	144	65	95
NPHS 1994/95	**5.0%**	**5.4%**	**4.7%**	**8.8%**	**6.9%**	**5.6%**	**3.7%**	**2.4%**
Error +/-	0.5	0.7	0.5	2.1	1.9	0.8	0.7	0.7
Sample size	782	370	412	100	93	367	149	73
GSS 1996	**3.3%**	**3.4%**	**3.2%**	**5.0%***	**5.6%***	**4.0%**	**1.9%**	**1.4%**
Error +/-	0.5	0.6	0.6	2.0	2.0	0.7	0.6	0.4
Sample size	346	170	176	24	35	141	46	100
NPHS 1996/97	**4.0%**	**4.2%**	**3.9%**	**7.1%**	**6.9%**	**4.3%**	**2.6%**	**2.5%**
Error +/-	0.3	0.4	0.4	1.5	1.4	0.5	0.5	0.7
Sample size	2810	1400	1410	308	365	1331	536	270
CTUMS (1st wave)1999	**4.3%**	**4.8%**	**3.8%**	**8.8%**	**6.2%**	**5.0%***	**3.1%***	**#**
Error +/-	0.9	1.4	1.0	1.9	1.5	1.7	1.6	
Sample size	670	320	350	284	174	130	62	20

** High variability; interpret with caution.*
*** Error ranges were produced using approximate estimation, not the variance estimation used by other surveys. Thus, exercise caution when comparing these values to those calculated by variance estimation.*
#Suppressed due to extreme variability/small sample size.

adult male occasional smoking. There were **no significant changes** after 1994/95.

Age 25 to 44

There was **no significant change** in the occasional smoking prevalence of Canadians aged 25 to 44 from 1985 to 1991. There was a **significant increase** of 1.1 percentage points {0.1% to 2.2%} from 1991 to 1994/95. However, there was a **significant decrease** of 1.6 percentage points {0.5% to 2.7%} from 1994/95 to 1996. **No significant changes** occurred after 1996.

Table 8
Statistically significant changes in non-daily (occasional) smoking prevalence, total, by sex and age group, 1985 to 1999

	Sex			Age Groups				
	Total	Men	Women	15-19	20-24	25-44	45-64	65+
GSS 1985	**4.6%**	**4.9%**	**4.4%**	**6.4%**	**7.7%**	**4.6%**	**3.5%**	**2.5%**
GSS 1991	**4.9%**	**5.7%**	**4.1%**	**6.3%**	**12.0%**	**4.5%**	**3.8%**	**2.7%**
Significant difference from 1985?	NO	NO	NO	NO	YES	NO	NO	NO
Change from 1985 to 1991					0.8-7.9↑			
SoSiC (Cycle 1) 1994*	**5.7%**	**5.6%**	**5.7%**	**8.8%**	**9.8%**	**5.4%**	**5.1%**	**3.0%**
Significant difference from 1985?*	YES*	NO	YES*	NO	NO	NO	NO	NO
Change from 1985 to Cycle 1	0.3-1.9↑		0.2-2.4↑					
Significant difference from 1991?*	NO	NO	YES*	NO	NO	NO	NO	NO
Change from 1991 to Cycle 1			0.5-2.6↑					
NPHS 1994/95	**5.0%**	**5.4%**	**4.7%**	**8.8%**	**6.9%**	**5.6%**	**3.7%**	**2.4%**
Significant difference from 1985?	NO	NO	NO	NO	NO	NO	NO	NO
Change from 1985 to 1994/95								
Significant difference from 1991?	NO	NO	NO	NO	YES	YES	NO	NO
Change from 1991 to 1994/95					1.6-8.6↓	0.1-2.2↑		
Significant difference from Cycle 1?*	NO	NO	NO	NO	YES*	NO	NO	NO
Change from Cycle 1 to 1994/95					0.4-5.3↓			
GSS 1996	**3.3%**	**3.4%**	**3.2%**	**5.0%**	**5.6%**	**4.0%**	**1.9%**	**1.4%**
Significant difference from 1985?	YES	YES	YES	NO	NO	NO	YES	YES
Change from 1985 to 1996	0.7-2.0↓	0.5-2.4↓	0.3-2.1↓				0.5-2.7↓	0.3-2.0↓
Significant difference from 1991?	YES	YES	YES	NO	YES	NO	YES	YES
Change from 1991 to 1996	0.9-2.3↓	1.3-3.4↓	0.1-1.8↓		2.8-10.0↓		0.8-3.1↓	0.5-2.2↓
Significant difference from Cycle 1?*	YES	YES	YES	YES	YES	NO	YES	YES
Change from Cycle 1 to 1996	1.6-3.2↓	1.1-3.3↓	1.4-3.6↓	1.3-6.3↓	1.6-6.8↓		1.3-5.1↓	0.8-2.4↓
Significant difference from 1994/95?	YES	YES	YES	YES	NO	YES	YES	YES
Change from 1994/95 to 1996	1.1-2.4↓	1.1-3.0↓	0.7-2.3↓	0.8-6.7↓		0.5-2.7↓	0.9-2.8↓	0.2-1.8↓
NPHS 1996/97	**4.0%**	**4.2%**	**3.9%**	**7.1%**	**6.9%**	**4.3%**	**2.6%**	**2.5%**
Significant difference from 1985?	YES	NO	NO	NO	NO	NO	NO	NO
Change from 1985 to 1996/97	0.0-1.1↓							
Significant difference from 1991?	YES	YES	NO	NO	YES*	NO	YES	NO
Change from 1991 to 1996/97	0.3-1.5↓	0.6-2.5↓			1.8-8.4↓		0.1-2.3↓	
Significant difference from Cycle 1?*	YES*	YES*	YES*	NO	YES*	NO	YES*	NO
Change from Cycle 1 to 1996/97	1.0-2.3↓	0.4-2.3↓	0.9-2.8↓		0.8-5.0↓		0.6-4.4↓	
Significant difference from 1996?	YES	YES	NO	NO	NO	NO	NO	YES
Change from 1996 to 1996/97	0.2-1.3↑	0.1-1.6↑						0.3-1.8↑
CTUMS (1st wave) 1999	**4.3%**	**4.8%**	**3.8%**	**8.8%**	**6.2%**	**5.0%**	**3.1%**	**#**
Significant difference from 1985?	NO	NO	NO	NO	NO	NO	NO	NA
Change from 1985 to mid-1999								
Significant difference from 1991?	NO	NO	NO	NO	YES	NO	NO	NA
Change from 1991 to mid-1999					2.5 to 9.2↓			
Significant difference from Cycle 1?*	YES*	NO	YES*	NO	YES*	NO	NO	NA
Change from Cycle 1 to mid-1999	0.3 to 2.5↓		0.6 to 3.2↓		1.3 to 5.9↓			
Significant difference from 1994/95?	NO	NO	NO	NO	NO	NO	NO	NA
Change from 1994/95 to mid-1999								
Significant difference from 1996?	NO	NO	NO	YES	NO	NO	NO	NA
Change from 1996 to mid-1999				1.1 to 6.5↑				
Significant difference from 1996/97?	NO	NO	NO	NO	NO	NO	NO	NA
Change from 1996/97 to mid-1999								

**Error ranges for SoSiC Cycle 1 were produced using approximate CV tables, not by variable-specific programs, and should be viewed and compared with caution.*
#Suppressed due to extreme variability/small sample size.
NA: Not applicable

Age 45 to 64

There were **no significant changes** in the non-daily smoking prevalence of Canadians aged 45 to 64 from 1985 to Cycle 1 (SoSiC) 1994. However, the 1996 rate was **significantly lower** than the Cycle 1 1994 rate by 3.2 percentage points {1.3% to 5.1%}. **No significant changes** occurred after 1996.

Age 65 and over

There was **no significant change** in the non-daily smoking prevalence of older Canadians aged 65 and over from 1985 to Cycle 1 1994. However, the 1996 rate was **significantly lower** than the Cycle 1 1994 prevalence (a 1.6 percentage point drop {0.8% to 2.4%}). There were **no significant changes** in the occasional smoking prevalence of Canadians aged 65 and over after 1996.

Changes in non-daily (occasional) smoking prevalence for youth aged 15 to 19, by province and region

As mentioned previously, results of trend analysis in youth smoking prevalence within provinces or regions should be done cautiously due to small sample sizes.

Some data points in various provinces and regions were suppressed due to extreme variability and/or small sample size, and thus no comparison could be made with those years. In cases where the provincial or regional data were not suppressed, there were no statistically significant changes between any periods in time from 1985 to 1999, although the small sample sizes and high variability of many of these data points means that these results should be viewed with extreme caution. No data table (besides Table 9) was created to present these facts.

Table 9
Estimated prevalence, error range and sample size of non-daily (occasional) smokers aged 15-19, by province/region, 1985 to 1999

	ATLANTIC	NF	PEI	NS	NB	QC	ON	PRAIRIE	MB	SK	AB	BC
GSS 1985	**5.9%***	#	#	#	#	#	#	#	#	#	#	#
Error +/-	3.8											
Sample size	9	3	1	2	3	6	14	10	3	2	5	7
GSS 1991	#	#	#	#	#	#	#	**8.4%***	#	#	#	**11.8%***
Error +/-								4.4				7.3
Sample size	8	2	2	2	2	7	6	15	4	3	8	10
SoSiC (Cycle 1) 1994	**7.9%**	#	#	#	#	**7.3%**	**9.6%**	**9.1%**	#	#	#	**9.7%**
Error +/-**	2.3					2.3	2.7	2.9				2.9
Sample size	59	25	3	18	13	46	52	60	25	15	20	49
SoSiC (Cycle 2) 1994	**8.4%**	#	#	#	#	**9.1%**	**8.5%**	**9.5%**	#	#	#	#
Error +/-**	2.4					2.6	2.6	3.1				
Sample size	58	26	5	11	16	44	40	50	21	16	13	26
SoSiC (Cycle 3) 1994	**5.9%***	#	#	#	#	**8.2%**	**8.5%**	**6.5%***	#	#	#	#
Error +/-**	2.0					2.5	2.6	2.4				
Sample size	36	8	4	11	13	42	40	38	18	7	13	27
NPHS 1994/95	**9.1%***	#	#	#	**15.0%***	**9.3%***	**7.8%***	**8.4%***	#	#	#	**11.1%***
Error +/-	3.8				7.9	4.7	3.5	4.2				7.2
Sample size	23	6	3	4	10	17	26	21	6	7	8	13
GSS 1996	#	#	#	#	#	#	#	#	#	#	#	#
Error +/-												
Sample size	5	2	0	1	2	4	6	6	0	2	4	3
NPHS 1996/97	**9.3%***	**15.1%***	#	#	#	**7.7%***	**6.1%**	**7.4%**	**6.9%***	#	**6.9%**	#
Error +/-	4.3	9.9				4.2	1.2	1.9	3.2		1.8	
Sample size	25	12	5	3	5	14	133	131	55	5	71	5
CTUMS (1st wave) 1999	**9.2%**	**7.8%***	**9.7%***	**11.0%**	**7.9%***	**12.2%***	**7.1%***	**7.2%**	**8.8%***	**11.4%***	**5.1%***	**9.3%***
Error +/-	1.5	2.8	3.5	3.4	2.9	4.4	3.4	1.9	5.1	3.9	2.2	4.0
Sample size	125	32	33	38	22	38	18	75	19	36	20	28

** High variability: interpret with caution.*

*** Error ranges were produced using crude estimation, not the variable-specific variance estimation used by other surveys. Thus, exercise caution when comparing these values to those calculated by variance estimation.*

 # Suppressed due to extreme variability/small sample size

Transition data: 1994/95 to 1996/97

Although it is interesting to examine changes in prevalence between data years, the *transition* of smokers and non-smokers between data years is also important. The longitudinal NPHS allows for such an analysis. The following is an overview of changes in the smoking or non-smoking population (aged 20 and over in 1996/97, followed by an analysis of transitions within youths aged 15 to 19 in 1996/97) from 1994/95 to 1996/97 with regards to smoking status. Smoking status in 1994/95 was divided into four main groups: daily smokers, occasional smokers, former smokers and never-smokers. Smoking status in 1996/97 was broken down into three main groups: daily smokers, occasional smokers and non-smokers. See Table 10 for more specific figures and rates. The technique used to test the statistically significant differences between transition data of adults and youths is described in *Appendix C*, "Interpretation of Results".

Transitions in smoking status, adults (aged 20+)

Adult (age 20+) daily smokers in 1994/95

There were approximately 5.5 million adult daily smokers in 1994/95. By 1996/97, 4.7 million or **86% of these smokers aged 20 and over still smoked on a daily basis**. About 3% of daily smokers switched to smoking only occasionally, while another 10% actually quit smoking. Another 2% of daily smokers in 1994/95 did not state their smoking status in 1996/97.

Adult non-daily (occasional) smokers in 1994/95

These findings indicate that **non-daily (occasional) smokers were one of the most volatile of all smoking status groups**. There were just over 1 million adult occasional smokers in 1994/95. However, 28% of non-daily smokers had become daily smokers by the time the second cycle was conducted in 1996/97. About 32% remained occasional smokers, while 38% quit smoking.

Adult former smokers in 1994/95

In contrast to occasional smokers, former smokers appear much less volatile in their smoking habits. Of the 6.6 million former smokers in 1994/95, **91% remained former smokers in 1996/97**, 3% started smoking daily, and 3% smoked on an occasional basis. About 2% of former smokers did not state their smoking status in 1996/97.

Adult never-smokers in 1994/95

Of the 8.3 million adult never-smokers in 1994/95, **96% were non-smokers in 1996/97**. About 1% became daily smokers, 1% became occasional smokers and 1% did not state their smoking status in 1996/97.

Overall, **1 in 10 daily smokers and over one-third of occasional smokers from 1994/95 quit by 1996/97**, and the vast majority (91%) of adults who were former smokers in 1994/95 were still former smokers two years later. A very small percentage of never-smokers became daily or occasional smokers, while about 28% of occasional smokers began smoking on a daily basis.

Transitions in smoking status, by sex

Although there were some small percentage-point differences in the transition rates when comparing adult (age 20+) men and women, most of the differences were not statistically significant. In other words, when taking into account the error range of each estimate, the smoking transitions of men did not differ significantly from the smoking transitions of women between 1994/95 and 1996/97. The only statistically significant difference was that 87% of men who smoked daily in 1994/95 were still daily smokers in 1996/97, while 84% of women who smoked daily in 1994/95 remained daily smokers in 1996/97 (data not shown).

Transitions in smoking status, youth (aged 15 to 19)

Although the transition rates of men and women did not significantly differ from each other or from the overall levels, the transition rates for youth smoking produced more interesting and statistically significant results compared with the transitions of adult smokers.

Youth daily smokers in 1994/95

There were 244,000 young people who smoked daily in 1994/95 and who were aged 15 to 19 in 1996/97; **79% remained daily smokers in 1996/97**. This value is **not significantly different** from the overall rate change for the daily smoking rate of all Canadian adults age 20 and over. All other data values for daily smoking youths were suppressed due to small sample size and/or extreme variability in the data.

Table 10
Self-reported smoking status change from 1994/95 to 1996/97, Canadians aged 20+ and aged 15-19

Smoking status in 1994/95	1994\95 population	Smoking status, Canadians aged 20+ in 1996\97							
		Daily smoker		Occasional smoker		Non-smoker		Not stated	
	('000s)	('000)	%	('000)	%	('000)	%	('000)	%
Daily smoker	5,469	4,684	86%	161	3%	523	10%	101	2%
Occasional Smoker	1,018	285	28%	329	32%	388	38%		#
Former Smoker	6,603	229	3%	196	3%	6,016	91%	162	2%
Never Smoker	8,261	79	1%*	93	1%*	7,967	96%	122	1%
Not Stated	21		#		#		#		#

Smoking status in 1994/95	1994\95 population	Smoking status of youth (aged 15-19) in 1996/97							
		Daily smoker		Occasional smoker		Non-smoker		Not stated	
	('000s)	('000)	%	('000)	%	('000)	%	('000)	%
Daily smoker	244	194	79%		#		#		#
Occasional Smoker	166	97	59%		#		#		#
Former Smoker	446	141	32%		#	255	57%		#
Never Smoker	1,262	101	8%*	72	6%*	1,085	86%		#
Not Stated	6		#		#		#		#

Source: *Statistics Canada, 1994/95 and 1996/97 National Population Health Surveys (longitudinal file)*
** High variability: interpret with caution*
 # Suppressed due to extreme variability

Youth occasional smokers in 1994/95

Of the 166,000 young people who were occasional smokers in 1994/95, **59% were smoking daily in 1996/97**. This was **significantly higher** than the corresponding transition rate for all Canadian adult occasional smokers who started smoking daily (28%). All other data values for occasional smoking youths were suppressed due to small sample size and/or extreme variability in the data.

Youth former smokers in 1994/95

Of the 446,000 young people who claimed to be former smokers in 1994/95, 32% of them became daily smokers by 1996/97. This was **significantly higher** compared with the transition rate of all Canadian adult former smokers to daily smoking (3%). Conversely, just 57% of former smoking youths were categorized as non-smokers in 1996/97, which is significantly lower than the adult former-smoker transition rate of 91%.

Youth never-smokers in 1994/95

Of the nearly 1.3 million youths who claimed to be never-smokers in 1994/95, 8% of them had become daily smokers by 1996/97. This result was **significantly higher** than the 1% transition rate of never-smoking Canadian adults to daily smoking. About 6% of never-smoking youths from 1994/95 became occasional smokers in 1996/97, which was **significantly higher** than the adult transition rate of 1%. A full 86% of the never-smoking youths in 1994/95 were non-smokers in 1996/97, which was **significantly lower** than the adult transition rate of 96%.

The Youth Smoking Survey (1994) collected detailed data on the smoking habits of young Canadians, and a technical report[24] is available for additional research into youth smoking issues.

Overall conclusions

One of the greatest hurdles to measuring smoking prevalence is that it is always changing. There is always a portion of the population that is in some stage of transition.[25] The 24.8% of the Canadian population who were current smokers in the first half of 1999 were not all part of the 35.1% of current smokers in 1985 - some of those smokers from 1985 have since quit or died. Every person in every age group, sex, province or region will quit, start, refuse to start, or switch between daily and occasional smoking status for one reason or another, and will continue to make such choices over time. Only investigation at the grass-roots level can reveal the reasons why people choose or refuse to become smokers.

That being said, the analysis in this paper does shed light on a number of interesting issues. The 1990s have represented a time of much smoking-related dialogue, debate, surveys, legislation, reduction strategies and price changes on tobacco. While all this was going on, changes in the smoking rate continued. Between 1991 and 1999, significant changes in **current** smoking rates occurred:

- an *increase* in current smoking for youth aged 15-19;
- *decreases* in the overall rate, both sexes, and all other age groups

While there were declines in current smoking prevalence from 1985 to 1991 among the overall population, both sexes and all age groups except those aged 15 to 24, most of the declines for these groups (except men and those aged 65 and over) over the entire 15-year period of analysis happened after 1991. Over the entire 15-year period, there was an overall decline in current smoking prevalence of Canadians, including decreases in the rates for both sexes and most age groups. The prevalence of current smoking for Canadian youths did not change significantly from 1985 to 1999, with the notable exception of a statistically significant increase between 1991 and 1994. While the point estimates of provincial youth current smokers followed a trend similar to the national youth current smoking prevalence, small sample sizes and high variability of the provincial data meant that these 'similar' changes were not statistically significant. Larger sample sizes at the regional level indicated some statistically significant fluctuations between certain years in the Prairie and Atlantic regions.

The rate of non-daily or occasional smoking has been a subject of great discussion over the last few years. Despite some discussion to the contrary, the overall rate of occasional smoking has *decreased* from 1985 to 1996/97 (and has not changed significantly since 1996/97). Most of the rate changes in fact occurred *after* 1991.

- Significant decreases in occasional smoking occurred from 1991 to 1996 across most age groups (except those aged 15 to 19 and aged 25 to 44) and both sexes and the overall level.
- While the occasional smoking prevalence of those aged 20 to 24 increased significantly between 1985 and 1991, followed by a significant decrease between 1991 and 1994/95, the prevalence in the first half of 1999 was approximately the same as the 1985 rate (i.e., the rate dropped since 1991 to return to near-1985 levels).

As well, a statistically significant but small increase in overall occasional smoking rates occurred between 1996 and 1996/97 in the:

- overall occasional smoking rate
- occasional smoking rate of men, and
- occasional smoking rate of those aged 65 and over.

The transition data provides some insight into the "movement within the rates", illustrating what is happening at a lower level that cannot be found when simply looking at or comparing cross-sectional smoking prevalence rates. The analysis revealed that the adult non-daily smoker group was the most volatile between data years, where:

- about 3 in 10 became daily smokers;
- just over 3 in 10 remained occasional smokers; and
- just under 4 in 10 quit.

The analysis also revealed that:

- for every four adult daily smokers in 1994/95 who were no longer classified as daily smokers in 1996/97, three adults who were classified as former, never- or occasional smokers in 1994/95 became daily smokers in 1996/97;
- 1 in 10 daily smoking adults in 1994/95 were non-smokers in 1996/97;
- approximately 6% of adults classified as former smokers in 1994/95 resumed smoking in 1996/97 (3% daily, 3% occasional); and
- only about 2% of never-smoker adults in 1994/95 became smokers in 1996/97 (half to daily smoking, half to occasional smoking).

The analysis provided even greater insight when the transition of youth smoking status was examined:

- 59% of youths who were occasional smokers in 1994/95 were daily smokers in1996/97;
- 32% of former-smoking youths began smoking daily in 1996/97 while 57% of former- smoking youths remained non-smokers;
- 86% of never-smoking youths were non-smokers in 1996/97 (compared with 96% of the adult population).

Most of the transition rates for youth were significantly different from those of the adult population. This appears to indicate that youth seem to respond differently to the various environmental factors surrounding the tobacco issue, compared with the adult population.

Further research in all aspects of smoking prevalence will obviously lead to greater insight into trends and patterns and can help other researchers more thoroughly understand and interpret these trends and patterns. When more data become available, the Health Statistics Division of Statistics Canada will provide updates on smoking matters in addition to examining further transitions in smoking patterns.

APPENDIX A: Quick Reference of Survey (1985 to 1999) Comparability

	Collection Method	Relevant # of Respondents	Response Rate	Smoking Questions	Overall Comparability	Variance estimated by...
GSS 1985	Telephone and personal interview	11,200	83.4% (telephone) 86.5% (personal)	At the present time, do you smoke daily, occasionally, or not at all?	Can compare wtih GSS 1991 and 1996, NPHS 1994/95 and 1996/97 and 1999 CTUMS	Variance estimation programs
NADS 1989	Telephone interview	11,634	78.7%	Have you ever been a cigarette smoker? How old were you when you started smoking? At the present time do you smoke cigarettes? How many cigarettes do you usually smoke per day? (can state that they do/did not smoke every day)	Reasonable comparison of daily smoking rates. Current and non-daily rates are not comparable.	Approximate CV tables
HPS 1990	Telephone interview	13,792	78%	Have you ever smoked cigarettes? At the present time, do you smoke cigarettes? Do you usually smoke cigarettes every day?	Reasonable comparison of daily smoking rates. Current and non-daily rates are not comparable.	Approximate CV tables
GSS 1991	Telephone interview	11,924	80%	Same as GSS 1985.	Can compare with GSS 1985 and 1996, SoSiC, NPHS and CTUMS.	Variance estimation programs
CADS 1994	Telephone interview	12,155	76.2%	Same as NADS 1989 plus additional question (2nd last): Thinking back over the last 7 days, did you smoke any cigarettes?	Same as NADS 89 and HPS 90. Also excluded here because 1994 better represented by SoSiC and NPHS.	Excluded
SoSiC 1994/95	Telephone interview (CATI)	15,804 (Cycle 1) 13,398 (C2) 12,808 (C3) 12,424 (C4)	83.9% (Cycle 1) C2: 84.8% of C1 C3: 81.0% of C1 C4: 78.6% of C1	Same as GSS 1985. "January, 1, 1994" derived variable is roughly comparable to other current smoker data.	Can compare with GSS 1985, 1991, and 1996, NPHS and CTUMS.	Approximate CV tables
NPHS 1994/95	Personal interview (CAPI)	16,982 (Health Component)	92.4%*	Same as GSS 1985.	Can compare with GSS 1985, 1991 and 1996, SoSiC, NPHS and CTUMS.	Variance estimation programs
GSS 1995	Telephone interview (CATI)	10,749	80.7%	Same as HPS 1990.	Same as NADS 89 and HPS 90. Also excluded here because 1995 better represented by NPHS.	Excluded
GSS 1996	Telephone interview (CATI)	12,756	85.3%	Same as GSS 1985.	Can compare with GSS 1985 and 1991, SoSiC, NPHS and CTUMS.	Variance estimation programs
NPHS 1996/97	Telephone interview (CATI) and personal interview (CAPI)	70,884 (Health component)	93.6% (Longitudinal) 79.0% (Health Component)	Same as GSS 1985.	Can compare with GSS 1985, 1991, and 1996, SoSiC, NPHS and CTUMS.	Variance estimation programs
CTUMS 1999 (1st wave)	Telephone interview (CATI)	11,164	93%	Same as GSS 1985.	Can compare with GSS 1985, 1991 and 1996, SoSiC and NPHS.	Variance estimation programs

** This is a rough calculation, complicated by methods used in this particular survey.*

CATI: Computer-Assisted Telephone Interviewing

CAPI: Computer-Assisted Personal Interviewing

APPENDIX B: Recommended core tobacco use questions

…as determined in the Workshop on Data for Monitoring Tobacco Use (March 1994)*

1. At the present time, do you smoke cigarettes every day, occasionally, or not at all?
2. Have you smoked at least 100 cigarettes in your life?
3. Have you ever smoked a whole cigarette?
4. Have you ever smoked cigarettes daily?
5. On how many of the last 30 days did you smoke at least one cigarette?
6. On those days when you smoked, how many cigarettes did you usually smoke?

7a. Thinking back over the last 7 days, starting with yesterday, how many cigarettes did you smoke on (yesterday)?

7b-g. How many cigarettes did you smoke on …(the day before)?

8. When did you stop smoking?
9. In what month and year did you stop smoking?
10. (if less than age 20) How old were you when you smoked your first whole cigarette?
11. (if less than age 20) How old were you when you first started smoking daily?
12. Excluding yourself, how many people smoke in your home every day or almost every day?
13. (If employed) Are you exposed to smoking in your place of work every day or almost every day?
14. Apart from your home (and place of work, if employed), are there any particular places where you are exposed to smoking every day or almost every day?

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APPENDIX C: Interpretation of Results

Interpretation of results (determining statistically significant differences)

To test if two parameters of interest (e.g., smoking rates in 1985 and 1991) are significantly different from each other, one must estimate the confidence interval (CI) around their estimated difference. If that CI contains zero, then we conclude that the difference is not statistically significant (i.e., we cannot rule out the possibility that the difference observed is due to chance because of the fact that we are dealing with samples). If it does not contain zero, then we conclude that the difference is statistically significant (i.e., the difference in point estimates reflects a real difference in our population(s) of interest). If we use a 95% CI, then we would be subject to erroneously inferring significance 1 time out of 20 (i.e., if we were to test for significance repeatedly, each time using different samples obtained with the same sample design). To obtain a 95% CI around the *difference* between two point estimates (A and B), we use the same formula as with CI's around other point estimates:

Upper 95% CI Limit=(A-B)+[1.96*square root (variance of (A-B))], and
Lower 95% CI Limit=(A-B)-[1.96*square root (variance of (A-B))],

Where square root (variance of (A-B))=square root [variance (A)+variance (B)-2 covariance (A,B)] and where “variance” represents an estimate of variance.

In the special case where A and B are obtained from independent samples, then covariance (A,B)=0 and the formula reduces to

Square root (variance of (A-B))=square root [variance (A)+ variance (B)] where (A,B) are independent.

Also, if A and B are independent, then one can quickly check for statistical significance of their difference by observing the CI around each point estimate. One of three scenarios will result:

1. The CI around the point estimates A and B do not overlap. For example, with a rate of 25% {+/- 2.0} and a rate of 19% {+/- 2.6}, the lower limit of the 25% rate is 23.0%, while the upper limit of the 19% rate is 21.5%. Then it can be shown that the difference between points A and B is statistically significant.
2. One point estimate lies inside the CI of the other estimate. For example, with a rate of 25% {+/-6.3} and a rate of 19% {+/-3.3}, the lower limit of the 25% rate is 18.7%, while the upper limit of the 19% rate is 22.3%. The CI of the 25% rate overlaps the 19% estimate. Thus, the difference between points A and B is not significantly different.
3. The CI around points A and B overlap, but each point estimate falls outside of the other point's CI. For example, rate of 25% {+/-3.5}; rate of 19% {+/-2.9}. The lower limit of the 25% rate is 21.5%, while the upper limit of the 19% rate is 21.9%. This result is inconclusive (i.e., the difference may or may not be statistically significant). If this is the outcome then the formula given above must be used to estimate the CI around (A-B). If the variances of points A and B are not given directly, then it may be deduced from the CI of each point estimate, using the formula Upper 95% CI Limit= (A)+ [1.96*square root(variance of A)]. As mentioned above, if the CI around A-B contains zero, then the difference is not statistically significant. If it does not contain zero, then the difference A-B is statistically significant.

If the point estimates A and B are not obtained from independent samples, then the covariance term is non-zero and it is not sufficient to know the variance or the CI each point A and B to determine if their difference is statistically significant. This is the case when comparing prevalence rates from the 1994/95 and 1996/97 NPHS. The two cross-sectional samples have a longitudinal component that overlaps, violating the assumption of independent samples. However, due to the large buy-ins in 1996/97, the longitudinal (i.e., non-independent) component of the sample is relatively small for Ontario, Alberta, Manitoba and for national estimates. Thus, for these geographical areas, one can say that the samples are *approximately* independent and can *cautiously* use the tests described above. It is not possible at present to estimate easily the true variance of differences between cross-sectional samples of the NPHS (i.e., accounting for the non-zero covariance). However, when examining transition data from the 1994/95 - 1996/97 longitudinal NPHS, such as the data on smoking transitions presented in this paper, CI's and variances were estimated using the Bootstrap technique.[26]

"Bootstrapping" or “jackknife” are weighted re-sampling procedures used to calculate coefficients of variations for totals and rates and to estimate standard errors used in the calculation of confidence intervals.[27,28] Bootstrapping was used on the cross-

sectional data on smoking prevalence for 1994/95 and 1996/97 NPHS, and a modified bootstrap program was used for 1985, 1991 and 1996 GSS and a jackknife technique for 1999 CTUMS. Such re-sampling procedures could not be done for 1989 NADS and 1990 HPS and were not available for 1994/95 SoSiC at the time of writing this report.

Proxy reporting in surveys on smoking

As mentioned earlier, studies have shown that proxy reporting may under-estimate smoking prevalence among young people aged 15 to 24. Ignorance about the tobacco use of other household members or reticence to report it are cited as two probable reasons for underestimation in general.[29] When parents report on smoking on behalf of their children, both ignorance and reticence are even more likely to be the case.

Surveys on smoking habits conducted by Statistics Canada during the 1960s to the early 1980s were Labour Force Survey (LFS) supplements that allowed for a high level of proxy reporting. Essentially, one household member aged 15 and older was asked questions on smoking habits for themselves (non-proxy) and for everyone else who lived in the household (proxy).

Unfortunately, the coding of the survey data files during the 1960s and 1970s did not allow for anyone to determine the exact level of proxy reporting and for which age and sex groups proxy reporting was taking place. The supplements from 1981, 1983 and 1986 allowed for the identification of proxy and non-proxy answers. Proxies comprised about 50% of responses for adults aged 15 and over in 1981 and 1983, and 26% in 1986. More importantly, male youth (age 15 to 19) proxies were 82% in 1981, 87% in 1983, and 54% in 1986; female youth proxies were 73% in 1981, 81% in 1983 and 53% in 1986. For young adults aged 20 to 24, males were 65% proxied in 1981, 70% in 1983 and 46% in 1986; females were 42% proxied in 1981, 48% in 1983 and 31% in 1986.

These LFS supplements were not only excluded from this study because of their high proxy reporting, but other reasons as well. Collection and sampling methodologies differ from some of the surveys included here; most importantly, the respondent was not selected randomly but because they were the first person age 15 and over who answered the telephone. While the sampling methodologies of these surveys are perfectly acceptable for deriving results in general, any attempt to remove proxy respondents from the estimates would leave the results based on a non-random sample. Since all the other surveys mentioned in the report are based on random sampling, comparisons could not be made with proxy-removed LFS supplements. As well, even though the question asked regarding present smoking behaviour in these supplement surveys is roughly similar to what can be found in the surveys analyzed in this report, these earlier surveys asked about past smoking behaviour first (“Have you ever smoked cigarettes, cigars, or a pipe?”). Thus, these LFS supplements succumb to the same problem of underreporting current and non-daily smokers as does the 1989 NADS, 1990 HPS, 1994 CADS and 1995 GSS.

Some of the major surveys on smoking conducted by Statistics Canada after 1985 allowed for proxy interviews, but the extent of this reporting and the reasons for allowing proxies were quite different from the earlier LFS supplements. For example, the 1991 GSS allowed proxy reporting only when the intended respondent had a major language difficulty or had an illness that prevented them from answering the questions. The total proxy value in the 1991 GSS that was associated with current non-smokers aged 15 to 24 was 1%. The 1994/95 NPHS allowed proxy reporting for the selected respondent only when a physical or mental illness/incapacity prevented the respondent from answering the questions. The total proxy associated with current non-smokers aged 15 to 24 was 5%. The 1996/97 NPHS allowed for proxies by the same criteria as the 1994/95 NPHS. The total proxy associated with current non-smokers aged 15 to 24 was 1% in 1996/97.

The level of proxy reporting in these three surveys was low (especially compared to the LFS supplements), and thus any underestimation of smoking among young people caused by these proxies is considered to be negligible. While some degree of caution should be taken when comparing these data on young people with other data years, the caution is not enough to warrant outright exclusion of the data for analysis or require re-working the sampling weights to exclude the proxy interviews.

Inclusion of "not stated" category in calculations

There are two ways to produce the rates when calculating survey results: you can either exclude or include respondents who did not answer the question at hand but who were classified as respondents to the overall survey. By *excluding* those that did not state an answer, you reduce the total population figure and essentially make an assumption about what those people would have stated as an answer (i.e., their smoking status is distributed in the same way as for people providing an answer). For example, if 100 people are asked whether they smoke daily, occasionally or not at all, these are possible results:

28 say daily, 10 say occasionally, 59 say not at all, and 3 do not state their smoking status. By *excluding* the "not stated" responses, you are basing your results on a sample of 97 people. Assuming equal weights for illustration, the results of this survey question would be 29% daily smokers, 10% occasional smokers and 61% who do not smoke at all. However, *including* the "not stated" responses provides a more accurate picture about what people actually said, and does not make an assumption about what the people who did not state anything *may* have said. By including the not stated responses, the unweighted results would be 28% daily smokers, 10% occasional smokers, 59% non-smokers, and 3% not stated.

Deciding on exclusion or inclusion of the "not stated" category when calculating rates can often boil down to a matter of personal preferences. There is no rule about using one method or another. However, in this working paper, it seemed more appropriate to illustrate the real level of *stated* responses to daily and occasional smoking, rather than inferring that those who did not state an answer *may* have had the same smoking status distribution as other respondents. While the percentage of not-stated responses on smoking questions presented in this working paper amount to less than 2% of all responses, it may make a difference when examining the data at the level of detail that we have done here.

Multiple comparisons

When simply determining whether or not there was significant change between two data years, the formulae presented in "Interpretation of Results" holds. However, when one wishes to make a joint significance statement about the change between multiple comparisons, the level of confidence drops from a minimum of 95% to a minimum of 90%. For example, if there was no significant change from 1985 to 1991, but there was a significant change from 1985 to 1994/95, one can state with at least 90% confidence that *simultaneously* that (1) there was no significant change from 1985 to 1991 and (2) there was a significant change from 1985 to 1994/95. There are ways to adjust to retain the joint statement at a minimum of 95% confidence, such as the Bonferroni method.[30] However, there are those who assert that these types of adjustments do little to solve the problems at the heart of making multiple comparisons.[31] At least one author suggests that as long as it is made clear how many comparisons have been made and that all non-significant results have been reported along with the significant results, there is no need to make such adjustments. Since this report presents all comparisons and the significance of each comparison, it was decided that such adjustments were not required. However, work is underway at Statistics Canada to try to determine the exact confidence level for the overlapping years presented in this paper.

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