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1.0 Introduction

The 1996 Sun Exposure Survey(SUNX) was conducted by Statistics Canada from September 4th, to October 6th, 1996. The project was sponsored by the Institute of Health Promotion Research, part of the faculty of Graduate Studies at the University of British Columbia. The survey was funded by the:

National Cancer Institute of Canada,
The Canadian Dermatology Association,
The Canadian Association of Optometrists,
Environment Canada,
Health Canada, and
BC Tel.

This manual contains a brief overview of the survey. Anyone interested in obtaining further information about the survey may contact either of the following people:

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IT IS IMPORTANT FOR USERS TO BE FAMILIAR WITH THE CONTENTS OF THIS DOCUMENT BEFORE

PUBLISHING OR OTHERWISE RELEASING ANY ESTIMATES DERIVED FROM THE MICRO DATA FILE OF THE 1996 SUN EXPOSURE SURVEY (SUNX).

The 1996 Sun Exposure Survey was conducted under the authority of the Statistics Act, Revised Statutes of Canada, 1985, Chapter S19. Collection plans for the survey conformed to the requirements of Treasury Board's Management of Government Information Holdings Policy 1989, and is registered under Collection Number STC/SSD-040-75053 (English) and SQC/SSD-040-75053 (French).

2.0 Background

Little is known about Canadians' sun-exposure behaviour or how they protect themselves from ultra-violet radiation. Knowledge about exposure and protective behaviours will assist in developing and implementing effective strategies for preventing sun-related diseases in Canada. The number of people diagnosed with sun-related diseases such as skin cancer and serious eye damage has been increasing over the past decade; it has been estimated that about 50,000 new cases of these diseases will be diagnosed in 1997. Taking appropriate action to protect oneself from the sun and other sources of ultra-violet radiation may significantly reduce the risk of skin cancer and eye damage.

An advisory committee of national organizations and agencies involved in sun-exposure, protection and health promotion research has provided consultation and direction to the research team. This survey was conducted as a pilot test in September of 1995 and minimal change was made for the conduct of the full survey in 1996. This was a cost-recovery survey, sponsored by the Institute of Health Promotion Research at the University of British Columbia. They received funding for this project from a number of sources including the National Cancer Institute of Canada, the Canadian Dermatology Association, the Canadian Association of Optometrists, Environment Canada, Health Canada, and BC Tel. The Institute of Health Promotion Research was responsible for analysis of the survey results.

The purpose of this research is to assess the sun-exposure and protective behaviours of people living in the five regions within Canada and builds on preliminary work funded by Environment Canada, the Canadian Dermatology Association, and Health Canada. The data collected during the research project will be disseminated to a variety of stakeholders to facilitate the development of a comprehensive strategy to prevent negative health outcomes associated with excessive exposure to the sun and other sources of ultra-violet rays.

Statistics Canada conducted the 1996 Sun Exposure Survey as a national survey to measure people's

awareness of the health risks associated with exposure to the sun and to learn how people protect themselves against such risks. This Random Digit Dialling (RDD) survey consisted of a sample of 12,065 telephone numbers across Canada. The expected number of respondents was approximately 4000 people, aged 15 and over. As a result we were able to obtain 4,023 completed interviews.

Data collection commenced the week of September 4, 1996 and continued for approximately 5 weeks. The interviewing was centralized in Ottawa and was conducted by the interviewers of Operations and Integration Division (O&ID), using Computer Assisted Telephone Interviewing (CATI). The CATI application was developed in the survey software “Interviewer” version 3.7.2 by members of the Operations Research and Development Division (ORDD). Interviewers asked questions about the amount of time the selected respondent spent in the sun during the summer (June to August) or during winter trips to sunny climates and what they did to protect themselves from the sun. Additional questions were used to measure attitudes about health risks and protective behaviours, parents of children aged 12 or under were asked questions about their children’s exposure to the sun.

3.0 Objectives

The two main objectives of the survey were firstly, to establish baseline measures of protection and exposure behaviours since these behaviours have never before been addressed in a national health survey; and secondly, to measure attitudes on risk perception and the need for protection.

The survey results were used to produce regional-level estimates. The sample size was not sufficient for provincial or sub-provincial analysis. Some of the survey collection procedures previously used in the 1995 Sun Exposure Test were changed in order to obtain a higher response rate. These changes included revisions to the introduction screens for the CATI application, telephone call management system, training, training manual, and respondent refusal process. All of the above methods were used to obtain a higher response rate than that obtained in the 1995 Sun Exposure Test. Additionally, an introductory letter was sent by the Chief Statistician of Canada to a sub sample of respondents. This sub sample represented approximately half of the individual household telephone numbers corresponding to private residences. All changes were funded by Special Surveys Division.

4.0
Concepts and Definitions

Since the Sun Exposure Survey was conducted over the telephone, easy to understand terms were used throughout the survey to avoid long explanations. Please refer to Chapter 12 for the detailed questionnaire. Unlike the questions and univariate counts included in Chapter 13, Chapter 12 includes the version that was used by the interviewers with selected household respondents.

Some standard concepts and definitions should be used in the analysis and interpretation of this data. The survey questions were designed with these definitions in mind.

1. Respondents were asked about protective behaviours if they spent on average at least 30 minutes per day in the sun.

2. Sunburn: any reddening of the skin received either from the sun or artificial methods of suntanning. Four types of sunburn were distinguished: blistering burns which required medical attention, blistering burns which did not require medical attention, redness or sensitivity with peeling, redness or sensitivity without peeling.

3. Pre-cancerous skin condition was defined as red spots or patches or suspicious moles.

4. Data collected for individuals 12 years of age and under was a proxy response from the parent. These responses do not necessarily refer to a single child 12 years of age or under but to all the parents' children in that age group.

5. Question 603A was a question which asked about the ethnic or cultural background of the respondent's parents or grandparents. The categories are based on visible minority status, ethnic or cultural background questions developed at Statistics Canada for other surveys.

6. The block of questions pertaining to sun exposure during winter travel is based on travel conducted between October 1995 and March 1996.

5.0
Survey Methodology

The Sun Exposure Survey was administered between September 4 and October 6, 1996 as a random digit dialling (RDD) survey, a technique whereby telephone numbers are generated randomly by computer.

5.1 [redacted]

[redacted]

persons 15 years of age and over living in Canada with the following two exceptions:

1. Residents of the Yukon and Northwest Territories; and
2. Full-time residents of institutions.

Because the survey was conducted using a sample of telephone numbers, households (and thus persons living in households) that do not have telephones were excluded from the sample population. People without telephones account for less than 3% of the target population. However, the survey estimates have been weighted to include persons without telephones.

5.2 [redacted]

[redacted]

represented in the sample, each of the ten provinces was divided into strata or geographic areas. Generally, for each province, one stratum represented the Census Metropolitan Areas (CMAs) of the province and a second stratum represented the non-CMAs. In Ontario and Quebec, the CMAs of Toronto and Montreal represented a third stratum. CMAs are areas defined by the Census and correspond roughly to cities with populations of 100,000 or more.

5.3 [redacted]

[redacted]

across Canada. The initial sample size of 12,065 phone numbers took into account the expected RDD hit rate (proportion of telephone numbers belonging to households). The anticipated response rate target was 70%.

Sample was allocated by region (Atlantic, Quebec, Ontario, Prairies, B.C.), using the square root allocation method. This method ensured that the design effects would stay close to 1.0 at both the regional and national level. C.V. levels of 13.0% or lower at the regional level and 5.0% or lower at the national level were ensured using this method. For those regions containing more than one province, sample was allocated proportionally by size in each province. This meant that the sampling fraction remained constant throughout the region.

5.4 [redacted]

[redacted]

using a refinement of RDD sampling called the Elimination of Non-Working Banks (ENWB) method. Using ENWB, the first stage in selecting the sample was to attempt to identify all working banks (i.e. all banks with at least one residential telephone number). This set of working banks became the frame for the survey. A bank is defined as the first 8 digits of the 10-digit telephone number (including area code). Thus, all banks with only unassigned, non-working, or business telephone numbers are excluded from the survey frame. The information needed to assemble the frame came from various telephone companies across Canada.

Each working bank was assigned to the proper province-stratum combination. Next, a systematic sample of banks was selected within each stratum. For each selected bank, a two digit number between 00 and 99 was generated at random. The random number was added to the bank to form a complete telephone number. This method allowed listed and unlisted residential numbers, as well as business and non-working phone numbers, to have a chance of being in the sample. At the same time it gave a much higher chance of reaching a residence than would be obtained if the last four digits of the number were randomly generated.

Each telephone number in the sample was dialled to determine whether or not it reached a household. For each household reached, an attempt was made to list all eligible household members and to sample one of these at random.

The random selection was set up such that all people in the household aged 15 or more had an equal probability of selection.

6.0 Data Collection

Data collection for the 1996 Sun Exposure Survey utilized Computer-Assisted Telephone Interviewing (CATI). In a CATI application, the survey questions and response categories are programmed with the appropriate skip logic between questions. The interviewer reads the question to the respondent and enters the respondent's answer. Thus, data collection and data capture occur simultaneously. The application is programmed to ensure that only valid answers can be entered, that the proper flow between questions is automatic, that the discrepancies between answers to related questions are passed through an edit and, if necessary, that the respondent is asked to verify or correct the response(s) in error.

6.1

contact and SUNX questions. The first section contained questions used to: (a) determine whether the telephone number belonged to a household, (b) determine the probability of that household being selected for the survey (i.e. number of other phone numbers belonging to the same household), (c) list the age, sex and marital status of each household member, and (d) randomly select one of the household members to complete the Sun Exposure Survey questions.

The 1996 Sun Exposure survey was an extension of the 1995 Sun Exposure Pilot Survey. Minimal change to questionnaire content was instituted in order to eliminate

the need of retesting the 1996 survey.

The CATI questionnaire was throughly tested using a series of predefined scenarios. Each scenario tested one aspect of the skip logic within the questionnaire. After the data was input the output was compared for accuracy.

6.2 [redacted]

[redacted]

stages of the data collection process and training process. A training document was developed to inform the interviewing staff of the particulars related to the subject matter content of the 1996 Sun Exposure Survey. This document, combined with two training sessions, one on survey content the other on refusal conversion, provide the background required to maximize response to the survey.

The training package and sessions were conducted by Marc Nadeau of the Operations Research and Development Division ORDD at Statistics Canada. Mr. Nadeau conducted a 4 hour subject matter training session with the interviewers. Training of survey staff was split into 3 sessions of 12 interviewers each. This training included mock interviews which took advantage of the interaction required between trainer and collection staff to fully understand survey content and survey objectives. As a result, approximately 36 interviewers were trained.

All CATI interviewers are under the supervision of senior collection managers (Operations and Integration Division, O&ID) who are responsible for ensuring that interviewers are familiar with the concepts and procedures of the survey, and also for periodically monitoring their live interviews throughout the collection period. Monitoring of the interviewers consisted of the supervisor listening to the telephone interview and remotely watching the responses being entered into the CATI application. Any errors or problems were noted and immediately brought to the attention of the interviewer.

During the first week of interviewing programmers from ORDD were on call to handle any refinements that the interviews might justify as critical to the successful flow of the survey. No major refinements were required except for a variable addition requested by the client. The added variable related to the "Ethnic or Cultural Background" of the survey respondent.

6.3 Methodology

used each time a different telephone number was dialled by the interviewer. If the telephone number belonged to a household, the household members were listed in order of age, from oldest to youngest. One household member aged 15 or more was selected at random by the computer.

The SUNX Survey was then conducted with the selected person. If this selected person was not available to be interviewed at that time, an attempt was made to determine a convenient time to phone back to complete the interview. Because the survey included questions on behaviour, attitudes and knowledge, all interviews had to be conducted with the selected respondent only; no proxy reporting was accepted.

6.4

office (Operations and Integration Division). All interviews took place between 9:00 a.m. and 9:00 p.m. local time (ie. respondent's time) between Monday and Thursday. British Columbia was the exception where interviewing ceases at 8:30 p.m. local time. On Friday and Sunday the survey schedule was modified to start at 1:00 p.m. to 6:00 p.m. local time. No interviews took place on Saturdays. The collection period for this survey was September 4th to October 6th which took into consideration an extension of one extra week to accommodate an increase in the sample in order to ensure 4000 completed interviews.

7.0 Data Processing

The main output of the Sun Exposure Survey is a "clean" micro data file. This Chapter presents a brief summary of

the processing steps involved in producing this file.

7.1

Computer-assisted interviewing means that the data collection and capture are combined into a single process.

7.2

However, 4 respondent records were unusable due to refusal to answer the question on respondent age. This made it impossible to weight these records so they were eliminated from the file. To accommodate most statistical packages, all blank fields were converted to a numeric value. Questions that were skipped because of a flow pattern in the questionnaire were assigned a code to indicate a "valid skip" or an imputed code was entered where applicable. Responses of "don't know" or "refused" were also assigned specific codes. Any question that was skipped because of a flow pattern associated with an earlier response of "don't know" or "refused" was assigned a value of "not stated", because it is uncertain whether or not the question would have applied to the person.

7.3

Variables

variables were created to accommodate user needs. These include demographic variables as well as incidence of sun exposure.

A derived variable is a new variable developed with the aid of multiple variables. As such this new variable was not asked as a question on the survey. Most derived variables have a DV identifier present in the variable name.

A number of these derived variables exist on the Public Use micro data file. Chapter 13, Record Layout and Univariates, provides the methodology for the development of each derived variable in the notes section accompanying each variable. Two variables however require further explanation, Income Adequacy and Ethnic - Cultural

Background.

Income Adequacy

The Income Adequacy DVINCAD variable combines the concepts of household size with household income. The intention of this derived variable is to index or categorize responses by income level based on the idea that size of the household affects the respondent's prosperity. This index can then be used as an indicator for understanding the shared behaviours that income might precipitate among respondents of similar economic means.

This variable was developed by Health Canada and was specifically requested by the sponsor of the survey. The General Social Surveys (GSS) and National Population Health Surveys have perviously used this variable.

One should be cautious when comparing the Sun Exposure version of this variable to that of the GSS and NPHS. The income gradients for lower middle and middle income are not identical to those used in the GSS and NPHS surveys. The question requesting the household income of the respondent was not asked in the same way for the Sun Exposure survey as was asked within the NPHS and GSS surveys.

The notes at the bottom of DVINCAD in Chapter 13 provides an outline of how the variable was derived and the differences between the GSS, NPHS income adequacy variable and that of the Sun Exposure.

Ethnic - Cultural background of respondents parents or grandparents

The ethnic or cultural background question used in the 1996 Sun Exposure Survey asked respondents to indicate from which background their parents or grandparents came. The respondent had the potential of indicating all responses that applied. The following indicates the exact wording of the question and the possible response categories.

> Canadians come from many ethnic and cultural backgrounds. From which backgrounds did your parents or grandparents come? (Instruction to interviewer: Do not read list, Mark all responses that apply.
>
> ...British, French other European
> ...Chinese, Japanese, Korean, Filipino
> ...East Indian (from India, Pakistan, Bangladesh, East Africa, etc.)

...Black (from Africa, Caribbean, Haiti, U.S.A., Canada, etc.
...North American Indian, Métis, Inuit/Eskimo
...Arab (from Egypt, Jordan, Lebanon, Iraq, etc.)
...West Asian (from Syria, Turkey, Afghanistan, Armenia, Iran, etc.)
...South East Asian (from Burma, Laos, Cambodia/Kampuchea, Thailand, Vietnam, etc.)
...North African (from Egypt, Morocco, Algeria, Tunisia, etc.)
...Latin America (from Mexico, Central America or South America)
...Canadian
...Other (specify)

Due to confidentiality concerns only Canadian, European, East-Asian and Other categories could be provided on the publicly released micro data file. These four categories represent individual variables on the file. Analysis of these variables should take into consideration that a respondent could indicate that they are any combination of the four responses.

DV603VEC is a vector variable which combines responses into one variable in order to more easily analyse this variable against others. Chapter 13, Record layout and Univariates indicates how this variable was derived.

7.4 [redacted]

[redacted]
such as the SUNX survey is that each person in the sample "represents", besides himself or herself, several other persons not in the sample. For example, in a 2% simple random sample of the population, each person in the sample represents 50 persons in the population.

The weighting phase is a step which calculates this number for each record. This weight must be used to derive estimates from the micro data file.

For example, if the number of people in Canada who ever actively sought a suntan during the past year is to be estimated, it is done by selecting the records referring to people with that characteristic (Q406A=1) and summing the weights of those records.

Data collected for individuals 12 years of age and under was a proxy response from the parent. These responses do not necessarily refer to a single child 12 years of age or

under but all to the parents' children in that age group. Because the data is a proxy response and could refer to one or more children, it is not possible to use the wieghted data to describe the characteristics of the population 12 years of age and under with any certainty.

Details of the method used to calculate these weights are presented in Chapter 11.

7.5 Confidential Information

described above differ in a number of important respects from the survey 'master' files held by Statistics Canada. These differences are the result of actions taken to protect the anonymity of individual survey respondents. Users requiring access to information excluded from the Micro data files may purchase custom tabulations. Estimates generated will be released to the user, subject to meeting the guidelines for analysis and release outlined in Chapter 9 of this document.

Geographic Identifiers: The survey master data file includes geographic identifiers for region, province and stratum (CMA, non-CMA, Toronto, Montreal). The public use Micro data file does not contain the identifiers for province and stratum. Because of the small sample size, estimates at the province and sub-provincial level would not be statistically reliable.

8.0
Data Quality

8.1

numbers were called. 5,847 of these were assumed to belong to households and 6,218 belonged to non-households. Of the 5,847 numbers, 231 were called repeatedly, but no contact was made; for the purpose of weighting and calculating response rates, we assume that these numbers belong to households. 1,589 of the households were non-responding because either they refused or the selected respondent could not be reached during the survey collection period. A complete interview was administered to the selected respondent in the remaining 4,027 households. However, due to incomplete roster information (age/sex data), 4 respondents were dropped from the sample. The final sample, of respondents 15 years of age and over, totalled 4,023.

8.2

collected from and about a sample of individuals. Somewhat different estimates might have been obtained if a complete census had been taken using the same questionnaire, interviewers, supervisors, processing methods, etc. as those actually used in the survey. The difference between the estimates obtained from the sample and those resulting from a complete count taken under similar conditions is called the sampling error of the estimate.

Errors which are not related to sampling may occur at almost every phase of a survey operation. Interviewers may misunderstand instructions, respondents may make errors in answering questions, the answers may be incorrectly entered on the computer and errors may be

introduced in the processing and tabulation of the data. These are all examples of non-sampling errors.

Over a large number of observations, randomly occurring errors will have little effect on estimates derived from the survey. However, errors occurring systematically will contribute to biases in the survey estimates. Considerable time and effort was made to reduce non-sampling errors in the survey. Quality assurance measures were implemented at each step of the data collection and processing cycle to monitor the quality of the data. These measures included extensive training of interviewers with respect to the survey procedures and CATI application; monitoring of interviewers to detect problems of questionnaire design or misunderstanding of instructions; and testing of the CATI application to ensure that range checks, edits, imputes and question flow were all programmed correctly.

8.2.1

Total non-response can be a major source of non-sampling error in many surveys, depending on the degree to which respondents and non-respondents differ with respect to the characteristics of interest. Total non-response occurred when the selected person could not be contacted or refused to participate in the survey. Total non-response was handled by adjusting the weight of individuals who responded to the survey to compensate for those who did not respond.

8.2.2

Partial non-response to the survey occurred when the respondent refused to answer a question, or could not recall the requested information. Partial non-response is indicated by codes on the Micro data file.

8.2.3

As mentioned in Chapter 5.1 (Population Coverage), less than 3% of households in Canada do not have telephones. Individuals living in non-telephone households may have unique characteristics which will not be reflected in the survey estimates. Users should be cautious when analysing subgroups of the population which have characteristics that may be correlated with non-telephone ownership.

8.2.4 [redacted]

Since it is an unavoidable fact that estimates from a sample survey are subject to sampling error, sound statistical practice calls for researchers to provide users with some indication of the magnitude of this sampling error. The basis for measuring the potential size of sampling errors is the standard error of the estimates derived from survey results. However, because of the large variety of estimates that can be produced from a survey, the standard error of an estimate is usually expressed relative to the estimate to which it pertains. This resulting measure, known as the coefficient of variation (C.V.) of an estimate, is obtained by dividing the standard error of the estimate by the estimate itself and is expressed as a percentage of the estimate.

[redacted]

For example, suppose that, based upon the survey results, one estimates that 19.3% of Canadians had a job that required them to work outdoors during June to August of 1996, and this estimate is found to have standard error of 0.64%. Then the coefficient of variation of the estimate is calculated as:

$$\left(\frac{.0064}{.193}\right) x\, 100\% = 3.3\%$$

8.3 [redacted]

[redacted]

had for not protecting themselves from the sun. The majority of these responses were in actuality listed as reasons shown in Questions 420A to 420E. In order to reduce double counting Q421 responses were recoded into Q420A to Q420E where ever possible and then deleted from Q421.

9.0 Guidelines for Tabulation, Analysis and Release

This Chapter of the documentation outlines the guidelines to be adhered to by users tabulating, analysing, publishing or otherwise releasing any data derived from the survey Micro data file. With the aid of these guidelines, users of Micro data should be able to produce the same figures as those produced by Statistics Canada and, at the same time, will be able to develop currently unpublished figures in a manner consistent with these established guidelines.

9.1 [redacted]

[redacted]

derived from these Micro data file correspond to those produced by Statistics Canada, users are urged to adhere to the following guidelines regarding the rounding of such estimates:

a) Estimates in the main body of a statistical table are to be rounded to the nearest thousand units using the normal rounding technique. In normal rounding, if the first or only digit to be dropped is 0 to 4, the last digit to be retained is not changed. If the first or only digit to be dropped is 5 to 9, the last digit to be retained is raised by one. For example, in normal rounding to the nearest 1000, if the last two digits are between 000 and 499, they are changed to 000 and the preceding digit (the thousands digit) is left unchanged. If the last digits are between 500 and 999 they are changed to 000 and the preceding digit is incremented by 1.

b) Marginal sub-totals and totals in statistical tables are to be derived from their corresponding unrounded components and then are to be rounded themselves to the nearest 1000 units using normal rounding.

c) Averages, proportions, rates and percentages are to be computed from unrounded components (i.e. numerators

and/or denominators) and then are to be rounded themselves to one decimal using normal rounding. In normal rounding to a single digit, if the final or only digit to be dropped is 0 to 4, the last digit to be retained is not changed. If the first or only digit to be dropped is 5 to 9, the last digit to be retained is increased by 1.

d) Sums and differences of aggregates (or ratios) are to be derived from their corresponding unrounded components and then are to be rounded themselves to the nearest 1000 units (or the nearest one decimal) using normal rounding.

e) In instances where, due to technical or other limitations, a rounding technique other than normal rounding is used resulting in estimates to be published or otherwise released which differ from corresponding estimates published by Statistics Canada, users are urged to note the reason for such differences in the publication or release document(s).

f) Under no circumstances are unrounded estimates to be published or otherwise released by users. Unrounded estimates imply greater precision than actually exists.

9.2 Guidelines for Tabulation

not self-weighting. When producing simple estimates, including the production of ordinary statistical tables, users must apply the proper sampling weight.

If proper weights are not used, the estimates derived from the Micro data file cannot be considered to be representative of the survey population, and will not correspond to those produced by Statistics Canada.

Users should also note that some software packages may not allow the generation of estimates that exactly match those available from Statistics Canada, because of their treatment of the weight field.

9.2.1 estimates: Categorical vs. Quantitative

Before discussing how the 1996 Sun Exposure Survey data can be tabulated and analysed, it is useful to describe the two main types of point estimates of population characteristics which can be generated.

Categorical Estimates

Categorical estimates are estimates of the number, or percentage of the surveyed population possessing certain characteristics or falling into some defined category. The number of people who spent 30 or more minutes (on average) in the sun each day during their leisure hours in the months of June to August, 1996 and the proportion of people who ever actively sought a suntan in the past year are examples of such estimates. An estimate of the number of persons possessing a certain characteristic may also be referred to as an estimate of an aggregate.

Quantitative Estimates

An example of a quantitative estimate is the total number of blistering burns which required medical attention experienced by Canadians during June to August of 1996. Another is the average number of blistering burns which required medical attention experienced by Canadians during June to August of 1996. For this average, the numerator is an estimate of the total number of blistering burns which required medical attention (experienced by all respondents who answered Q409B), and its denominator is the total Canadian population (since all respondents answered Q409B).

9.2.2 Estimates

Estimates of the number of people with a certain characteristic can be obtained from the Micro data file by summing the final weights of all records possessing the characteristic(s) of interest. Proportions and ratios of the form X/Y are obtained by:

(a) summing the final weights of records having the characteristic of interest for the numerator (X),
(b) summing the final weights of records having the characteristic of interest for the denominator (Y), then
(c) dividing the numerator estimate by the denominator estimate.

9.2.3 Estimates

Estimates of quantities can be obtained from the Micro data file by multiplying the value of the variable of interest by the final weight for each record, then summing this quantity over all records of interest. For example, to obtain an estimate of the total number of blistering burns which required medical attention that Canadians (15 years of age and older) have had during June to August of 1996, multiply the value reported in Q409B (number of blistering burns which required medical attention experienced during June to August of 1996) by the final weight for the record, then sum this value over all records.

9.3 Analysis

design, with stratification and multiple stages of selection, and unequal probabilities of selection of respondents. Using data from such complex surveys presents problems to analysts because the survey design and the selection probabilities affect the estimation and variance calculation procedures that should be used.
While many analysis procedures found in statistical packages allow weights to be used, the meaning or definition of the weight in these procedures differ from that which is appropriate in a sample survey framework, with the result that while in many cases the estimates produced by the packages are correct, the variances that are calculated are almost meaningless.

For many analysis techniques (for example linear regression, logistic regression, analysis of variance), a method exists which can make the application of standard packages more meaningful. If the weights on the records are rescaled so that the average weight is one (1), then the results produced by the standard packages will be more reasonable; they still will not take into account the stratification and clustering of the sample's design, but they will take into account the unequal probabilities of selection. The rescaling can be accomplished by dividing each weight by the overall average weight before the analysis is conducted.

In order to provide a means of assessing the quality of tabulated estimates, Statistics Canada has produced a set of Approximate Sampling Variability Tables (commonly referred to as "C.V. Tables") for the Sun Exposure Survey. These tables can be used to obtain approximate coefficients of variation for categorical-type estimates and proportions. See Chapter 10 for more details.

9.4 [redacted]

[redacted]

Micro data tapes, users should first determine the number of respondents who contribute to the calculation of the estimate. If this number is less than 30, the weighted estimate should not be released regardless of the value of the coefficient of variation for this estimate. For weighted estimates based on sample sizes of 30 or more, users should determine the coefficient of variation of the **rounded** estimate and follow the guidelines in Chapter 10.

Quality Level Guidelines

Quality Level of Estimate	Guidelines
1. Acceptable	Estimates have: a sample size of 30 or more, and low coefficients of variation in the range 0.0% - 16.5% No warning is required.
2. Marginal	Estimates have: a sample size of 30 or more, and high coefficients of variation in the range 16.6% - 33.3%. Estimates should be flagged with the letter M (or some similar identifier). They should be accompanied by a warning to caution subsequent users about the high levels of error, associated with the estimates.
3. Unacceptable	Estimates have: a sample size of less than 30, or very high coefficients of variation in excess of 33.3%. Statistics Canada recommends not to release estimates of unacceptable quality. However, if the user chooses to do so then estimates should be flagged with the letter U (or some similar identifier) and the following warning should accompany the estimates: "The user is advised that . . . (specify the data) . . . do not meet Statistics Canada's quality standards for this statistical program. Conclusions based on these data will be unreliable, and most likely invalid. These data and any consequent findings should not be published. If the user chooses to publish these data or findings, then this disclaimer must be published with the data."

10.0
Approximate Sampling Variability Tables

In order to supply coefficients of variation which would be applicable to a wide variety of categorical estimates produced from this Micro data file and which could be readily accessed by the user, a set of Approximate Sampling Variability Tables has been produced. These "look-up" tables allow the user to obtain an approximate coefficient of variation based on the size of the estimate calculated from the survey data.

The coefficients of variation (C.V.) are derived using the variance formula for simple random sampling and incorporating a factor which reflects the multi-stage, clustered nature of the sample design. This factor, known as the design effect, was determined by first calculating design effects for a wide range of characteristics and then choosing from among these a conservative value to be used in the look-up tables which would then apply to the entire set of characteristics.

The following table shows the design effects, sample sizes and population counts which were used to produce the Approximate Sampling Variability Tables. The population numbers are the revised demographic estimates based on the 1991 Census, including non-permanent residents; these Census counts are projected forward using data on births, deaths and migration. The population counts in the table are the demography projections for the population 15 years of age and over, for September 1996, the reference month for the survey weights.

Table of Design Effects

Region	Design Effect	Sample Size	Population
Atlantic	1.20	552	1,919,853
Quebec	1.20	993	5,915,049
Ontario	1.21	1,087	8,930,985
Prairies	1.16	750	3,806,536

Region	Design Effect	Sample Size	Population
B.C.	1.17	641	3,091,902
Canada	1.27	4,023	23,664,325

All coefficients of variation in the Approximate Sampling Variability Tables are approximate and, therefore, unofficial. Estimates of actual variance for specific variables may be obtained from Statistics Canada on a cost-recovery basis. The use of actual variance estimates would allow users to release otherwise unreleaseable estimates, i.e. estimates with coefficients of variation in the 'confidential' range.
Remember: If the number of observations on which an estimate is based is less than 30, the weighted estimate should not be released regardless of the value of the coefficient of variation for this estimate. This is because the formulas used for estimating the variance do not hold true for small sample sizes.

10.1 [redacted] for Categorical Estimates

[redacted]
approximate coefficients of variation from the Sampling Variability Tables for estimates of the number, proportion or percentage of the surveyed population possessing a certain characteristic and for ratios and differences between such estimates.

Rule 1: Estimates of Numbers Possessing a Characteristic (Aggregates)

The coefficient of variation depends only on the size of the estimate itself. On the Sampling Variability Table for the appropriate geographic area, locate the estimated number in the left-most column of the table (headed "Numerator of Percentage") and follow the asterisks (if any) across to the first figure encountered. This figure is the approximate coefficient of variation.

Rule 2: Estimates of Proportions or Percentages Possessing a Characteristic

The coefficient of variation of an estimated proportion or percentage depends on both the size of the proportion or percentage and the size of the numerator of the proportion

or percentage. Estimated proportions or percentages are relatively more reliable than the corresponding estimates of the numerator of the proportion or percentage, when the proportion or percentage is based upon a sub-group of the population. For example, the proportion of people in Canada who had a job that required them to work outdoors during June to August of 1996 is more reliable than the estimated number of people in Canada who had a job that required them to work outdoors during June to August of 1996. (Note that in the tables the coefficients of variation decline in value reading from left to right.)

When the proportion or percentage is based upon the total population of the geographic area covered by the table (i.e. if the denominator is equal to the total population), the coefficient of variation of the proportion or percentage is the same as the coefficient of variation of the numerator of the proportion or percentage. In this case, Rule 1 can be used.

When the proportion or percentage is based upon a subset of the total population (e.g. those in a particular sex or age group), reference should be made to the proportion or percentage (across the top of the table) and to the numerator of the proportion or percentage (down the left side of the table). The intersection of the appropriate row and column gives the coefficient of variation.

Rule 3: Estimates of Differences Between Aggregates or Percentages

The standard error of a difference between two estimates is approximately equal to the square root of the sum of squares of each standard error considered separately. That is, the standard error of a difference ($\hat{d} = \hat{X}_1 - \hat{X}_2$) is:

$$\sigma_{\hat{d}} = \sqrt{(\hat{X}_1 \alpha_1)^2 + (\hat{X}_2 \alpha_2)^2}$$

where $\hat{X}_1$ is estimate 1, $\hat{X}_2$ is estimate 2, and α_1 and α_2 are the coefficients of variation of $\hat{X}_1$ and $\hat{X}_2$ respectively. The coefficient of variation of $\hat{d}$ is given by $\sigma\hat{d}/\hat{d}$. This formula is accurate for the difference between separate and uncorrelated characteristics, but is only approximate otherwise.

Rule 4: Estimates of Ratios

A ratio is an estimate taking the form $\hat{R} = \hat{X}_1/\hat{X}_2$ where $\hat{X}_1$ and $\hat{X}_2$ are both quantities estimated from the survey. In the case where the numerator ($\hat{X}_1$) is a subset of the denominator ($\hat{X}_2$), the ratio should be converted to a percentage and Rule 2 applied. This would apply, for

example, to the case where the denominator is the number of people who had a job which required them to work outdoors during June to August of 1996 and the numerator is the number of people who had a job that required them to work outdoors during June to August of 1996 and were aged 25 to 44 years.

The ratio of the number of people who are concerned about protecting themselves from sunburn when they are out in the sun as compared to the number of people who are concerned about protecting themselves from skin cancer when they are out in the sun is an example where the numerator is not a subset of the denominator. In this case, the standard deviation of the ratio of the estimates is approximately equal to the square root of the sum of squares of each coefficient of variation considered separately multiplied by R. That is, the standard error of a

$$\sigma_{\hat{R}} = \hat{R}\sqrt{\alpha_1^{\,2} + \alpha_2^{\,2}}$$

ratio ($\hat{R} = \hat{X}_1/\hat{X}_2$) is:
where α_1 and α_2 are the coefficients of variation of $\hat{X}_1$ and $\hat{X}_2$ respectively. The coefficient of variation of $\hat{R}$ is given by $\sigma R/R$. The formula will tend to overstate the error, if $\hat{X}_1$ and $\hat{X}_2$ are positively correlated and understate the error if $\hat{X}_1$ and $\hat{X}_2$ are negatively correlated.

Rule 5: Estimates of Differences of Ratios

In this case, Rules 3 and 4 are combined. The cv's for the two ratios are first determined using Rule 4, and then the cv of their difference is found using Rule 3.

10.1.1 [redacted] tables for Categorical Estimates

The following 'real life' examples are included to assist users in applying the foregoing rules.

[redacted]

Example 1: Estimates of Numbers Possessing a Characteristic (Aggregates)

Suppose that a user estimates that 4,558,536 people in Canada had a job that required them to work outdoors during June to August of 1996. How does the user determine the coefficient of variation of this estimate?

(1) Refer to the c.v. table for CANADA.

(2) The estimated aggregate (4,558,536) does not

appear in the left-hand column (the 'Numerator of Percentage' column), so it is necessary to use the figure closest to it, namely 5,000,000.

(3) The coefficient of variation for an estimated aggregate is found by referring to the first non-asterisk entry on that row, namely, 3.3%.

(4) So the approximate coefficient of variation of the estimate is 3.3%. The finding that there were 4,558,536 people (after rounding) in Canada who had a job that required them to work outdoors during June to August of 1996 is publishable with no qualifications.

Example 2: Estimates of Proportions or Percentages Possessing a Characteristic

Suppose that the user estimates that 2,101,220/4,558,536 = 46.1% of Canadians who had a job that required them to work outdoors during June to August of 1996 are in the age group 25-44. How does the user determine the coefficient of variation of this estimate?

(1) Refer to the c.v. table for CANADA.

(2) Because the estimate is a percentage which is based on a subset of the total population (Canadians who had a job that required them to work outdoors during June to August of 1996), it is necessary to use both the percentage (46.1%) and the numerator portion of the percentage (2,101,220) in determining the coefficient of variation.

(3) The numerator, 2,101,220 does not appear in the left-hand column (the 'Numerator of Percentage' column) so it is necessary to use the figure closet to it, namely 2,00,000. Similarly, the percentage estimate does not appear as any of the column headings, so it is necessary to use the figure closest to it, 50.0%.

(4) The figure at the intersection of the row and column used, namely 4.3%, is the coefficient of variation to be used.

(5) So the approximate coefficient of variation of the estimate is 4.3%. The finding that 46.1% of Canadians who had a job that required them to work outdoors during June to August of 1996 are in the age group 25-44 can be published with no qualifications.

Example 3: Estimates of Differences Between Aggregates or Percentages

Suppose that a user estimates that 3,438,030/11,638,751= 29.5% of males said they had a job that required them to work outdoors during June to August of 1996, while 1,120,506/12,025,574 = 9.3% of females said they had a job that required them to work outdoors during June to August of 1996. How does the user determine the coefficient of variation of the difference between these two estimates?

(1) Using the c.v. table for CANADA in the same manner as described in Example 2 gives the c.v. of the estimate for males as 4.2%, and the c.v. of the estimate for females as 8.2%.

(2) Using Rule 3, the standard error of a difference ($\hat{d} = \hat{X}_1 - \hat{X}_2$) is:

$$\sigma_{\hat{d}} = \sqrt{(\hat{X}_1 \alpha_1)^2 + (\hat{X}_2 \alpha_2)^2}$$

where $\hat{X}_1$ is estimate 1, $\hat{X}_2$ is estimate 2, and α_1 and α_2 are the coefficients of variation of $\hat{X}_1$ and $\hat{X}_2$ respectively.

$$\sigma_{\hat{d}} = \sqrt{[(.295)(.042)]^2 + [(.093)(.082)]^2}$$

$$= \sqrt{(.00015) + (.00006)}$$

$$= .014$$

That is, the standard error of the difference $\hat{d} = (.295 - .093) = .202$ is:

(3) The coefficient of variation of $\hat{d}$ is given by $\sigma\hat{d}/\hat{d} = .014/.202 = 0.071$.

(4) So the approximate coefficient of variation of the difference between the estimates is 7.1%. This estimate can be published with no qualifications.

Example 4: Estimates of Ratios

Suppose that the user estimates that 9,046,016 Canadians are most concerned about protecting themselves from skin cancer while out in the sun. while 7,915,957 Canadians are most concerned about protecting themselves from sunburn while out in the sun. The user is interested in comparing the estimates in the form of a ratio. How does the user determine the coefficient of variation of this estimate?

(1) First of all, this estimate is a ratio estimate, where the numerator of the estimate ($=\hat{X}_1$) is the number of Canadians who are most concerned about protecting themselves from skin cancer while out in the sun. The denominator of the estimate ($=\hat{X}_2$) is the number of Canadians who are most concerned about protecting themselves from sunburn while out in the sun.

(2) Refer to the c.v. table for CANADA.

(3) The numerator of this ratio estimate is 9,046,016. The figure closest to it is 9,000,000. The coefficient of variation for this estimate is found by referring to the first non-asterisk entry on that row, namely, 2.2%.

(4) The denominator of this ratio estimate is 7,915,957. The figure closest to it is 8,000,000. The coefficient of variation for this estimate is found by referring to the first non-asterisk entry on that row, namely, 2.5%.

(5) So the approximate coefficient of variation of

$$\alpha_{\hat{R}} = \sqrt{\alpha_1^{\,2} + \alpha_2^{\,2}}$$

the ratio estimate is given by Rule 4, which is,

where α_1 and α_2 are the coefficients of variation of $\bar{X}_1$ and $\bar{X}_2$ respectively.

$$\alpha_{\hat{R}} = \sqrt{(.022)^2 + (.025)^2}$$

$$= 0.033$$

That is,
The obtained ratio of Canadians who are most concerned about protecting themselves from skin cancer as opposed to sunburn while out in the sun is 9,046,016/7,915,957, which is 1.14:1. The coefficient of variation of this estimate is 3.3%, which is releasable with no qualifications.

10.2 [redacted] to obtain Confidence Limits

[redacted]

intuitively meaningful measure of sampling error is the confidence interval of an estimate. A confidence interval constitutes a statement on the level of confidence that the true value for the population lies within a specified range of values. For example a 95% confidence interval can be described as follows:

If sampling of the population is repeated indefinitely, each sample leading to a new confidence interval for an estimate, then in 95% of the samples the interval will cover the true population value.

Using the standard error of an estimate, confidence intervals for estimates may be obtained under the assumption that under repeated sampling of the population, the various estimates obtained for a population characteristic are normally distributed about the true population value. Under this assumption, the chances are about 68 out of 100 that the difference between a sample estimate and the true population value would be less than one standard error, about 95 out of 100 that the difference would be less than two standard errors, and about 99 out

100 that the differences would be less than three standard errors. These different degrees of confidence are referred to as the confidence levels.

Confidence intervals for an estimate, $\hat{X}$, are generally expressed as two numbers, one below the estimate and one above the estimate, as ($\hat{X}$-k, $\hat{X}$+k) where k is determined depending upon the level of confidence desired and the sampling error of the estimate.

Confidence intervals for an estimate can be calculated directly from the Approximate Sampling Variability Tables by first determining from the appropriate table the coefficient of variation of the estimate $\hat{X}$, and then using the

$$CI_{\hat{X}} = [\ \hat{X} - t\ \hat{X}\ \alpha_{\hat{X}}\ , \hat{X} + t\ \hat{X}\ \alpha_{\hat{X}}\ ]$$

following formula to convert to a confidence interval CI:

where $\alpha\hat{X}$ is the determined coefficient of variation of $\hat{X}$, and

t = 1 if a 68% confidence interval is desired
t = 1.6 if a 90% confidence interval is desired
t = 2 if a 95% confidence interval is desired
t = 3 if a 99% confidence interval is desired.

Note: Release guidelines which apply to the estimate also apply to the confidence interval. For example, if the estimate is not releasable, then the confidence interval is not releasable either.

10.2.1 [redacted] tables to obtain confidence limits

A 95% confidence interval for the estimated proportion of Canadians who had a job that required them to work outdoors during June to August of 1996 (from Example 1) would be calculated as follows.

[redacted]

$\hat{X}$ = 19.3% (or expressed as a proportion = .193)

t = 2

$\alpha\hat{X}$ = 3.3% (.033 expressed as a proportion) is the coefficient of variation of this estimate as determined from the tables.

CI_X = {.193 - (2) (.193) (.033), .193 + (2) (.193) (.033)}

CI_X = {.193 - .013, .193 + .013}

CI_X = {.180, .206}

With 95% confidence it can be said that between 18.0% and 20.6% of Canadians had a job that required hem to work outdoors during June to August of 1996.

10.3 [redacted] to do a t-test

[redacted] testing, a procedure for distinguishing between population parameters using sample estimates. The sample estimates can be numbers, averages, percentages, ratios, etc. Tests may be performed at various levels of significance, where a level of significance is the probability of concluding that the characteristics are different when, in fact, they are identical.

Let $\mathbf{X_1}$ and $\mathbf{X_2}$ be sample estimates for 2 characteristics of interest. Let the standard error on the difference $\bar{X}_1 - \bar{X}_2$ be $\sigma\hat{d}$.

If $t = \frac{\hat{X}_1 - \hat{X}_2}{\sigma_{\hat{d}}}$ is between -2 and 2, then no conclusion about the difference between the characteristics is justified at the 5% level of significance. If however, this ratio is smaller than -2 or larger than +2, the observed difference is significant at the 0.05 level. That is to say that the characteristics are significant.

10.3.1 [redacted] tables to do a t-test

$$t = \frac{\hat{X}_1 - \hat{X}_2}{\sigma_{\hat{d}}} = \frac{.295 - .093}{.014} = \frac{.202}{.014} = 14.43$$

Let us suppose we wish to test, at 5% level of significance, the hypothesis that there is a difference between the proportion of males and females who had a job that required them to work outdoors during June to August of 1996. From Example 3, the standard error of the difference between these two estimates was found to be =.014. Hence,

[redacted] that there is a significant difference between the two

estimates at the 0.05 level of significance.

10.4 [redacted] for Quantitative Estimates

[redacted]

produced to determine their sampling error. Since most of the variables for the Sun Exposure Survey are primarily categorical in nature, this has not been done.

As a general rule, however, the coefficient of variation of a quantitative total will be larger than the coefficient of variation of the corresponding category estimate (i.e., the estimate of the number of persons contributing to the quantitative estimate). If the corresponding category estimate is not releasable, the quantitative estimate will not be either.

Coefficients of variation of such estimates can be derived as required for a specific estimate using a technique known as pseudo replication. This involves dividing the records on the Micro data files into subgroups (or replicates) and determining the variation in the estimate from replicate to replicate. Users wishing to derive coefficients of variation for quantitative estimates may contact Statistics Canada for advice on the allocation of records to appropriate replicates and the formulae to be used in these calculations.

10.5 [redacted]

Sun Exposure Survey

[redacted]

and Canada levels are specified in the table below. Estimates smaller than the minimum size given in the "Not Releasable" column may not be released under any circumstances.

Table of Release Cut-Offs

Region	Acceptable	Marginal	Unacceptable
Atlantic	142,000 and higher	37,000 to 141,900	under 37,000
Quebec	251,500 and higher	64,000 to 251,400	under 64,000
Ontario	351,000 and higher	89,000 to 350,900	under 89,000
Prairies	204,500 and higher	52,500 to 204,400	under 52,500
B.C.	194,500 and higher	50,000 to 194,400	under 50,000
CANADA	271,500 and higher	67,000 to 271,400	under 67,000

10.6 [redacted]

[redacted]

Sun Exposure Survey are given on the following pages.

1996 SUN EXPOSURE SURVEY

Approximate Sampling Variability Tables for ATLANTIC

NUMERATOR OF PERCENTAGE ('000)	ESTIMATED PERCENTAGE 0.1%	1.0%	2.0%	5.0%	10.0%	15.0%	20.0%	25.0%	30.0%	35.0%	40.0%	50.0%	70.0%	90.0%
1	204.2	203.2	202.2	199.1	193.8	188.3	182.7	176.9	170.9	164.7	158.2	144.4	111.9	64.6
2	********	143.7	143.0	140.8	137.0	133.2	129.2	125.1	120.8	116.4	111.9	102.1	79.1	45.7
3	********	117.3	116.7	114.9	111.9	108.7	105.5	102.1	98.7	95.1	91.3	83.4	64.6	37.3
4	********	101.6	101.1	99.5	96.9	94.2	91.3	88.4	85.4	82.3	79.1	72.2	55.9	32.3
5	********	90.9	90.4	89.0	86.7	84.2	81.7	79.1	76.4	73.6	70.8	64.6	50.0	28.9
6	********	83.0	82.6	81.3	79.1	76.9	74.6	72.2	69.8	67.2	64.6	59.0	45.7	26.4
7	********	76.8	76.4	75.2	73.2	71.2	69.1	66.9	64.6	62.2	59.8	54.6	42.3	24.4
8	********	71.9	71.5	70.4	68.5	66.6	64.6	62.5	60.4	58.2	55.9	51.1	39.6	22.8
9	********	67.7	67.4	66.4	64.6	62.8	60.9	59.0	57.0	54.9	52.7	48.1	37.3	21.5
10	********	64.3	63.9	63.0	61.3	59.6	57.8	55.9	54.0	52.1	50.0	45.7	35.4	20.4
11	********	61.3	61.0	60.0	58.4	56.8	55.1	53.3	51.5	49.7	47.7	43.5	33.7	19.5
12	********	58.7	58.4	57.5	55.9	54.4	52.7	51.1	49.3	47.5	45.7	41.7	32.3	18.6
13	********	56.4	56.1	55.2	53.7	52.2	50.7	49.1	47.4	45.7	43.9	40.1	31.0	17.9
14	********	54.3	54.0	53.2	51.8	50.3	48.8	47.3	45.7	44.0	42.3	38.6	29.9	17.3
15	********	52.5	52.2	51.4	50.0	48.6	47.2	45.7	44.1	42.5	40.9	37.3	28.9	16.7
16	********	50.8	50.6	49.8	48.4	47.1	45.7	44.2	42.7	41.2	39.6	36.1	28.0	16.1
17	********	49.3	49.0	48.3	47.0	45.7	44.3	42.9	41.4	39.9	38.4	35.0	27.1	15.7
18	********	47.9	47.7	46.9	45.7	44.4	43.1	41.7	40.3	38.8	37.3	34.0	26.4	15.2
19	********	46.6	46.4	45.7	44.5	43.2	41.9	40.6	39.2	37.8	36.3	33.1	25.7	14.8
20	**********	45.2	44.5	43.3	42.1	40.9	39.6	38.2	36.8	35.4	32.3	25.0	14.4	
21	**********	44.1	43.4	42.3	41.1	39.9	38.6	37.3	35.9	34.5	31.5	24.4	14.1	
22	**********	43.1	42.4	41.3	40.2	39.0	37.7	36.4	35.1	33.7	30.8	23.9	13.8	
23	**********	42.2	41.5	40.4	39.3	38.1	36.9	35.6	34.3	33.0	30.1	23.3	13.5	
24	**********	41.3	40.6	39.6	38.4	37.3	36.1	34.9	33.6	32.3	29.5	22.8	13.2	
25	**********	40.4	39.8	38.8	37.7	36.5	35.4	34.2	32.9	31.6	28.9	22.4	12.9	
30	**********	36.9	36.3	35.4	34.4	33.4	32.3	31.2	30.1	28.9	26.4	20.4	11.8	
35	**********	34.2	33.7	32.8	31.8	30.9	29.9	28.9	27.8	26.7	24.4	18.9	10.9	
40	**********	31.5	30.6	29.8	28.9	28.0	27.0	26.0	25.0	22.8	17.7	10.2		
45	**********	29.7	28.9	28.1	27.2	26.4	25.5	24.5	23.6	21.5	16.7	9.6		
50	**********	28.2	27.4	26.6	25.8	25.0	24.2	23.3	22.4	20.4	15.8	9.1		
55	**********	26.8	26.1	25.4	24.6	23.9	23.0	22.2	21.3	19.5	15.1	8.7		
60	**********	25.7	25.0	24.3	23.6	22.8	22.1	21.3	20.4	18.6	14.4	8.3		
65	**********	24.7	24.0	23.4	22.7	21.9	21.2	20.4	19.6	17.9	13.9	8.0		
70	**********	23.8	23.2	22.5	21.8	21.1	20.4	19.7	18.9	17.3	13.4	7.7		
75	**********	23.0	22.4	21.7	21.1	20.4	19.7	19.0	18.3	16.7	12.9	7.5		
80	**********	22.3	21.7	21.1	20.4	19.8	19.1	18.4	17.7	16.1	12.5	7.2		
85	**********	21.6	21.0	20.4	19.8	19.2	18.5	17.9	17.2	15.7	12.1	7.0		
90	**********	21.0	20.4	19.9	19.3	18.6	18.0	17.4	16.7	15.2	11.8	6.8		
95	**********	20.4	19.9	19.3	18.7	18.1	17.5	16.9	16.2	14.8	11.5	6.6		
100	**********	19.4	18.8	18.3	17.7	17.1	16.5	15.8	14.4	11.2	6.5			
125	**********	17.3	16.8	16.3	15.8	15.3	14.7	14.2	12.9	10.0	5.8			
150	**********	15.8	15.4	14.9	14.4	14.0	13.4	12.9	11.8	9.1	5.3			
200	**********	13.3	12.9	12.5	12.1	11.6	11.2	10.2	7.9	4.6				
250	**********	11.9	11.6	11.2	10.8	10.4	10.0	9.1	7.1	4.1				
300	**********	10.5	10.2	9.9	9.5	9.1	8.3	6.5	3.7					
350	**********	9.8	9.5	9.1	8.8	8.5	7.7	6.0	3.5					
400	**********	8.8	8.5	8.2	7.9	7.2	5.6	3.2						
450	**********	8.3	8.1	7.8	7.5	6.8	5.3	3.0						
500	**********	7.6	7.4	7.1	6.5	5.0	2.9							
750	**********	5.8	5.3	4.1	2.4									
1000	**********	3.5	2.0											
1500	**********	1.7												

NOTE: FOR CORRECT USAGE OF THESE TABLES PLEASE REFER TO Micro data DOCUMENTATION

1996 SUN EXPOSURE SURVEY

Approximate Sampling Variability Tables for QUEBEC

NUMERATOR OF PERCENTAGE ('000)	ESTIMATED PERCENTAGE 0.1%	1.0%	2.0%	5.0%	10.0%	15.0%	20.0%	25.0%	30.0%	35.0%	40.0%	50.0%	70.0%	90.0%
1	267.2	266.0	264.6	260.6	253.6	246.5	239.1	231.5	223.7	215.5	207.1	189.0	146.4	84.5
2	188.9	188.1	187.1	184.2	179.3	174.3	169.1	163.7	158.2	152.4	146.4	133.7	103.5	59.8
3	154.3	153.6	152.8	150.4	146.4	142.3	138.1	133.7	129.1	124.4	119.6	109.1	84.5	48.8
4	133.6	133.0	132.3	130.3	126.8	123.2	119.6	115.8	111.8	107.8	103.5	94.5	73.2	42.3
5	119.5	119.0	118.4	116.5	113.4	110.2	106.9	103.5	100.0	96.4	92.6	84.5	65.5	37.8
6	********	108.6	108.0	106.4	103.5	100.6	97.6	94.5	91.3	88.0	84.5	77.2	59.8	34.5
7	********	100.5	100.0	98.5	95.9	93.2	90.4	87.5	84.5	81.5	78.3	71.4	55.3	32.0
8	********	94.0	93.6	92.1	89.7	87.1	84.5	81.9	79.1	76.2	73.2	66.8	51.8	29.9
9	********	88.7	88.2	86.9	84.5	82.2	79.7	77.2	74.6	71.8	69.0	63.0	48.8	28.2
10	********	84.1	83.7	82.4	80.2	77.9	75.6	73.2	70.7	68.2	65.5	59.8	46.3	26.7
11	********	80.2	79.8	78.6	76.5	74.3	72.1	69.8	67.4	65.0	62.4	57.0	44.1	25.5
12	********	76.8	76.4	75.2	73.2	71.2	69.0	66.8	64.6	62.2	59.8	54.6	42.3	24.4
13	********	73.8	73.4	72.3	70.3	68.4	66.3	64.2	62.0	59.8	57.4	52.4	40.6	23.4
14	********	71.1	70.7	69.6	67.8	65.9	63.9	61.9	59.8	57.6	55.3	50.5	39.1	22.6
15	********	68.7	68.3	67.3	65.5	63.6	61.7	59.8	57.8	55.7	53.5	48.8	37.8	21.8
16	********	66.5	66.2	65.1	63.4	61.6	59.8	57.9	55.9	53.9	51.8	47.3	36.6	21.1
17	********	64.5	64.2	63.2	61.5	59.8	58.0	56.2	54.2	52.3	50.2	45.8	35.5	20.5
18	********	62.7	62.4	61.4	59.8	58.1	56.4	54.6	52.7	50.8	48.8	44.6	34.5	19.9
19	********	61.0	60.7	59.8	58.2	56.5	54.9	53.1	51.3	49.4	47.5	43.4	33.6	19.4
20	********	59.5	59.2	58.3	56.7	55.1	53.5	51.8	50.0	48.2	46.3	42.3	32.7	18.9
21	********	58.0	57.8	56.9	55.3	53.8	52.2	50.5	48.8	47.0	45.2	41.3	32.0	18.4
22	********	56.7	56.4	55.6	54.1	52.5	51.0	49.4	47.7	46.0	44.1	40.3	31.2	18.0
23	********	55.5	55.2	54.3	52.9	51.4	49.9	48.3	46.6	44.9	43.2	39.4	30.5	17.6
24	********	54.3	54.0	53.2	51.8	50.3	48.8	47.3	45.7	44.0	42.3	38.6	29.9	17.3
25	********	53.2	52.9	52.1	50.7	49.3	47.8	46.3	44.7	43.1	41.4	37.8	29.3	16.9
30	********	48.6	48.3	47.6	46.3	45.0	43.7	42.3	40.8	39.4	37.8	34.5	26.7	15.4
35	********	45.0	44.7	44.0	42.9	41.7	40.4	39.1	37.8	36.4	35.0	32.0	24.8	14.3
40	********	42.1	41.8	41.2	40.1	39.0	37.8	36.6	35.4	34.1	32.7	29.9	23.2	13.4
45	********	39.7	39.5	38.8	37.8	36.7	35.6	34.5	33.3	32.1	30.9	28.2	21.8	12.6
50	********	37.6	37.4	36.8	35.9	34.9	33.8	32.7	31.6	30.5	29.3	26.7	20.7	12.0
55	********	35.9	35.7	35.1	34.2	33.2	32.2	31.2	30.2	29.1	27.9	25.5	19.7	11.4
60	**********	34.2	33.6	32.7	31.8	30.9	29.9	28.9	27.8	26.7	24.4	18.9	10.9	
65	**********	32.8	32.3	31.5	30.6	29.7	28.7	27.7	26.7	25.7	23.4	18.2	10.5	
70	**********	31.6	31.1	30.3	29.5	28.6	27.7	26.7	25.8	24.8	22.6	17.5	10.1	
75	**********	30.6	30.1	29.3	28.5	27.6	26.7	25.8	24.9	23.9	21.8	16.9	9.8	
80	**********	29.6	29.1	28.4	27.6	26.7	25.9	25.0	24.1	23.2	21.1	16.4	9.5	
85	**********	28.7	28.3	27.5	26.7	25.9	25.1	24.3	23.4	22.5	20.5	15.9	9.2	
90	**********	27.9	27.5	26.7	26.0	25.2	24.4	23.6	22.7	21.8	19.9	15.4	8.9	
95	**********	27.2	26.7	26.0	25.3	24.5	23.8	22.9	22.1	21.2	19.4	15.0	8.7	
100	**********	26.5	26.1	25.4	24.6	23.9	23.2	22.4	21.6	20.7	18.9	14.6	8.5	
125	**********	23.3	22.7	22.0	21.4	20.7	20.0	19.3	18.5	16.9	13.1	7.6		
150	**********	21.3	20.7	20.1	19.5	18.9	18.3	17.6	16.9	15.4	12.0	6.9		
200	**********	18.4	17.9	17.4	16.9	16.4	15.8	15.2	14.6	13.4	10.4	6.0		
250	**********	16.5	16.0	15.6	15.1	14.6	14.1	13.6	13.1	12.0	9.3	5.3		
300	**********	14.6	14.2	13.8	13.4	12.9	12.4	12.0	10.9	8.5	4.9			
350	**********	13.6	13.2	12.8	12.4	12.0	11.5	11.1	10.1	7.8	4.5			
400	**********	12.7	12.3	12.0	11.6	11.2	10.8	10.4	9.5	7.3	4.2			
450	**********	12.0	11.6	11.3	10.9	10.5	10.2	9.8	8.9	6.9	4.0			
500	**********	11.3	11.0	10.7	10.4	10.0	9.6	9.3	8.5	6.5	3.8			
750	**********	9.0	8.7	8.5	8.2	7.9	7.6	6.9	5.3	3.1				
1000	**********	7.6	7.3	7.1	6.8	6.5	6.0	4.6	2.7					
1500	**********	5.8	5.6	5.3	4.9	3.8	2.2							
2000	**********	4.8	4.6	4.2	3.3	1.9								
3000	**********	2.7	1.5											
4000	**********	2.3	1.3											
5000	**********	1.2												

NOTE: FOR CORRECT USAGE OF THESE TABLES PLEASE REFER TO Micro data DOCUMENTATION

1996 SUN EXPOSURE SURVEY

Approximate Sampling Variability Tables for ONTARIO

NUMERATOR OF PERCENTAGE ('000)	ESTIMATED PERCENTAGE													
	0.1%	1.0%	2.0%	5.0%	10.0%	15.0%	20.0%	25.0%	30.0%	35.0%	40.0%	50.0%	70.0%	90.0%
1	315.1	313.7	312.1	307.3	299.1	290.7	282.0	273.0	263.8	254.2	244.2	222.9	172.7	99.7
2	222.8	221.8	220.7	217.3	211.5	205.5	199.4	193.1	186.5	179.7	172.7	157.6	122.1	70.5
3	181.9	181.1	180.2	177.4	172.7	167.8	162.8	157.6	152.3	146.8	141.0	128.7	99.7	57.6
4	157.6	156.9	156.1	153.7	149.6	145.3	141.0	136.5	131.9	127.1	122.1	111.5	86.3	49.9
5	140.9	140.3	139.6	137.4	133.8	130.0	126.1	122.1	118.0	113.7	109.2	99.7	77.2	44.6
6	128.6	128.1	127.4	125.5	122.1	118.7	115.1	111.5	107.7	103.8	99.7	91.0	70.5	40.7
7	119.1	118.6	118.0	116.1	113.1	109.9	106.6	103.2	99.7	96.1	92.3	84.3	65.3	37.7
8	111.4	110.9	110.3	108.6	105.7	102.8	99.7	96.5	93.3	89.9	86.3	78.8	61.1	35.2
9	********	104.6	104.0	102.4	99.7	96.9	94.0	91.0	87.9	84.7	81.4	74.3	57.6	33.2
10	********	99.2	98.7	97.2	94.6	91.9	89.2	86.3	83.4	80.4	77.2	70.5	54.6	31.5
11	********	94.6	94.1	92.7	90.2	87.6	85.0	82.3	79.5	76.6	73.6	67.2	52.1	30.1
12	********	90.6	90.1	88.7	86.3	83.9	81.4	78.8	76.1	73.4	70.5	64.4	49.9	28.8
13	********	87.0	86.6	85.2	83.0	80.6	78.2	75.7	73.2	70.5	67.7	61.8	47.9	27.7
14	********	83.8	83.4	82.1	79.9	77.7	75.4	73.0	70.5	67.9	65.3	59.6	46.2	26.6
15	********	81.0	80.6	79.3	77.2	75.1	72.8	70.5	68.1	65.6	63.1	57.6	44.6	25.7
16	********	78.4	78.0	76.8	74.8	72.7	70.5	68.3	65.9	63.5	61.1	55.7	43.2	24.9
17	********	76.1	75.7	74.5	72.5	70.5	68.4	66.2	64.0	61.7	59.2	54.1	41.9	24.2
18	********	73.9	73.6	72.4	70.5	68.5	66.5	64.4	62.2	59.9	57.6	52.5	40.7	23.5
19	********	72.0	71.6	70.5	68.6	66.7	64.7	62.6	60.5	58.3	56.0	51.1	39.6	22.9
20	********	70.1	69.8	68.7	66.9	65.0	63.1	61.1	59.0	56.8	54.6	49.9	38.6	22.3
21	********	68.5	68.1	67.1	65.3	63.4	61.5	59.6	57.6	55.5	53.3	48.6	37.7	21.8
22	********	66.9	66.5	65.5	63.8	62.0	60.1	58.2	56.2	54.2	52.1	47.5	36.8	21.3
23	********	65.4	65.1	64.1	62.4	60.6	58.8	56.9	55.0	53.0	50.9	46.5	36.0	20.8
24	********	64.0	63.7	62.7	61.1	59.3	57.6	55.7	53.8	51.9	49.9	45.5	35.2	20.4
25	********	62.7	62.4	61.5	59.8	58.1	56.4	54.6	52.8	50.8	48.8	44.6	34.5	19.9
30	********	57.3	57.0	56.1	54.6	53.1	51.5	49.9	48.2	46.4	44.6	40.7	31.5	18.2
35	********	53.0	52.8	51.9	50.6	49.1	47.7	46.2	44.6	43.0	41.3	37.7	29.2	16.9
40	********	49.6	49.3	48.6	47.3	46.0	44.6	43.2	41.7	40.2	38.6	35.2	27.3	15.8
45	********	46.8	46.5	45.8	44.6	43.3	42.0	40.7	39.3	37.9	36.4	33.2	25.7	14.9
50	********	44.4	44.1	43.5	42.3	41.1	39.9	38.6	37.3	35.9	34.5	31.5	24.4	14.1
55	********	42.3	42.1	41.4	40.3	39.2	38.0	36.8	35.6	34.3	32.9	30.1	23.3	13.4
60	********	40.5	40.3	39.7	38.6	37.5	36.4	35.2	34.1	32.8	31.5	28.8	22.3	12.9
65	********	38.9	38.7	38.1	37.1	36.1	35.0	33.9	32.7	31.5	30.3	27.7	21.4	12.4
70	********	37.5	37.3	36.7	35.7	34.7	33.7	32.6	31.5	30.4	29.2	26.6	20.6	11.9
75	********	36.2	36.0	35.5	34.5	33.6	32.6	31.5	30.5	29.4	28.2	25.7	19.9	11.5
80	********	35.1	34.9	34.4	33.4	32.5	31.5	30.5	29.5	28.4	27.3	24.9	19.3	11.1
85	********	34.0	33.9	33.3	32.4	31.5	30.6	29.6	28.6	27.6	26.5	24.2	18.7	10.8
90	**********	32.9	32.4	31.5	30.6	29.7	28.8	27.8	26.8	25.7	23.5	18.2	10.5	
95	**********	32.0	31.5	30.7	29.8	28.9	28.0	27.1	26.1	25.1	22.9	17.7	10.2	
100	**********	31.2	30.7	29.9	29.1	28.2	27.3	26.4	25.4	24.4	22.3	17.3	10.0	
125	**********	27.9	27.5	26.8	26.0	25.2	24.4	23.6	22.7	21.8	19.9	15.4	8.9	
150	**********	25.5	25.1	24.4	23.7	23.0	22.3	21.5	20.8	19.9	18.2	14.1	8.1	
200	**********	21.7	21.1	20.6	19.9	19.3	18.7	18.0	17.3	15.8	12.2	7.0		
250	**********	19.4	18.9	18.4	17.8	17.3	16.7	16.1	15.4	14.1	10.9	6.3		
300	**********	17.7	17.3	16.8	16.3	15.8	15.2	14.7	14.1	12.9	10.0	5.8		
350	**********	16.4	16.0	15.5	15.1	14.6	14.1	13.6	13.1	11.9	9.2	5.3		
400	**********	15.4	15.0	14.5	14.1	13.7	13.2	12.7	12.2	11.1	8.6	5.0		
450	**********	14.1	13.7	13.3	12.9	12.4	12.0	11.5	10.5	8.1	4.7			
500	**********	13.4	13.0	12.6	12.2	11.8	11.4	10.9	10.0	7.7	4.5			
750	**********	10.9	10.6	10.3	10.0	9.6	9.3	8.9	8.1	6.3	3.6			
1000	**********	9.2	8.9	8.6	8.3	8.0	7.7	7.0	5.5	3.2				
1500	**********	7.3	7.0	6.8	6.6	6.3	5.8	4.5	2.6					
2000	**********	6.1	5.9	5.7	5.5	5.0	3.9	2.2						
3000	**********	4.6	4.5	4.1	3.2	1.8								
4000	**********	3.5	2.7	1.6										
5000	**********	2.4	1.4											
6000	**********	2.2	1.3											
7000	**********	1.2												
8000	**********	1.1												

NOTE: FOR CORRECT USAGE OF THESE TABLES PLEASE REFER TO Micro data DOCUMENTATION

1996 SUN EXPOSURE SURVEY

Approximate Sampling Variability Tables for PRAIRIES

NUMERATOR OF PERCENTAGE ('000)	ESTIMATED PERCENTAGE													
	0.1%	1.0%	2.0%	5.0%	10.0%	15.0%	20.0%	25.0%	30.0%	35.0%	40.0%	50.0%	70.0%	90.0%
1	242.5	241.4	240.2	236.5	230.2	223.7	217.0	210.1	203.0	195.6	187.9	171.6	132.9	76.7
2	171.5	170.7	169.8	167.2	162.8	158.2	153.4	148.6	143.5	138.3	132.9	121.3	94.0	54.3
3	140.0	139.4	138.7	136.5	132.9	129.1	125.3	121.3	117.2	112.9	108.5	99.0	76.7	44.3
4	********	120.7	120.1	118.2	115.1	111.8	108.5	105.1	101.5	97.8	94.0	85.8	66.4	38.4
5	********	108.0	107.4	105.8	102.9	100.0	97.0	94.0	90.8	87.5	84.0	76.7	59.4	34.3
6	********	98.6	98.1	96.5	94.0	91.3	88.6	85.8	82.9	79.9	76.7	70.0	54.3	31.3
7	********	91.2	90.8	89.4	87.0	84.5	82.0	79.4	76.7	73.9	71.0	64.8	50.2	29.0
8	********	85.3	84.9	83.6	81.4	79.1	76.7	74.3	71.8	69.2	66.4	60.7	47.0	27.1
9	********	80.5	80.1	78.8	76.7	74.6	72.3	70.0	67.7	65.2	62.6	57.2	44.3	25.6
10	********	76.3	76.0	74.8	72.8	70.7	68.6	66.4	64.2	61.9	59.4	54.3	42.0	24.3
11	********	72.8	72.4	71.3	69.4	67.4	65.4	63.4	61.2	59.0	56.7	51.7	40.1	23.1
12	********	69.7	69.3	68.3	66.4	64.6	62.6	60.7	58.6	56.5	54.3	49.5	38.4	22.1
13	********	67.0	66.6	65.6	63.8	62.0	60.2	58.3	56.3	54.3	52.1	47.6	36.9	21.3
14	********	64.5	64.2	63.2	61.5	59.8	58.0	56.2	54.3	52.3	50.2	45.9	35.5	20.5
15	********	62.3	62.0	61.1	59.4	57.8	56.0	54.3	52.4	50.5	48.5	44.3	34.3	19.8
16	********	60.4	60.0	59.1	57.5	55.9	54.3	52.5	50.7	48.9	47.0	42.9	33.2	19.2
17	********	58.5	58.3	57.4	55.8	54.3	52.6	51.0	49.2	47.4	45.6	41.6	32.2	18.6
18	********	56.9	56.6	55.7	54.3	52.7	51.1	49.5	47.8	46.1	44.3	40.4	31.3	18.1
19	********	55.4	55.1	54.3	52.8	51.3	49.8	48.2	46.6	44.9	43.1	39.4	30.5	17.6
20	********	54.0	53.7	52.9	51.5	50.0	48.5	47.0	45.4	43.7	42.0	38.4	29.7	17.2
21	********	52.7	52.4	51.6	50.2	48.8	47.4	45.9	44.3	42.7	41.0	37.4	29.0	16.7
22	********	51.5	51.2	50.4	49.1	47.7	46.3	44.8	43.3	41.7	40.1	36.6	28.3	16.4
23	********	50.3	50.1	49.3	48.0	46.6	45.2	43.8	42.3	40.8	39.2	35.8	27.7	16.0
24	********	49.3	49.0	48.3	47.0	45.7	44.3	42.9	41.4	39.9	38.4	35.0	27.1	15.7
25	********	48.3	48.0	47.3	46.0	44.7	43.4	42.0	40.6	39.1	37.6	34.3	26.6	15.3
30	********	44.1	43.9	43.2	42.0	40.8	39.6	38.4	37.1	35.7	34.3	31.3	24.3	14.0
35	********	40.8	40.6	40.0	38.9	37.8	36.7	35.5	34.3	33.1	31.8	29.0	22.5	13.0
40	**********	38.0	37.4	36.4	35.4	34.3	33.2	32.1	30.9	29.7	27.1	21.0	12.1	
45	**********	35.8	35.3	34.3	33.3	32.3	31.3	30.3	29.2	28.0	25.6	19.8	11.4	
50	**********	34.0	33.4	32.6	31.6	30.7	29.7	28.7	27.7	26.6	24.3	18.8	10.9	
55	**********	32.4	31.9	31.0	30.2	29.3	28.3	27.4	26.4	25.3	23.1	17.9	10.3	
60	**********	31.0	30.5	29.7	28.9	28.0	27.1	26.2	25.3	24.3	22.1	17.2	9.9	
65	**********	29.8	29.3	28.5	27.7	26.9	26.1	25.2	24.3	23.3	21.3	16.5	9.5	
70	**********	28.7	28.3	27.5	26.7	25.9	25.1	24.3	23.4	22.5	20.5	15.9	9.2	
75	**********	27.7	27.3	26.6	25.8	25.1	24.3	23.4	22.6	21.7	19.8	15.3	8.9	
80	**********	26.4	25.7	25.0	24.3	23.5	22.7	21.9	21.0	19.2	14.9	8.6		
85	**********	25.6	25.0	24.3	23.5	22.8	22.0	21.2	20.4	18.6	14.4	8.3		
90	**********	24.9	24.3	23.6	22.9	22.1	21.4	20.6	19.8	18.1	14.0	8.1		
95	**********	24.3	23.6	22.9	22.3	21.6	20.8	20.1	19.3	17.6	13.6	7.9		
100	**********	23.6	23.0	22.4	21.7	21.0	20.3	19.6	18.8	17.2	13.3	7.7		
125	**********	21.2	20.6	20.0	19.4	18.8	18.2	17.5	16.8	15.3	11.9	6.9		
150	**********	19.3	18.8	18.3	17.7	17.2	16.6	16.0	15.3	14.0	10.9	6.3		
200	**********	16.3	15.8	15.3	14.9	14.4	13.8	13.3	12.1	9.4	5.4			
250	**********	14.6	14.1	13.7	13.3	12.8	12.4	11.9	10.9	8.4	4.9			
300	**********	13.3	12.9	12.5	12.1	11.7	11.3	10.9	9.9	7.7	4.4			
350	**********	12.3	12.0	11.6	11.2	10.9	10.5	10.0	9.2	7.1	4.1			
400	**********	11.2	10.9	10.5	10.1	9.8	9.4	8.6	6.6	3.8				
450	**********	10.5	10.2	9.9	9.6	9.2	8.9	8.1	6.3	3.6				
500	**********	10.0	9.7	9.4	9.1	8.7	8.4	7.7	5.9	3.4				
750	**********	7.9	7.7	7.4	7.1	6.9	6.3	4.9	2.8					
1000	**********	6.4	6.2	5.9	5.4	4.2	2.4							
1500	**********	4.9	4.4	3.4	2.0									
2000	**********	3.0	1.7											
3000	**********	1.4												

NOTE: FOR CORRECT USAGE OF THESE TABLES PLEASE REFER TO Micro data DOCUMENTATION

1996 SUN EXPOSURE SURVEY

Approximate Sampling Variability Tables for BRITISH COLUMBIA

NUMERATOR OF PERCENTAGE ('000)	ESTIMATED PERCENTAGE													
	0.1%	1.0%	2.0%	5.0%	10.0%	15.0%	20.0%	25.0%	30.0%	35.0%	40.0%	50.0%	70.0%	90.0%
1	237.4	236.3	235.1	231.5	225.3	219.0	212.5	205.7	198.7	191.5	184.0	168.0	130.1	75.1
2	167.9	167.1	166.3	163.7	159.3	154.9	150.2	145.5	140.5	135.4	130.1	118.8	92.0	53.1
3	137.1	136.5	135.8	133.7	130.1	126.4	122.7	118.8	114.7	110.6	106.2	97.0	75.1	43.4
4	********	118.2	117.6	115.8	112.7	109.5	106.2	102.9	99.4	95.8	92.0	84.0	65.1	37.6
5	********	105.7	105.2	103.5	100.8	97.9	95.0	92.0	88.9	85.6	82.3	75.1	58.2	33.6
6	********	96.5	96.0	94.5	92.0	89.4	86.7	84.0	81.1	78.2	75.1	68.6	53.1	30.7
7	********	89.3	88.9	87.5	85.2	82.8	80.3	77.8	75.1	72.4	69.5	63.5	49.2	28.4
8	********	83.6	83.1	81.9	79.7	77.4	75.1	72.7	70.3	67.7	65.1	59.4	46.0	26.6
9	********	78.8	78.4	77.2	75.1	73.0	70.8	68.6	66.2	63.8	61.3	56.0	43.4	25.0
10	********	74.7	74.4	73.2	71.3	69.3	67.2	65.1	62.8	60.6	58.2	53.1	41.1	23.8
11	********	71.3	70.9	69.8	67.9	66.0	64.1	62.0	59.9	57.7	55.5	50.6	39.2	22.6
12	********	68.2	67.9	66.8	65.1	63.2	61.3	59.4	57.4	55.3	53.1	48.5	37.6	21.7
13	********	65.6	65.2	64.2	62.5	60.7	58.9	57.1	55.1	53.1	51.0	46.6	36.1	20.8
14	********	63.2	62.8	61.9	60.2	58.5	56.8	55.0	53.1	51.2	49.2	44.9	34.8	20.1
15	********	61.0	60.7	59.8	58.2	56.5	54.9	53.1	51.3	49.4	47.5	43.4	33.6	19.4
16	********	59.1	58.8	57.9	56.3	54.7	53.1	51.4	49.7	47.9	46.0	42.0	32.5	18.8
17	********	57.3	57.0	56.2	54.7	53.1	51.5	49.9	48.2	46.4	44.6	40.7	31.6	18.2
18	********	55.7	55.4	54.6	53.1	51.6	50.1	48.5	46.8	45.1	43.4	39.6	30.7	17.7
19	********	54.2	53.9	53.1	51.7	50.2	48.7	47.2	45.6	43.9	42.2	38.5	29.8	17.2
20	********	52.8	52.6	51.8	50.4	49.0	47.5	46.0	44.4	42.8	41.1	37.6	29.1	16.8
21	********	51.6	51.3	50.5	49.2	47.8	46.4	44.9	43.4	41.8	40.2	36.7	28.4	16.4
22	********	50.4	50.1	49.4	48.0	46.7	45.3	43.9	42.4	40.8	39.2	35.8	27.7	16.0
23	********	49.3	49.0	48.3	47.0	45.7	44.3	42.9	41.4	39.9	38.4	35.0	27.1	15.7
24	********	48.2	48.0	47.3	46.0	44.7	43.4	42.0	40.6	39.1	37.6	34.3	26.6	15.3
25	********	47.3	47.0	46.3	45.1	43.8	42.5	41.1	39.7	38.3	36.8	33.6	26.0	15.0
30	********	43.2	42.9	42.3	41.1	40.0	38.8	37.6	36.3	35.0	33.6	30.7	23.8	13.7
35	**********	39.7	39.1	38.1	37.0	35.9	34.8	33.6	32.4	31.1	28.4	22.0	12.7	
40	**********	37.2	36.6	35.6	34.6	33.6	32.5	31.4	30.3	29.1	26.6	20.6	11.9	
45	**********	35.1	34.5	33.6	32.6	31.7	30.7	29.6	28.5	27.4	25.0	19.4	11.2	
50	**********	33.3	32.7	31.9	31.0	30.0	29.1	28.1	27.1	26.0	23.8	18.4	10.6	
55	**********	31.7	31.2	30.4	29.5	28.6	27.7	26.8	25.8	24.8	22.6	17.5	10.1	
60	**********	30.4	29.9	29.1	28.3	27.4	26.6	25.7	24.7	23.8	21.7	16.8	9.7	
65	**********	28.7	28.0	27.2	26.4	25.5	24.7	23.8	22.8	20.8	16.1	9.3		
70	**********	27.7	26.9	26.2	25.4	24.6	23.8	22.9	22.0	20.1	15.6	9.0		
75	**********	26.7	26.0	25.3	24.5	23.8	22.9	22.1	21.2	19.4	15.0	8.7		
80	**********	25.9	25.2	24.5	23.8	23.0	22.2	21.4	20.6	18.8	14.5	8.4		
85	**********	25.1	24.4	23.8	23.0	22.3	21.6	20.8	20.0	18.2	14.1	8.1		
90	**********	24.4	23.8	23.1	22.4	21.7	20.9	20.2	19.4	17.7	13.7	7.9		
95	**********	23.8	23.1	22.5	21.8	21.1	20.4	19.6	18.9	17.2	13.3	7.7		
100	**********	23.2	22.5	21.9	21.2	20.6	19.9	19.2	18.4	16.8	13.0	7.5		
125	**********	20.7	20.2	19.6	19.0	18.4	17.8	17.1	16.5	15.0	11.6	6.7		
150	**********	18.9	18.4	17.9	17.3	16.8	16.2	15.6	15.0	13.7	10.6	6.1		
200	**********	15.9	15.5	15.0	14.5	14.1	13.5	13.0	11.9	9.2	5.3			
250	**********	14.3	13.9	13.4	13.0	12.6	12.1	11.6	10.6	8.2	4.8			
300	**********	13.0	12.6	12.3	11.9	11.5	11.1	10.6	9.7	7.5	4.3			
350	**********	11.7	11.4	11.0	10.6	10.2	9.8	9.0	7.0	4.0				
400	**********	10.9	10.6	10.3	9.9	9.6	9.2	8.4	6.5	3.8				
450	**********	10.3	10.0	9.7	9.4	9.0	8.7	7.9	6.1	3.5				
500	**********	9.5	9.2	8.9	8.6	8.2	7.5	5.8	3.4					
750	**********	7.5	7.3	7.0	6.7	6.1	4.8	2.7						
1000	**********	6.1	5.8	5.3	4.1	2.4								
1500	**********	4.3	3.4	1.9										
2000	**********	2.9	1.7											

NOTE: FOR CORRECT USAGE OF THESE TABLES PLEASE REFER TO Micro data DOCUMENTATION

1996 SUN EXPOSURE SURVEY

Approximate Sampling Variability Tables for CANADA

NUMERATOR OF PERCENTAGE ('000)	ESTIMATED PERCENTAGE 0.1%	1.0%	2.0%	5.0%	10.0%	15.0%	20.0%	25.0%	30.0%	35.0%	40.0%	50.0%	70.0%	90.0%
1	273.2	271.9	270.6	266.4	259.3	252.0	244.4	236.7	228.7	220.3	211.7	193.3	149.7	86.4
2	193.2	192.3	191.3	188.4	183.3	178.2	172.8	167.4	161.7	155.8	149.7	136.6	105.8	61.1
3	157.7	157.0	156.2	153.8	149.7	145.5	141.1	136.6	132.0	127.2	122.2	111.6	86.4	49.9
4	136.6	136.0	135.3	133.2	129.6	126.0	122.2	118.3	114.3	110.2	105.8	96.6	74.8	43.2
5	122.2	121.6	121.0	119.1	116.0	112.7	109.3	105.8	102.3	98.5	94.7	86.4	66.9	38.7
6	111.5	111.0	110.5	108.7	105.8	102.9	99.8	96.6	93.3	90.0	86.4	78.9	61.1	35.3
7	103.2	102.8	102.3	100.7	98.0	95.2	92.4	89.5	86.4	83.3	80.0	73.0	56.6	32.7
8	96.6	96.1	95.7	94.2	91.7	89.1	86.4	83.7	80.8	77.9	74.8	68.3	52.9	30.6
9	91.1	90.6	90.2	88.8	86.4	84.0	81.5	78.9	76.2	73.4	70.6	64.4	49.9	28.8
10	86.4	86.0	85.6	84.2	82.0	79.7	77.3	74.8	72.3	69.7	66.9	61.1	47.3	27.3
11	82.4	82.0	81.6	80.3	78.2	76.0	73.7	71.4	68.9	66.4	63.8	58.3	45.1	26.1
12	78.9	78.5	78.1	76.9	74.8	72.7	70.6	68.3	66.0	63.6	61.1	55.8	43.2	24.9
13	75.8	75.4	75.0	73.9	71.9	69.9	67.8	65.6	63.4	61.1	58.7	53.6	41.5	24.0
14	73.0	72.7	72.3	71.2	69.3	67.3	65.3	63.3	61.1	58.9	56.6	51.6	40.0	23.1
15	70.5	70.2	69.9	68.8	66.9	65.1	63.1	61.1	59.0	56.9	54.7	49.9	38.7	22.3
16	68.3	68.0	67.6	66.6	64.8	63.0	61.1	59.2	57.2	55.1	52.9	48.3	37.4	21.6
17	66.3	66.0	65.6	64.6	62.9	61.1	59.3	57.4	55.5	53.4	51.3	46.9	36.3	21.0
18	64.4	64.1	63.8	62.8	61.1	59.4	57.6	55.8	53.9	51.9	49.9	45.5	35.3	20.4
19	62.7	62.4	62.1	61.1	59.5	57.8	56.1	54.3	52.5	50.5	48.6	44.3	34.3	19.8
20	61.1	60.8	60.5	59.6	58.0	56.3	54.7	52.9	51.1	49.3	47.3	43.2	33.5	19.3
21	59.6	59.3	59.0	58.1	56.6	55.0	53.3	51.6	49.9	48.1	46.2	42.2	32.7	18.9
22	58.2	58.0	57.7	56.8	55.3	53.7	52.1	50.5	48.8	47.0	45.1	41.2	31.9	18.4
23	57.0	56.7	56.4	55.5	54.1	52.5	51.0	49.4	47.7	45.9	44.1	40.3	31.2	18.0
24	********	55.5	55.2	54.4	52.9	51.4	49.9	48.3	46.7	45.0	43.2	39.4	30.6	17.6
25	********	54.4	54.1	53.3	51.9	50.4	48.9	47.3	45.7	44.1	42.3	38.7	29.9	17.3
30	********	49.6	49.4	48.6	47.3	46.0	44.6	43.2	41.7	40.2	38.7	35.3	27.3	15.8
35	********	46.0	45.7	45.0	43.8	42.6	41.3	40.0	38.7	37.2	35.8	32.7	25.3	14.6
40	********	43.0	42.8	42.1	41.0	39.8	38.7	37.4	36.2	34.8	33.5	30.6	23.7	13.7
45	********	40.5	40.3	39.7	38.7	37.6	36.4	35.3	34.1	32.8	31.6	28.8	22.3	12.9
50	********	38.5	38.3	37.7	36.7	35.6	34.6	33.5	32.3	31.2	29.9	27.3	21.2	12.2
55	********	36.7	36.5	35.9	35.0	34.0	33.0	31.9	30.8	29.7	28.5	26.1	20.2	11.7
60	********	35.1	34.9	34.4	33.5	32.5	31.6	30.6	29.5	28.4	27.3	24.9	19.3	11.2
65	********	33.7	33.6	33.0	32.2	31.3	30.3	29.4	28.4	27.3	26.3	24.0	18.6	10.7
70	********	32.5	32.3	31.8	31.0	30.1	29.2	28.3	27.3	26.3	25.3	23.1	17.9	10.3
75	********	31.4	31.2	30.8	29.9	29.1	28.2	27.3	26.4	25.4	24.4	22.3	17.3	10.0
80	********	30.4	30.2	29.8	29.0	28.2	27.3	26.5	25.6	24.6	23.7	21.6	16.7	9.7
85	********	29.5	29.3	28.9	28.1	27.3	26.5	25.7	24.8	23.9	23.0	21.0	16.2	9.4
90	********	28.7	28.5	28.1	27.3	26.6	25.8	24.9	24.1	23.2	22.3	20.4	15.8	9.1
95	********	27.9	27.8	27.3	26.6	25.9	25.1	24.3	23.5	22.6	21.7	19.8	15.4	8.9
100	********	27.2	27.1	26.6	25.9	25.2	24.4	23.7	22.9	22.0	21.2	19.3	15.0	8.6
125	********	24.3	24.2	23.8	23.2	22.5	21.9	21.2	20.5	19.7	18.9	17.3	13.4	7.7
150	********	22.2	22.1	21.7	21.2	20.6	20.0	19.3	18.7	18.0	17.3	15.8	12.2	7.1
200	********	19.2	19.1	18.8	18.3	17.8	17.3	16.7	16.2	15.6	15.0	13.7	10.6	6.1
250	**********	17.1	16.8	16.4	15.9	15.5	15.0	14.5	13.9	13.4	12.2	9.5	5.5	
300	**********	15.6	15.4	15.0	14.5	14.1	13.7	13.2	12.7	12.2	11.2	8.6	5.0	
350	**********	14.5	14.2	13.9	13.5	13.1	12.7	12.2	11.8	11.3	10.3	8.0	4.6	
400	**********	13.5	13.3	13.0	12.6	12.2	11.8	11.4	11.0	10.6	9.7	7.5	4.3	
450	**********	12.8	12.6	12.2	11.9	11.5	11.2	10.8	10.4	10.0	9.1	7.1	4.1	
500	**********	11.9	11.6	11.3	10.9	10.6	10.2	9.9	9.5	8.6	6.7	3.9		
750	**********	9.7	9.5	9.2	8.9	8.6	8.3	8.0	7.7	7.1	5.5	3.2		
1000	**********	8.4	8.2	8.0	7.7	7.5	7.2	7.0	6.7	6.1	4.7	2.7		
1500	**********	6.7	6.5	6.3	6.1	5.9	5.7	5.5	5.0	3.9	2.2			
2000	**********	5.8	5.6	5.5	5.3	5.1	4.9	4.7	4.3	3.3	1.9			
3000	**********	4.6	4.5	4.3	4.2	4.0	3.9	3.5	2.7	1.6				
4000	**********	3.9	3.7	3.6	3.5	3.3	3.1	2.4	1.4					
5000	**********	3.3	3.2	3.1	3.0	2.7	2.1	1.2						
6000	**********	3.0	2.8	2.7	2.5	1.9	1.1							
7000	**********	2.7	2.6	2.5	2.3	1.8	1.0							
8000	**********	2.5	2.4	2.2	1.7	1.0								
9000	**********	2.2	2.0	1.6	0.9									
10000	**********	1.9	1.5	0.9										
12500	**********	1.3	0.8											
15000	**********	1.2	0.7											
20000	**********	0.6												

NOTE: FOR CORRECT USAGE OF THESE TABLES PLEASE REFER TO Micro data DOCUMENTATION

11.0 Weighting

For the micro data file, statistical weights were placed on each record to represent the number of sampled persons that the record represents.

The weighting for the Sun Exposure Survey consisted of several steps: calculation of a basic weight, an adjustment for non-response, an adjustment for selecting one person in the household, and finally, an adjustment for post-stratification to sex-age group population totals at the regional level (Atlantic, Quebec, Ontario, Prairies, B.C.).

11.1 Weighting Procedures for the Sun Exposure Survey

Basic Weight

With the Elimination of Non-Working Banks method of RDD, each telephone number within a Province-Stratum has an equal probability of selection. This probability is equal to T_s/T_p, where T_s= number of telephone numbers sampled in the Province-Stratum, and T_p= number of possible telephone numbers in the Province-Stratum. Note that the number of possible telephone numbers for a Province-Stratum is equal to the number of working banks for that Province-Stratum multiplied by 100. Each telephone number in the sample was assigned a basic weight equal to the inverse of its probability of selection. That is, for a telephone number in Province-Stratum j, the basic weight W1 is defined as:

$$W1(j) = \frac{T_p(j)}{T_s(j)}$$

Non-Response Adjustment

After calculating the basic weight, all telephone numbers corresponding to non-households were dropped from the sample. For the remaining telephone numbers, the basic weights of households which responded were adjusted to represent non-responding households. Note that telephone numbers which were not resolved (i.e. not determined if they belonged to a household or not) were assumed to be non-responding households in the weighting. A household was considered as responding if the selected person responded to the interview. The non-response adjustment factor for

a household in Province-Stratum j was calculated as H(j)/RH(j), where H(j) = {sum of the basic weights of all households in j}, and RH(j) = {sum of the basic weights of the responding households in j}. The non-response adjusted weight W2 was calculated by multiplying the basic weight for the

$$W2(j) = W1(j) * \frac{H(j)}{RH(j)}$$

responding households by the non-response adjustment factor:

Non-responding households were then dropped from further weighting procedures.

Multiple Telephone Adjustment

Weights for households with more than one (different) telephone number were adjusted downwards to account for the fact that such households have a higher probability of being selected. The weight for each household was divided by the number of distinct residential telephone numbers that serviced the household (NTel). That is, W4 = W3/NTel.

Selected Person Weight

A person weight was then calculated for each person who responded to the survey. The probability of an individual i being selected in a given household was 1/HHSIZE. The inverse of the probability of selection (that is, HHSIZE) was used as the selected person adjustment factor. The initial person weight (W5) was obtained by multiplying W4 by the selected person adjustment factor.

Region-Sex-Age Group Adjustments

The next weighting step was to adjust the weights to agree with Census projected region-sex-age group distributions. Counts were obtained for September 1996 for the following age groups: 15-19, 20-24, 25-34, 35-44, 45-54, 55-64, 65+. The adjustment factor for region-sex-age group k was defined as Ck/Sk, where Ck = {Census population projection for RSA k}, and Sk = {sum of weights W5 for persons in the sample in RSA k}. The adjusted weight W6 was calculated as W5 multiplied by the adjustment factor.

It should be noted that persons living in households without telephone service are included in these projections even though such persons were not sampled.

Calibration Estimation Adjustments

The weights for each respondent were adjusted by an iterative process using a calibrated estimation procedure. This procedure ensured that estimates produced for a region-sex-age group would agree with the population totals for that region-sex-age group. This adjustment was made by using a two-stage iterative weighting procedure, each time using the weight obtained from the previous step, until the set of estimates agreed with the Census projections. The final statistical weight can be found in the "WEIGHT" field on the micro data file. Note that this field has an implied

decimal and should be read as (99999999V9999) where V represents the location of the implied decimal place.

12.0 Questionnaire

13.0
Record Layout and Univariates