Catalogue No. 92-393-XIE

2001 Census Income Data

2001 Census Technical Report

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Introduction

The 2001 Census required the participation of the entire population of Canada, i.e. some 30 million people distributed over a territory of 9 million square kilometres. An endeavour of this magnitude represented a tremendous challenge. Although there are high quality standards governing the collection and processing of the data, and in spite of efforts aimed at reducing non-response, for example through the use of communications, it is not possible to eliminate all errors. While this term does not necessarily imply any mistake as such, some element of error is bound to result in view of decisions to control census costs.

Statistics Canada is committed to explaining the methods and concepts used to collect and process its data and to providing users with information on the quality of the data produced, as well as other data characteristics which might limit their usefulness or interpretation.

The **2001 Census Technical Reports Series** includes 16 reports covering the variables of the 2001 Census of Population, as well as *Coverage* and *Sampling and Weighting*.

This report deals with the income of individuals. It has been prepared by the Income Statistics Division, with the support of staff from the Census Operations Division and the Social Survey Methods Division.

Users will find additional information on census concepts, variables and geography in the *2001 Census Dictionary* (Catalogue No. 92-378-XIE), and an overview of the complete census process in the *2001 Census Handbook* (Catalogue No. 92-379-XIE).

1. Data Collection and Coverage

This stage of the census process ensures that each of the 11.8 million households in Canada is enumerated. The census enumerates the entire Canadian population, which consists of Canadian citizens (by birth and by naturalization), landed immigrants, and non-permanent residents, together with family members who live with them. Non-permanent residents are persons living in Canada who have a Minister's permit, a student or employment authorization, or who are claiming refugee status, and family members living with them.

The census also counts Canadian citizens and landed immigrants who are temporarily outside the country on Census Day. This includes federal and provincial government employees working outside Canada, Canadian embassy staff posted to other countries, members of the Canadian Armed Forces stationed abroad, and all Canadian crew members of merchant vessels. Because people outside the country are enumerated, the Census of Canada is considered a modified *de jure* census.

1.1 General

1.1.1 Collection Methods

To ensure the best possible coverage, the country is divided into small geographic areas called enumeration areas (EAs). Each census representative is responsible for at least one EA. The optimal number of households in an EA ranges from 175 in rural areas to 600 in urban areas. In the 2001 Census, there were 42,851 enumeration areas in Canada, and 38,000 people were engaged in collecting the data.

In 2001, approximately 98% of households were self-enumerated. Self-enumeration requires that a census representative drop off a questionnaire at each household during the two weeks before Census Day. An adult or responsible member of the household is asked to complete the questionnaire for all members of the household, and then mails the questionnaire in a pre-addressed envelope.

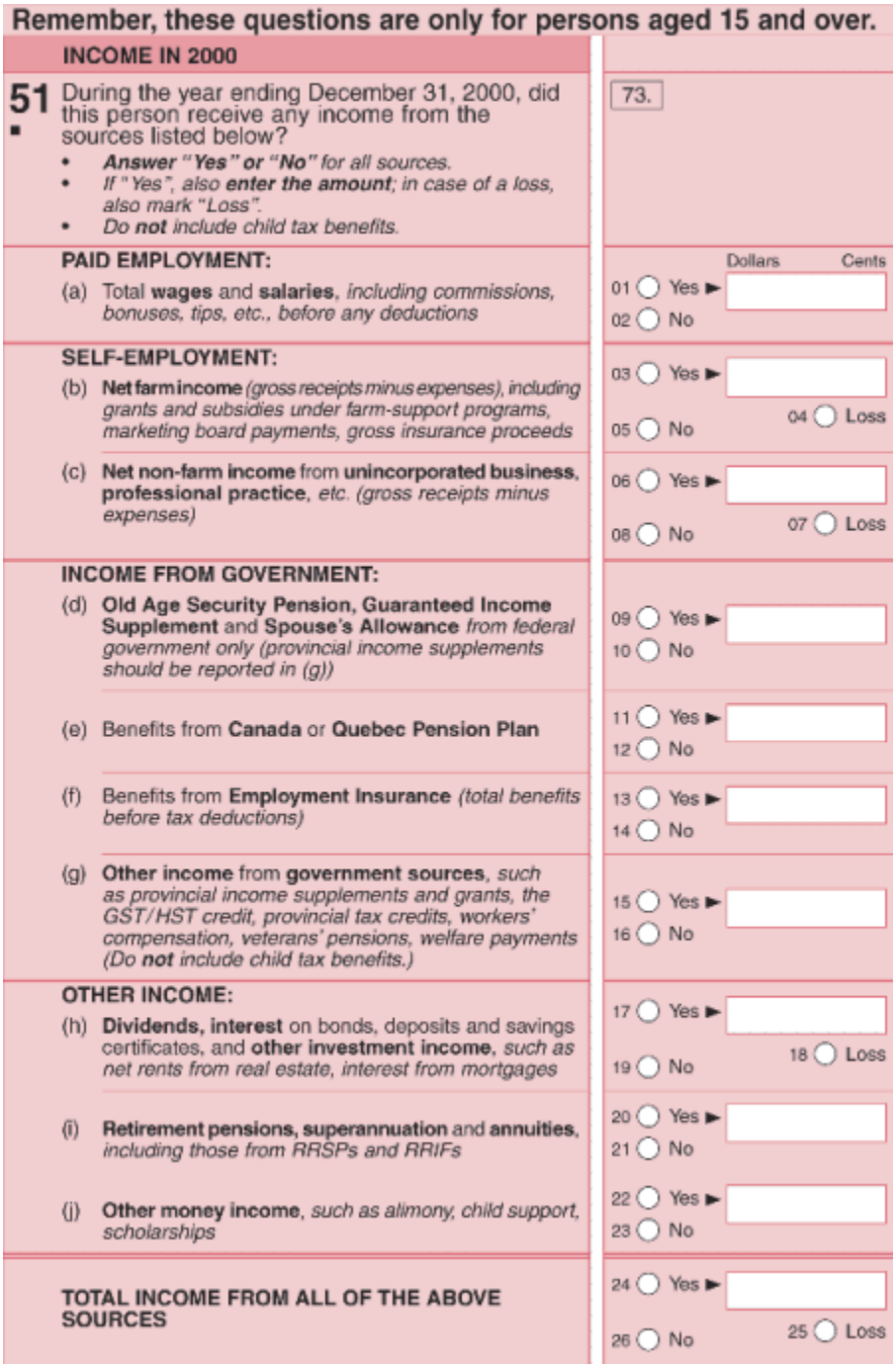
Approximately 2% of households were enumerated in the 2001 Census using the canvasser enumeration method. In this case, a census representative visits the household and completes a questionnaire for the household by interview. This method is normally used in remote and northern areas of the country, and on most Indian reserves. The canvasser enumeration method is also used in certain urban areas where it is considered highly possible that respondents would be unlikely to return a questionnaire.

1.1.2 Special Coverage Studies

Since 100% coverage is virtually impossible with such a large survey, a number of checks are performed on the collection of data. These studies measure the extent of coverage errors that occur when dwellings or individuals are missed, incorrectly included or double-counted. These checks are the Vacancy Check, the Reverse Record Check and the Overcoverage Study. These studies are discussed in the 2001 Census Technical Report on *Coverage* (Catalogue No. 92-394-XIE), planned for release in December 2004.

1.2 Questionnaire and Instructions

Following is the income question as it appeared on the long Population Questionnaire (Form 2B) and Individual Census Questionnaire in the 2001 Census.



Remember, these questions are only for persons aged 15 and over.

INCOME IN 2000

51 During the year ending December 31, 2000, did this person receive any income from the sources listed below?

- ***Answer "Yes" or "No"*** *for all sources.*
- *If "Yes", also* ***enter the amount****; in case of a loss, also mark "Loss".*
- *Do* ***not*** *include child tax benefits.*

73.

Dollars Cents

PAID EMPLOYMENT:

(a) Total **wages** and **salaries**, *including commissions, bonuses, tips, etc., before any deductions*

01 ◯ Yes ► 02 ◯ No

SELF-EMPLOYMENT:

(b) **Net farm income** *(gross receipts minus expenses), including grants and subsidies under farm-support programs, marketing board payments, gross insurance proceeds*

03 ◯ Yes ► 05 ◯ No 04 ◯ Loss

(c) **Net non-farm income** from **unincorporated business, professional practice**, *etc. (gross receipts minus expenses)*

06 ◯ Yes ► 08 ◯ No 07 ◯ Loss

INCOME FROM GOVERNMENT:

(d) **Old Age Security Pension, Guaranteed Income Supplement** and **Spouse's Allowance** *from federal government only (provincial income supplements should be reported in (g))*

09 ◯ Yes ► 10 ◯ No

(e) Benefits from **Canada** or **Quebec Pension Plan**

11 ◯ Yes ► 12 ◯ No

(f) Benefits from **Employment Insurance** *(total benefits before tax deductions)*

13 ◯ Yes ► 14 ◯ No

(g) **Other income** from **government sources**, *such as provincial income supplements and grants, the GST/HST credit, provincial tax credits, workers' compensation, veterans' pensions, welfare payments (Do* ***not*** *include child tax benefits.)*

15 ◯ Yes ► 16 ◯ No

OTHER INCOME:

(h) **Dividends, interest** on bonds, deposits and savings certificates, and **other investment income**, *such as net rents from real estate, interest from mortgages*

17 ◯ Yes ► 19 ◯ No 18 ◯ Loss

(i) **Retirement pensions, superannuation** and **annuities**, *including those from RRSPs and RRIFs*

20 ◯ Yes ► 21 ◯ No

(j) **Other money income**, *such as alimony, child support, scholarships*

22 ◯ Yes ► 23 ◯ No

TOTAL INCOME FROM ALL OF THE ABOVE SOURCES

24 ◯ Yes ► 26 ◯ No 25 ◯ Loss

The following income-related information was published in a user guide provided to all recipients of the long Population Questionnaire (Form 2B) or Individual Census Questionnaire (Form 3B).

INCOME

Question 51 provides the only source of detailed income statistics for all people in Canada, their families and households. Income tax records neither cover all people nor do they provide some important information on the characteristics of persons with income.

Governments use income statistics to develop income support programs and social services, such as Old Age Security Pension, provincial income supplements, social assistance, and welfare payments. They also use these statistics to ensure that programs supplementing family incomes do so efficiently and to identify specific geographic areas that need assistance.

Businesses, large and small, use these statistics to locate stores near consumers and to develop new products and services.

Personal or identifiable information is never sold or given to mailing lists. NO ONE, including government departments, has access to income or other personal information collected in the census. All your answers are kept confidential. This is the law.

QUESTION 51 – Income in 2000

GENERAL INSTRUCTIONS

Complete Question 51 for all persons aged 15 and over, whether or not they worked or had income in 2000.

Report annual income received from January 1, 2000 to December 31, 2000 for **each** applicable source in parts (a) to (j) as well as the total income from **all** sources. If you are not sure of the exact amount for a source, give your best estimate. If necessary, consult your 2000 income tax return and information slips.

Report income obtained from outside Canada in Canadian dollars.

PAID EMPLOYMENT

Part (a) – Total wages and salaries

Include:

- total wages and salaries from all jobs **before** deductions for income tax, pensions, etc. (Do not report take-home pay only.)
- commissions, tips, cash bonuses and casual earnings
- military pay and allowances
- benefits from wage-loss replacement plans or income-maintenance insurance plans
- employer or union supplementary unemployment benefits.

Report retirement allowances and severance pay in part (j).

If using T4 slips to answer part (a), report the amount in Box 14 minus the amounts in Boxes 30 to 40.

SELF-EMPLOYMENT INCOME

Part (b) – Net farm income

Persons who operated an agricultural operation in 2000, alone or in partnership, should report net farm income (gross receipts minus operating expenses such as wages, rents or depreciation) in part (b).

In the case of a partnership, report only this person's share of net income.

Agricultural operations produce any of the following items intended for sale: crops, livestock, poultry or other agricultural products (greenhouse or nursery products, Christmas trees, sod, honey, maple syrup, furs, eggs, milk, etc.)

Include:

- cash advances in gross receipts received in 2000
- all rebates and farm-support payments from federal, provincial and regional agricultural programs such as dairy or milk subsidies
- marketing board payments and dividends received from co-operatives
- gross insurance and program proceeds such as payments from crop insurance or Net Income Stabilization Account (NISA).

Report income from **incorporated farms** in part (a) and/or in part (h).

For persons who rented out their farms, report the net rent in part (h).

Part (c) – Net non-farm income from unincorporated business, professional practice, etc.

Mark **Yes** in part (c) for:

- persons who owned and operated a non-farm, unincorporated business or professional practice in 2000, alone or in partnership, including:
  - self-employed fishers, trappers and hunters
  - persons doing casual work, such as babysitting in their own home, or selling and delivering cosmetics or newspapers
  - freelancers, such as artists, writers or music teachers
  - persons providing room and board to non-relatives.

Report net income (gross receipts minus operating expenses such as wages, rents or depreciation). Do not subtract personal deductions such as income tax and pension contributions.

In the case of a partnership, report only this person's share of net income.

Report income from **incorporated businesses** in part (a) and/or in part (h).

INCOME FROM GOVERNMENT

Part (d) – Old Age Security Pension, Guaranteed Income Supplement and Spouse's Allowance

Mark **Yes** in part (d) for:

- persons 65 years and over who in 2000 received Old Age Security Pension (and Guaranteed Income Supplement)
- 60 to 64-year-old spouses of Old Age Security Pension recipients and widow(er)s who in 2000 received Spouse's Allowance.

Report only money received from the **federal** government.

Report provincial or territorial income supplements in part (g).

If using T4A (OAS) slips to answer question (d), report the sum of amounts in Boxes 18 and 21.

Part (e) – Benefits from Canada or Quebec Pension Plan

Include these CPP/QPP payments:

- retirement pensions
- survivors' benefits
- disability pensions
- orphans' benefits
- a combination of these pensions and benefits.

Do **not** include:

- contributions to the plan
- lump-sum death benefits.

Report income from employee pension plans in part (i).

Report old age, retirement and war pensions received from foreign sources in part (j).

If using T4A(P) slips to answer question (e), report the amount in Box 20.

Part (f) – Benefits from Employment Insurance

Include benefits received:

- for unemployment
- for sickness
- for maternity, paternity or adoption
- for work sharing or training
- by self-employed fishers.

If using T4E slips to answer question (f), report the amount in Box 14.

Part (g) – Other income from government sources

Report in part (g) income received from federal, provincial, territorial and municipal governments in 2000 and not reported in other parts of Question 51.

Include:

- provincial or territorial income supplements to Old Age Security pension recipients
- provincial or territorial payments for rent or lodging expenses for senior citizens
- workers' compensation benefits
- veterans' pensions
- war veterans' allowances
- pensions to widows and dependants of veterans

- refunds of Goods and Services Tax (GST) or Harmonized Sales Tax (HST)
- refundable provincial or territorial tax credits
- cash benefits for food, fuel and shelter from social assistance (welfare) programs
- cash assistance to persons who are handicapped or disabled
- payments received from training programs sponsored by government
- regular payments from provincial automobile insurance plans (exclude lump-sum payments).

Do **not** include:

- income tax refunds
- Canada Child Tax Benefit (CCTB) and any provincial or territorial child tax benefits such as:
  - Nova Scotia Child Benefit
  - New Brunswick Child Tax Benefit and Working Income Supplement
  - Quebec Family Allowance
  - Ontario Child Supplement for Working Families
  - Saskatchewan Child Benefit or Employment Supplement
  - Alberta Employment Tax Credit
  - British Columbia Family Bonus or Earned Income Benefit
  - Yukon Child Benefit
  - Northwest Territories Child Benefit and Nunavut Child Benefit.

OTHER INCOME

Part (h) – Dividends, interest on bonds, deposits and savings certificates, and other investment income

Include:

- the actual (not the taxable) amount of **dividends** received from Canadian and foreign corporate stocks and mutual funds
- interest from deposits in banks, trust companies, co-operatives, credit unions and caisses populaires
- interest on savings certificates, guaranteed investment certificates (GICs), Canada Savings Bonds, other government or corporate bonds and debentures or treasury bills
- cash dividends and interest from insurance policies
- net rents from real estate, including farm land
- mortgage and loan interest received
- regular income from an estate or trust fund
- investment income received from abroad (report in Canadian dollars).

In the case of a joint investment, report only this person's share.

Part (i) – Retirement pensions, superannuation and annuities, including those from RRSPs and RRIFs

Include:

- pension income or survivor benefits from an employee pension plan

- payments received from all annuities, including payments from a matured RRSP in the form of a life annuity, a fixed-term annuity, a RRIF or an income-averaging annuity contract
- pensions of retired civil servants, Armed Forces personnel and RCMP officers
- annuity payments received from the Canadian Government Annuities Fund or an insurance company.

Do **not** include:

- lump-sum benefits
- withdrawals from a pension plan or RRSP
- refunds of overcontributions.

Report severance pay, retirement allowances, and old age, retirement and war pensions received from foreign sources in part (j).

Part (j) – Other money income

Report in part (j) any other regular cash income received in 2000 and not covered in parts (a) to (i).

Include:

- alimony, child support and any periodic support from persons not in the household
- non-refundable scholarships, bursaries, fellowships and research grants
- severance pay and retirement allowances
- royalties
- non-investment income from outside Canada (report in Canadian dollars).

Do **not** include:

- money received from gambling, lotteries, the sale of property or loan repayments
- Canada Child Tax Benefit (CCTB) and other provincial or territorial child tax benefits
- a cash refund of pension fund contributions
- lump-sum death benefits or any other one-time, lump-sum payment
- lump-sum inheritance or insurance policy settlements or cash gifts
- capital gains or losses
- income tax refunds.

1.3 Coverage and Collection - Income

The resources spent on a modern census are so large that, to ensure maximum benefit from such a huge investment, the census usually collects more than the basic demographic data. At the same time, governments are sensitive to the issue of response burden. Canada, like some countries, has adopted an approach that attempts to meet the dual objective of efficient use of resources and lower response burden.

This approach consists of making use of two basic forms to collect information, a short form (Form 2A) and a long form (Form 2B). The short form contains questions on name, sex, date of birth, marital status, common-law status, relationship to Person 1 and first language learned in childhood (mother tongue).

The answers to these questions provide the basic data on the population characteristics of the nation. In 2001, four out of five households in Canada received this short questionnaire.

The long form, in addition to including the basic questions used on the short form, asks questions on activities of daily living, sociocultural characteristics, mobility and education, place of birth of parents, household activities, labour market activities, income and housing. Thus, the answers to these questions provide a social and economic portrait of Canada at the time of the census. This long form was distributed to a 20% sample of the population, or one in five households, in 2001.

The income question consisted of 10 questions on sources of income and a question on total income. Each question was addressed to individuals 15 years and over in the sampled households. Income information was not collected from individuals under 15 years of age, institutional residents and recent immigrants who entered Canada between January 1 and May 15, 2001.

Respondents were asked to provide an amount against the sources from which they received an income during the calendar year 2000. Variations of Form 2B (Forms 2C, 2D and 3) were used for certain segments of the population. For example, Form 2C was given to Canadians abroad, while Form 2D was used in canvasser areas. However, it is sufficient to know that the income questions on these forms solicited the same information as those on the 2B questionnaire.

A reproduction of the 2001 Census income question is reproduced in Section 1.2, Questionnaire and Instructions.

Although there are 10 sources of income listed on the questionnaire, it is important to advise the respondents about the components of each source. To this end, a guide is produced for respondents, which explains each question on the Form 2B. This guide is included in the drop-off package for each household in the sample. The portion of the guide dealing with income questions is reproduced in Section 1.2, Questionnaire and Instruction.

1.4 Concepts and Components

The 2001 Census Dictionary (Catalogue No. 92-378-XIE) contains detailed definitions of census terms, variables and concepts. Users should refer to the 2001 Census Dictionary for full definitions and additional remarks related to any concepts and definitions not found in this chapter.

1.4.1 Concept of Income

A mention of income without any qualification begs the question: "What is income?" When asked about his/her income, a working individual will most likely state his/her wages from work or profits from self-employment in a business activity, while a non-working or retired person will likely give his/her income from investments or pension benefits, etc. In some cases, government transfer payments, such as employment insurance benefits or child tax benefits, will be included in the answer.

For census purposes, income includes all money income, before taxes, received by individuals 15 years and over from employment, investments, government transfer payments and other miscellaneous sources during the calendar year preceding the census. It excludes the value of income "in kind" and lump-sum payments. For detailed definitions of income sources and total income, see Appendix A.

Income is usually generated over time. It is generally stated as an amount per hour, week, month or year. It is, therefore, also important to specify, in addition to the constituents of income, the time period for which the respondent is to report his/her income. Income data from the 2001 Census relate to calendar year 2000.

In addition to the constituents of income and the period covered, it is also important to specify the "income unit" (an individual, family, etc.) which received income. The census collects income information from all individuals 15 years and over in a sample of households. From other information on the questionnaire, incomes for other units such as families, households or spouses can easily be calculated.

1.4.2 Components of Income

Income stems from many sources. These sources can be grouped broadly as follows:

(a) Employment Income/Earnings

The primary source of income is employment or work, which may be undertaken either for others or for oneself. The monetary return to the employees is generally called a wage or a salary, and the return to those working for themselves is called income "employment income" or "earnings".

(b) Investment Income

While the combined use of labour and capital results in self-employment income, labour alone usually entitles one to a wage or salary. Use of capital alone also produces income, referred to as investment income, in the form of interest, dividends, rent, etc.

(c) Government Transfer Payments

A very common source of income among Canadians is government transfer payments. These payments may be in the form of social insurance (such as Canada/Quebec Pension Plan benefits) or are income-tested (for example, Canada Child Tax Benefits, Old Age Security pension and Guaranteed Income Supplement) and needs-tested (such as mothers' allowance).

(d) Other Sources

Finally, income is also received from miscellaneous sources such as retirement pensions and alimony.

The above broad framework is depicted in Figure 1. The items in the figure are based on the income data available from the 2001 Census database. Detailed definitions of sources of income are presented in Appendix A.

1.4.3 Related Variables

The census database allows users to cross-classify income by a host of population, family and household characteristics. For definitions of these variables and characteristics, users should consult the 2001 Census Dictionary, relevant census guides and other documents.

1.4.4 Most-used Income Statistics

Users of census income and other data have, to a large extent, total flexibility to define the statistics required by them. The following are some of the statistics that are more commonly used:

(a) Income Size Distributions

Although census income variables show the actual dollar values in the database, these are normally grouped into a few categories to classify the income units by income size groups. It is often useful to obtain both numeric and percentage distributions. The number of feasible groups would depend on

several factors. It should, however, be kept in mind that too detailed a distribution would be subject to large sampling errors.

(b) Average Income

Average income refers to the weighted mean total income of a group who reported income for 2000. Average income is calculated from unrounded data by dividing the aggregate income of the group by the number of units with income in that group.

While this is the standard definition of an average, it should be noted that **average income (total income or income from a component) of individuals is always derived by dividing the aggregate income by the number of recipients (of total income or income from a component)**. The results of most analysis based on averages that include individuals without income could be quite misleading.

However, **the average incomes of non-family persons, families and households are always calculated by dividing the aggregate income by the number of units, whether or not they had any income**. Although all households, families and non-family persons are expected to have income during the reference period, there are some minor exceptions. It is possible for a family or a non-family person to have subsisted without income by reducing past savings or by going into debt. In other cases, zero-income situations result from changes in family composition, recent immigration, etc. Some of the families not reporting income may have either been newly formed or undergone a change in family composition through marriage, divorce or widowhood. Most of the families with female reference persons without income may fall into this category. The majority of other families without any income may in fact be families that recently migrated to Canada and were instructed not to report income received prior to arrival in Canada. Similar reasons apply to most non-family persons without income. On the whole, the numbers of such cases of zero income families and non-family persons are extremely small.

(c) Standard Error of Average Income

Users may wish to obtain standard errors for the average incomes produced for them. This statistic is an estimate of the error introduced into these data by the fact that they are collected only from a one-in-five random sample of households. There is a 95% probability that the true average income of a group (the value that would have been obtained had sampling not been used) lies within plus or minus two standard errors, and there is a 99% probability that the true average lies within plus or minus two and one half standard errors. The estimated standard error does not include the effects of certain types of response error, or systematic or coverage errors.

(d) Median Income

Median income of a specified group of income recipients is defined as that amount which divides their income size distribution into two halves, i.e. the incomes of the first half are below the median, while those of the second half are above the median. The organization of the census database is such that it does not lend itself to easy calculation of true medians. Therefore, estimates of median income from census data are derived from grouped data. For highly skewed distributions, especially for small groups of population, the median is generally a better measure of central tendency than the mean.

(e) Incidence and Composition of Income

The presence of actual dollars allows users to produce aggregate amounts of income from various sources which, in turn, can be used to obtain and analyze the income composition of various groups. Similarly, it is possible to generate from the census database the incidence of various sources of income among individuals, families and households.

(f) Major Source of Income

It is possible to obtain a distribution of individuals, families or households by their major source of income. This variable is an indicator of the income component, which constitutes the largest proportion of the total income of an income unit. Various combinations of income sources can be used to derive this classification. For example, income sources can be combined into five components as follows: wages and salaries, self-employment income (farm and non-farm), government transfer payments, investment income and other income (retirement pensions and other money income). The absolute values for these components are compared and the component with the largest absolute value is designated as the major source of income.

(g) Incidence of Low Income

The incidence of low income is defined as the proportion or percentage of economic families or unattached individuals in a given classification below the low income cut-offs. For the 2001 Census, these incidence rates are calculated from unrounded estimates of economic families and unattached individuals 15 years of age and over. The incidence of low income can also be derived for census families, non-family persons and the population in private households.

2. Data Processing

This part of the census process involved the processing of all the completed questionnaires, from the data capture of the information through to the creation of an accurate and complete retrieval database. The final database was transferred to the Data Quality Measurement Project to determine the overall quality of the data, and to the Dissemination Project for the production and marketing of the 2001 Census products and services. A new objective for 2001 was to create an image retrieval system giving access to the images (pictures) of all the census questionnaires and visitation records, so that subsequent processes requiring access to original census forms would not have to handle the thousands of boxes and paper documents, as in previous censuses.

2.1 General

2.1.1 Regional Processing

Regional Processing was responsible for the manual coding of the industry and occupation responses and the data capture of the questionnaire information into a machine-readable format for subsequent processing systems. Given the enormous volume of census questionnaires and information to be captured (representing over 4 billion keystrokes), Regional Processing has been contracting this work out since 1981 to the Canada Customs and Revenue Agency (CCRA), formerly called Revenue Canada. By using the trained staff and infrastructure already in place at CCRA, the census realized cost savings by partnering with another government agency. For the 2001 Census, approximately 2,800 CCRA employees were sworn to secrecy under the *Statistics Act* to perform the census work, under the same rules and regulations as those which apply to the employees of Statistics Canada.

When the collection activities for a specific enumeration area (EA) were completed, the questionnaires, along with their maps and visitation records, were shipped in EA boxes from the field collection units to one of eight designated CCRA tax centres across the country.

The first step was to prepare the completed questionnaires for data capture. This traditionally included the manual assignment of codes to written answers that were provided by the respondents. For 2001, most of the written responses were converted to codes using automated systems (see Section 2.1.4). The only written responses that had to be manually coded for the 2001 Census were the questions on industry and occupation contained in the long-form questionnaires. Research into the automation of the coding of these questions has begun, and it is expected that an automated system will be operational for the 2006 Census.

The industry responses were coded at CCRA according to the North American Industry Classification System (NAICS), which was introduced as a standard within Statistics Canada a few years ago. NAICS is designed to provide a common framework for Canada, the United States and Mexico, which will enable the production of industry statistics under the North American Free Trade Agreement (NAFTA). This meant a change for industry coding - in 1996, industry was coded using the 1980 Standard Industrial Classification (SIC). In order to allow longitudinal comparisons, the 2001 industry question was also coded using the 1980 SIC during the Automated Coding phase (see Section 2.1.4). This phase was carried out with more automated means than in previous censuses.

Once the questionnaires were received and registered at one of the CCRA tax centres, and the industry and occupation codes assigned, the next step was to sort, label and batch the questionnaires in preparation for data capture. The labels affixed to each questionnaire contained a unique sequence number that was used to control the movement of the questionnaire throughout the CCRA operations. For the first time, the label also included a bar code to facilitate the scanning of the questionnaire in the imaging operation (see Section 2.1.2).

Data capture was then performed by traditional manual keying at mainly mainframe terminals. Verification of the accuracy of the data capture operation was done by selecting a sample of questionnaires that were already key-entered and capturing the information from the questionnaires in this sample a second time. Quality control statistics were produced by comparing the two sets of captured information.

As the data were keyed, they were transmitted in real time over dedicated communication lines to the CCRA computer in Ottawa. Within 24 hours, the data were then transferred to tape cartridges and transported by bonded carrier to Statistics Canada, where they were loaded into the mainframe computer. Questionnaires were reassembled into their EA boxes for shipment to Statistics Canada's 2001 processing site in Ottawa.

2.1.2 Imaging

In previous censuses, the remaining processing steps that required access to the questionnaires and visitation records used the paper documents. For 2001, the need to handle the paper was eliminated by imaging (scanning) all the questionnaires and visitation records as soon as they arrived at the 2001 processing site from the CCRA tax centres. Subsequent operations then had access to the questionnaires and visitation record images, using an image retrieval system, rather than using the paper documents.

As the EA boxes arrived at the 2001 processing site, they were registered. Then, the documents were prepared for imaging. Since the questionnaires and visitation records were in booklet format, they had to be cut into separate sheets in order to be run through the scanners. Following the cutting, since the 2A questionnaire was actually two booklets glued together (one English and the other French), the unused portion had to be separated from the completed portion. Extra material that was included with the questionnaires was removed (e.g., paper clips and notes). The questionnaires were then batched by EA for imaging.

The 13 million documents were imaged using 15 high-volume scanners running five days a week, two shifts per day. The geographic identifier that was required to identify each document image was automatically assigned using the bar code on the label affixed during the data-capture operations at CCRA (see Section 2.1.1). Quality control was performed to ensure that each document contained the right number of pages, and that the number of questionnaires by form type was correct for each EA. A problem-resolution operation resolved any problems that arose. The images were then written to optical platters for subsequent access and archiving. As the questionnaires were scanned, their images were also kept in magnetic storage for immediate access by the Interactive Verification activities (see Section 2.1.3).

The images on the optical platters are being kept in a secure location and are only accessible to authorized Statistics Canada employees from within the secure location.

2.1.3 Interactive Verification

The main objective of Interactive Verification was to identify and correct errors in the data, for which proper resolution required reference to the images of the questionnaires and/or visitation records. A detailed set of edits was applied to the captured data to identify possible errors, such as households with missing or duplicate persons, incorrect enumeration of foreign or temporary residents, questionnaires assigned to the wrong household, or misclassification of households as occupied or unoccupied. A thorough review of the information on all relevant census forms was conducted to determine the appropriate corrective action for each edit failure. In some cases, this required adding and/or deleting persons or dwellings; consequently, this process had an impact on the census counts.

As the census data arrived on cartridges from the Canada Customs and Revenue Agency (CCRA), they were loaded into Statistics Canada's computers, ready for the Interactive Verification activities. A series of automated "structural" edits were performed, mainly to verify the information filled out by the Census

Representative on the front cover of the questionnaire. These edits included, among other things, matching questionnaire and household types, cross-checking the number of questionnaires and people enumerated, and verifying that the geographic identifiers were unique. Some edits were also performed on the income information, so that anomalies could be extracted and examined by income subject-matter experts.

All edits were done by enumeration area (EA). Errors were flagged, and then corrected by referring to the images of the questionnaires and visitation record for that EA. The corrections were made to the electronic data using an interactive PC-based system. Some of the corrections were also noted on the questionnaire images, using a process commonly called "annotation".

Once the EA edits were completed, automated and manual processes were used to verify the block number that the Census Representative had copied from the EA map onto the questionnaire and Visitation record (VR).

A National Block Program has been implemented for the first time in 2001. A "block" is basically the smallest area bounded by streets or roads, lakes and rivers. In urban centres, "blocks" are generally recognizable city blocks. In rural areas, "blocks" are much larger areas, but are still bounded by identifiable features, with no significant feature splitting an area. These blocks are added together to create the EAs for data collection purposes, and the dissemination areas (DAs) for the dissemination of census products and services.

During the field collection operations, as census representatives delivered a questionnaire to each dwelling within their EA, they wrote the person's name (if possible) and the address in their VRs. At the same time, they copied the VR line number from the VR onto the questionnaire, to uniquely identify the questionnaire for that dwelling. As well, they identified the block number for the dwelling from their EA map and copied the number into the VR and onto the questionnaire. These block numbers were data-captured, so that all the dwellings in Canada could be identified as belonging to a particular block.

As a final step in the Interactive Verification process, the data were reformatted and forwarded for the final processing steps, namely Automated Coding and Edit and Imputation.

Interactive Verification also performed some special processing to ensure that Canadians living outside Canada on Census Day (people aboard coast guard and Canadian Armed Forces vessels, Canadian-registered merchant vessels, and diplomatic and military personnel) were enumerated.

2.1.4 Automated Coding

Automated coding matched the write-in responses that were "data-captured" from the long-form questionnaires during Regional Processing (see Section 2.1.1) to entries in an automated reference file/classification structure containing a series of words or phrases and corresponding numerical codes. Although a large percentage of write-in responses can be coded in a purely automated manner, a series of responses always remains unmatched. Specially trained coders and subject-matter experts reviewed all unmatched responses and, with the assistance of PC-based interactive coding systems, assigned the appropriate numerical code after examining responses to other questions and from other members of the household. Automated coding was applied to write-in responses for the following questions on the long form (2B):

- relationship to Person 1;
- home language;
- non-official languages;
- first language learned in childhood (mother tongue);
- language of work (new in 2001);
- place of birth;
- place of birth of parents (new in 2001);

- citizenship;
- ethnic origin (ancestry);
- population group;
- Indian Band/First Nation;
- place of residence 1 year ago;
- place of residence 5 years ago;
- major field of study;
- religion (last asked in 1991);
- place of work;
- industry according to the 1980 SIC (first time for automated coding in 2001).

As the responses for a particular variable were coded, the data for that variable were sent to the Edit and Imputation phase.

2.1.5 Edit and Imputation

2.1.5.1 General

The data collected in any survey or census contain omissions or inconsistencies. These errors can be the result of respondents answering the questions incorrectly or incompletely, or they can be due to errors generated during processing. For example, a respondent may be reluctant to answer a question, may fail to remember the right answer or may misunderstand the question. Census staff may code responses incorrectly or may make other mistakes during processing.

Prior to Edit and Imputation, the questionnaires underwent some basic manual edits during collection. Field staff reviewed the questionnaires for missing responses or unacceptable multiple responses. Such problems were resolved by contacting the respondents and obtaining the required information. Following collection, Interactive Verification (see Section 2.1.3) performed some basic structural edits, where the images of the questionnaires and visitation records were referenced as necessary.

The final clean-up of the data was done in Edit and Imputation and was, for the most part, fully automated. It applied a series of detailed edit rules that identified any missing or inconsistent responses. These missing or inconsistent responses were corrected most of the time by changing the values of as few variables as possible through imputation. Imputation invoked "deterministic" and/or "minimum-change 'hot deck'" methods. For deterministic imputation, errors were corrected by inferring the appropriate response value from responses to other questions. For minimum-change "hot deck" imputation, a record with a number of characteristics in common with the record in error was selected. Data from this "donor" record were borrowed and used to change the minimum number of variables necessary to resolve all the edit failures.

Two different automated systems were used to carry out this processing.

The **N**earest-neighbour **I**mputation **M**ethod (NIM), developed for the 1996 Census to perform Edit and Imputation for basic demographic characteristics such as age, sex, marital status, common-law status and relationship to Person 1, was expanded for 2001 and implemented in a system called CANCEIS (**CAN**adian **C**ensus **E**dit and **I**mputation **S**ystem) to include Edit and Imputation for such variables as industry, place of work, mode of transportation and mobility. As in 1996, CANCEIS continued to allow more extensive and exact edits to be applied to the response data, while preserving responses through minimum-change "hot deck" imputation.

SPIDER (**S**ystem for **P**rocessing **I**nstructions from **D**irectly **E**ntered **R**equirements) was used to process the remaining census variables, such as mother tongue, dwelling and income. This tool translated subject-matter requirements, identified through decision logic tables, into computer-executable modules. SPIDER performed both deterministic and "hot deck" imputation.

2.1.5.2 Dwelling Classification Study (DCS)

The Dwelling Classification Study takes a sample of dwellings declared either unoccupied or absent during the collection process. Later, the DCS returns to these dwellings to determine if, on Census Day, they were occupied, unoccupied or should not have been listed because they did not meet the definition of a census dwelling. If a dwelling was occupied, one of two separate adjustments is made to the census database. If the dwelling was listed as vacant in the census, then a technique, called "random additions", was applied to add households and persons to the census database. In the 2001 Census, 111,628 households and 222,720 persons were added to the database to account for the estimated number of persons living in vacant dwellings. The second adjustment was concerned with absent households. These were adjusted by creating a new household size for all such dwellings on the census database. A total of 143,681 households with 317,587 persons were added to the census database through this adjustment.

2.1.5.3 Weighting

Data on age, sex, marital status, common-law status, mother tongue and relationship to Person 1 were collected from all Canadians. However, the bulk of the information gathered in the census came from the 20% sampling of the population. Weighting, applied to the respondent data after Edit and Imputation, was used to adjust the census sample to represent the whole population.

The weighting method produced fully representative estimates from the sample data. For the 2001 Census, weighting employed a methodology known as calibration (or regression) estimation. Calibration estimation started with initial weights of approximately 5 and then adjusted them by the smallest possible amount needed to ensure closer agreement between the sample estimates (e.g., number of males, number of people aged 15 to 19) and the actual population counts for age, sex, marital status, common-law status and household size.

Once invalid and non-response data were corrected, they were transferred to the final national retrieval databases for subsequent data quality studies and dissemination.

2.2 Processing - Income

2.2.1 Regional Processing

In the case of income, detailed instructions were given to keyers and their supervisors to resolve reporting situations where responses did not meet specific criteria. The instructions included, for example, the following procedures:

- convert non-annual values (for example, per month) into annual amounts;
- convert values reported in foreign currencies into Canadian dollar equivalents;
- resolve multiple amounts reported against a single source;
- resolve cases where a range of values was reported (e.g., $10,000 to $15,000); and
- resolve keyed alpha-numeric entries.

If a situation was not covered by the specified procedures, keyers were instructed to "key what they see", while at the same time the regional office sought the advice of subject-matter specialists. The problem was described by the regional staff through the "Technical Assistance Request Form (TARF)". TARFs were electronically transmitted to head office and a resolution was generally provided the same day. Subsequently, similar reporting situations could then be dealt with in a consistent manner in all regions. In 2001, less than 10 TARFs were received requiring a resolution of an income reporting situation.

2.2.2 Interactive Verification

For the income questions, certain errors, if left uncorrected, could lead to distortions which could have serious repercussions on the quality and credibility of census income data. For example, a respondent-provided amount of $90,000 in wages and salaries could be entered erroneously with an additional zero, changing the original amount to $900,000. Similarly, an amount of $9,000 in Employment Insurance benefits could be erroneously keyed in as $90,000. A few errors of this magnitude in the first source could quickly add millions of dollars to wage estimates, while similar errors in the second source could lead to obvious errors in the estimates.

To safeguard against such errors, an on-line editing system was established that checked all amount entries against specified limits. For example, $250,000 was the upper limit for wages and salaries of doctors, lawyers, judges, etc., $19,000 for Employment Insurance benefits, and so on. If a reported amount was in excess of the specified limits, the relevant source was highlighted on an electronic display of the income question, along with various individual characteristics (sex, age, education, weeks worked, etc.), to assist in validation of the response. In some cases, it was also necessary to examine the electronic image of the questionnaire. Responses were then either accepted as reported or modified as required on the database. All responses that had been invalidated during key-entry could only be corrected by consulting the questionnaire. These types of responses consisted largely of alpha-numeric responses and mis-keyed values.

Table 1 shows the upper and lower limits specified for various income sources, the total number of amount responses and the number of responses that fell outside the limits. There were 10 million amount entries, of which about 89,000, or 0.9%, were electronically examined. Reported responses (including all of those that were invalidated during key entry) were changed in about 77,000 cases. This amounted to 86% of all records examined and 0.8% of all amount responses.

2.2.2.1 Changes to Employment Income Sources

The largest number of adjustments to an individual source was made to wages and salaries. However, considering the very high incidence of this source among income recipients, the proportions of records examined and changed were quite small. The large correction rate for non-farm self-employment income was largely due to misreporting of wages and salaries by persons who were self-employed in incorporated companies. Also, in certain instances, non-farm self-employment income had been misreported as farm self-employment income. Correction of this reporting error affected both sources. It was suspected that some of these reporting errors stemmed from the sequence of these questions and the highlighting of the term "self-employment" on the questionnaire. The large correction rate for farm self-employment income, in addition to being affected by misreporting of the other self-employment income source, resulted from a cross-edit carried out with Census of Agriculture data. With information on the farm operation and farm operators from the Census of Agriculture questionnaire, it was usually possible to validate net farm income reported on the Census of Population questionnaire. In many cases where farm income was changed, it was also necessary to adjust the reported values (which may have been within our limits) of the spouse or another family member.

2.2.2.2 Changes to Transfer Payment Sources

The adjustments to various sources of government transfer payments may seem substantial, but most of these result from classification errors in reporting. For example, respondents reporting amounts for Old Age Security (OAS) pension and Guaranteed Income Supplement (GIS) in excess of their 2000 entitlement caused a common error among the transfer payment sources. This over-reporting was often due to one of the following reasons:

- OAS/GIS pension was combined with Canada/Quebec Pension Plan (CPP/QPP) benefits;
- one spouse reported OAS/GIS for both spouses;

- some individuals, under the age of 60, misreported another transfer payment or a retirement pension in this source.

All cases of reporting over $14,000 as OAS/GIS were examined during the Interactive Verification processing and either manually resolved at this stage or left for automated edit and correction later. For example, certain individuals who multiplied their current (May 2000) OAS/GIS payment by 12, to arrive at their annual amount for 2000, had their over-reporting corrected during automated processing (see Section 2.2.2).

2.2.2.3 Changes to Other Income Sources

Some of the errors encountered in reporting of investment income related to reporting of multiple amounts. Misreporting of entire pension income (OAS, CPP/QPP and private pension) against retirement pensions or OAS/GIS or CPP/QPP resulted in corrections to the retirement pension source. Because of its position on the questionnaire, respondents sometimes inadvertently reported total income in the other money income field. This was a frequent cause of error identification for that source. In most of the above cases, the questionnaire had to be consulted to rectify or confirm reported amounts.

Upon completion of the updates and corrections required in this processing phase, the income data were then transferred to the next phase in processing, namely, edit and imputation.

2.2.3 Edit and Imputation

Section 2.1.5 provides a brief description of the procedures followed and systems used during the edit and imputation of census data. The specific procedures followed for the edit and imputation of the income variables are described in detail below.

2.2.3.1 Overview of Income Processing

For this phase of income processing, it has been assumed that most respondents completed their census questionnaires (including the income questions) as accurately as possible. This assumption stems partly from Statistics Canada's philosophy of trust in respondents and partly from the nature of census income data. Although there are known relationships between income and some other census variables, these are not simple linear relationships. Furthermore, the time-lag between some of these variables (for example, current occupation or class of worker in May 2001 and income in 2000) does not allow verification of some of the apparent inconsistencies.

The edit and imputation phase of income processing used a system that edited the reported values for selected income sources against specified criteria. It checked for reasonable consistency, on the one hand, among income sources and, on the other, between income and other variables. It also imputed data for non-response cases from an established pool of donor records and, finally, derived new income variables.

The processing system employs a set of highly complex and technical operations. The description in this section has been kept, as much as possible, both brief and non-technical. The order in which the various operations are described has been adopted for ease of reference and does not follow the actual system. Users interested in greater detail may refer to other documents or get in touch with the subject-matter experts at Statistics Canada.

In very broad terms, the entire process consists of the following parts:

(a) Determination of Income Processing Universe

As previously mentioned, no income data was requested from individuals less than 15 years of age, from persons who immigrated to Canada in 2001, or from residents of institutions. For these individuals, any reported income was removed and all sources and total income were set to zero. The income reported by members of Hutterite colonies was also removed because of inconsistencies of reporting of income among these colonies. Thus, once any income reported by the individuals described above was "zeroed out", they were excluded from further processing. The remainder of the records went through the processing stream for income.

(b) Determination of Response to Question on Income Sources

The response status of total income and of each of the sources listed on the questionnaire was classified into four categories.

(c) Determination of Response to Income Question

The response status of each income record as a whole was determined by examining the information provided in total income, income sources and certain related variables. All records were classified into nine categories.

(d) Edit and Assignment of Sources

Income values provided for the 10 income sources listed on the 2001 Census questionnaire were edited for consistency and flagged for correction or assignment where necessary.

(e) Assignment for Non-response

All records were stratified on the basis of certain important income-related characteristics and divided into "donors" and "recipients" according to their response status. Complete and partial non-response cases were dealt with separately.

(f) Derivation of Final Variables

Once the reported income sources were finalized through edits and assignments, GST/HST/QST credits, the Alberta Energy Tax Refund and child tax benefits and allowances were estimated and assigned where appropriate. Total income of each individual was then calculated as a sum of the amounts of its constituent sources. Finally, other related income variables were derived.

2.2.3.2 Edit and Assignment of Individual Income Sources

Many respondents leave an income source blank if they consider that the source is inapplicable to them. For example, young respondents tend to leave sources concerning retirement pensions (public or private) blank. As a first step, therefore, the responses on the questionnaire for individual income sources were examined in combination with the response to total income, and each income source was assigned in one of the following four codes:

AMOUNT - Reported an amount (negative in some cases).

PARTIAL - Indicated receipt of income without providing an amount.

ZERO - Gave a clear indication of no income from the source.

BLANK - Left the source blank.

Derived in the above manner, the response rates to the individual sources, other than those of employment income, ranged from 84% to 86%. In the case of wages and salaries, 86% of the individuals in the edit universe responded to the question while, for farm and non-farm self-employment income, response rates were 80% and 79%, respectively.

Since there is a wide variance in the incomes reported by individuals with similar characteristics, editing of most income sources against specified "standards" is not possible. Therefore, individual sources were edited only for obvious inconsistencies. However, the amounts reported against various sources of government transfer payments were compared with the existing administrative standards and adjustments were made where necessary. These edits of sources were undertaken at the start of processing, and after imputation for non-response to guard against any inconsistencies introduced as a result of imputation.

(a) Total Income

The information provided by respondents against this item was used as a control during most of the automated processing of income data. The amounts reported as total income were edited in conjunction with the responses provided to the sources of income, as follows:

(i) In all cases where respondents provided amounts for total income and one or more sources of income, the system compared the sum of reported sources and the total income. Because reported cents were not captured, a difference of plus or minus $10 was ignored and the reported total income was replaced by the derived sum of sources.

(ii) If the difference between the sum of reported sources and total income was greater than $10, an edit was undertaken to check if the difference equalled reported wages or income from non-farm self-employment. (Some respondents tended to report their "gross" earnings in wages and "net" earnings in self-employment.) If so, the inappropriate source was removed.

(iii) In cases where the sum of sources was less than the reported total income, it was assumed that the respondent had missed reporting at least one source of income. Where negative income was reported against one of the sources, the reported total income was replaced by the derived sum of sources, keeping in view the possibility of errors of addition in such cases. The remaining records in this group were separated for assignment of missing sources.

(iv) In all other cases where the respondent reported total income, income sources were only partially answered or were left blank. Where only one source was partially responded to or left blank, the reported total income was assigned to the single indicated source. The edit, however, ensured that excessive values were not assigned to government transfer payment sources or that negative total income values were only assigned to a source in which a loss could have been incurred. The remaining records in this group were earmarked for assignment of source data.

Whenever an amount was changed in one of the sources during edit and imputation, the total income field was automatically adjusted.

(b) Wages and Salaries

This is the most important source of income in terms of both incidence and share of total income. Except for three checks, the reported amounts were accepted. First, as already stated above, a check for duplicate reporting of wages and non-farm self-employment income was undertaken, which might have led to the deletion of wages and salaries in certain cases. Secondly, in cases of obvious misreporting of farm and/or non-farm self-employment income against wages, the amount was transferred from the

former to the latter source without affecting reported total income. Thirdly, an edit was carried out to rectify certain inconsistencies between reported class of worker and employment income source.

(c) Net Farm and Non-farm Self-employment Income

Other than the impact of editing of total income and wages and salaries, and the consistency edit against class of worker, as explained above, no other changes were made to this source during editing.

(d) Old Age Security Pension and Guaranteed Income Supplement

As explained earlier, head office processing dealt with most cases where the reported amount for Old Age Security pension and Guaranteed Income Supplement benefits exceeded $14,000. An analysis of inconsistencies indicated that editing of this field often involved changes to Canada/Quebec Pension Plan and other government transfer payments.

To begin with, the existing amounts in this field were edited and changed where necessary, as follows:

(i) If the reported amount equalled 12 times the current monthly (May 2001) entitlement, it was changed to the actual 2000 entitlement.

(ii) If the reported amount exceeded the actual OAS/GIS entitlement, the excess was transferred, as appropriate, to either other government income (as a provincial income supplement) or CPP/QPP benefits, or to both.

(iii) If a respondent reported OAS/GIS income but did not meet the age, marital status and residence requirements, the reported amount was transferred to CPP/QPP benefits if the respondent was eligible for such benefits. Otherwise, the amount was transferred to other government transfer payments.

(iv) If the editing of CPP/QPP benefits clearly indicated that a respondent reported the OAS/GIS income against that source, it was transferred to OAS/GIS.

One major change that occurred in the OAS/GIS administration, since the 1996 Census, is the institution of the claw-back of OAS benefits **at source** for higher-income recipients. During processing, census took the claw-back into account only when assigning values to non-respondents to the OAS/GIS source.

Once all sources had been edited and assignment for non-response concluded, the entire file was passed through a routine to ensure that Old Age Security and Guaranteed Income Supplement were not assigned to an ineligible individual. Furthermore, while all persons aged 65 years and over in 2000 with incomes below $89,176 were entitled to some Old Age Security (OAS), the entitlement to the Guaranteed Income Supplement (GIS) was dependent on a much lower income threshold. In the case of married couples, the amount of GIS depended on the combined income of husband and wife. Also, 60- to 64-year-old spouses of OAS recipients were entitled to the Allowance and 60- to 64-year-old widow(er)s were entitled to the Allowance for the Survivor. Finally, individuals not born in Canada had to fulfil certain residence requirements before becoming entitled to OAS/GIS benefits.

To meet these various conditions, a relatively complex system, which took into account age, immigration status, family status and individual/spousal income, was developed and, on the basis of 2000 administrative entitlements, an OAS/GIS entitlement was calculated for each individual. If the respondent reported more than this estimated entitlement against OAS/GIS, no action was taken. In all other cases, the calculated amount replaced the existing amount against OAS/GIS.

(e) Canada/Quebec Pension Plan Benefits

There is a wide variety of both the types of CPP/QPP benefits and recipients, which makes it difficult to do a consistency edit of this source. The benefits stem from the contributions, calculated as a percentage of earnings, made by employed persons during their working lives. In some cases, respondents reported their CPP/QPP "contributions" rather than their benefits from this source. Where this was so established, the amount was deleted. Furthermore, as already explained where respondents over the age of 65 in 2000 reported their exact OAS/GIS entitlement against these benefits and reported zero OAS/GIS income, the amount was transferred to OAS/GIS. Similarly, reported amounts against this source by other elderly respondents who were not considered eligible for these benefits, or amounts in excess of administrative entitlements, were transferred to OAS/GIS to the extent of their entitlement, and any remaining excess to "other government income".

Evaluation of CPP/QPP benefits in previous censuses indicated that the incidence of these benefits, in census as compared to administrative data, was significantly lower. After imputation for non-response, census incidence of CPP/QPP benefits in 2000 was found again to be much lower than administrative data indicated. Accordingly, an edit and imputation module was implemented to process potential recipient records with "blank" or "partial" response to the CPP/QPP question. A hot-deck imputation strategy was adopted that matched recipients with non-recipients on the basis of sex, age, marital status, presence of private retirement pension and disability status. Where appropriate, presence of a university degree was used as an auxiliary matching constraint.

(f) Employment Insurance Benefits

Some respondents erroneously reported their employment insurance contributions rather than the employment insurance benefits received by them. These were removed in a manner similar to the misreported contributions to CPP/QPP.

Evaluation of income data from earlier censuses had revealed that the incidence of Employment Insurance benefits was substantially lower than indicated by relevant administrative data. Since the census did not collect information on weeks of unemployment during the reference year, it was not considered feasible to undertake changes to this source during regular processing. After imputation for non-response, census incidence of Employment Insurance benefits was found again to be much lower than administrative data. Accordingly, an edit and imputation module was implemented to process potential recipient records with non-response to the Employment Insurance question.

On the basis of an analysis of relevant data from different sources, the process to impute these benefits to non-respondents was reviewed and modified. As a first step, a processing universe was established. Excluded from this universe were individuals who:

- were accepted to be without income after assignment for total non-response;

- had worked 49 to 52 weeks in 2000 or who had never worked;

- had worked 40 to 48 weeks in 2000 and were self-employed;

- were overseas;

- were under 20 or over 65 years of age;

- belonged to a class of worker ineligible for Employment Insurance benefits.

The remaining individuals were divided into two groups: recipients and non-recipients of Employment Insurance benefits. Each group was classified into 14 strata on the basis of sex, age, weeks worked and

class of worker. Imputation was carried out within each stratum and, where applicable, more detailed categories of age and weeks worked were used as auxiliary matching constraints.

(g) Canada Child Tax Benefits

No information was collected directly from respondents on Canada Child Tax benefits. Since payment of these benefits is dependent on parental "net income", a complex formula based on income tax statistics was used to derive net income. The Canada Child Tax benefits were then calculated on the basis of the number of eligible children in the family and the derived parental net income, and were assigned to the female parent in **most** census families. In previous censuses, this assignment had been made to the spouse or partner with the larger income. Separate procedures were implemented to accommodate the child benefits and earned income supplements provided by certain provinces and territories.

(h) Other Income from Government Sources

This source of income consists of all transfer payments other than those listed above, received from federal, provincial or municipal governments in 2000, and is suspected of substantial under-reporting. Because of the large number of programs involved and the variety of the criteria for their applicability, it is impossible to undertake a thorough edit of this component.

In 2000, Newfoundland and Labrador, New Brunswick, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia, the Yukon Territory, the Northwest Territories and Nunavut provided supplementary benefits to elderly recipients. These provincial income supplements were estimated for each individual based on the diverse eligibility rules used by each province (usually associated with OAS and/or GIS entitlements). If the reported income for "other income from government sources" was higher than the calculated supplement, no action was taken. In all other cases, the calculated entitlement replaced the reported value.

Respondents were expected to report the Goods and Services Tax (GST) credit for 2000 for this source. An evaluation of the initial data revealed substantial non-reporting. Accordingly, entitlement to this credit was ascertained, and estimated amounts were calculated. Then, in cases of non-reporting or under-reporting, the calculated amount of GST credit was assigned to the "Other income from Government Sources" field.

(i) Investment Income and Retirement Pensions

Other than the impact of editing of total income, no specific edit for these sources was undertaken.

(j) Other Money Income

Examination of questionnaires during Interactive Verification Task revealed that some respondents were inadvertently reporting their total income in the "Other Money Income" amount field. To avoid doubling of total income, an edit was performed to remove other money income and correct total income.

2.2.3.3 Imputation for Income Non-response

To impute the missing income data for non-respondents, three steps were undertaken. First, all individuals were given a record response code according to the type of their response to income questions. Secondly, all records were divided into "donors" (respondents) and "recipients" (non-respondents) and were, at the same time, classified into a set of homogeneous strata. Finally, "donors" and "recipients" were matched to obtain missing income data.

(a) Record Response Code

All individuals were divided into nine groups, with each given a record response code as follows:

RC1 - These records, by definition, had no income and were not used as donors for the imputation of data to non-respondents.

RC2 - These were respondent records (with zero income) and were part of the donor universe, along with those of income recipients, for non-respondent records whose income status could not be determined (see RC4 below).

RC3 - These were respondent records (with income) and were part of the donor universe for non-respondent records coded RC4; they constituted the entire donor universe for non-respondent records coded RC5 to RC9.

RC4 - These were non-respondent records for persons who may or may not have had income in 2000. These records were assigned complete income data from RC2 and RC3.

RC5 - These were non-respondent records for persons who received an unknown income in 2000. These records were assigned complete income data from RC3 records.

RC6 - These records provided an amount for respondents' total income only. These records were matched with an RC3 record with similar total income for complete assignment of income data.

RC7 - These records provided an amount for total income as well as for some sources but, at the same time, did not give a response for some of the sources. A procedure similar to that for records coded RC6 was adopted, except that the recipient record was assigned data for only those sources that were "partial" or "blank". In other words, an amount already reported against a source was not replaced.

RC8 - These records were similar to those coded RC7, except that information was provided for employment income sources only, but not for total income. These records were treated in the same manner as those coded RC7, except that the matching of non-respondents was undertaken on the basis of reported employment income, rather than total income.

RC9 - These records were without an amount reported in either the three employment income sources or in the overall income total. These were treated in a manner similar to those coded RC5, except that the recipient was assigned data for only those sources that were "partial" or "blank".

Based upon the above classification of records, about 76% of all individuals provided complete income information, 10.8% provided only partial information and 12.4% were completely non-respondent. Table C2 gives a breakdown of individuals by record response codes.

(b) Stratification

The income of a non-respondent retired person is, other things being equal, likely to be similar to that of another retired person. Again, two persons aged between 30 to 35 years, with university degrees and working full year full time in 2000, are likely to have similar incomes. It is, therefore, logical to match non-respondents (recipients) and respondents (donors) with as many common characteristics as possible.

Partial respondents (records coded RC6, RC7 and RC8), where total or employment income was given but some source information was missing (and respondent records coded RC3), were divided into four strata: one each for the Aboriginal population, non-Aboriginal population who worked in 2000, non-Aboriginal population who did not work in 2000 and Canadians residing abroad. Within each stratum, the donor-recipient pair was further matched on the closeness of their given total or employment incomes

(seven groups), sex, age (four to six groups), work activity (worked or did not work in 2000), class of worker (paid worker/unpaid family worker, non-farm self-employed or farm self-employed) and on whether they live or not on a reserve (on or off reserve).

For complete non-respondents, the operation was much more complex. Both respondents (records coded RC2 and RC3) and complete non-respondents (records coded RC4, RC5 and RC9) were divided into 114 strata on the basis of homogeneity of selected characteristics as follows:

(i) The non-Aboriginal population in Canada was stratified into 73 groups based on age (10-year age groups), work activity (weeks worked in 2000), work effort (full-time or part-time), class of worker (paid workers, non-farm self-employed, farm self-employed or unpaid family workers) and census family status (husbands or male lone parents, female lone parents, wives, children, non-family persons/same sex partners and persons in collective dwellings (not processed through family formation).

(ii) The Aboriginal population in Canada was stratified into 35 groups based on age (10-year groups), work activity (weeks worked in 2000), work effort (full-time or part-time), class of worker (paid workers, self-employed, all other workers), census family status (husbands or male lone parents, female lone parents, wives, children, non-family persons/same sex partners and persons in collective dwellings) and reserve status (on or off reserve).

(iii) The Canadians outside the country were stratified into six groups based on age (15-65 and 66 and over), work activity (worked or did not work in 2000) and census family status (husbands or lone parents, wives, children and non-family persons).

To further improve the donor-recipient similarity, each of the 114 strata was divided into smaller groups, where appropriate, on the basis of sex, detailed age groups, presence of a university degree, occupation (above- or below-average income occupation) and full- or part-time work.

(c) Imputation

Each non-respondent (recipient) was paired with a respondent (donor) with matching additional characteristics within each stratum. If an exact match could not be found, then the additional matching constraints were relaxed, but imputation was always carried out within the stratum. Once the best match for a recipient was found, the non-respondent was assigned the income sources and total income of the donor record. In the case of non-respondents who initially provided either (i) employment income sources or (ii) non-employment sources or (iii) total income only, just the missing source information was taken from the donor record.

In all cases of imputation, the processing system ensured that the donor and recipient records were located geographically as close as possible.

2.2.3.4 Derived Income Variables

As a last step in the processing of income, additional income variables, already defined in Appendix A (3), were derived. A few points need to be noted:

(a) As stated earlier, the most important of these variables is, of course, "total income". In a few cases, the sum of positive and negative incomes from various sources amounted to zero. It was considered important to differentiate these cases from true zero-income records. Accordingly, these records were assigned one dollar in their total income field.

(b) It should be noted that the total income of census families, economic families and households is derived only for persons in private households in Canada.

(c) In addition to (b) above, the Income Status variable indicating the position of an economic family or an unattached individual in relation to low income cut-offs does not apply to the population in the Yukon Territory, the Northwest Territories, Nunavut and on Indian reserves.

2.2.3.5 Impact of Edit and Imputation on Income Estimates

As stated at the outset of this section, the objective of edit and imputation was not to "create" data but to ensure the reasonable accuracy and consistency of the data supplied by the respondents. With this objective in view during each of the many phases of edit and imputation, a record was kept of all changes made to the data. Table C3 gives the original and the final number of income recipients and the amount received from different income sources.

The table shows the impact of edit and imputation on both the number of recipients and aggregate income from each source. At the end of the process, the number of income recipients as well as the aggregate amount of income had increased by about 17%. While the proportion of income assigned for most sources is commensurate with the proportion of records imputed, the following points should be kept in mind when examining data in Table C3:

(a) The changes to farm and non-farm self-employment income include those resulting from the edit between class of worker and reported employment income sources, as noted earlier. Excluding this edit, the number of recipients of net farm income and net non-farm self-employment income increased by 23% each. The corresponding aggregate amounts increased by 21% and 25%, respectively.

(b) No information was collected on Canada Child Tax benefits. These were estimated and assigned to those entitled to receive them.

(c) Aggregate Old Age Security pension and Guaranteed Income Supplement benefits increased by 57% during the course of processing. Just over four-fifths of this amount was assigned after imputation for non-response to bring individuals up to administrative entitlement levels, given individual or spousal total income, as explained under Section 2.2.3.2 "Edit and Assignment of Individual Income Sources".

(d) The changes to Canada or Quebec Pension Plan benefits for the 2001 Census include the impact of the procedure to edit and impute benefits to non-respondents separately, as previously explained. Excluding the impact of this procedure, the number of recipients and the aggregate benefits would have increased by about 30%.

(e) The separate procedure to edit and impute Employment Insurance benefits to non-respondents, as explained in the text, accounted for much of the change in these benefits. Excluding the impact of this procedure, the number of recipients would have increased by 26.5% and the aggregate benefits by 25.1%.

(f) The large proportion of individuals with other income from government sources assigned or imputed is due primarily to three procedures. First, on the basis of age, family status and individual or family income, the Goods and Services Tax (GST), the Harmonized Sales Tax (HST) and the Quebec Sales Tax (QST) credits were calculated. Secondly, Alberta residents 16 years of age and over were entitled to the Alberta Energy Refund (AER). Thirdly, on the basis of age and income (individual or family), provincial income supplements were calculated for recipients of Old Age Security pension and Guaranteed Income Supplement. The existing amount (after imputation for non-response) of other government income was then verified for individuals and families to ensure that it equalled at least the sum of the calculated values for GST/HST/QST, the AER credit and the provincial income supplement. Under-reported amounts were replaced by the calculated values. The addition of relatively small amounts to a large number of individuals resulted in a much higher increase in the number of recipients as compared to the increase in aggregate transfer payments.

3. Data Quality Measurement

3.1 General

Throughout the census-taking process, every effort was made to ensure high-quality results. Rigorous quality standards were set for data collection and processing, and the Public Communications Program assisted in minimizing non-response. A Data Quality Measurement Program was established to provide users with information on the quality and limitations of census data.

Although considerable effort is made throughout the entire process to ensure high standards of data quality, the resulting data are subject to a certain degree of inaccuracy. To assess the usefulness of census data for their purposes and to understand the risk involved in drawing conclusions or making decisions on the basis of these data, users should be aware of their inaccuracies and appreciate their origin and composition.

Within the **2001 Census Technical Reports Series**, users will find detailed 2001 Census information on *Coverage* and *Sampling and Weighting*. These two reports are scheduled to be released in November and December 2004 respectively.

3.2 Data Evaluation and Quality of Income Estimates

Before data are released, an evaluation is undertaken with respect to the quality of census income estimates. In fact, however, the qualitative aspect of the data is a consideration throughout the processes described earlier in this document. Thus, the editing of amounts against maximum limits during interactive verification is carried out towards this end (see Table C1). The first step in automatic processing is to determine the nature of the response to income questions (see Table C2). Again, during edit and imputation, audit trails are instituted to keep a record of changes made (see Table C3).

Once the data have been finalized, an overall evaluation of income estimates is undertaken before release. This evaluation consists of reconciliation of census income statistics with other sources of similar data. The results of two such reconciliations are summarized below.

3.2.1 Census and National Accounts

The final estimates of 2000 income derived from the 2001 Census were evaluated in relation to 2000 personal income estimates in the National Accounts. Before the evaluation, however, it was necessary to make adjustments for differences of concepts and coverage in the two sources. For example, personal income estimates include supplementary labour income in wages, but census estimates are for actual wages received. The results of the evaluation are shown in Table C4. The overall census estimates of aggregate income from comparable sources were just 4% lower than similar National Accounts estimates. There was, however, substantial variation in the results of comparisons of individual sources.

The estimate of employment income was almost identical to the comparable estimate in the National Accounts. This was an improvement over a similar reconciliation of employment income from the 1996 Census. The comparison of the component sources of employment income did, however, show some variation. Estimates of wages and salaries, the most important source of income, were also almost identical, differing by only 0.1% in the two estimates. Aggregate non-farm self-employment income in the census was 8% lower than National Accounts estimates. Reconciliation between census estimates of farm income with those in the National Accounts has generally been unsatisfactory in the past and, for 2000, the comparison is also unsatisfactory. The census estimate of farm income is over two and one-quarter times higher than the similar National Accounts estimate. For this reason, it has been recommended that users exercise caution in the use of farm income estimates.

The census estimates of Old Age Security pensions and Child Tax benefits were fairly close to National Accounts estimates, but the aggregates for Employment Insurance benefits, Canada/Quebec Pension Plan benefits and other government transfer payments were underestimated to a larger degree. The "other government transfer payments" include income from a very large variety of transfer programs, and the adjustments made to the personal income estimates for conceptual equivalence were only approximate. Furthermore, a "catch-all" category like "other" is generally subject to underestimation. Finally, there was a very large discrepancy between estimates of investment income in the census and in the National Accounts. The underestimation in the census (and the surveys) of this source of income is a common phenomenon in Canada and elsewhere.

3.2.2 Census and Survey of Labour and Income Dynamics

Census income statistics were also compared with similar statistics from the Survey of Labour and Income Dynamics. An identical income concept is used in the census and the survey, but there are differences of coverage. The survey does not cover the population in the Yukon Territory, the Northwest Territories, Nunavut, Indian reserves and outside Canada. Adjustments were made to the census data for these differences before undertaking comparisons with the survey data.

National and provincial income size distributions of different population groups such as individuals and families were compared from the two sources. Similarly, the incidence of low income among economic families and unattached individuals was compared according to different characteristics. The average incomes of individuals in each province, shown in Table C5, were also compared.

The results of these comparisons indicated a very good reconciliation between the census and survey income statistics

4. Historical Comparability

4.1 Content and Coverage

The Canadian censuses have a long tradition of collecting some income data. A question on wages and salaries has been asked in every census taken in the present century. However, prior to 1961, census income data were limited to wages and salaries, and no information was collected on income from any other source such as self-employment, investments, retirement pensions, or government transfer payments.

The 1961 Census collected, for the first time, information on total income by source of income, i.e. both earnings from employment and other income. However, the 1961 Census did not ask a question on income from farming. Moreover, for income purposes, the coverage in the 1961 Census was restricted to a sample of non-farm private households and excluded households in the Northwest Territories. The income reference period in the 1961 Census covered the 12 months immediately preceding the census or, if income information could not be provided for that time period, the previous calendar year, i.e. 1960.

The 1971 Census was the first to collect, from a sample of all households, complete information on income from all sources during the previous calendar year. The total income concept was identical in the 1981, 1986, 1991, 1996 and 2001 Censuses, although there were differences in the number and combination of questions asked on the sources of income. These later censuses, however, excluded the institutional population.

Thus, in terms of content, coverage and reference period, income data from the 1961 and earlier censuses are generally not comparable to data from more recent Censuses. Income data from the 1971 Census can be compared to those from more recent censuses after adjustments for coverage have been made. While the 1981, 1986, 1991, 1996 and 2001 Censuses are identical in terms of income content, the 1991, 1996 and 2001 Censuses differ slightly from previous censuses in terms of coverage. Persons in Canada on student authorizations, employment authorizations, Minister's permits, and as refugee claimants, were enumerated in the 1991, 1996 and 2001 Censuses, but not in previous censuses. These persons, as noted earlier, are referred to as **non-permanent residents**.

Figure 2 provides the relevant details about income sources, reference period, etc., for the 1961, 1971, 1981, 1986, 1991, 1996 and 2001 Censuses.

4.2 Current Versus Constant Dollars

The average income of a census family in 1990 was $51,342, $54,583 in 1995 and $66,160 in 2000. Thus, family income increased by 6% between 1990 and 1995 and by 21.2% between 1995 and 2000. However, the value of the dollar also changed during this period. When the changes in the purchasing power of a dollar, as measured by changes in the Consumer Price Index (CPI), are taken into account, family income dropped by almost 5% between 1990 and 1995 and then increased by 11.3% between 1995 and 2000. It is, therefore, important to take this factor into account when comparing incomes over time. One method to do so is to adjust incomes, as illustrated above, by changes in the CPI over the periods.

5. Conclusion

This document is a brief report to users of census income data and provides a general description of the various facets of the 2001 Census as they relate to income. The concept of income and the processing of income data collected in a survey are quite complex. For example, the automated editing and processing of income data are conducted using hundreds of decision tables embodying logical relationships, conditions and actions. At the same time, a detailed procedure is devised and maintained to audit and monitor the impact of various actions. Such details cannot be included in this report, which is intended only to provide an overview. Users are welcome to contact the following officer in the Income Surveys Section, Income Statistics Division, for further information on any aspect of income data from the census: John Gartley, at (613) 951-6906.

Appendix A. Glossary of Terms

The definitions of census terms, variables and concepts are presented here as they appear in the *2001 Census Dictionary* (Catalogue No. 92-378-XIE). Users should refer to the *2001 Census Dictionary* for full definitions and additional remarks related to any concepts, such as information on direct and derived variables and their respective universe.

(1) Sources of Income

(a) Total wages and salaries

Refers to gross wages and salaries before deductions for such items as income tax, pensions and employment insurance. Included in this source are military pay and allowances, tips, commissions and cash bonuses, benefits from wage-loss replacement plans or income-maintenance insurance plans, as well as all types of casual earnings during calendar year 2000. The value of taxable allowances and benefits provided by employers, such as free lodging and free automobile use, is excluded.

Persons doing casual work such as babysitting in their own homes or selling and delivering cosmetics or newspapers were asked to report their net income in the non-farm self-employment category.

Prior to the 2001 Census, benefits from wage-loss replacement plans or income-maintenance insurance plans were included under "Other Money Income".

(b) Net non-farm income from unincorporated business professional practice, etc.

Refers to net income (gross receipts minus expenses of operation such as wages, rents and depreciation) received during calendar year 2000 from the respondent's non-farm unincorporated business or professional practice. In the case of partnerships, only the respondent's share was reported. Also included is net income from persons babysitting in their own homes, persons providing room and board to non-relatives, self-employed fishers, hunters and trappers, operators of direct distributorships (such as those selling and delivering cosmetics), as well as freelance activities of artists, writers, music teachers, hairdressers, dressmakers, etc.

(c) Net farm income

Refers to net income (gross receipts from farm sales minus depreciation and cost of operation) received during calendar year 2000 from the operation of a farm, either on the respondent's own account or in partnership. In the case of partnerships, only the respondent's share of income was reported. Included with gross receipts are cash advances received in 2000, dividends from cooperatives, rebates and farm-support payments to farmers from federal, provincial and regional agricultural programs (e.g. milk subsidies and marketing board payments) and gross insurance proceeds such as payments from the Net Income Stabilization Account (NISA). The value of income "in kind", such as agricultural products produced and consumed on the farm, is excluded.

Agricultural operations produce at least one of the following items intended for sale: field crops, vegetables, tree fruits, or seed; greenhouse and nursery products; poultry and livestock; animal products such as eggs, milk, meat, furs or wool; other agricultural products such as honey, mushrooms, sod, Christmas trees or maple syrup products.

(d) Old Age Security Pension and Guaranteed Income Supplement

Refers to Old Age Security pensions and Guaranteed Income Supplements paid to persons 65 years of age and over, and to the Allowance or Allowance for the survivor paid to 60- to 64-year-old spouses of old

age security recipients or widow(er)s by the federal government during the calendar year 2000. (Provincial income supplements to seniors are included in "Other income from government sources".)

(e) Benefits from Canada or Quebec Pension Plan

Refers to benefits received during calendar year 2000 from the Canada or Quebec Pension Plan (e.g., retirement pensions, survivors' benefits and disability pensions). It does not include lump-sum death benefits. Retirement pensions of civil servants, RCMP and military personnel are reported separately under "Retirement Pensions".

(f) Benefits from Employment Insurance

Refers to total Employment Insurance benefits, received during calendar year 2000, before income tax deductions. It includes benefits for unemployment, sickness, maternity, paternity, adoption, work sharing, retraining and benefits to self-employed fishers received under the federal Employment Insurance Program.

(g) Canada Child Tax Benefits

Refers to payments received under the Canada Child Tax Benefit program during calendar year 2000 by eligible parents with dependent children under 18 years of age. No information on these benefits was collected from respondents. Instead, these were calculated and assigned, where applicable, to one of the parents in the census family on the basis of information on children in the family and the family income. Included with the Canada Child Tax Benefit is the National Child Benefit Supplement (NCBS) for low-income families with children. The NCBS is the federal contribution to the National Child Benefit (NCB), a joint initiative of federal, provincial and territorial governments. Also included under this program are child benefits and earned income supplements provided by certain provinces and territories.

(h) Other Income from Government Sources

Refers to all transfer payments, excluding those covered as a separate income source (Canada Child Tax Benefits, Old Age Security pensions and Guaranteed Income Supplements, Canada or Quebec Pension Plan benefits and Employment Insurance benefits) received from federal, provincial or municipal programs during the calendar year 2000. This source includes social assistance payments received by persons in need, such as mothers with dependent children, persons temporarily or permanently unable to work, elderly individuals, the blind and persons with disabilities. Included are provincial income supplement payments to seniors and provincial payments to help offset accommodation costs. Also included are other transfer payments, such as payments received from training programs sponsored by the federal and provincial governments, regular payments from provincial automobile insurance plans, veterans' pensions, war veterans' allowance, pensions to widows and dependants of veterans, and workers' compensation. Additionally, refundable provincial tax credits, the Alberta Energy Tax Refund and refunds of the Good and Services Tax (GST), Harmonized Sales Tax (HST) or Quebec Sales Tax (QST) received in 2000 are included.

(i) Dividends, Interest on Bonds, Deposits and Savings Certificates, and Other Investment Income

Refers to interest received during calendar year 2000 from deposits in banks, trust companies, cooperatives, credit unions, caisses populaires, etc., as well as interest on savings certificates, bonds and debentures, and all dividends from both Canadian and foreign corporate stocks and mutual funds. Also included is other investment income from either Canadian or foreign sources, such as net rents from real estate, mortgage and loan interest received, regular income from an estate or trust fund, and interest from insurance policies.

(j) Retirement Pensions, Superannuation and Annuities, Including Those from RRSPs and RRIFs

Refers to all regular income received by the respondent during calendar year 2000 as the result of having been a member of a pension plan of one or more employers. It includes payments received from all annuities, including payments from a matured Registered Retirement Savings Plan (RRSP) in the form of a life annuity, a fixed-term annuity, a Registered Retirement Income Fund (RRIF) or an income-averaging annuity contract; pensions paid to widow(er)s or other relatives of deceased pensioners; pensions of retired civil servants, Armed Forces personnel and Royal Canadian Mounted Police (RCMP) officers; annuity payments received from the Canadian Government Annuities Fund, an insurance company, etc. It does not include lump-sum death benefits, lump-sum benefits or withdrawals from a pension plan or RRSP, or refunds of overcontributions.

(k) Other Money Income

Refers to regular cash income received during calendar year 2000 and not reported in any of the other nine sources listed on the questionnaire. For example, alimony, child support, periodic support from other persons not in the household, income from abroad (excluding dividends and interest), non-refundable scholarships and bursaries, severance pay and royalties are included.

(2) Total Income

Total income is the sum of amounts received during 2000 by an income recipient from the 10 sources listed and defined above. The amounts against the various sources are actual dollars reported or assigned. Although the census questionnaire includes a question on "total income", that information was used only for control purposes. The final variable "Total income" is derived by summing all the sources of income after those sources have been processed through edit and imputation.

It is important to note that the census income concept does not include gambling gains and losses, lottery prizes, money inherited during the year in a lump sum, capital gains or losses, receipts from the sale of property, income tax refunds, loan payments received, lump-sum settlements of insurance policies, rebates received on property taxes, refunds of pension contributions, as well as all income "in kind", such as free meals, living accommodation, or agricultural products produced and consumed on the farm.

(3) Derived Income Variables

From the sources of income (and sometimes in combination with other related variables), a number of other income variables are derived and included in the census database. The most important of these variables is, of course, "Total income", as described above. Others are briefly explained below.

(a) Employment Income/Earnings

Employment income, also known as earnings, refers to total income received by persons 15 years of age and over during calendar year 2000 as wages and salaries, net income from a non-farm unincorporated business and/or professional practice, and/or net farm self-employment income.

(b) Census Family Income

A census family consists of a married couple (with or without children of either or both spouses), a couple living common-law (with or without children of either or both partners) or a lone parent of any marital status with at least one child living in the same dwelling. A couple living common-law may be of opposite or same sex. The total income of a census family is the sum of the total incomes of all members (15 years of age and over) of that family.

For the 2001 Census, several changes were made to the census family concept. For a complete description of the modifications to the census family concept and how they affect data comparability with those of previous censuses, consult the section related to the Family Universe of the *2001 Census Dictionary*.

(c) Economic Family Income

An economic family consists of a group of two or more persons who live in the same dwelling and are related to each other by blood, marriage, common-law or adoption. The total income of an economic family is the sum of the total incomes of all members (15 years of age and over) of that family.

(d) Household Income

A household consists of a person or a group of persons (other than foreign residents), irrespective of their interrelationship, who occupy the same dwelling and do not have a usual place of residence elsewhere in Canada. The total income of a household is the sum of the total incomes of all members (15 years of age and over) of that household.

(e) Income Status

This variable indicates the position of an economic family or an unattached individual 15 years of age and over in relation to Statistics Canada's low income cut-offs (LICOs), that is, whether the total income of a family unit is above or below the applicable cut-off point. Measures of low income known as low income cut-offs (LICOs) were first introduced in Canada in 1968 based on 1961 Census income data and 1959 family expenditure patterns. At that time, expenditure patterns indicated that Canadian families spent about 50% of their total income on food, shelter and clothing. It was arbitrarily estimated that families spending 70% or more of their income (20 percentage points more than the average) on these basic necessities would be "straitened" circumstances. With this assumption, low income cut-off points were set for five different sizes of families.

Subsequent to these initial cut-offs, revised low income cut-offs were established based on national family expenditure data from 1969, 1978, 1986 and 1992. These data indicated that Canadian families spent, on average, 42% in 1969, 38.5% in 1978, 36.2% in 1986 and 34.7% in 1992 of their total income on basic necessities. Since 1992, data from the expenditure survey have indicated that this proportion has remained fairly stable. By adding the original difference of 20 percentage points to the basic level of expenditure on necessities, new low income cut-offs were set at income levels differentiated by family size and degree of urbanization. Since 1992, these cut-offs have been updated yearly by changes in the consumer price index.

The following is the 2000 matrix of low income cut-offs:

Low Income Cut-offs for Economic Families and Unattached Individuals, 2000

	Size of Area of Residence				
Family Size	500,000 or more	100,000 to 499,999	30,000 to 99,999	Small urban regions	Rural(farm and non-farm)
1	18,371	15,757	15,648	14,561	12,696
2	22,964	19,697	19,561	18,201	15,870
3	28,560	24,497	24,326	22,635	19,738
4	34,572	29,653	29,448	27,401	23,892
5	38,646	33,148	32,917	30,629	26,708
6	42,719	36,642	36,387	33,857	29,524
7 +	46,793	40,137	39,857	37,085	32,340

Users should note the following points:

(i) Given the widespread misunderstanding concerning the nature of the cut-offs, it is useful to spell out unambiguously what they are and what they are not. As will be apparent from the above brief description, the cut-offs are not poverty lines and should not be so interpreted. The setting of poverty lines necessarily involves a value judgement as to the level of minimum income below which an individual or family would generally be regarded as "poor". No such judgement has been attempted in constructing the low income cut-offs. Rather, these cut-offs were designed in response to the need to quantify the numbers and characteristics of individuals and families falling into the lowest income category - defined in relative terms, taking into account current overall levels of living. These cut-offs do not take into account a number of important factors that could impact an individual's or family's standard of living such as wealth (e.g. home ownership and mortgage indebtedness), access to subsidized goods and services or future earning potential.

(ii) The concept of LICOs applies to economic families and unattached individuals. The economic family concept is broader than the census family concept. However, since all members of an economic family share a common income status, it is possible to produce low-income statistics for census families or the population in private households.

(iii) Annual low-income statistics are published from the data collected in the Survey of Labour and Income Dynamics. It may be pointed out that the census and the survey differ slightly when applying the "Size of Area" or "Degree of Urbanization" classification to derive incidence of low income. However, the overall impact of this difference is negligible.

(iv) The low income cut-offs are based on certain expenditure-income patterns that were not available from survey data for the entire population. For this reason, the population resident in the Yukon, Northwest Territories, Nunavut and on Indian reserves is excluded.

To summarize, Statistics Canada's low income cut-offs identify the lowest income groups, taking into account "Family Size" and "Area of Residence" classification.

Appendix B. 2001 Census Products and Services

The census is a reliable source for describing the characteristics of Canada's people and dwellings. The range of products and services derived from census information is designed to produce statistics that will be useful, understandable and accessible to all users. Sources, such as the *2001 Census Catalogue*, the Statistics Canada Web site (http://www.statcan.ca) and, specifically, the On-Line Catalogue, contain detailed information about the full range of 2001 Census products and services.

There are several new product and service features for the 2001 Census:

1. Media

- The Internet is the preferred medium for disseminating standard data products and reference products.
- More census data are available to the public free of charge via the Internet.

2. Content

- Data tables for the 2001 Census are released by **topics**, that is, groups of variables on related subjects.
- Wherever possible, the language and vocabulary used in 2001 Census products available on the Internet is simplified to make the information accessible to more people.
- Users are offered various methods of searching and navigating through **census standard products** (including **reference products** on the Internet.

3. Geography

- Geographic units such as dissemination areas, urban areas, designated places and metropolitan influenced zones were added to the standard products line. Some new units, such as dissemination areas, replace others.

4. Variables

- Information on the following new subjects was collected in the 2001 Census: birthplace of parents, other languages spoken at home and language of work. The 2001 questionnaire also included the question on religion, which is asked in every decennial census. The family structure variable was broadened to include same-sex couples.

Appendix C. Tables

Table C1. Income Outliers (Sample Counts), 2001 Census

	Limits		Responses					
Source	**Upper**	**Lower**	**With Amount**	**Outside Limits and Examined**		**Amounts Changed**	**Percent of Total Responses**	**Percent of Examined Responses**
	$	**$**	**Number**	**Number**	**%**	**Number**	**%**	**%**
Wages and salaries	140,000	0	2,528,488	14,142	0.6	9,274	0.4	65.6
Non-farm self-employment income	125,000	-20,000	208,028	4,120	2.0	5,027	2.4	122.0
Farm self-employment income	75,000	-20,000	84,208	4,110	4.9	4,939	5.9	120.2
Old Age Security Pension and Guaranteed Income Supplement	14,000	0	571,862	9,595	1.7	8,659	1.5	90.2
Canada/Quebec Pension Plan benefits	15,000	0	606,608	5,529	0.9	7,610	1.3	137.6
Employment Insurance benefits	19,000	0	252,299	4,654	1.8	3,583	1.4	77.0
Other transfers from governments	20,000	0	866,533	13,966	1.6	9,422	1.1	67.5
Investment income	60,000	-10,000	805,152	12,067	1.5	4,450	0.6	36.9
Retirement pensions	50,000	0	433,435	9,089	2.1	7,594	1.8	83.6
Other money income	50,000	0	223,754	4,983	2.2	2,412	1.7	48.4
Total income	**150,000**	**-30,000**	**3,377,229**	**7,114**	**0.2**	**13,747**	**0.4**	**193.2**
Total responses	**-**	**-**	**9,957,596**	**89,369**	**0.9**	**76,717**	**0.8**	**85.8**

Table C2. Distribution of Population 15 Years and Over by Type of Response to Income Questions, 2001 Census

Record Response Code	Type of Response	Response Rate
	Respondents	**76.8**
RC1-2	Without income	6.7
RC3	With income	70.1
	Partial respondents	**10.8**
RC6	Only total income reported, no information on sources	4.5
RC7	Total income reported and sources indicated, without amount	1.8
RC8	Employment income reported but total income not reported	2.0
RC9	No employment income sources indicated	2.5
	Non-respondents	**12.4**
RC4	Indeterminate, no information provided	7.7
RC5	With income, no other information	4.7
	Total	**100.0**

Table C3. Impact of Edit and Imputation on the Number of Income Recipients and Their Aggregate Income (Sample Statistics) by Source of Income, 2001 Census

	Number of Income Recipients			Aggregate Amount Received		
Source of Income	**Original**	**Final**	**Change**	**Original**	**Final**	**Change**
	'000		**%**	**$'000**		**%**
Wages and salaries	2,522	3,059	21.3	81,013	95,423	17.8
Non-farm self-employment income	206	271	31.0	5,369	6,745	25.6
Farm self-employment income	80	85	7.2	983	914	-7.0
Old Age Security Pension and Guaranteed Income Supplement	563	697	23.9	2,964	4,666	57.4
Canada/Quebec Pension Plan benefits	603	881	46.0	2,984	4,346	45.6
Employment Insurance benefits	250	422	68.7	1,117	1,872	67.6
Canada Child Tax Benefits	-	692	100.0	-	1,701	100.0
Other income from government sources	861	2,437	182.9	1,980	3,636	83.6
Investment income	803	1,004	25.1	4,826	5,957	23.4
Retirement pensions	434	556	27.9	6,233	7,841	25.8
Other money income	220	277	25.8	925	1,166	26.0
Total income	**3,928**	**4,595**	**17.0**	**114,861**	**134,267**	**16.9**

Table C4. Comparison Between Census Income Estimates and Adjusted Personal Income Estimates, Canada, 2000

Source of Income in 2000	Census Income Estimates	Adjusted Personal Income Estimates	Difference	
	1	2	Absolute 3=(1-2) $ Millions	Relative (3/2)100 %
Wages and salaries	482,140	481,668	472	0.1
Non-farm self-employment income	34,482	37,512	-3,030	-8.1
Farm self-employment income	4,693	2,066	2,627	127.2
Employment income	521,315	521,246	69	0.0
Old Age Security Pension and Guaranteed Income Supplement	23,004	21,948	1,056	4.8
Canada/Quebec Pension Plan benefits	21,901	24,086	-2,185	-9.1
Canada Child Tax Benefits	7,652	7,671	-19	0.2
Employment Insurance benefits	8,987	9,615	-628	-6.5
Other income from government sources	17,224	27,469	-10,245	-37.3
Transfer payments from government	78,769	90,789	-12,020	-13.2
Investment income	30,724	45,042	-14,318	-31.8
Total income	**630,808**	**657,077**	**-26,269**	**-4.0**

Notes:

Total income consists of comparable sources in the census and National Accounts estimates; it excludes retirement pensions and other money income.

Components may not add to totals due to rounding.

Table C5. Percentage Distribution of Individuals 16 Years and Over, Income Recipients, Their Aggregate Income and Their Average Income, by Province, Census and Survey of Labour and Income Dynamics, 2000

Province	Population 16 Years and Over		Income Recipients		Aggregate Income		Average Income	
	Census %	Survey %	Census %	Survey %	Census %	Survey %	Census $	Survey $
Newfoundland	1.8	1.9	1.7	1.8	1.3	1.4	22,673	21,627
Prince Edward Island	0.4	0.5	0.5	0.5	0.4	0.4	23,952	23,178
Nova Scotia	3.1	3.2	3.0	3.0	2.6	2.6	25,262	25,058
New Brunswick	2.5	2.6	2.5	2.5	2.0	2.1	24,193	24,250
Quebec	24.6	25.2	24.5	24.2	22.2	22.9	27,222	27,514
Ontario	38.2	37.9	38.1	38.4	42.0	41.0	33,106	32,658
Manitoba	3.5	3.7	3.6	3.6	3.2	3.4	27,071	25,776
Saskatchewan	3.1	3.2	3.1	3.1	2.7	3.1	26,521	26,426
Alberta	9.7	9.0	10.0	9.6	10.5	9.6	31,759	30,845
British Columbia	13.2	12.9	13.1	13.3	13.1	13.9	29,929	29,408
Canada	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**30,016**	**29,688**