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Census of Population Reference Guide

Income Reference Guide

Census of Population, 2016

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. not available for any reference period
.. not available for a specific reference period
... not applicable
0 true zero or a value rounded to zero
0^s value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
^{p} preliminary
^{r} revised
x suppressed to meet the confidentiality requirements of the *Statistics Act*
^{E} use with caution
F too unreliable to be published
* significantly different from reference category ($p < 0.05$)

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Definitions and concepts

The 2016 Census Program (http://www12.statcan.gc.ca/census-recensement/index-eng.cfm) for the first time gathered income information solely from administrative data sources. The use of administrative data not only reduced response burden, it also increased the quality and quantity of income data available.

The integration of income data from Canada Revenue Agency's tax and benefits records into the short-form census for the first time allows for the compilation of income statistics for people in Canada, their families and households at fine levels of geography.

Used in conjunction with the ethnocultural, education and labour characteristics collected on the long-form census, income data can shed light on many socioeconomic issues.

Governments use income statistics to monitor economic well-being and develop income support programs and social services, such as child benefit programs, employment insurance programs, provincial income supplements and welfare payments.

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

Private sector and public sector researchers as well as academics may also make use of income data to study labour markets and industrial patterns, and compare incomes across neighbourhoods, cities or regions.

Individual income information was compiled for the population aged 15 years and over. Taxable and non-taxable income received during calendar year 2015 that was regular and recurring in nature was included. One-time receipts, such as lump-sum withdrawals from registered retirement savings plans (RRSPs) and other savings plans, lump-sum insurance settlements, lump-sum pension benefits, capital gains or losses, inheritances and lottery winnings were excluded.

Users should be aware that Statistics Canada income definitions do not always correspond to income concepts used by other organisations. For example, the definition of total income adopted by the Census of Population Program does not correspond to that used by the Canada Revenue Agency for income tax purposes.

Users should also note the reference periods or reference dates when analyzing income data with other variables. The reference period for income data is the calendar year 2015. The demographic variables collected on the questionnaire, such as age and family status, reflect respondent's characteristics on the census reference day, May 10, 2016.

On the long-form questionnaire, some labour variables, such as Hours worked for pay or in self-employment (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop046-eng.cfm) and Labour force status (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop057-eng.cfm), refer to the job held during the reference week of Sunday, May 1 to Saturday, May 7, 2016, and not calendar year 2015. Other labour variables, such as Class of worker (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop017-eng.cfm), Industry (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop181-eng.cfm) and Occupation (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop157-eng.cfm), refer to the job held during the reference week of Sunday, May 1 to Saturday, May 7, 2016 or to the most recent job held since January 1, 2015. Therefore, the employment income from 2015 may or may not correspond to the job reported.

Three labour variables have the same reference period as income data: Weeks worked during the reference year (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop129-eng.cfm), Full-time or part-time weeks worked during the reference year (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop035-eng.cfm) and Work activity during the reference year (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop224-eng.cfm).

In housing analysis, income data is used with Shelter costs (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage033-eng.cfm) to compute the housing variable – Shelter-cost-to-income ratio (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage028-eng.cfm). Minor inconsistencies arise as these shelter cost variables, as well as their components (Condominium fees (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage006-eng.cfm); Annual payment for electricity (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage002-eng.cfm); Annual payment for fuels (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage003-eng.cfm); Annual payment for water and other municipal services (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage004-eng.cfm); Annual property taxes (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage005-eng.cfm); Monthly mortgage payment (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage027-eng.cfm) and Rent, monthly cash (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage023-eng.cfm)), were either collected for the most recent month or for the last 12 months before the reference period, whereas the income data were always for the previous calendar year.

All variables included in the census are defined in the *Dictionary, Census of Population, 2016* (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/index-eng.cfm), Catalogue no. 98-301-X. Additional information about the census can be found in the *Guide to the Census of Population, 2016* (http://www12.statcan.gc.ca/census-recensement/2016/ref/98-304/index-eng.cfm), Catalogue no. 98-304-X.

Total income (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop123-eng.cfm) consists of two broad classes of income: Market income (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop069-eng.cfm) and Government transfers (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop037-eng.cfm). These two broad classes of income can be further classified into the following categories to allow for more detailed income analyses.

Market income (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop069-eng.cfm)

- Employment income (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop027-eng.cfm)
    - Wages, salaries and commissions (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop128-eng.cfm)
    - Net self-employment income (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop140-eng.cfm)
- Investment income (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop180-eng.cfm)
- Private retirement income (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop194-eng.cfm)
    - Market income not included elsewhere (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop193-eng.cfm)

Government transfers (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop037-eng.cfm)

- Old Age Security pension (OAS) and Guaranteed Income Supplement (GIS) (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop104-eng.cfm)
    - Old Age Security pension (OAS) (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop220-eng.cfm)
    - Guaranteed Income Supplement (GIS) and spousal allowance (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop218-eng.cfm)
- Canada Pension Plan (CPP) and Québec Pension Plan (QPP) benefits (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop008-eng.cfm)
    - Canada Pension Plan (CPP) and Québec Pension Plan (QPP) – Retirement benefits (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop198-eng.cfm)

    - Canada Pension Plan (CPP) and Québec Pension Plan (QPP) – Disability benefits (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop196-eng.cfm)
    - Canada Pension Plan (CPP) and Québec Pension Plan (QPP) – Survivor benefits (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop197-eng.cfm)

- Employment Insurance (EI) benefits (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop009-eng.cfm)
    - Employment Insurance (EI) – Regular benefits (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop206-eng.cfm)
    - Employment Insurance (EI) – Other benefits (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop205-eng.cfm)

- Child benefits (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop015-eng.cfm)
    - Basic Canada child tax benefit (CCTB) (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop195-eng.cfm)
    - National child benefit supplement (NCBS) (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop209-eng.cfm)
    - Universal child care benefit (UCCB) (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop215-eng.cfm)
    - Provincial and territorial child benefits (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop212-eng.cfm)

- Other government transfers (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop192-eng.cfm)
    - Social assistance benefits (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop213-eng.cfm)
    - Workers' compensation benefits (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop216-eng.cfm)
    - Working income tax benefit (WITB) (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop217-eng.cfm)
    - Goods and services tax (GST) credit and harmonized sales tax (HST) credit (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop207-eng.cfm)
    - Government transfers not included elsewhere (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop208-eng.cfm)

For illustration of the hierarchical structure of the income components, please refer to the figure in Appendix 4.1 Components of income in 2015 (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/app-ann/a4_1-eng.cfm) or the detailed Classification of income sources (http://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TVD=299493).

After-tax income (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop004-eng.cfm) is a useful measure of funds available to a household, family or individual for consumption, saving and investment. It is derived by removing Income taxes (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop048-eng.cfm) from total income. Income taxes consist of: Net federal income tax (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop210-eng.cfm) and Provincial and territorial income taxes (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop211-eng.cfm).

To complement the income concepts, several related variables are also available.

- Net capital gains or losses (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop162-eng.cfm)
- Payroll deductions, namely Contributions to Employment Insurance (EI) (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop200-eng.cfm), Contributions to Canada Pension Plan (CPP) and Québec Pension Plan (QPP) (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop199-eng.cfm) and Contributions to registered pension plans (RPP) (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop201-eng.cfm)
- Contributions to savings accounts, namely Contributions to tax-free savings accounts (TFSA) (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop203-eng.cfm) and Contributions to registered retirement savings plans (RRSPs) (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop202-eng.cfm)

In addition to the above concepts that are common between the short-form and long-form questionnaires, variables related to the Market Basket Measure (MBM) (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop165-eng.cfm) low-income concept developed by Employment and Social Development Canada (ESDC) are also available, but only for the long-form census. The Disposable income for the MBM (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/fam028-eng.cfm) is the income amount available, after adding the mortgage-free owner's difference in expenditures for the MBM (Table 4.6 (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/tab/t4_6-eng.cfm)) and deducting the Non-discretionary spending for the MBM (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/fam030-eng.cfm) from the after-tax income. The Non-discretionary spending for the MBM includes mandatory payroll deductions, health care expenses, Child care expenses paid (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop161-eng.cfm) and Child or spousal support payments (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop164-eng.cfm).

Since income may be pooled and shared to pay for expenses such as food and shelter, it is often useful to look at the situation of a family or a household by summing income for family or household members. Total income and After-tax income have been derived at various levels of aggregation:

- Total income of census family (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop123-eng.cfm)
- Total income of economic family (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop123-eng.cfm)
- Total income of household (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop123-eng.cfm)
- After-tax income of census family (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop004-eng.cfm)
- After-tax income of economic family (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop004-eng.cfm)
- After-tax income of household (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop004-eng.cfm)

Definitions for Census family (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/fam004-eng.cfm), Economic family (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/fam011-eng.cfm), Household (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage007-eng.cfm) and Private household (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage014-eng.cfm) can be found in the *Dictionary, Census of Population, 2016* (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/index-eng.cfm), Catalogue no. 98-301-X. Figure 3.1 Family membership and family status (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/figures/f3_1-eng.cfm) of the *Census Dictionary* illustrates the relationships and classifications of people at each aggregation level.

To facilitate comparisons across families or households of different sizes, adjusted family and household incomes are also provided. Adjusted incomes are computed by dividing family or household incomes by a factor equal to

the square root of the family or household size (known as the equivalence scale). This adjustment for different family or household sizes takes into account economies of scale. It reflects the fact that the needs of a family or household increase, but at a decreasing rate, as the number of members increases. The adjusted family and household income variables are:

- Adjusted total income of economic family (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage030-eng.cfm)
- Adjusted total income of person not in economic family (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage030-eng.cfm)
- Adjusted total income of household (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage030-eng.cfm)
- Adjusted after-tax income of economic family (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage015-eng.cfm)
- Adjusted after-tax income of person not in economic family (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage015-eng.cfm)
- Adjusted after-tax income of household (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage015-eng.cfm)

Statistics such as the average or the median can be calculated for all income variables. Notes on the methodology behind the derivation of these statistics at the population level and other levels of aggregation are available in Appendix 4.0 Derived Statistics (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/app-ann/a4_0-eng.cfm) of the *Dictionary, Census of Population, 2016* (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/index-eng.cfm), Catalogue no. 98-301-X.

In 2016, as part of the measures to ensure non-disclosure of individual characteristics, the average and aggregate income statistics are only available from the sampled population, i.e., information from the long-form census questionnaire. The median income statistic is the measure of central tendency that is available for 100% of the population (short-form census questionnaire).

In standard income products that include historical data, dollar amounts have been converted where necessary into 2015 constant dollars using the Consumer Price Index (CPI).

Classifications

Quantitative income variables can be transformed into qualitative variables to make classifications for tabulation purposes.

Income recipients can be classified based on the presence of a particular income source. For instance, people aged 15 years and over with employment income are classified as Earners or employment income recipients (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop026-eng.cfm).

The population can also be categorized into income groups. One such classification method is based on deciles; it classifies individuals into ten income groups containing equal numbers of people.

The decile concept can be applied to any income concept. The Economic family after-tax income decile group (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop166-eng.cfm) variable is derived based on the ranking of the adjusted after-tax income of economic families and persons not in economic families living in private households. The Total income decile group (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop214-eng.cfm) variable is derived based on the ranking of the total income of the population aged 15 years and over living in private households. The Employment income decile group (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop204-eng.cfm) variable is derived based on the ranking of the employment income of all the employment income recipients living in private households.

People, families and households can be assigned a Low-income status (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop191-eng.cfm) based on different low-income concepts. The four low-income concepts that are available on both the short-form and long-form census are: Low-income measure, after tax (LIM-AT) (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/fam021-eng.cfm), Low-income measure, before tax (LIM-BT) (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/fam022-eng.cfm), Low-income cut-offs, after tax (LICO-AT) (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/fam019-eng.cfm) and Low-income cut-offs, before tax (LICO-BT) (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/fam020-eng.cfm). The Market Basket Measure (MBM) (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop165-eng.cfm) low-income concept developed by ESDC is only available for the long-form sample.

These concepts differ according to the income variable used (before-tax income, after-tax income or disposable income for the MBM), the aggregation level (economic families and persons not in economic families or households) and the source of the applicable threshold.

Table 4.1 Summary of low-income lines in the 2016 Census of Population Program (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/tab/t4_1-eng.cfm) summarises the different characteristics of each measure.

The actual threshold amounts for calendar year 2015 are provided in the following tables:

- Table 4.2 Low-income measures thresholds (LIM-AT and LIM-BT) for private households of Canada, 2015 (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/tab/t4_2-eng.cfm)
- Table 4.3 Low-income cut-offs, after tax (LICO-AT – 1992 base) for economic families and persons not in economic families, 2015 (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/tab/t4_3-eng.cfm)
- Table 4.4 Low-income cut-offs, before tax (LICO-BT – 1992 base) for economic families and persons not in economic families, 2015 (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/tab/t4_4-eng.cfm)
- Table 4.5 Market Basket Measure (MBM) thresholds for economic families and persons not in economic families, 2015 (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/tab/t4_5-eng.cfm)

For each of these methods, once the low-income status has been assigned, it is possible to compute several low-income indicators:

- Prevalence of low income (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/fam025-eng.cfm)
- Low-income gap (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage 019-eng.cfm)
- Low-income gap ratio (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop219-eng.cfm)

Collection methods

Income variables were constructed using various administrative tax and benefits records from Canada Revenue Agency (CRA), rather than collected through the questionnaires.

To provide as extensive coverage on income data as possible, both tax filers and non-tax filers known to the agency were included when performing record linkage between the census and the CRA administrative database. Tax filers were those who filed a tax return for calendar year 2015. Non-tax filers did not file a tax return for 2015, but certain administrative information is available for them.

There were three main types of administrative data from CRA. The first type came from T1 Income Tax and Benefit Return filings, thus, only tax filers would have this information. The second type was associated with tax slips issued by employers (e.g., T4), financial institutions (e.g., T3, T4A, T4RIF, T4RSP, T5) and administrators of various government programs (e.g., T4A(P), T4A(OAS), T4E, T5007). Slips information was available for both tax filers and non-tax filers. The third type of data, also available for both tax filers and non-tax filers, was related to government programs administered by CRA, such as the Universal Child Care Benefit program, the Canada Child Tax Benefit program and the Goods and Services Tax/Harmonized Sales Tax credits program.

Thus, respondents who were tax filers would have complete information to construct all the person-level variables identified in the Definitions and concepts section. Respondents who were not tax filers only had sufficient information to populate certain variables. Variables that could not be derived using the available input were resolved through imputation. Respondents not linked to any CRA administrative records would initially have no income data at all; imputation was used to determine all the income fields. Details on the scope and impact of imputation are provided in the Data quality section.

In addition to the administrative data, two questions related to non-discretionary spending were collected on the long-form questionnaire (http://www23.statcan.gc.ca/imdb/p3Instr.pl?Function=getInstrumentList&Item_Id=295122&UL=1V&) to produce statistics related to the Market Basket Measure (MBM) low-income concept developed by ESDC. Question 48 requested those who worked in 2015 to report Child care expenses paid (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop161-eng.cfm) in 2015. Question 49 asked for the amount of Child or spousal support payments (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop164-eng.cfm) made to a former spouse or partner in 2015.

Data quality for short-form estimates

The 2016 Census of Population underwent a thorough data quality assessment, similar to what was done for past censuses. A number of data quality indicators (briefly described below) were produced and used to evaluate the quality of the data.

The data quality assessment was done in addition to the regular quality checks completed at key stages of the census. For example, during data collection and processing, the consistency of the responses provided was checked and the non-response rates for each question were analysed. As well, the quality of imputed responses was assessed as part of the data editing and imputation steps. Finally, resulting census counts were compared with other data sources, and certified for final release.

For information about data quality for the census subdivision of Wood Buffalo, the data collection methodology and the use of administrative data sources, please refer to Appendix 1.4 (http://www12.statcan.gc.ca/census-recensement/2016/ref/98-304/app-ann1-4-eng.cfm) of the *Guide to the Census of Population, 2016*, Catalogue no. 98-304-X.

The main highlights of this assessment for the Income data are presented below.

Data quality indicators

A number of quality indicators were produced and analysed during the data quality assessment of the Census of Population. Three of these are presented to users: the global non-response rate (GNR), the income data quality indicator and the imputation rate.

The GNR combines non-response at the household level (or total non-response) and non-response at the question level (partial non-response). It is calculated for each geographic area. The GNR is the key criterion that determines whether or not the census counts are released for a given geographic area – data are suppressed for geographic areas with a GNR equal to or greater than 50%. More information on the GNR is available in the *Guide to the Census of Population, 2016* (http://www12.statcan.gc.ca/census-recensement/2016/ref/98-304/index-eng.cfm), Catalogue no. 98-304-X.

To reduce the burden on Canadians, Statistics Canada did not ask questions on income but rather used information already available from the Canada Revenue Agency by linking census respondents to various tax and benefit records. A data quality indicator measuring the percentage of income data that was not obtained from administrative data files was calculated. The range of the income data quality indicator is provided to users. The sections on linkage rates and income data quality indicator below summarize the effects of using administrative data to collect income data. The section on edit and imputation assesses the extent to which various income variables were imputed due to lack of information from administrative data.

Certification of final counts

Once data processing, editing and imputation were completed, the data were tabulated to represent the total Canadian population. Certification of the final counts was the last step in the validation process leading to recommendation for release of the data for each geography and domain of interest. Based on the analysis of data quality indicators and the comparison of the Census counts with other data sources, the recommendation is for unconditional release, conditional release or non-release for quality reasons. In the case of conditional release or non-release, appropriate notes and warnings are included in this guide. Several data sources were used to evaluate the Census counts. However, since the risk of error often increases for lower levels of geography and for smaller populations, and the data sources used to evaluate these counts are less reliable (or not available) at these lower levels, it can be difficult to certify the counts at these levels.

Census counts are also subject to confidentiality rules that ensure non-disclosure of individual respondent identity and characteristics. For more information on Census confidentiality rules, please refer to the *Guide to the Census of Population, 2016* (http://www12.statcan.gc.ca/census-recensement/2016/ref/98-304/index-eng.cfm), Catalogue no. 98-304-X.

Linkage to administrative records – private households

The success of tax record linkage is the prerequisite for having reliable statistics on income. As mentioned in the Collection methods section, Census respondent information could be linked to two types of CRA records: (1) tax-filers, for whom complete income information would be available from T1 filings, tax slips and CRA-administered government programs, and (2) non-tax-filers, for whom only information from tax slips and CRA-administered government programs would be available. The tax-filers and non-tax-filers groups together convey the overall CRA linkage level or rate, while the tax-filers group states the T1 linkage level or rate.

In 2016, 94.8% of the population 15 years of age and older, in private households, were linked to an administrative record from the Canada Revenue Agency. More specifically, 85.2% of the population was linked to a tax filer record, and 9.6% was linked to non-tax filer records. In contrast, 73.4% of the population in 2006 was linked to a tax filer record. This was the result of 82.4% of the population giving permission to access tax records and 89.1% being linked. At that time, the linkage pool was not expanded to the non-tax filers.[1]

T1 linkage rates varied more geographically than CRA linkage rates. Among the provinces, Alberta (82.4%), British Columbia (82.9%) and Ontario (83.8%) had the lowest T1 linkage rate. Quebec had the highest T1 linkage rate, at 89.7%. The T1 linkage rates in the three territories were all below the national level: 71.5% in Nunavut, 76.2% in Northwest Territories and 77.8% in Yukon. When both tax filers and non-tax filers were considered, the linkage rate increased substantially. Between 93% and 96% of the population in each province was linked to a CRA record. Even the lowest CRA linkage rate for the territories was at a respectable 85.7% in Nunavut. Records that were not linked to any CRA record were split roughly half and half between non-responding and responding household.

There were some variations in linkage rates among different population groups. For instance, females had slightly higher linkage rates than males. While the CRA linkage rates were quite uniform across age groups, ranging from 93.8% to 95.9%, the T1 linkage rates increased with age. The most notable was the low T1 linkage rate amongst the 15 to 19 years age group (42.3%). In contrast, the T1 linkage rate was 84.3% for the 20 to 24 years age group. The T1 linkage rate for those 65 years and over was 93.2%. People living on-reserve or remote areas enumerated using the 2A-R questionnaire also had lower T1 and CRA linkage rates, at 63.9% and 82.2% respectively.

1. In 2006 (and in 2011 for the National Household Survey), some respondents provided income information by filling out the income questions on the questionnaire rather than opting for the use of administrative data.

Table 1
Tax record linkage rate for population 15 years of age and older in private households, 2006 Census, 2011 National Household Survey and 2016 Census

Regions	Tax record linkage rate (%)			
	2006 Census (long-form)[1]	2011 NHS[1]	2016 Census (short-form) T1 record[2]	2016 Census (short-form) CRA record[3]
Canada	73.4	65.0	85.2	94.8
Newfoundland and Labrador	77.7	70.7	88.2	95.4
Prince Edward Island	76.8	67.4	87.0	95.2
Nova Scotia	75.6	68.1	85.7	95.1
New Brunswick	77.1	69.5	87.9	95.6
Quebec	76.6	71.0	89.7	96.1
Ontario	71.8	62.2	83.8	95.0
Manitoba	74.1	65.3	84.9	95.1
Saskatchewan	75.3	67.1	85.2	94.4
Alberta	74.2	61.8	82.4	93.8
British Columbia	69.8	61.9	82.9	93.1
Yukon	47.9	61.9	77.8	90.6
Northwest Territories	35.2	67.9	76.2	87.8
Nunavut	8.2	61.3	71.5	85.7

CRA – Canada Revenue Agency.
NHS – National Household Survey.
T1 – T1 Income tax and benefit return.
1. The proportion of 2006 Census or 2011 NHS questionnaire respondents who gave linkage permission and were matched to a tax record. Responses on the questionnaire were also provided for a proportion of the non-consenters.
2. The proportion of 2016 Census respondents who were linked to a tax filer.
3. The proportion of 2016 Census respondents who were linked to a CRA record.
Sources: Statistics Canada, Census of Population, 2006 and 2016; National Household Survey, 2011.

Linkage to administrative records – collective households

Due to differences in collection methodology, the amount of identity-related information collected from different types of households varied. Generally speaking, the data required for establishing administrative links were less available in some types of collective household. As a result, collective households had lower T1 and CRA linkage rates (71.0% and 77.4%) than private households overall.

The T1 and CRA linkage rates were mixed amongst the different types of collective dwellings as well. Close to two-thirds of the population aged 15 years and over living in collective dwellings were in nursing homes or residences for seniors. Due to relatively complete census information, the T1 and CRA linkage rates were quite good amongst people living in these two types of facilities (83.3% and 86.1%). The T1 and CRA linkage rates for other collective types as a group were 49.1% and 61.9%. Service collective dwellings, which included lodging and rooming houses, hotels, motels, campgrounds and parks, school residences and training centre residences, and other establishments with temporary accommodation services, had some of the lowest linkage rates. Collectively, their T1 and CRA linkage rates were 20.0% and 25.4% respectively.

The lower linkage rates and different population composition, compared to the private household, could potentially have an impact on the data quality of the income estimates for some collective households. As such, income estimates for collectives dwellings are not available in standard products, but are available as custom tabulations only.

Table 2
Tax record linkage rate for population 15 years of age and older in collective households, 2016 Census

Type of collective dwelling	Population 15 years and over	Tax record linkage rate (%)	
		2016 Census T1 record[2]	2016 Census CRA record[3]
Total	664,760	71.0	77.4
Hospitals	17,425	73.0	79.3
Residential care facilities such as group homes for persons with disabilities and addictions	62,930	75.0	85.5
Nursing homes and residences for seniors	425,670	83.3	86.1
Correctional and custodial facilities	24,325	21.7	72.5
Shelters	19,160	42.1	69.0
Service collective dwellings[1]	62,355	20.0	25.4
Religious establishments	12,945	83.8	90.2
Hutterite colonies	23,780	85.3	90.2
Others	16,180	3.3	3.6

CRA – Canada Revenue Agency.
T1 – T1 Income tax and benefit return.
1. Service collective dwellings include lodging and rooming houses, hotels, motels, campgrounds and parks, school residences and training centre residences, and other establishments with temporary accommodation services.
2. The proportion of 2016 Census respondents who were linked to a tax filer.
3. The proportion of 2016 Census respondents who were linked to a CRA record.
Source: Statistics Canada, Census of Population, 2016.

Income data quality indicator

The income data quality indicator was computed from the linkage rates for the population in private households and indicates for a geographic area the approximate proportion of income data which does not come from administrative sources. The ranges chosen for the flag attached to the data tables were 0: < 10%, 1: 10% to 20%, 2: 20% to 30%, 3: 30% or more. An indicator of 9 indicates that most of the income data is not available for this geographic area for confidential reasons.[2] Table 3 presents the distribution by geographic area type.

The provinces all show an indicator of 0 meaning that less than 10% of the income amounts were imputed, whereas the three territories, because of their lower linkage rates, have an indicator flag of 1 meaning that 10% to 20% of the income amounts were imputed. For all lower-level geographic area types except census subdivisions (CSDs), 98% of areas presenting income data (flags 0 - 3) show a flag of 0 or 1, meaning less than 20% of amounts were imputed. Furthermore, 85% or more of the areas have an indicator flag of 0 meaning that less than 10% of the income amounts were imputed. The CSDs, which are often areas with smaller populations present more variability and slightly higher rates of income data not from administrative sources.

2. Some of these areas will have two of their income statistics published in the Census Profile (median total income of households and median after-tax income of households).

Table 3
Distribution of short-form income data quality indicator flags by geographic area type

	Income data quality indicator flag					
	0	1	2	3	9	
Geographic area type	Less than 10%	10% to 20%	20% to 30%	30% or more	No census income data for confidentiality	Total census areas published
Canada	1	0	0	0	0	1
Provinces and territories	10	3	0	0	0	13
Census metropolitan areas (CMA)	35	0	0	0	0	35
Census agglomerations (CA)	104	13	0	0	0	117
Provincial parts of CMA or CA	7	1	0	0	0	8
Census divisions (CD)	251	36	5	1	0	293
Census subdivisions (CSD)	2,935	534	160	79	877	4,585
Census tracts (CT)	4,939	611	32	8	55	5,645
Dissemination areas (DA)	46,030	6,540	480	169	1,784	55,003

Source: Statistics Canada, Census of Population, 2016.

Impact of edit and imputation

With the availability of CRA administrative data, most income variables could be compiled with confidence. This is particularly true for respondents who could be linked to a tax filer records as they would have the most complete set of administrative income data. For those who could be linked to a non-tax filer record, some income fields could be taken from the CRA records directly. Other fields required some imputation based on demographic characteristics and correlated auxiliary data from CRA. Table 4 summarizes the methods through which income components and income taxes were compiled for the linked respondents. For those who could not be linked to any CRA records, the entire income record was imputed based on demographic characteristics.

Table 4
Data compilation methods for income components and income taxes

Income components and income taxes	Tax filers	Non-tax filers
Wages, salaries and commissions	A	A/I
Net farm income	A	I
Net non-farm self-employment income	A	I
Investment income	A	I
Private retirement income	A	I
Market income not included elsewhere	A	A/I
Old Age Security pension	A	A
Guaranteed Income Supplement	A	A
Canada/Quebec Pension Plan - Retirement benefits	A	A
Canada/Quebec Pension Plan - Disability benefits	A	A
Canada/Quebec Pension Plan - Survivor benefits	A	A
Employment Insurance - Regular benefits	A	A
Employment Insurance - Other benefits	A	A
Basic Canada Child Tax Benefit	A	A
National Child Benefit Supplement	A	A
Universal Child Care Benefit	A	A
Provincial and territorial child benefits	D	D
Social assistance benefits	A	A
Workers' compensation benefits	A	A
Working Income Tax Benefit	A	A
Goods and Services Tax credit and Harmonized Sales Tax credit	A	A
Government transfers not included elsewhere	A/D	D/I
Net federal tax	A	I
Provincial and territorial income taxes	A/D [1]	I

A – Compiled directly from administrative tax records.
D – Derived based on program specifications.
I – Imputed using related auxiliary administrative data and demographic characteristics.
1. For residents living in Quebec, the provincial income tax was derived deterministically because such data was not available from the Canada Revenue Agency (CRA).
Source: Statistics Canada, Income Statistics Division.

Table 5 gives the percentage change in the number of income recipients, the aggregate amount received from different income sources and the average amount received before and after edit and imputation for the past three census cycles.

With the high T1 and CRA linkage rates, significantly less imputation was required for income in the 2016 Census. The number of total income recipients increased by only 7.7% during imputation, compared to over one-third in the previous two census cycles. The aggregate amount of total income in the file increased by 6.8%, also notably lower than in 2006 and 2011. Average total income dropped marginally by 0.9%.

Table 5
Impact of edit and imputation on number of recipients, aggregate amounts and averages by source

	Change in number of recipients			Change in aggregate amount			Change in average amount for recipients		
	2006 Census	2011 NHS	2016 Census	2006 Census	2011 NHS	2016 Census	2006 Census	2011 NHS	2016 Census
Source	percentage								
Total income	38.8	34.2	7.7	29.7	27.4	6.8	-6.6	-5.0	-0.9
Market income									
Wages, salaries and commissions	12.7	28.9	5.4	10.0	27.0	5.4	-2.4	-1.5	0.0
Net farm income	-0.2	19.5	8.1	-23.6	15.7	6.9	-23.5	-3.2	-1.1
Net non-farm self-employment income	10.1	24.8	15.5	11.4	26.1	14.6	1.2	1.1	-0.8
Investment income	10.6	24.0	8.7	10.2	18.8	5.4	-0.4	-4.2	-3.1
Private retirement income	9.8	18.3	7.1	9.2	15.3	6.7	-0.6	-2.6	-0.3
Market income not included elsewhere	12.0	23.9	10.6	12.2	21.2	11.4	0.1	-2.2	0.8
Government transfers									
OAS, GIS and allowance	10.7	24.4	2.7	16.2	32.7	1.8	5.0	6.6	-0.9
CPP/QPP benefits	10.9	23.2	4.3	10.5	21.9	4.6	-0.3	-1.1	0.3
Employment Insurance benefits	12.0	34.2	4.9	12.3	33.7	3.0	0.2	-0.4	-1.8
Child benefits	770.5	31.0	3.7	984.0	39.4	3.7	24.5	6.4	-0.1
Other government transfers	127.7	211.1	25.9	58.5	115.0	50.3	-30.4	-30.9	19.4
Income taxes									
Income taxes	13.5	32.9	14.9	21.3	42.2	26.4	6.9	7.0	10.0

NHS – National Household Survey.
OAS – Old Age Security pension.
GIS – Guaranteed Income Supplement.
CPP – Canada Pension Plan.
QPP – Québec Pension Plan.
Sources: Statistics Canada, Census of Population, 2006 and 2016; National Household Survey, 2011.

Wages and salaries, which represented close to 68% of the aggregated total income and was an income source present for about two-thirds of the income target population, only saw a 5.4% increase in number of recipients and in aggregate amount. This was made possible because the T4 slips identified 1.25 million more persons with wages and salaries on top of the T1 record (6.6% of the total number of recipients), representing 5.3% of the aggregate amount of wages and salaries. Of the 959,000 records imputed with wages and salaries, about 40% were from non-responding households, and 60% were from respondents who could not be linked to CRA records.

Though not as high as in 2011, the change during imputation in the number of recipients and in the aggregate amount for net non-farm self-employment income is higher when compared to the magnitudes observed for other income sources. This stems mainly from the relative absence of information to guide imputation in the absence of a tax return as no corresponding slips are issued by external entities. The distribution in imputed amounts thus corresponds roughly to the distribution in the tax filers.

The extent to which child benefits and other government transfers were imputed reduced tremendously in 2016 compared to the past. This happened because some of the key components of these two sources were drawn from the child benefits and GST/HST credit files from the CRA instead of being derived deterministically.

The magnitude of imputation for other government transfers in 2016 appeared high compared to other government sources because many types of non-taxable income not present in CRA files were derived or imputed during edit and imputation. Some of the sources added were provincial income supplements for seniors and various refundable provincial credits and rebates. These sources tended to be larger in amounts than the GST and HST credits, which was the most common form of other government transfer prior to imputation. This therefore contributed to an increase in the average amount (19.4%) due to imputation. In previous census cycles, these relatively small amounts of GST and HST credits were also derived during processing, hence the drop in the average amount during the imputation process.

Income taxes also underwent more imputation than other fields. The provincial income tax for residents living in Quebec had to be imputed deterministically because Quebec's provincial income tax is administered independently and the income tax amounts were not available even though respondents could be linked to a CRA tax filer's record.

Comparison with other data sources

As with all data sources produced by Statistics Canada, the quality of the 2016 Census income information released was evaluated internally prior to publication. As part of this evaluation, the income data were compared, to the extent possible, with other data sources. Many factors affect comparisons of income data across these data sources. Amongst other factors, comparability is affected by differences in target populations; reference period; sampling and collection methods; and approaches to data processing.

The main sources of data for comparison were the income estimates from the Survey of Labour and Income Dynamics (SLID) (http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3889) (2005 and 2010), the Canadian Income Survey (CIS) (http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5200) (2015) and the Annual Income Estimates for Census Families and Individuals (T1 Family File – T1FF) (http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=4105), an administrative data file created primarily from income tax returns submitted to the Canada Revenue Agency (CRA). For evaluation purposes, the 2016 Census estimates were also compared with those from the 2006 Census and the 2011 National Household Survey (NHS).

The 2016 Census used information from the T1 files, tax slips and CRA benefits records to compile and derive income, while SLID/CIS and T1FF drew their income information primarily from T1 files and child benefits records only.

All of the above sources have different coverage levels as they are produced with different methods. For example, the SLID/CIS estimates reflect adjustments made for the population net undercoverage, while the census and T1FF estimates do not include such an adjustment.

The 2016 Census income tables target all persons in private households who usually lived in Canada. It included persons who lived on Indian reserves and in other Indian settlements, permanent residents, non-permanent residents, such as refugee claimants; holders of work or study permits; and members of their families living with them. In the SLID/CIS, residents of the Yukon, the Northwest Territories, Nunavut and persons living on Indian reserves were excluded.

As in SLID/CIS, the NHS and the 2016 Census income tables also excluded persons living in institutional collective dwellings such as hospitals, nursing homes and penitentiaries; Canadian citizens living in other countries; full-time members of the Canadian Forces stationed outside Canada; and foreign residents. Also excluded were persons

living in non-institutional collective dwellings such as work camps, hotels and motels, and student residences.[3] This last group of people were included in the 2006 Census for individual-level income statistics, but not for income statistics at the family level. Due to the administrative nature of the T1FF and limited dwelling type information available, none of the above exclusions apply to this file.

Given the sensitivity of most income indicators to such methodological differences, users should use caution when comparing 2016 Census income estimates to the NHS, other household income surveys, administrative data or earlier census data. The results of some comparison exercises are presented below.

Individual income by source

The key statistics between the census and the comparison sources (T1FF/SLID/CIS) were by and large comparable. Since there were methodological differences between CIS (started in 2012) and SLID (terminated in 2011), historical comparison were mainly performed against T1FF. Income estimates from the 2011 voluntary National Household Survey (NHS) were also less directly comparable. As reported in the Income Reference Guide, National Household Survey, 2011 (http://www12.statcan.gc.ca/nhs-enm/2011/ref/guides/99-014-x/99-014-x2011006-eng.cfm), Catalogue no. 99-014-XWE2011006, median wages and salaries growth between 2005 and 2010 was higher compared to SLID and T1FF. This contributed to a smaller growth in median wages and salaries between the 2011 NHS and the 2016 Census compared to T1FF over the 5-year period. For these reasons, the focus of the remaining comparisons on levels and changes will be between 2005 and 2015.

Table 6
Median income and percentage change for income data from different sources for Canada (provinces only), 2005 and 2015

	Census	SLID	T1FF	Census	CIS	T1FF	Census	SLID/CIS	T1FF
Source	2005 median ($)			2015 median ($)			% change (2005 to 2015)		
Total income	30,294	29,629	30,001	34,186	32,821	33,902	12.8	10.8	13.0
Employment income	31,741	31,118	31,063	33,659	33,141	33,647	6.0	6.5	8.3
Wages, salaries and commissions[1]	33,129	32,534	32,689	35,546	34,779	35,639	7.3	6.9	9.0
Net self-employment income	6,685	9,264	5,916	6,712	7,594	5,837	0.4	-18.0	-1.3
Investment income	592	530	581	773	759	812	30.7	43.2	39.8
Private retirement income	14,198	14,518	13,772	16,344	14,297	15,849	15.1	-1.5	15.1
Market income not included elsewhere	984	1,364	1,029	1,468	1,025	988	49.1	-24.9	-4.0
Government transfers	4,985	4,281	5,426	5,471	5,595	5,943	9.8	30.7	9.5
Old Age Security pension and Guaranteed Income Supplement	6,751	6,751	6,751	6,786	6,786	6,786	0.5	0.5	0.5
Canada Pension Plan and Quebec Pension Plan benefits	7,202	7,249	7,230	7,422	7,431	7,439	3.1	2.5	2.9
Employment Insurance benefits	4,885	4,688	4,926	5,614	5,653	5,727	14.9	20.6	16.3

3. Although income data have been gathered for these populations in 2016, they are not included in the published standard products.

Table 6
Median income and percentage change for income data from different sources for Canada (provinces only), 2005 and 2015

	Census	SLID	T1FF	Census	CIS	T1FF	Census	SLID/CIS	T1FF
Source	2005 median ($)			2015 median ($)			% change (2005 to 2015)		
Child benefits	2,882	2,355	3,019	3,840	2,707	3,246	33.2	15.0	7.5
Other income from government sources	679	534	596	624	771	969	-8.1	44.5	62.5
Income taxes	5,769	5,880	5,854	6,306	5,988	6,072	9.3	1.8	3.7
After-tax income	27,566	26,830	27,136	30,849	29,934	30,780	11.9	11.6	13.4

1. Median wages and salaries based on the T4 Statement of Earnings information slips was $35,700 in 2015. This represented a growth of 13.0% from 2005, after taking into account inflation.
Note: Dollar values are presented in 2015 constant dollars.
Sources: Statistics Canada, Census of Population, 2006 and 2016; Survey of Labour and Income Dynamics (SLID), 2005; and Canadian Income Survey (CIS), 2015; Annual Income Estimates for Census Families and Individuals (T1 Family File), 2005 and 2015.

In terms of total income, the census had more recipients (2.5%) than T1FF in 2015; the aggregate sum was also 2.0% higher. These minor differences were expected because of the different target populations described above. Median and average total income amounts were almost identical; the census estimates were within 1% of T1FF's estimates. All of the aforementioned indicators showed very similar growth patterns between 2005 and 2015, according to both data sources. For instance, census reported a 12.8% growth in median, while T1FF showed 13.0%.

As for employment income, the census had 4.6% more recipients than T1FF. The aggregate sum was 4.2% higher according to the census. Similar to what was observed in total income, the median and average employment income from the two data sources were almost identical (within 0.5%) in 2015. The median employment income growth between 2005 and 2015 was 6.0% for the census, compared to 8.3% from T1FF. When one of the biggest components of employment income, wages and salaries, was compared to T4 administrative records, it revealed that the medians were much closer in 2015 (T4: $35,700 versus census: $35,529) than in 2005 (T4: $31,600 versus census $33,129).

Statistics on some other income sources may present more differences between census and T1FF. The differences may be attributable to issues that can be classified in two broad categories: coverage issues and conceptual and processing differences.

Coverage issues

In standard tables, the census shows fewer persons with benefits from the Old Age Security programs and from Canada and Quebec Pension Plans than T1FF, mainly because of differences in coverage. T1FF captured the population eligible for these benefits during year 2015, including persons living in collective dwellings such as residences for seniors and nursing homes. The published census data only covered those still living in private households in May 2016. When those living in collective dwellings were included, the number of recipients and the aggregate amounts were much closer between the two data sources. The median amounts, on the other hand, were essentially the same between T1FF and census in 2015 regardless of any coverage adjustments.

Conceptual and processing differences

Four areas showed slightly different figures mainly because of the ways in which the data is classified conceptually or processed. Firstly, some incongruities in the number of child benefits recipients and the median amount between census and T1FF can be largely attributed to a different processing strategy for these benefits.

In 2016, the census distributed child benefits based on linkages to the administrative payment files. In the case of couple families, this method tended to allocate all types of benefits managed by the same program, such of the

Canada Child Tax Benefit (CCTB) and the Universal Child Care Benefit (UCCB), to only one spouse (usually the mother).

However, in T1FF, while the CCTB was still assigned to the payee, the UCCB amount was retrieved directly from the T1 tax return. Based on CRA's stipulation, the lower-income spouse was to report the amount when filing taxes. Thus the child benefit amounts were more spread out amongst spouses or partners in T1FF than in the census. As a result, the number of recipients was higher in T1FF and the median benefit amount was lower in the T1FF ($3,246) than in the census ($3,840).

In 2005, the census used a strategy similar to T1FF's; hence, the increase in median amount over the last decade was much more pronounced when estimates from censuses (33.2%) and T1FF (7.5%) were contrasted. Trend analysis of the child benefits variable would be better served by a different level of analysis (family- or household-level variables instead of individual).

Scholarships and bursaries have become over time mainly non-taxable and unavailable from the tax return. For the 2016 Census, it has been possible to have them retrieved from additional CRA information slips, and added to market income not included elsewhere. This change to the processing sources may explain the increases in the number of recipients of this source (17.0%) and the median amount (49.1%) between 2005 and 2015. In contrast, the T1FF program has not yet introduced this enhancement, and consequently saw a 3.4% drop in number of recipients, and a 4.0% drop in median, for this source over the same period of time.

The last two differences in this section relate to the classification of components within other income from government sources. Social assistance benefits and refundable provincial tax credits were also treated differently between census and T1FF in 2015.

In the CRA tax slips, provincial senior's supplement amounts for certain jurisdictions appeared as social assistance benefits. For the census, where identified, these amounts were considered refundable provincial tax credits instead and moved to the other government income not included elsewhere component. The consequence is that fewer social assistance benefits and benefit recipients were observed compared to T1FF.

Another adjustment made for the 2016 Census was the treatment of certain provincial tax credits in Quebec, such as the Quebec childcare expense tax credit and the tax credit respecting the work premium, etc. Instead of removing these credit amounts from any provincial income tax, as was done in T1FF and for past census cycles, these credits were included as income under the government transfers not included elsewhere category in 2016. This change represents an improvement in the income sources classification because these amounts are income and not taxes in nature. Roughly $2.5 billion dollars in credits were treated in this manner. This accounted for over 55% of the government transfers not included elsewhere category and 25% of the income in the overall other income from government source category in Quebec in 2016. Due partially to the 2016 Census not offsetting the Quebec provincial taxes with the roughly $2.5 billion in provincial tax credits, the aggregate amount in provincial taxes was higher in census than in T1FF. These $2.5 billion credits represented about half of the difference in aggregate amounts between the two sources.

Regional aspects

The 2015 median employment income and 2015 median total income from census and T1FF for provinces, territories, census metropolitan areas (CMAs) and census agglomerations (CAs) were mostly comparable. The Northwest Territories had the largest discrepancy (9.9%) between the two sources amongst the provinces and territories; closer examination showed that the differences stem mainly from persons included in one source and not the other. On average, the census estimates for median employment income and median total income for the provinces and territories, excluding the Northwest Territories, were within 0.7% and 1.5% percent of the T1FF estimates, respectively. All 35 CMAs had median employment and median total income within 4% of the T1FF estimates, and 28 of them had a difference in median total income of 2% or less. Amongst CAs, the average percentage difference in median total income was 2.2% and very seldom would the estimates deviate more than 5% between the two sources.

Administrative data are not available for all components of total income. As a result, some components are estimated based solely on information available within the short-form census content. Income in the 'Government transfers not included elsewhere' classification (a new sub-category within the 'Other government transfers' category that includes for example some provincial supplements programs) is likely underestimated for residents of Ontario. The aggregate amounts in this category in the 2016 Census are thought to represent 65% to 70% of expected values based on other administrative sources and public accounts. In a similar way, another review showed that mandatory contributions to provincial health plans for British Columbia were likely underestimated by approximately 20%. Users should be aware when interpreting statistics that are sensitive to such under-estimations.

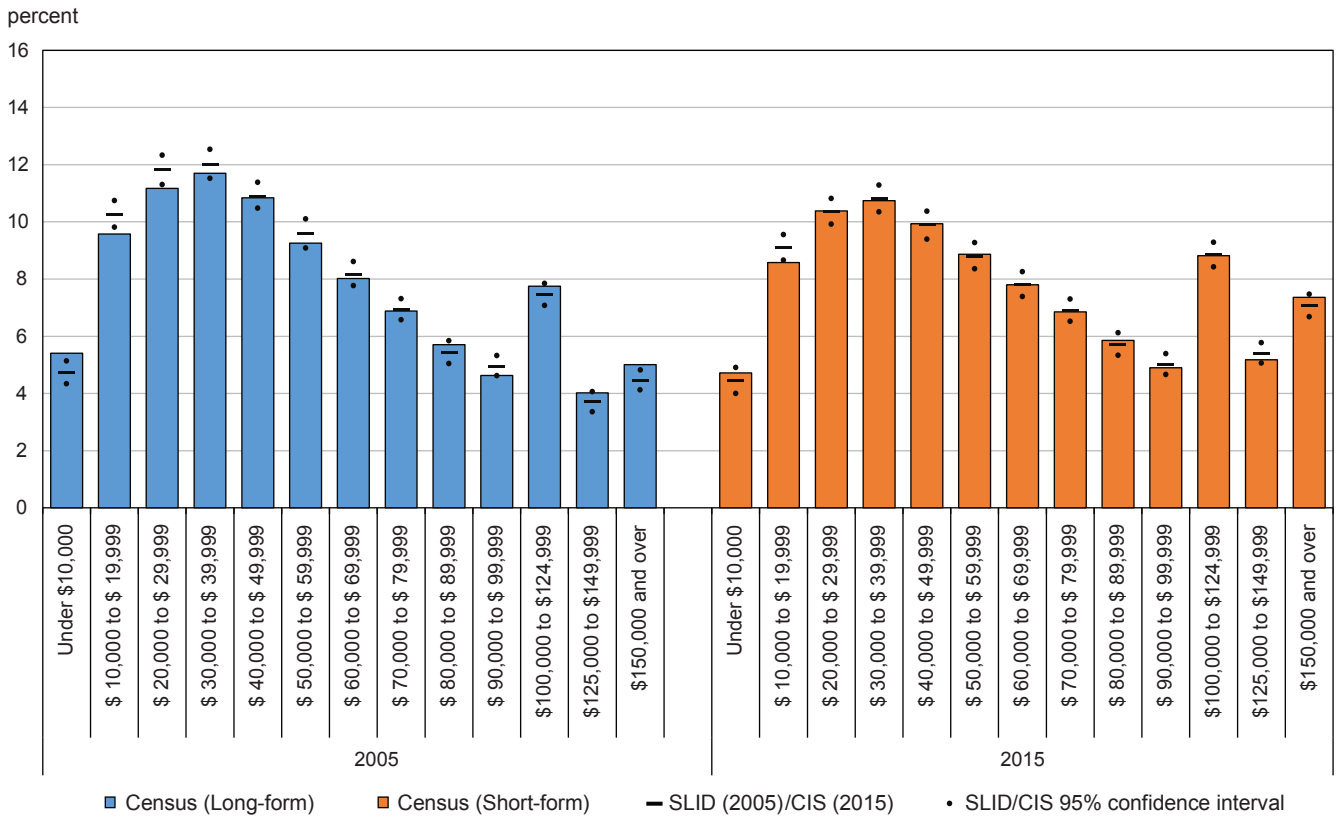
In summary, the main income trends from the census were in line with T1FF between 2005 and 2015. As described above, care should be exercised when evaluating trends for particular detailed sources, such as market income not included elsewhere or child benefits because of changes to the data sources and derivation method employed. Due to methodological differences between 2016 Census and the 2011 NHS in the way income estimates are derived, standard data products only present 2005 and 2015 income data when considering change over time.

Family income distributions

In terms of family income distributions, the 2015 distributions overall demonstrated closer agreement than the 2005 distributions across data sources.

In terms of after-tax income at the economic family level, the census estimated relatively more economic families and persons not in economic families (together they will be called economic family units) at the two tail ends of the distribution compared to CIS. The differences at the lower end of the income distribution, however, were less pronounced in 2015 than in 2005 when SLID was the comparator.

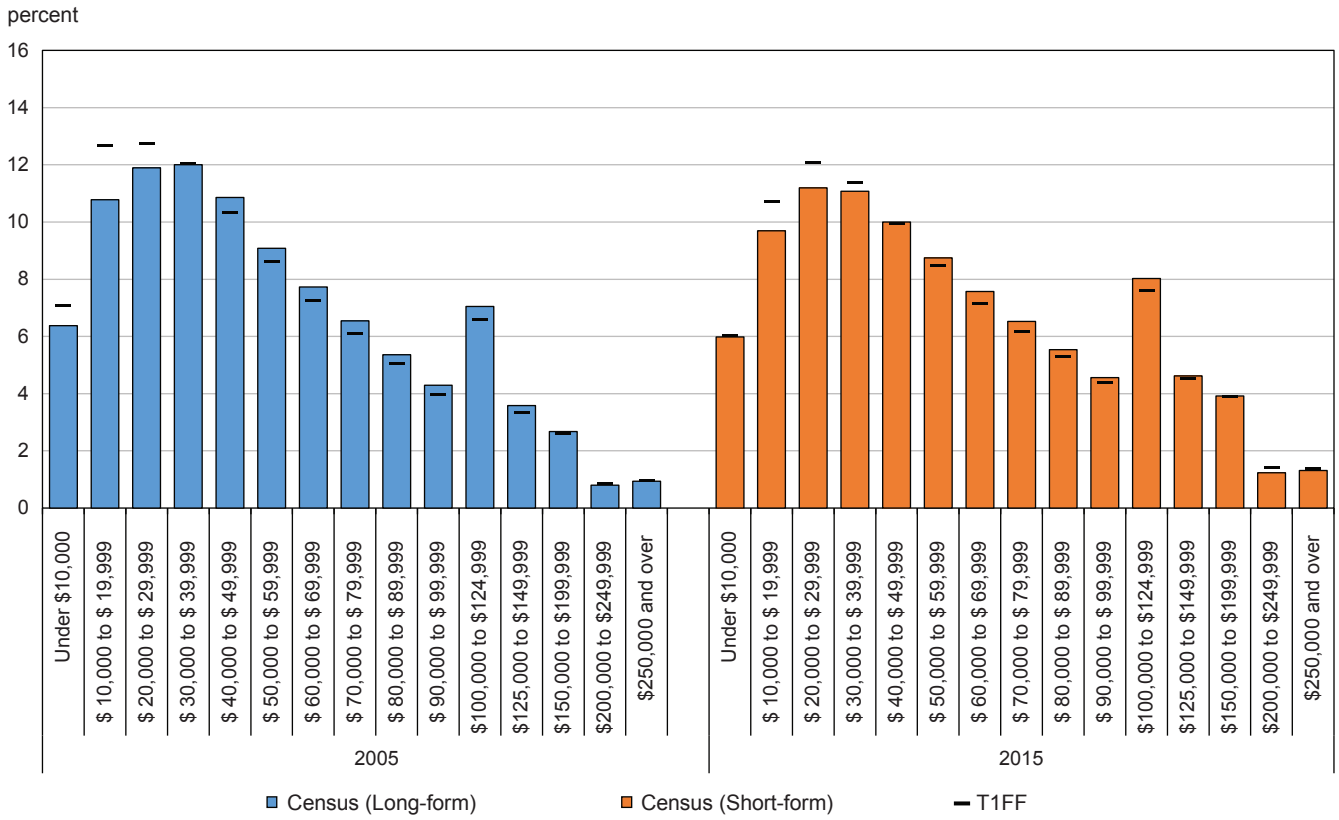
Chart 1
Distribution of after-tax income of economic family units, for Canada (provinces only), 2005 and 2015



SLID - Survey of Labour and Income Dynamics
CIS - Canadian Income Survey
Note: Dollar values are 2015 constant dollars.
Sources: Statistics Canada, Census of Population, 2006 and 2016; Survey of Labour and Income Dynamics (SLID), 2005; and Canadian Income Survey (CIS), 2015.

Since the T1FF is mainly based on the information provided on income tax returns, family estimates can only be calculated for census families and persons not in census families (together they will be called census family units). In terms of after-tax income at the census family level, the census and T1FF distributions were the least alike around the $10,000 to $29,999 range. This pattern was also observed in 2005, but the magnitude of the difference shrank from 2.8 percentage points a decade ago to 1.9 percentage points in 2015.

Chart 2
Distribution of after-tax income of census family units, for Canada, 2005 and 2015



T1FF – T1 Family File
Note: Dollar values are 2015 constant dollars.
Sources: Statistics Canada, Census of Population, 2006 and 2016; Annual Income Estimates for Census Families and Individuals (T1 Family File), 2005 and 2015.

Low income

The LIM is an internationally used measure of low income. The concept underlying the LIM is that a household has low income if its income is less than half of the median income of all households. The LIM income threshold is the same for a household, regardless of where they live in Canada, and is itself derived from the private households present in the census.

Low-income rates for Canada (excluding the territories) based on the low-income measure, after-tax (LIM-AT) was 14.2% in the 2016 Census. That prevalence rate when estimated by 2015 CIS was exactly the same. The low income rates were comparable for most of the provinces. The biggest gaps were observed in Quebec and Alberta. In Quebec, census reported a low-income rate of 14.6% and CIS reported 16.2%. In Alberta, census reported a low-income rate of 9.3% and CIS reported 6.9%.

Table 7
Prevalence of low income based on low-income measure, after-tax (LIM-AT) for population in private households, 2005 and 2015

	2005		2015	
	Census	SLID	Census	CIS
Geography	percentage			
Canada (provinces only)	14.0	13.0	14.2	14.2
Newfoundland and Labrador	20.0	19.1	15.4	15.4
Prince Edward Island	15.5	11.2	16.9	15.9
Nova Scotia	17.2	14.8	17.2	17.5
New Brunswick	17.2	17.5	17.1	16.9
Quebec	15.3	14.1	14.6	16.2
Ontario	12.9	11.7	14.4	14.3
Manitoba	15.7	14.7	15.4	15.6
Saskatchewan	16.8	17.8	12.8	12.6
Alberta	9.8	8.7	9.3	6.9
British Columbia	15.4	14.8	15.5	15.8

SLID – Survey of Labour and Income Dynamics.
CIS – Canadian Income Survey.
Sources: Statistics Canada, Census of Population, 2006 and 2016; Survey of Labour and Income Dynamics (SLID), 2005; and Canadian Income Survey (CIS), 2015.

High income

The comparison of the 2016 Census data to administrative sources for high-income persons is much closer than was observed with such comparisons with income data from the 2011 NHS. In comparison to 2005 data, the evaluation of trends for some of the highest groups may still present slight differences.

The 2016 Census estimated 48,100 more persons with a total income of $100,000 or more in 2015 than the T1FF, corresponding to a difference of 2.1% between the estimates.

Overall, the census and T1FF presented similar growth trajectories between 2005 and 2015 for high-income individuals, with census showing a 56.2% increase among individuals with $100,000 or more and T1FF showing a 54.3% increase for this group.

While the 2016 Census and T1FF presented virtually the same number of persons in the $200,000 or more range, the census has progressively lower coverage rates compared to the T1FF as incomes increase. For example, the census showed about 0.8%, or 1,400, fewer persons with total incomes of $300,000 or more compared with the T1FF estimate, but 3.7% less in the $1,000,000 or more income range (700 persons).

In 2015, the estimates between these two sources are closer than they have been for any census. Given this gap has been closing, the growth estimates differ somewhat across the sources for these income groups. In terms of change between 2005 and 2015, the census showed an increase of 32.5% in the number of millionaires, whereas T1FF only showed a 26.6% increase.

Table 8
Distribution of total income by data source, 2005 and 2015

Total income group	2005		2015		Percentage change 2005 to 2015	
	Census (long-form)	T1FF	Census (short-form)	T1FF	Census	T1FF
Population with income	24,340,040	23,672,530	27,488,530	26,780,550	12.9	13.1
Income under $100,000	22,888,670	22,234,960	25,221,930	24,562,070	10.2	10.5
Income $100,000 or more	1,451,370	1,437,570	2,266,600	2,218,480	56.2	54.3
$200,000 or more	254,905	260,570	390,285	390,270	53.1	49.8
$300,000 or more	116,030	121,590	165,380	166,740	42.5	37.1
$500,000 or more	46,065	49,680	63,195	64,420	37.2	29.7
$1,000,000 or more	14,560	15,810	19,300	20,010	32.6	26.6

T1FF – T1 Family File.
Note: Dollar values are 2015 constant dollars.
Sources: Statistics Canada, Census of Population, 2006 and 2016; Annual Income Estimates for Census Families and Individuals (T1 Family File), 2005 and 2015.

Data quality for long-form estimates

When the census data analysis involves crossing data from the short-form census questionnaire and the long-form census questionnaire (e.g., analysing an education variable with an age variable or analysing an education variable with an income variable), users must take into consideration certain aspects of the quality, such as the non-response bias and the variability due to sampling and total non-response.

Non-response bias for the long-form estimates

Non-response bias is a potential source of error for all surveys, including the long-form census questionnaire. Non-response bias arises when the characteristics of persons who participate in a survey are different from those who do not.

In general, the risk of non-response bias increases as the response rate declines. For the 2016 long-form census questionnaire, Statistics Canada adapted its collection and estimation procedures in order to mitigate, to the extent possible, the effect of non-response bias. For more information on these mitigation strategies, please refer to the *Guide to the Census of Population, 2016* (http://www12.statcan.gc.ca/census-recensement/2016/ref/98-304/index-eng.cfm), Catalogue no. 98-304-X.

Variability due to sampling and total non-response for the long-form estimates

The objective of the long-form census questionnaire is to produce estimates on various topics for a wide variety of geographies, ranging from very large areas (such as provinces and census metropolitan areas) to very small areas (such as neighbourhoods and municipalities), and for various subpopulations (such as Aboriginal peoples and immigrants) that are generally referred to as ‘domains of interest’. In order to reduce response burden, the long-form census questionnaire is administered to a random sample of households.

This sampling approach and the total non-response introduce variability in the estimates that needs to be accounted for. This variability also depends on the population size and the variability of the characteristics being measured. Furthermore, the precision of estimates may vary appreciably depending on the domain or geography of interest, in particular because of the variation in response rates. For more information on the variability due to sampling and total non-response in long-form census questionnaire estimates, please refer to the *Guide to the Census of Population, 2016* (http://www12.statcan.gc.ca/census-recensement/2016/ref/98-304/index-eng.cfm), Catalogue no. 98-304-X.

To improve consistency between short-form and long-form estimates, income information for the long-form sampled respondents was taken directly from their corresponding short-form records. Nevertheless, income estimates from the long-form may differ from those from the short form due to the effects of sampling in the Census long-form. The effects of higher rates of imputation for specific sub-populations are also an important consideration for users of income estimates from the Census long-form. This section discusses these two issues in turn.

The effects of sampling on income estimates

In the 2016 Census, the long-form questions were asked of one in four households living in private dwellings. Initial sampling weights were calibrated to align, where possible, certain long-form estimates to the counts seen in the Census short-form. However, differences in income estimates remain between the long-form and short-form due to the presence of sampling error in estimates from the long-form. The impact of sampling is generally small for larger populations but grows when the estimates are based on smaller groups or populations with more specific characteristics. Statistics are also subject to more or less variability based on the distribution of the variable in the population,[4] the nature of the statistic and whether or not they were used in the calibration steps.[5]

Tables 9A and 9B present the variability of selected estimates due to sampling. One notices that averages were generally subject to larger sampling errors than medians. For example, for 124 estimates of the median total income of households in areas where there were 50,000 households or more (first row of table 9A), 100% of the estimates had differences of less than 1% between the statistic produced from the short form and the one produced from the long form. In the case of the average (eleventh row of table 9A), 89.5% had less than 1% difference between the estimates, 9.7% had between 1% and 2% difference and 0.8% had more than 2% but less than 5% difference. Median and average amounts for earnings and total income were often less variable than the same statistics for government transfers.

In table 9B, the percentage of persons with employment income was often less variable than the percentage of persons with government transfers. For estimates of 1,000 to 4,999 persons with employment income in populations of 5,000 to 9,999 persons 15 years of age or older, in almost three-quarters (74.4%) of the 5,802 pairs evaluated, the short-form and long-form estimates were closer than 0.5 percentage points. For government transfers, less than half (44.6%) of the 6,588 estimates of similar size combinations were within that same margin.

4. The distribution throughout the population has an impact but also the distribution within the households. The presence of outliers can also have an impact.

5. Certain income variables were used in calibration such as number of persons in low-income, number of households in each quartile of total income. Further description of methods used for sampling and during the non-response adjustments, the weighting and the calibration phases are available in Chapter 9 – Sampling and weighting for the long form (http://www12.statcan.gc.ca/census-recensement/2016/ref/98-304/chap9-eng.cfm) in the the Guide to the Census of Population, 2016, Catalogue no. 98-304-X and, eventually in the *Sampling and Weighting Technical Report, Census of Population, 2016* (http://www12.statcan.gc.ca/census-recensement/2016/ref/98-306/index-eng.cfm), Catalogue no. 98-306-X (to be released Fall of 2018).

Table 9A
Distribution of differences between long-form and short-form estimates by statistic and size of universe, 2016 Census

Statistic	Size of universe[1]	Number of selected estimates	Average of statistic on short form	Average of statistic on long form	Distribution of differences as percentage of short-form estimate				
					Less than 1%	1.0% to 1.9%	2.0% to 4.9%	5.0% to 14.9%	15% or higher
			$		percentage				
Median total income of households	50,000 and higher	124	69,348	69,349	100.0	0.0	0.0	0.0	0.0
	10,000 to 49,999	640	73,007	73,000	98.4	1.6	0.0	0.0	0.0
	5,000 to 9,999	736	71,422	71,374	96.3	3.1	0.4	0.1	0.0
	1,000 to 4,999	9,868	77,210	77,079	64.5	12.0	18.0	5.5	0.0
	500 to 999	3,690	73,464	73,229	19.9	15.1	33.2	29.9	1.9
	100 to 499	50,546	76,667	75,970	10.1	8.5	22.2	43.7	15.5
	Less than 100	593	100,497	100,789	7.4	6.1	18.4	39.8	28.3
Average total income of households	50,000 and higher	124	88,442	88,492	89.5	9.7	0.8	0.0	0.0
	10,000 to 49,999	640	91,967	92,028	70.6	20.0	8.3	1.1	0.0
	5,000 to 9,999	736	90,795	91,007	51.6	27.9	16.2	4.3	0.0
	1,000 to 4,999	9,868	95,987	96,078	35.1	25.3	28.4	10.2	1.0
	500 to 999	3,690	91,004	91,251	17.5	15.4	36.1	27.7	3.3
	100 to 499	50,546	94,258	94,396	9.5	9.5	25.8	44.2	11.1
	Less than 100	593	117,457	120,386	5.6	7.4	17.9	45.4	23.8
Median total income of economic families	50,000 and higher	68	90,584	90,642	100.0	0.0	0.0	0.0	0.0
	10,000 to 49,999	596	89,413	89,391	88.9	10.2	0.8	0.0	0.0
	5,000 to 9,999	247	96,217	96,188	76.9	18.6	4.5	0.0	0.0
	1,000 to 4,999	8,579	93,690	93,602	40.6	26.1	28.3	5.0	0.0
	500 to 999	3,099	91,151	90,963	21.7	17.0	35.6	25.2	0.5
	100 to 499	48,100	91,000	90,035	10.6	8.8	22.4	43.2	15.0
	Less than 100	5,497	80,573	79,670	6.9	6.3	15.1	39.9	31.7
Average total income of economic families	50,000 and higher	68	111,217	111,353	92.6	7.4	0.0	0.0	0.0
	10,000 to 49,999	596	108,934	109,106	69.1	21.8	8.6	0.5	0.0
	5,000 to 9,999	247	114,698	114,989	48.6	29.6	15.8	6.1	0.0
	1,000 to 4,999	8,579	112,913	113,034	33.3	25.4	30.1	10.4	0.9
	500 to 999	3,099	109,361	109,872	18.3	17.8	37.1	24.2	2.7
	100 to 499	48,100	108,792	108,920	9.4	9.0	24.9	44.5	12.2
	Less than 100	5,506	96,323	97,600	6.0	6.5	19.1	43.7	24.7
Median total income of persons	50,000 and higher	743	36,061	36,061	96.8	3.0	0.3	0.0	0.0
	10,000 to 49,999	1,501	37,141	37,138	67.8	22.3	9.9	0.1	0.0
	5,000 to 9,999	7,207	37,821	37,818	44.4	28.5	25.1	2.0	0.0
	1,000 to 4,999	18,172	36,442	36,410	24.8	20.8	36.1	17.8	0.5
	500 to 999	38,282	38,570	38,375	13.3	11.8	29.1	40.3	5.5
	100 to 499	86,230	33,293	33,087	10.3	8.5	22.1	42.8	16.3
	Less than 100	19,780	29,740	28,751	7.7	5.9	14.9	32.9	38.6
Average total income of persons	50,000 and higher	743	48,529	48,585	77.1	14.7	7.5	0.7	0.0
	10,000 to 49,999	1,501	47,860	47,891	49.7	28.6	18.1	3.6	0.1
	5,000 to 9,999	7,207	48,973	49,033	39.5	26.8	26.3	6.9	0.5
	1,000 to 4,999	18,172	47,349	47,421	23.3	20.1	35.3	19.2	2.1
	500 to 999	38,282	49,227	49,247	12.9	12.7	30.9	37.9	5.7
	100 to 499	86,230	42,844	42,883	9.2	8.9	24.6	44.0	13.4
	Less than 100	28,152	36,431	36,354	4.5	4.3	12.2	34.9	44.2

Table 9A
Distribution of differences between long-form and short-form estimates by statistic and size of universe, 2016 Census

Statistic	Size of universe[1]	Number of selected estimates	Average of statistic on short form	Average of statistic on long form	Distribution of differences as percentage of short-form estimate				
					Less than 1%	1.0% to 1.9%	2.0% to 4.9%	5.0% to 14.9%	15% or higher
			$		percentage				
Median employment income of persons	50,000 and higher	468	36,728	36,728	94.9	4.3	0.9	0.0	0.0
	10,000 to 49,999	1,072	35,570	35,558	76.7	15.5	6.8	0.9	0.1
	5,000 to 9,999	4,200	39,385	39,394	65.2	17.0	16.0	1.9	0.0
	1,000 to 4,999	16,556	35,330	35,298	35.7	16.6	28.3	18.0	1.5
	500 to 999	22,784	39,641	39,434	13.2	10.8	28.4	40.0	7.6
	100 to 499	89,951	31,638	31,281	8.2	6.5	17.4	39.7	28.2
	Less than 100	21,060	19,497	18,718	4.1	3.3	8.4	22.3	61.9
Average employment income of persons	50,000 and higher	468	48,080	48,140	79.1	16.2	4.3	0.4	0.0
	10,000 to 49,999	1,072	45,805	45,864	55.4	28.1	13.4	2.4	0.7
	5,000 to 9,999	4,200	49,244	49,328	43.4	27.0	24.3	5.0	0.3
	1,000 to 4,999	16,556	45,583	45,643	26.6	20.9	33.3	17.1	2.0
	500 to 999	22,784	49,329	49,387	13.5	12.6	31.4	37.1	5.4
	100 to 499	89,951	41,292	41,387	8.0	8.2	22.0	43.6	18.2
	Less than 100	32,658	27,276	27,039	2.5	2.6	7.7	23.7	63.5
Median government transfers of persons	50,000 and higher	444	5,761	5,772	65.3	22.1	11.3	1.4	0.0
	10,000 to 49,999	1,081	6,250	6,254	54.7	18.9	20.4	6.1	0.0
	5,000 to 9,999	3,376	5,749	5,749	37.3	16.0	25.6	19.2	2.0
	1,000 to 4,999	17,789	6,118	6,120	24.4	13.2	22.5	30.1	9.8
	500 to 999	18,636	5,999	5,972	19.2	11.8	19.8	27.0	22.2
	100 to 499	103,911	6,696	6,654	10.8	7.6	16.3	26.6	38.7
	Less than 100	22,330	8,152	8,007	9.3	6.8	16.7	27.0	40.2
Average government transfers of persons	50,000 and higher	444	7,662	7,671	91.9	7.9	0.2	0.0	0.0
	10,000 to 49,999	1,081	7,889	7,897	71.6	19.2	8.0	1.1	0.0
	5,000 to 9,999	3,376	7,518	7,527	42.7	27.5	25.2	4.6	0.0
	1,000 to 4,999	17,789	7,975	7,982	29.0	21.6	32.7	16.1	0.7
	500 to 999	18,636	7,560	7,564	14.4	12.9	27.4	36.7	8.5
	100 to 499	103,911	8,307	8,315	9.8	9.2	23.0	39.3	18.7
	Less than 100	32,015	9,280	9,351	6.0	5.9	15.2	29.9	43.1

1. Size of universe represents the number of persons with that specific type of income or the number of economic families or households depending on the statistic.
Source: Statistics Canada, Census of Population, 2016.

Table 9B
Distribution of differences between long-form and short-form estimates by characteristic, size of universe and estimated number of persons with characteristic, 2016 Census

Characteristic	Size of universe[1]	Estimated number of persons with characteristic	Number of selected estimate	Average estimate on short form	Average estimate on long form	Distribution of differences between long form and short form in percentage points (p.p.)					
						Less than 0.5 p.p.	0.5 p.p. to 1.0 p.p.	1.0 p.p. to 2.0 p.p.	2.0 p.p. to 5.0 p.p.	5.0 p.p. to 10.0p.p.	10.0 p.p. and higher
						percentage					
Presence of employment income	50,000 and higher	50,000 and higher	478	67.2	67.2	99.4	0.6	0.0	0.0	0.0	0.0
		1,000 to 49,999	343	57.8	57.7	98.0	2.0	0.0	0.0	0.0	0.0
	10,000 to 49,999	10,000 to 49,999	737	71.0	71.0	88.9	9.9	1.2	0.0	0.0	0.0
		5,000 to 9,999	1,411	61.6	61.5	91.6	6.4	2.0	0.0	0.0	0.0
		500 to 4,999	95	22.2	22.2	66.3	28.4	5.3	0.0	0.0	0.0
	5,000 to 9,999	5,000 to 9,999	2,889	76.7	76.8	71.0	18.9	9.5	0.6	0.0	0.0
		1,000 to 4,999	5,802	61.1	61.1	74.4	14.1	10.3	1.1	0.0	0.0
		100 to 999	24	11.0	11.0	25.0	50.0	25.0	0.0	0.0	0.0
	1,000 to 4,999	1,000 to 4,999	10,716	69.8	69.9	34.5	24.4	28.2	12.7	0.2	0.0
		500 to 999	6,352	60.7	60.6	20.7	17.4	27.2	31.5	3.3	0.0
		100 to 499	1,389	20.7	20.4	22.5	22.3	28.7	24.1	2.3	0.0
		Less than 100	108	6.6	5.9	28.7	25.0	34.3	12.0	0.0	0.0
	500 to 999	500 to 999	16,846	81.8	82.2	17.5	16.1	27.1	34.5	4.7	0.1
		100 to 499	33,651	60.9	60.7	11.9	11.4	20.6	40.7	14.8	0.7
		Less than 100	408	11.5	10.5	17.9	18.6	23.5	35.3	4.7	0.0
	100 to 499	100 to 499	54,920	69.1	69.4	10.1	9.8	18.1	38.9	20.4	2.7
		Less than 100	16,596	27.1	26.5	8.2	8.1	15.9	35.8	25.2	6.7
	Less than 100	Less than 100	27,911	57.5	57.0	7.2	3.4	6.9	22.0	28.5	32.0
Presence of government transfers	50,000 and higher	50,000 and higher	444	65.0	65.0	99.3	0.7	0.0	0.0	0.0	0.0
		5,000 to 49,999	377	55.0	55.0	95.8	4.2	0.0	0.0	0.0	0.0
	10,000 to 49,999	10,000 to 49,999	711	72.0	72.0	83.1	14.9	2.0	0.0	0.0	0.0
		5,000 to 9,999	1,355	56.6	56.6	62.1	30.9	6.9	0.1	0.0	0.0
		1,000 to 4,999	177	37.0	37.0	62.7	27.7	9.0	0.6	0.0	0.0
	5,000 to 9,999	5,000 to 9,999	2,014	76.2	76.2	61.9	26.6	10.9	0.6	0.0	0.0
		1,000 to 4,999	6,588	56.0	56.0	44.6	31.4	20.9	3.1	0.0	0.0
		100 to 999	113	14.4	14.3	56.6	22.1	19.5	1.8	0.0	0.0
	1,000 to 4,999	1,000 to 4,999	11,024	72.4	72.4	43.5	21.7	23.1	11.4	0.3	0.0
		500 to 999	6,383	56.1	56.1	17.7	17.3	28.2	33.5	3.3	0.0
		Less than 499	1,158	32.9	32.0	17.2	16.2	27.9	34.4	4.3	0.0
	500 to 999	500 to 999	12,141	81.7	82.1	28.2	17.2	22.6	27.2	4.8	0.1
		100 to 499	37,920	56.8	56.6	11.7	11.3	21.3	40.6	14.6	0.5
		Less than 100	844	13.9	12.7	17.4	14.1	26.1	36.5	5.9	0.0
	100 to 499	100 to 499	64,842	75.1	75.4	25.0	11.2	16.3	29.5	15.9	2.1
		Less than 100	6,674	40.3	39.1	7.3	7.1	14.3	33.9	26.1	11.2
	Less than 100	Less than 100	27,911	80.3	80.6	39.2	2.2	5.9	14.3	16.1	22.2

Table 9B
Distribution of differences between long-form and short-form estimates by characteristic, size of universe and estimated number of persons with characteristic, 2016 Census

Characteristic	Size of universe[1]	Estimated number of persons with characteristic	Number of selected estimate	Average estimate on short form	Average estimate on long form	Distribution of differences between long form and short form in percentage points (p.p.)					
						Less than 0.5 p.p.	0.5 p.p. to 1.0 p.p.	1.0 p.p. to 2.0 p.p.	2.0 p.p. to 5.0 p.p.	5.0 p.p. to 10.0p.p.	10.0 p.p. and higher
						percentage					
Prevalence of low income based on the Low-income measure, after tax (LIM-AT)	50,000 and higher	50,000 and higher	78	15.0	15.0	100.0	0.0	0.0	0.0	0.0	0,0
		10,000 to 49,999	464	16.6	16.6	98.7	1.3	0.0	0.0	0.0	0,0
		5,000 to 9,999	292	10.9	10.9	98.6	1.4	0.0	0.0	0.0	0,0
		1,000 to 4,999	32	6.6	6.5	87.5	12.5	0.0	0.0	0.0	0,0
	10,000 to 49,999	5,000 to 49,999	217	19.2	19.2	91.7	8.3	0.0	0.0	0.0	0,0
		1,000 to 4,999	1,758	14.4	14.4	87.0	10.7	2.2	0.1	0.0	0,0
		500 to 999	334	6.7	6.7	79.9	17.7	2.4	0.0	0.0	0,0
		100 to 499	48	4.0	3.7	66.7	25.0	8.3	0.0	0.0	0,0
	5,000 to 9,999	1,000 to 9,999	3,325	20.6	20.7	71.3	15.5	11.1	2.1	0.0	0,0
		500 to 999	4,251	11.3	11.4	62.4	22.6	13.6	1.4	0.0	0,0
		Less than 499	1,690	6.0	5.8	54.0	30.2	14.6	1.1	0.0	0,0
	1,000 to 4,999	1,000 to 4,999	709	33.1	33.3	32.0	24.4	27.5	15.7	0.4	0,0
		500 to 999	3,672	21.2	21.5	31.0	24.2	28.3	14.8	1.6	0,0
		100 to 499	12,479	13.2	13.3	25.5	22.9	28.1	21.2	2.2	0,1
		Less than 100	3,438	5.7	5.0	25.7	22.8	31.5	18.9	1.1	0,0
	500 to 999	500 to 999	51	65.2	66.8	3.9	3.9	21.6	47.1	21.6	2,0
		100 to 499	19,311	22.6	23.8	11.2	11.2	20.1	39.5	16.2	1,9
		Less than 100	36,002	9.1	8.5	16.4	15.4	26.0	34.7	7.1	0,3
	100 to 499	100 to 499	8,285	31.2	34.0	7.0	7.1	14.4	34.1	28.5	8,9
		Less than 100	73,544	13.1	12.8	10.8	10.5	19.3	37.4	18.6	3,4
	Less than 100	Less than 100	32,601	16.9	16.9	6.9	3.1	7.0	21.5	27.1	34,4

Table 9B
Distribution of differences between long-form and short-form estimates by characteristic, size of universe and estimated number of persons with characteristic, 2016 Census

Characteristic	Size of universe[1]	Estimated number of persons with characteristic	Number of selected estimate	Average estimate on short form	Average estimate on long form	Distribution of differences between long form and short form in percentage points (p.p.)					
						Less than 0.5 p.p.	0.5 p.p. to 1.0 p.p.	1.0 p.p. to 2.0 p.p.	2.0 p.p. to 5.0 p.p.	5.0 p.p. to 10.0p.p.	10.0 p.p. and higher
						percentage					
Prevalence of low income based on the Low-income cut-offs, after tax (LICO-AT)	50,000 and higher	50,000 and higher	51	12.2	12.1	100.0	0.0	0.0	0.0	0.0	0.0
		10,000 to 49,999	290	13.4	13.4	98.3	1.7	0.0	0.0	0.0	0.0
		5,000 to 9,999	317	8.6	8.6	97.8	2.2	0.0	0.0	0.0	0.0
		1,000 to 4,999	208	5.2	5.1	96.6	1.9	1.4	0.0	0.0	0.0
	10,000 to 49,999	5,000 to 49,999	55	18.9	18.9	74.5	21.8	1.8	1.8	0.0	0.0
		1,000 to 4,999	1,146	11.6	11.6	76.5	18.2	5.2	0.1	0.0	0.0
		500 to 999	737	5.8	5.8	73.5	21.8	4.5	0.1	0.0	0.0
		100 to 499	419	3.1	3.0	77.8	20.5	1.7	0.0	0.0	0.0
	5,000 to 9,999	1,000 to 9,999	1,596	20.2	20.3	47.7	28.7	20.4	3.1	0.1	0.0
		500 to 999	3,113	10.3	10.4	48.7	31.9	17.6	1.8	0.0	0.0
		100 to 499	4,404	4.9	4.8	60.5	29.3	9.9	0.3	0.0	0.0
		Less than 100	153	1.6	1.2	72.5	20.3	5.2	2.0	0.0	0.0
	1,000 to 4,999	1,000 to 4,999	287	34.1	34.3	23.3	31.0	26.1	19.5	0.0	0.0
		500 to 999	1,836	20.8	21.0	28.9	24.5	27.9	16.8	1.8	0.1
		100 to 499	9,455	10.1	10.2	32.6	25.0	25.2	15.5	1.6	0.0
		Less than 100	8,720	3.6	3.3	39.9	27.0	23.6	9.2	0.2	0.0
	500 to 999	100 to 999	9,512	22.0	23.3	10.9	10.7	19.0	39.9	17.5	2.0
		Less than 100	45,852	6.2	5.9	21.2	19.3	28.2	27.5	3.8	0.1
	100 to 499	100 to 499	2,956	29.1	32.0	6.2	8.3	14.0	33.4	29.9	8.2
		Less than 100	78,873	6.8	6.6	16.9	15.5	24.3	32.7	9.5	1.1
	Less than 100	Less than 100	32,601	4.0	3.9	37.0	1.9	9.3	24.5	17.5	9.7

p.p. – percentage points
1. Size of universe represents the number of persons in private households for the low-income characteristic and the number of persons in private households aged 15 years or older for the presence of an income source characteristics.
Source: Statistics Canada, Census of Population, 2016.

The effects of imputation on estimates for subpopulations

Income estimates could be less reliable and some incoherence might be present when considering subpopulations with low income linkage rates. Based on the 2016 long-form sample, 97.1% of the population 15 years of age and older in private households were linked to an administrative record from the CRA. More specifically, 87.3% of the population was linked to a tax filer (T1) record, and 9.8% was linked to non-tax filer records. As a result of edit and imputation, the aggregate total income for the population increased 4.4%. (See Table 10).

Table 10
Tax record linkage rate and impact of the edit and imputation of income variables, by selected Aboriginal, visible minority and immigration characteristics for the population aged 15 years and older in private households, 2016 Census — 25% sample data

Characteristic	Population aged 15 years and over	Tax record linkage rate		Change in aggregate amount during edit and imputation		
		T1 record[1]	CRA record[2]	Total income	Employment income	Government transfers
		percentage				
Aboriginal indentity						
Population in private households	28,643,020	87.3	97.1	4.4	3.5	6.8
Aboriginal identity	1,224,920	75.8	93.0	9.7	7.7	12.8
First Nations (North American Indian)	691,405	71.2	90.6	13.1	10.5	15.8
Métis	456,555	82.7	96.9	5.8	4.6	7.5
Inuk (Inuit)	43,535	73.8	87.6	17.9	14.8	24.2
Multiple Aboriginal responses	15,300	78.4	96.7	6.4	4.5	8.6
Aboriginal responses not included elsewhere	18,120	82.9	95.0	7.7	6.8	8.1
Non-Aboriginal identity	27,418,105	87.9	97.3	4.2	3.3	6.5
Visible minority						
Population in private households	28,643,020	87.3	97.1	4.4	3.5	6.8
Total visible minority population	6,073,875	84.5	96.3	5.9	4.1	10.7
South Asian	1,511,130	86.1	97.1	4.9	3.5	8.0
Chinese	1,335,285	86.7	95.7	4.8	3.3	8.2
Black	880,100	78.0	95.6	9.0	6.1	14.7
Filipino	627,620	87.0	97.4	4.0	3.1	6.9
Latin American	376,450	83.3	96.0	7.1	4.7	14.6
Arab	379,630	83.5	96.4	7.9	4.2	16.6
Southeast Asian	254,485	85.4	96.0	6.5	4.7	12.6
West Asian	218,770	85.5	97.0	8.5	4.4	12.8
Korean	156,695	83.4	94.3	7.9	6.1	10.4
Japanese	75,240	82.6	94.5	5.9	5.6	4.0
Visible minority, n.i.e.	106,305	82.9	96.7	6.4	5.0	9.5
Multiple visible minorities	152,160	81.3	97.1	5.5	3.7	9.9
Not a visible minority[3]	22,569,145	88.1	97.4	4.1	3.3	6.1
Immigration status and period of immigration						
Population in private households	28,643,020	87.3	97.1	4.4	3.5	6.8
Non-immigrants	21,018,465	87.0	97.4	4.1	3.3	6.7
Immigrants	7,165,170	90.1	97.5	4.5	3.4	6.5
Before 2015	6,897,260	90.9	97.6	4.3	3.2	6.3
In 2015	182,305	84.1	96.4	10.2	6.9	31.5
In 2016	85,610	41.5	93.2	23.3	19.2	65.1
Non-permanent residents	459,385	60.1	81.2	28.7	20.5	69.6

CRA – Canada Revenue Agency.
T1 – T1 Income tax and benefit return.
n.i.e. – not included elsewhere
1. The proportion of 2016 Census long-form respondents who were linked to a tax filer.
2. The proportion of 2016 Census long-form respondents who were linked to a CRA record.
3. Includes persons who reported “Yes” to the Aboriginal group question (Question 18), as well as persons who were not considered to be members of a visible minority group.
Source: Statistics Canada, Census of Population, 2016.

Persons with an Aboriginal identity had a rate of linking to a record from the CRA of 93.0%. The proportion linked to tax filer records was at 75.8%. The proportion linked to a non-tax filer record was 17.1%.[6] The higher linkage rates to non-tax filers allowed for accurate compilation of many income sources and provided a good basis for imputation of the missing income sources. The aggregate total income for the Aboriginal population increased 9.7% during edit and imputation. Linkage rates varied between Aboriginal identity groups. For instance, 71.2% of First Nations people and 73.8% of Inuit were linked to a tax-filer record, while 82.7% of Métis were linked. The overall linkage rates for First Nations people and Inuit were 90.6% and 87.6%, respectively. For Métis, the rate was very close to that of the overall population, at 96.9%.

The lower T1 linkage rates amongst the Aboriginal populations can be partially attributed to their age distribution and lower income levels. About 11.8% of the Aboriginal population, as compared to 7.0% of the overall population, was between 15 and 19 years of age. The median total income amongst Aboriginal peoples ($25,527) was lower than that of the overall population ($34,206). The T1 filing rates for younger people and people with lower income are typically lower because they are less often required to file taxes given their circumstances.

In general, the linkage rates for visible minority groups were lower than those for persons who were not a visible minority. Those identified as Black had the lowest rate of linking to a tax-filer record (78.0%) and the highest rate of linking to a non-tax filer record (17.5%). Age distribution played a role in the level of these rates; 11.4% of the Black population was between 15 and 19 years of age in 2016. The tax-filer linkage rates for the other visible minority groups ranged from 82.6% (Japanese) to 87.0% (Filipino). The increase in aggregate total income as a result of edit and imputation were in line with these linkages rates.

Immigrants and non-immigrants had almost exactly the same overall linkage rates, at about 97.5%. Immigrants were more likely to be linked to a tax-filer record than non-immigrants (90.1% vs 87.0%). However, very recent Immigrants (those who landed in Canada as immigrants in 2015 and 2016[7]) were less likely to be linked to a tax-filer record and more likely to be linked to a non-tax filer record. For those who immigrated in 2015, the T1 linkage rate was 84.1% and the overall CRA linkage rate was 96.4%. For those who immigrated in 2016, the T1 linkage rate was 41.5% and the overall CRA linkage rate was 93.2%. Edit and imputation increased the aggregate total income of 2015 and 2016 immigrants by 10.2% and 23.3%;[8] the increase in aggregate government transfer was more notable, at 31.5% and 65.1%, respectively. These increases appear to be disproportionally higher than those for the overall population.

There was a significant increase in the number of non-permanent residents in Canada over the last decade. According to the 2016 Census, Canada had close to 460,000 non-permanent residents over 15 years of age, almost double the number in 2006. In terms of their income data for 2015, over 60% of non-permanent residents could be linked to a tax filer record and over 21% could be linked to a non-tax filer record, amounting to an overall linkage rate of 81.2%. During edit and imputation, the aggregate total income of non-permanent residents increase by 28.7%; the increase in aggregate government transfer was 69.6%. These increases appear to be disproportionally higher than those for the overall populations. Generally speaking, this population had lower income than other Canadian residents living in private households. However, due to the lack of information on their length of stay in Canada in 2015, it would be difficult to contrast their income situation with that of permanent residents.

6. The Aboriginal population, Inuit in particular, had higher total household non-response. With adjustments for total household non-response, the linkage to tax-filers and non-tax filers would be 77.3% and 17.6%, amounting to an overall CRA linkage rate of 95.0%.
7. This includes immigrants who landed on or prior to May 10, 2016.
8. In previous censuses, income received in the reference period (i.e. the calendar year prior to the census) by persons who became immigrants in the census year was not included in total income. Due to changes in the income data collection and processing strategies in 2016 this condition was not imposed for the 2016 Census. Thus, some persons in these groups could show income for 2015 that they may have received as non-permanent resident or before arriving in Canada.

Owing to the unique situations amongst the 2015 and 2016 immigrants and non-permanent residents, their income estimates may be less reliable and may not be directly comparable with other population groups. Users should use caution when interpreting data for these groups. For additional information about the long-form-specific characteristics, refer to the corresponding reference guide (http://www12.statcan.gc.ca/census-recensement/2016/ref/index-eng.cfm).

Inconsistency between presence of employment income and work activity

As was the case in the data from the 2006 Census, there appear to be some inconsistencies between the presence of employment income and work activity reported in the 2016 Census data.[9]

For example, among full-year, full-time workers, close to 259,000 (2.7%) were without earnings in 2015. Moreover, among people who did not report any work activity in 2015, over 1.9 million (20.8%) had some earnings for that year. The majority of these latter cases were associated with relatively low amounts of earnings. For instance, approximately 775,000 (40.2%) of these 1.9 million persons had earnings of less than $1,000 and another 367,000 (19.0%) had over $1,000 but less $5,000 in earnings in 2015. (See Table 11).

Table 11
Presence of employment income and work activity during the reference year for the population aged 15 years and over in private households, Canada, 2005 and 2015

	2006 Census			2016 Census		
Presence of employment income	Did not work	Worked full year, full time	All others	Did not work	Worked full year, full time	All others
Total - Population aged 15 years and over	7,724,715	9,545,490	8,241,675	9,282,005	9,626,010	9,735,000
Without employment income	6,567,015	288,690	500,840	7,352,740	258,960	602,645
With employment income	1,157,700	9,256,800	7,740,830	1,929,270	9,367,045	9,132,355
With employment income less than $1,000[1]	462,020	101,280	376,175	774,885	85,700	385,635
With employment income between $1,000 and $4,999	250,695	111,935	1,111,875	366,545	109,590	1,057,025
With employment income of $5,000 and over	444,985	9,043,580	6,252,785	787,835	9,171,755	7,689,690
Total - Population aged 15 years and over (%)	100.0	100.0	100.0	100.0	100.0	100.0
Without employment income (%)	85.0	3.0	6.1	79.2	2.7	6.2
With employment income (%)	15.0	97.0	93.9	20.8	97.3	93.8
With employment income less than $1,000[1] (%)	6.0	1.1	4.6	8.3	0.9	4.0
With employment income between $1,000 and $4,999 (%)	3.2	1.2	13.5	3.9	1.1	10.9
With employment income of $5,000 and over (%)	5.8	94.7	75.9	8.5	95.3	79.0

1. Includes negative values.
Note: Dollar values are presented in 2015 constant dollars.
Sources: Statistics Canada, Census of Population, 2006 and 2016.

While there appear to be some inconsistencies between employment income and work activity, a review of the source of the income data shows that a large number of cases had employment income obtained directly from administrative data. Among the persons who did not work in 2015, but reported earnings of less than $5,000, 86.7% were linked to a T1 filer record and 9.4% were linked to a non-tax filer record, while 3.9% were imputed. For those who reported they did not work, but had income of $5,000 and over, 68.7% were linked to a tax filer

9. The same was observed in the 2011 voluntary National Household Survey.

record, while 20.7% were imputed using basic demographic information only. As for those without employment income but worked full-year full-time in 2015, 87.2% had no earnings according to the T1 and T4 files.

Some factors that may give rise to the inconsistencies between employment income and work activity are: conceptual irregularities, respondent recall and imputation error.

Conceptual irregularities in earnings may occur when the remuneration received in the reference period is for employment associated with another reference period. A few examples of these irregularities would include deferred salary arrangements, pay equity settlements, implementation of new collective agreements and administration of retroactive payments. This could potentially correspond to the situation of those who did not work but received some employment income during 2015.

Employment that is irregular and very short-term in nature may not be recalled or perceived by respondents as work, even though earnings were received for the services provided. Some specific examples for 2015 include those who were employed temporarily to support the work associated with the general federal election and the four provincial elections. Some of these term positions may have a duration as short as a single day to up to a month. These types of work arrangements may reflect the situation of those who reported not having worked but had small amount of employment income in 2015. The age profile also confirms that this group is not mainly composed of the core-working age population, and hence may have less labour market attachment. Those between the age of 15 and 24 and those over age 60 represent over 70% of people in this group, but only 15.2% of full-year full-time workers.

Lastly, due to the methods employed in the 2016 Census income processing, imputation error may account for a certain percentage of the inconsistencies. To ensure better consistency between short-form and long-form estimates, only information that is common between the short-form and the long-form was taken into account when imputing income variables. This avoids introducing bias between the estimates produced from the full population and those from the sampled population. However some incoherence may be introduced across domains, and income estimates for certain long-form characteristics might be subject to more non-sampling error than in previous cycles. Generally speaking, subpopulations with low income linkage rates and that differ substantially from the general population could be more affected by the change in the 2016 income processing strategy.

Income data quality indicator

Similar to the practice for the short-form data, an income data quality indicator was computed from the linkage rates for the population in private households responding to the long form. This indicator informs, for a geographic area, the approximate proportion of income data which does not come from administrative sources. This indicator is attached to each geographic area in data tables and has the following ranges 0: < 10%, 1: 10% to 20%, 2: 20% to 30%, 3: 30% or more. An indicator of 9 indicates that long-form income data is not available for this geographic area for confidentiality reasons. Table 12 presents the distribution by geographic area type. There is more variability in the long form than seen in the distribution for the short-form indicator presented in Table 3. This is in part because of the smaller population in the sample for each area and partly because of the variance introduced by the weighting activities.

Table 12
Distribution of long-form income data quality indicator flags by geographic area type

	Income data quality indicator flag					
	0	1	2	3	9	Total census areas published
Geographic area type	Less than 10%	10% to 20%	20% to 30%	30% or more	No census income data for confidentiality	
Canada	1	0	0	0	0	1
Provinces and territories	9	4	0	0	0	13
Census metropolitan areas (CMA)	34	1	0	0	0	35
Census agglomerations (CA)	97	19	1	0	0	117
Provincial parts of CMA or CA	6	1	1	0	0	8
Census divisions (CD)	226	62	4	1	0	293
Census subdivisions (CSD)	2,462	949	176	86	888	4,561
Census tracts (CT)	4,366	1,175	40	8	52	5,641
Dissemination areas (DA)	38,060	13,810	865	174	2,054	54,963

Source: Statistics Canada, Census of Population, 2016.