Commuting Reference Guide

Census of Population, 2021

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Table of contents

Definitions and concepts

The 2021 Census of Population long-form questionnaire provides information on commuting for the Canadian population aged 15 and older living in private households. The following are excluded: people living in institutional collective dwellings such as hospitals, nursing homes and penitentiaries; people living in non-institutional collective dwellings such as work camps, hotels and motels, and student residences; and Canadian citizens living in other countries and full-time members of the Canadian Forces stationed outside Canada.

The following variables, as defined in the *Dictionary, Census of Population, 2021*, Statistics Canada Catalogue no. 98-301-X, have been created from the commuting questions:

- place of work status
- location of workplace
- commuting destination
- main mode of commuting
- multiple modes of commuting
- commuting vehicle occupancy
- distance (straight-line) from home to work
- commuting duration
- time leaving for work
- time arriving at work.

These data are often used in conjunction with age, gender, labour and income variables to paint a picture of workers and those who commute.

The characteristics and concepts related to commuting appear in a subset of the population universe, for people aged 15 years and older in occupied private dwellings who were employed during the week of Sunday, May 2, to Saturday, May 8, 2021.

Questions

Commuting data are obtained from the information collected through questions 51 (place of work status), 52(a) (multiple modes of commuting), 52(b) (main mode of commuting), 52(c) (commuting vehicle occupancy), 53(a) (time leaving for work) and 53(b) (commuting duration), along with place of residence information. Answers to these questions are collected as part of the 2021 Census of Population long-form questionnaire (2A-L questionnaire) and 2A-R questionnaire.

In addition to the variables obtained from each question, the distance (straight-line) from home to work variable, commuting destination variable and time arriving at work variable are derived from the commuting questions.

For the 2021 Census, the 2A short-form questionnaire was used to enumerate all usual residents of 75% of private dwellings. The 2A-L long-form questionnaire, which also includes the questions from the 2A short-form questionnaire, was used to enumerate a 25% sample of private households in Canada. For private households in First Nations communities, Métis settlements, Inuit regions and other remote areas, the 2A-R questionnaire was used to enumerate 100% of the population. Commuting questions are asked of each respondent aged 15 years and older in occupied private dwellings who had a job or was absent from work during the week of Sunday, May 2, to Saturday, May 8, 2021.

The questions asked on the 2A-R questionnaire were the same as on the 2A-L questionnaire, but the examples, where provided for commuting, were more relevant to these areas.

The commuting data available for each individual depend on their response to Question 51 on place of work status.

Refer to Table 2.7 of the *Dictionary, Census of Population, 2021*, Statistics Canada Catalogue no. 98-301-X, for commuting data available for each place of work status.

For more information on the reasons why the census questions are asked, please refer to the five fact sheets found on The road to the 2021 Census web page.

Classifications

Data for location of workplace are available for the entire country for a number of standard geographic areas, including province or territory, census division, and census subdivision. Details for these geographic areas are included in the Introduction to the geography universe in the *Dictionary, Census of Population, 2021*, Statistics Canada Catalogue no. 98-301-X.

Locations of workplace that fall within a census metropolitan area or census agglomeration are also available for more detailed geographic areas, including census tracts, dissemination areas, and custom areas through custom requests.

Locations of workplace can also be provided for most other units in Figure 1.1, the hierarchy of standard geographic areas for dissemination, also found in the *Dictionary, Census of Population, 2021*, Statistics Canada Catalogue no. 98-301-X.

Concepts over time

Most commuting variables can be compared over time, although with some considerations described below.

First, the population universe of the commuting section has changed, from people aged 15 years and older in occupied private dwellings who were currently employed or employed at any point since January of the year before (as used in the 2016 Census and previous cycles) to people aged 15 years and older in occupied private dwellings who were employed (or absent from work) during the week of Sunday, May 2, to Saturday, May 8, 2021. Any comparison of the commuting concepts over time should ensure that the universe used for data prior to 2021 is adjusted to reflect the change in 2021. For 2021 Census standard data products on Statistics Canada's website, the universe will be the same between census cycles.

Second, in the 2011 and 2016 censuses of population, the question on sharing a ride to work was worded differently than it is for the 2021 Census of Population. Previously, the question asked how many people, including this person, usually shared the ride to work in this car, truck or van. For 2021, it asks how many workers, including this person, usually ride in this car, truck or van to work. While conceptually both questions are intended to measure only workers sharing a ride in the vehicle, data from previous cycles indicated that sometimes school-age children or non-working adults were being included in the counts. Therefore, comparability of this question between 2021 and previous cycles may show differences related to the more precise definition used in 2021, beyond any actual changes to patterns of sharing rides to work.

Third, in the 2021 Census of Population, a new question about multiple modes of commuting was added. Respondents were asked to report all modes of transportation that were used as part of their commute. If respondents selected multiple modes, they were then asked to report their main mode of commuting.

Collection and processing

The COVID-19 pandemic emerged in Canada in early 2020 and affected all steps of the 2021 Census process, from data collection to dissemination. Please refer to the *Guide to the Census of Population, 2021*, Statistics Canada Catalogue no. 98-304-X, for more detailed information on this topic.

Data quality

The 2021 Census of Population underwent a thorough data quality assessment. The different certification activities conducted to evaluate the quality of the 2021 Census data are described in Chapter 9 of the *Guide to the Census of Population, 2021*, Statistics Canada Catalogue no. 98-304-X.

The data quality assessment was conducted in addition to the regular verifications and quality checks completed at key stages of the census. For example, throughout data collection and processing, the accuracy of specific steps such as data capture and coding was measured, the consistency of the responses provided was checked, and the non-response rates for each question were analyzed. As well, the quality of imputed responses was assessed during data editing and imputation.

During the data quality assessment, a number of data quality indicators were produced and used to evaluate the quality of the data. These indicators are briefly described below. Finally, resulting census counts were compared with other data sources and certified for final release.

The main highlights of this assessment of the data pertaining to Commuting are presented below.

Variability due to sampling and total non-response

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 populations (such as Indigenous peoples and immigrants) that are generally referred to in this document as “populations 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 total non-response introduce variability into 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 considerably depending on the domain or geography of interest, in particular because of the variation in response rates. For more information on variability due to sampling and total non-response in long-form census questionnaire estimates, please refer to the *Guide to the Census of Population, 2021*, Statistics Canada Catalogue no. 98-304-X.

Non-response bias

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 those 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 2021 long-form census questionnaire, Statistics Canada adapted its collection and estimation procedures to mitigate the effect of non-response bias to the extent possible. For more information on these mitigation strategies, please refer to the *Guide to the Census of Population, 2021*, Statistics Canada Catalogue no. 98-304-X.

Data quality indicators

A number of quality indicators were produced and analyzed during the 2021 Census of Population data quality assessment. Four indicators are available to data users for long-form content: the total non-response (TNR) rate; the confidence interval; as well as the non-response rate and the imputation rate per question.

The **total non-response (TNR) rate** is the primary quality indicator that accompanies each disseminated 2021 Census of Population product, and is calculated for each geographic area. It measures total non-response at the dwelling level. Non-response is said to be total when no questionnaire is returned from a dwelling or when

a returned questionnaire does not meet the minimum content. More information on the TNR rate is available in Chapter 9 of the *Guide to the Census of Population, 2021*, Statistics Canada Catalogue no. 98-304-X.

The confidence interval was selected as a variance-based quality indicator to accompany the 2021 Census of Population long-form estimates because it helps users easily make a statistical inference. This indicator provides a measure of the accuracy of the long-form estimates. Using a science-based approach, research and simulations were done to ensure that confidence intervals are constructed using adequate statistical methods for the Census of Population data and areas of interest.

A confidence interval is associated with a confidence level, generally set at 95%. A 95% confidence interval is an interval constructed around the estimate so that, if the process that generated the sample were repeated many times, the value of the interest parameter in the population would be contained in 95% of these intervals. The confidence interval consists of a lower bound and an upper bound. These two bounds accompany the long-form estimates in most data tables.

Further details on the different methods used to construct confidence intervals and their assumptions are provided in the *Sampling and Weighting Technical Report, Census of Population, 2021*, Statistics Canada Catalogue no. 98-306-X.

The **non-response rate per question** is a measure of missing information due to non-response to a question. It measures only the non-response that is resolved through imputation during data processing (as opposed to weighting when a sample is used). For the long-form questionnaire, the non-response rate per question includes only partial non-response to the question, except for First Nations communities, Métis settlements, Inuit regions and other remote areas where both partial and total non-response are taken into account. Partial non-response is when answers to certain questions are not provided for a respondent household.

The non-response rate per question for a question on the long-form questionnaire is defined as the sum of the weights of in-scope units in the population of interest who did not respond to the question divided by the sum of the weights of in-scope units in the population of interest. Here “units” refers to the statistical units for which data are collected or derived (e.g., persons or households, depending on whether the question is about a person-level characteristic or a household-level characteristic). A unit is considered to be in scope for a given question if the question is applicable to that unit and the unit belongs to the population of interest related to the question.

The **imputation rate per question** measures the extent to which responses to a given question were imputed. Imputation is used to replace missing data in the event of non-response or when a response is found to be invalid (e.g., multiple answers are provided when a single answer is expected). Imputation is conducted to eliminate data gaps and to reduce bias introduced by non-response. Imputation is generally done by identifying persons or households in the same geographical area with similar characteristics to the incomplete record and copying their values to fill in the missing or invalid responses.

The imputation rate for a question on the long-form questionnaire is defined as the sum of the weights of in-scope units in the population of interest for which the response to the question was imputed divided by the sum of the weights of in-scope units in the population of interest (see the definition of “units” provided in the above section on the non-response rate per question).

For long-form content, imputation for most areas is done to resolve partial non-response—not total non-response, which instead is treated by weighting. However, in First Nations communities, Métis settlements, Inuit regions and other remote areas, whole household imputation (WHI) is used to resolve total non-response. It first imputes the occupancy status of non-respondent dwellings and further imputes all the data for those dwellings resolved as occupied in the first step. WHI is included in the imputation rate per question, including the use of administrative data to impute non-responding households in areas with low response rates; see Appendix 1.7 of the *Guide to the Census of Population, 2021*, Statistics Canada Catalogue no. 98-304-X. As with the non-response rate, a unit is considered to be in scope if the question is applicable to that unit and the unit belongs to the population of interest related to the question.

The non-response and imputation rates per question can be interpreted as the proportion of in-scope units in the population of interest for which information was not reported or was imputed, respectively. The long-form rates are weighted to reflect the fact that the long-form questionnaire is only distributed to a sample of the population, so in this case, the proportion is estimated.

The non-response and imputation rates for a question are often similar, but some differences can be observed for a given question because of additional data processing steps that may have been required. These rates were regularly checked during data assessment, and a detailed analysis was done if there was a difference between the two rates for a question, to ensure the appropriateness of the processing steps taken and the quality of the data. A difference between the non-response rate and the imputation rate for a question can generally be explained by one of the following two factors:

- Some responses were considered invalid or inconsistent during the edit stage and imputation was needed, which is why the imputation rate is higher than the non-response rate for a question.
- Some non-responses were resolved in a straightforward manner early during data processing because a single resolution was possible based on the answers provided to other questions, making imputation unnecessary. This may explain why the non-response rate is higher than the imputation rate for a question.

The *2021 Census Data Quality Guidelines*, Statistics Canada Catalogue no. 98-26-0006, provides all the information required to understand and interpret the data quality indicators for the 2021 Census, along with guidelines to enable their proper usage. Data quality indicators are provided so that users are informed about the quality of the statistical information and can determine the relevance and the limitations of the data relative to their needs. In general, the quality of the 2021 Census of Population data is very good, but in some cases, data have to be used with caution. It is strongly recommended that users consult all available data quality indicators to get a better sense of the quality of the data products they are interested in.

Certification of final counts

Once data editing and imputation were completed, the data were weighted to ensure that estimates represent the total Canadian population living in private dwellings. Certification of the final weighted estimates was the last step in the validation process, which led to the recommendation to release the data for each level of geography and domain of interest. Based on the analysis of the data quality indicators and the comparison of long-form census questionnaire estimates with other data sources, the recommendation is for unconditional release, conditional release, or non-release (for quality reasons on rare occasions). For conditional release or non-release, appropriate notes and warnings are included in the products and provided to users. Moreover, other data sources were used to evaluate the long-form census questionnaire estimates. 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.

Long-form census questionnaire estimates are also subject to confidentiality rules that ensure non-disclosure of respondent identity and characteristics. For more information on privacy and confidentiality, please refer to Chapter 1 of the *Guide to the Census of Population, 2021*, Statistics Canada Catalogue no. 98-304-X. For information on how Statistics Canada balances the protection of confidentiality and the need for disaggregated census data, with specific attention to new 2021 Census content, please refer to *Balancing the Protection of Confidentiality with the Needs for Disaggregated Census Data, Census of Population, 2021*, Statistics Canada Catalogue no. 98-26-0005.

For more information on data processing and the calculation of estimates and their level of precision, please refer to the *Sampling and Weighting Technical Report, Census of Population, 2021,* Statistics Canada Catalogue no. 98-306-X.

Data quality for commuting

Tables 1 and 2 below present the non-response and imputation rates for key census questions about commuting across Canada.

Table 1
Non-response rates by questions, Canada, provinces and territories, 2021 Census of Population

	Non-response rates by questions				
	Place of work status	Location of workplace	Main mode of commuting	Commuting vehicle occupancy	Commuting duration
Geography			percent		
Canada	2.9	3.5	3.0	3.6	3.9
Newfoundland and Labrador	2.5	2.9	2.3	2.8	3.4
Prince Edward Island	2.1	2.3	2.1	2.8	3.1
Nova Scotia	2.3	2.7	2.3	3.0	3.2
New Brunswick	2.6	3.1	2.4	3.1	3.4
Quebec	2.6	3.1	2.5	3.0	3.3
Ontario	2.7	3.4	2.9	3.5	3.8
Manitoba	3.1	3.5	3.1	3.9	4.2
Saskatchewan	3.0	3.4	3.0	3.8	4.0
Alberta	3.7	4.6	3.8	4.5	5.0
British Columbia	3.3	4.0	3.5	4.1	4.3
Yukon	5.7	6.0	5.5	6.3	6.7
Northwest Territories	10.2	11.0	10.8	11.4	12.2
Nunavut	26.6	26.8	26.6	26.5	28.8

Source: Statistics Canada, 2021 Census of Population.

Table 2
Imputation rates by questions, Canada, provinces and territories, 2021 Census of Population

	Imputation rates by questions				
Geography	Place of work status	Location of workplace	Main mode of commuting	Commuting vehicle occupancy	Commuting duration
	percent				
Canada	2.9	3.8	3.3	3.7	6.3
Newfoundland and Labrador	2.5	3.1	2.6	2.8	6.0
Prince Edward Island	2.1	2.4	2.4	2.8	4.8
Nova Scotia	2.3	2.8	2.5	3.0	5.7
New Brunswick	2.6	3.9	2.6	3.1	5.4
Quebec	2.6	3.2	2.9	3.1	5.1
Ontario	2.7	3.6	3.2	3.6	6.5
Manitoba	3.1	3.5	3.5	4.0	6.4
Saskatchewan	3.0	3.9	3.4	3.8	6.4
Alberta	3.7	5.0	4.1	4.6	7.6
British Columbia	3.3	4.5	3.8	4.2	6.8
Yukon	5.7	6.1	6.0	6.5	8.6
Northwest Territories	10.2	11.0	11.4	11.5	13.4
Nunavut	26.6	26.8	27.4	26.6	29.6

Source: Statistics Canada, 2021 Census of Population.

Most of the imputation rates are lower than those in 2016, except for the territories, which yielded higher imputation rates compared with 2016.

The non-response and imputation rates per question at lower levels of geography are also available in 2021 Census data tables presenting data quality indicators. This information is scheduled for release on August 17, 2022, for short-form questions and on November 30, 2022, for long-form questions.

Data verification indicates that, compared to previous censuses, more respondents reported a work location which was the same as, or in very close proximity to, their place of residence. This may contribute to an overestimation of ‘other method’ category of the mode of commuting variable and the ‘less than 1 km’ category of the commuting distance variable.

Comparability over time

Most commuting variables can be compared over time while recognizing the exceptions described below.

Location of workplace

Before the 2016 Census, both automated and manual coding of location of workplace for people working in rural census subdivisions located outside census metropolitan areas and census agglomerations was done by coding all records to a representative point in the largest dissemination block within that census subdivision.

In 2016, the automated coding of location of work was refined by creating the possibility of automatically coding to a block face or dissemination block within a rural census subdivision. The coding of location of work was further refined in 2021 by implementing new matching functions within the automatic coding process and expanding the manual coding of work locations in rural census subdivisions to the block face or dissemination block level wherever possible.

These changes mean that overall—and specifically for non-urban areas—the coding of location of workplace is geographically more precise than in previous censuses.

Commuting vehicle occupancy

In 2021, changes were made to the question on sharing a ride to work. The question was updated to specifically ask about the number of workers riding in the car, truck or van. For example, school-age children could be in the car but should not be counted. As well, processes were adjusted to accept the fact that a passenger could be the only worker riding in the car, truck or van, whereas in previous censuses this was not the case. For example, if the driver is a student or a non-working adult, then the passenger is the only worker in the vehicle. As a result, it is difficult to directly compare 2021 commuting vehicle occupancy estimates with census data from 2016 and 2011.

Multiple modes of commuting

The concept of multiple modes of commuting was added in 2021 and therefore has no historical comparability.

COVID-19 impact

Users should be aware that all trends in commuting data are highly affected by the pandemic and pandemic-related health measures. At the time of the census, in May 2021, several provinces and territories had instituted restrictions and closures because of the pandemic. There was a significant decline in the number of commuters because of an increase in people working from home and a decline in employment in certain industries where working from home was not feasible (e.g., retail sales, food services).

Comparability with other data sources

Many factors influence comparisons of commuting data across other data sources. Comparability is affected by differences in survey target population, reference period, sampling and collection methods, question wording, questionnaire format, examples and instructions, approaches to data processing, and the social and political climate at the time of data collection.

Users should exercise caution when comparing data from the 2021 Census of Population with data from other sources, because there may be differences in the definitions used and the way the data are collected. Some common discrepancies are included below.

Employed population of interest

In the 2021 Census of Population, the estimated number of workers in a given geographic area may differ from the estimates derived from other sources (e.g., business and establishment surveys), because companies with more than one location often report that all their workers are working at one location (e.g., head office). In addition, the 2021 Census of Population collects detailed information only for a person’s main job. People with more than one job are counted only at their main job.

Worked at home

In the 2021 Census of Population, estimates of people who worked at home are based on a person’s main job and usual place of work, whereas many other surveys ask respondents whether they work some of their hours at home. As a result, other surveys could report a much higher estimate of the population that worked at home.

Commuting distance

The commuting distance is calculated as the straight-line distance between the residential dissemination block representative point and the workplace location representative point. In most cases inside census metropolitan areas and census agglomerations, the calculated commuting distance underestimates the actual distance travelled to work, because workers seldom have a route that minimizes the distance they travel—such as a straight line—between their home and workplace. The commuting distance may be inflated for people working outside census metropolitan areas and census agglomerations, because the workplace location is sometimes coded to a single representative point for the census subdivision of work. This phenomenon can affect the calculated commuting distance, in particular when the census subdivision of work has a large area.

Commute origin

The 2021 Census of Population assumes the commute originates from an individual's usual place of residence, but there are often exceptions to this case. In some instances, respondents were employed earlier in the year or in the previous year while living at a certain residence, but at the time of the census were absent from work and living at a different residence. In other cases, respondents have been on extended work trips (e.g., working on a special project in a different part of the province or country). Often, a person at the respondent's usual place of residence will complete the person's census information without mentioning the special circumstance that they commute from a temporary residence. Similarly, some people maintain a residence close to work and return to their usual place of residence (for census purposes) on weekends. Regardless, no changes are made to the usual residence of employed people; their usual residence at the time of the census is treated as the starting point of their commute.

Furthermore, students often work after school at a location near their school. As a result, the data may show unusual commutes or an unusual mode of transportation relative to their place of residence.

Comparability with the Labour Force Survey

There are few comparable sources for commuting data on a national scale. To evaluate the findings from the 2021 Census of Population, the data collected were compared with data from the Labour Force Survey (LFS) when possible.

In April 2020, several questions were added to the LFS to collect information related to working from home. Data from the 2021 Census regarding the "place of work status" were compared with data from the May 2021 LFS and showed comparable results.

The May 2022 LFS included additional questions comparable with the 2021 Census commuting content, providing a more recent picture of commuting patterns. These LFS data can be used to compare with the 2021 Census estimates for place of work status, modes of commuting and commuting time variables. Comparing 2021 Census data with May 2022 LFS showed a partial return to 2016 commuting trends.