



In Pursuit of Health Equity: Defining Stratifiers for Measuring Health Inequality

A Focus on Age, Sex, Gender, Income, Education and Geographic Location

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Executive summary

Health equity is the absence of unjust, avoidable differences in health care access, quality or outcomes. Measuring **health inequalities** allows us to identify differences that can be acted on and can be used to measure progress toward achieving health equity. Inequalities between subpopulations can be identified by disaggregating health indicators using equity stratifiers. An equity stratifier refers to a characteristic — such as a demographic, social, economic, racial or geographic descriptor — that can identify population subgroups for the purpose of measuring differences in health and health care that may be considered unfair or unjust.

This document provides recommended definitions for a selection of equity stratifiers for measuring health inequalities: age, sex, gender, income, education and geographic location. The goal of this report is to facilitate and encourage the use of standard equity stratifiers in data collection, performance measurement and reporting initiatives, thus enabling comparisons across Canada. These proposed definitions are part of a broader program of work under way at the Canadian Institute for Health Information (CIHI) to harmonize and strengthen the measurement of health inequalities in Canada.

Development of equity stratifier definitions

The equity stratifiers defined in this report were among those prioritized for routine measurement at a [pan-Canadian dialogue](#) convened in March 2016.¹ Table 1 summarizes the definitions. They were developed in collaboration with Statistics Canada with the support of pan-Canadian expert working groups. This is by no means an exhaustive list of individual characteristics or identifiers that affect health care access, quality and outcomes; it represents a first step toward a harmonized approach to measuring health inequalities in Canada. Work is also under way to inform the measurement of health inequalities by racial and ethnic identities. As well, CIHI is developing a toolkit to accelerate the integration of these equity stratifier definitions into analysis and reporting on health inequalities.

Table 1 Summary of equity stratifier definitions

Equity stratifier	Construct	Measure
Age	Age in years	Age categories should be determined on an indicator-by-indicator basis for measuring health inequality
Sex	Sex assigned at birth	2 categories: <ul style="list-style-type: none"> • Female • Male
Gender	Lived gender	3 categories: <ul style="list-style-type: none"> • Female gender • Male gender • Gender diverse
Income	Relative income	Income quintiles
Education	Educational attainment	Highest self-reported household educational attainment using 5 categories: <ul style="list-style-type: none"> • Less than high school • High school completion • Post-secondary school completion below bachelor's degree • Bachelor's degree completion • Post-secondary school completion above bachelor's degree
Geographic location	Urban and rural/remote place of residence*	Statistical Area Classification type (SACtype) defined as <ul style="list-style-type: none"> • Urban (SACtypes 1, 2, 3) • Rural/remote (SACtypes 4, 5, 6, 7, 8)

Note

* Consider a measure of travel burden for complementary analysis.

Introduction

Health equity is the absence of unjust, avoidable differences in health care access, quality or outcomes. It is a growing priority for Canada's health care systems, as it is a key component of health system performance, including quality of care. Measuring inequalities across relevant population subgroups allows us to identify differences in health care and health service utilization that can be acted on and used to measure progress toward achieving health equity.

This document provides recommended definitions for a selection of equity stratifiers for measuring health inequalities: age, sex, gender, income, education and geographic location. These were among the stratifiers prioritized for routine measurement at a [pan-Canadian dialogue](#) convened in March 2016.¹ The consistent measurement of health inequalities using these definitions will facilitate comparisons across Canada.

Health system performance reports routinely include performance indicator averages and occasionally disaggregate these indicators for subpopulations.² By focusing on the averages, there is a risk that overall population health and health system performance could improve without progress toward health equity. For example, smoking rates for the population on average declined between 2003 and 2013, yet the smoking rate for people in the lowest income group remained stable.³ This highlights the importance of stratifying health indicator results using equity or socio-demographic data.

What is an equity stratifier?

An equity stratifier refers to a characteristic such as a demographic, social, economic, racial or geographic descriptor that can identify population subgroups for the purpose of measuring differences in health and health care that may be considered unfair or unjust.

These proposed equity stratifier definitions are part of a broader program of work under way at the Canadian Institute for Health Information (CIHI) to harmonize and strengthen the measurement of health inequalities in Canada. It builds on ongoing collaboration with the Public Health Agency of Canada (PHAC) and Statistics Canada on the Pan-Canadian Health Inequalities Reporting initiative.

The overall goals of this program of work are to

- Build awareness of the importance of addressing inequity in health and health care to improve health system performance and population health;
- Facilitate and encourage the use of standard equity stratifiers in data collection, performance measurement and reporting initiatives; and
- Enable comparisons across organizations and jurisdictions to promote learning and to build the evidence base for successful health equity strategies.

In the long term, more consistent and routine monitoring and reporting of health inequalities will contribute to more equitable health care access, quality and outcomes for vulnerable populations.

Who will use these equity stratifier definitions?

These definitions are intended to inform health inequality measurement and data collection through administrative, clinical, demographic and survey data. These definitions were primarily created for

- Individuals responsible for or involved in the measurement of health, health system performance and health inequalities, including planning and needs assessments (e.g., analysts, methodologists and statisticians working in ministries, health regions or quality councils); and
- Data custodians currently collecting data or starting a data collection initiative that can be used for measuring health, health system performance and health inequalities (e.g., regions, facilities and health centres collecting socio-demographic data).

Development of definitions

These definitions were developed with the support of a pan-Canadian expert working group and expert reviewers (see [Appendix A](#)). They reflect current best practices and provide practical considerations for implementation and use. Furthermore, CIHI recognizes the importance of ensuring consistent use of names and definitions across the data landscape in Canada. As such, we worked closely with Statistics Canada to ensure that these definitions align with standards developed by Statistics Canada for its statistical programs.^{4, 5}

A stepwise process was used to develop these definitions. As a first step, we gathered evidence associating each of the stratifiers with inequity in health and health care (see [Appendix B](#)) and summarized the literature in discussion documents for each stratifier. With the exception of age, we considered more than one possible construct for defining each stratifier. For example, both educational attainment and health literacy are relevant for defining education.

Next, we collectively considered each construct by taking into account evidence synthesized according to the criteria outlined in Table 2 and, together with the pan-Canadian expert working group, we selected recommended constructs.ⁱ

Finally, we used a similar criteria-based approach for determining how each recommended construct should be measured and operationalized for equity stratification using Statistics Canada’s standards.

Table 2 Criteria for selecting a construct to capture the equity stratifier

Criteria	Description
Use	The construct has been used to measure health inequality within Canada.
Strength of evidence	There is strong evidence (qualitative or quantitative) that this construct is associated with access, quality and/or outcomes of health care.
Relevance	The construct is consistent with the current understanding of mechanisms that contribute to inequitable access, quality and/or outcomes of health care.
Actionability	The construct can identify populations for policy or program intervention aimed at addressing inequity at either the clinical (point-of-care) or health care system level.
Feasibility	The construct is or can be defined at a pan-Canadian level using variables from existing data sources with ongoing data collection.

Note

The selected criteria are consistent with those used in other similar priority-setting exercises conducted by organizations such as the Institute of Medicine.^{9–11}

i. Documentation for all constructs is available upon request.

These definitions were developed with the goal of facilitating a harmonized baseline approach to measuring health inequalities at a national level and across Canadian jurisdictions. To do this, the following considerations were taken into account:

1. Changes to data availability

The availability of equity stratifier data in Canada has been changing over time as data sources have been linked and as new data has been collected. Recognizing that the data landscape is evolving, we developed the equity stratifier definitions to strike a balance between the data that is currently available and what the evidence and working group consider best practice at this time, independent of the constraints of data availability and quality. We also recognize that measurement standards will likely evolve and change.

2. Small populations

Certain populations that are uniquely susceptible to health inequity may also be relatively small in size. For example, the proportion of the population living in households with less than high school education is about 6% and getting smaller, as trends indicate that the Canadian population is attaining higher levels of education over time.¹² These small population sizes may present challenges for data analysis (e.g., they may lack statistical power, small counts may not be reportable). However, it remains important to capture information on small populations both for ethical reasons — to improve outcomes and care experiences for all populations — and for economic reasons — since a small but complex subpopulation may account for significant costs to health and social systems.^{13, 14} Thus different analytical techniques can be used to support analysis on small populations, such as pooling data across multiple years.

3. Different approaches to accessing equity stratifier data

The following 3 approaches summarize how equity stratifier variables are accessed. The equity stratifier definitions highlight strengths and limitations of these approaches in terms of timeliness, data quality and feasibility, where possible.

- **Equity stratifier data embedded in health databases:** Equity stratifier data can be collected as part of administrative or survey data and used to analyze health indicators. The availability of embedded equity stratifier data in health administrative databases is often limited. For example, in CIHI's data holdings, equity stratifier variables are generally limited to age and sex; where additional stratifiers are available, they are not captured consistently across data holdings.¹ However, efforts are under way to document and consider expanding equity stratifiers in CIHI's data holdings where possible. In contrast to administrative databases, surveys such as the Canadian Community Health Survey (CCHS) generally include more extensive equity stratifier information.

- **Linking health and equity stratifier data at the individual level:** Equity stratifier data can be accessed by linking person-level health care data with equity stratifier data from other data sources describing the same person. Linkage can be made using unique personal identifiers, such as provincial health card numbers available from provincial health registries, or by matching on several non-unique personal identifiers. Statistics Canada is well-positioned to link a wide range of administrative and survey data sources, many of which are available through its Research Data Centres;¹⁵ examples are Statistics Canada's linkage of CIHI's Discharge Abstract Database (DAD) to the long-form 2006 Census¹⁶ as well as to the CCHS. Note that the DAD excludes Quebec, and that long-form census data is available for less than 20% of the Canadian population (thus limiting analysis for small populations such as health regions) and is not designed to include certain populations, such as people living in institutions.
- **Linking health and equity stratifier data at the area level:** Equity stratifier data can be accessed by using an individual's postal code to link person-level health care data with aggregate equity stratifier data by geographic areas (e.g., Statistics Canada's dissemination areas). The Postal Codeⁱⁱ Conversion File (PCCF) and Postal Code Conversion File Plus (PCCF+) developed by Statistics Canada allow for the assignment of the 6-character postal codes to standard census geographic areas.¹⁷

4. Examining multiple equity stratifiers

Stratification for health system performance reporting can be accomplished using a single equity stratifier or multiple equity stratifiers.^{3, 18–22} Considering multiple equity stratifiers simultaneously (e.g., looking at health inequalities by income and sex at the same time) or using indices can strengthen the measurement of inequalities. Because individuals occupy multiple social domains and identities,²³ and the effects of these intersecting domains and identities can be more or less than additive,^{24, 25} intersectional analysis is often recommended for health inequality measurement and reporting.^{25, 26}

Indices are composite measures consisting of a number of related variables (or equity stratifiers) and have been used to capture overall health equity concepts, including marginalization and deprivation.ⁱⁱⁱ For example, the Canadian Marginalization Index (CAN-Marg) characterizes residential instability, material deprivation, ethnic concentration and dependency to understand inequalities between population groups or geographic areas.²⁷ Indices help summarize multiple issues affecting a population and can inform resource allocation and service planning through the identification of local areas of disadvantage.^{27, 32, 33} Complementary analysis with individual stratifiers helps obtain detailed information and reveals underlying socio-demographic patterns.^{34, 35}

ii. Postal code is an official mark of Canada Post Corporation.

iii. Several marginalization and deprivation indices are currently used in Canada, such as the Canadian Marginalization Index (CAN-Marg),²⁷ the Quebec Index of Material and Social Deprivation²⁸ and the Socio-Economic Factor Index (SEFI),²⁹ which are all based on census data and available for area-based analysis, as well as the Canadian Deprivation Index (CDI),³⁰ which is based on data from the CCHS.³¹

Format of equity stratifier definitions

Each stratifier definition follows a consistent format, as follows:

Definition summary

Construct:

Measure:

Construct

The construct that was recommended by the expert working group is described here. Additional information summarizing evidence related to that construct is available in [Appendix B](#).

Measure

The recommended measure to operationalize the construct for equity stratification, using the Statistics Canada standard, is described here. Additional information pertaining to the measure, such as a summary of current approaches to collecting information on the recommended measure, is available in [Appendix C](#).

Considerations

Additional considerations for the measurement of health inequalities are provided for each stratifier. These range from methodological considerations to alternative or complementary approaches for defining the stratifier.



Box: Statistics Canada's standards

A summary of the current standards developed for Statistics Canada's statistical programs related to each stratifier are provided in a box, along with relevant definitions and references.

Equity stratifier definitions

Age

Definition summary

Construct: Age in years

Measure: Age categories should be determined on an indicator-by-indicator basis for measuring health inequality.

Age in years

Age refers to the number of complete years since an individual's date of birth. Age is often a derived variable relative to a specified reference date (e.g., facility admission date, Census day). Age in years is recommended for measuring age-related inequalities for its widespread collection and the feasibility of reporting at the pan-Canadian level. Age in years is available in all of CIHI's databases.

Age categorization determined based on indicator

It is important to monitor inequalities in health related to age in order to support the identification of differences in health and health care that may be unjust. As such, age has been identified as a relevant equity stratifier by a number of organizations,^{8, 9, 36} including the World Health Organization (WHO).³⁷ To carry out age stratification, age categories should be determined on an indicator-by-indicator basis, as illustrated in the literature and current practice (see Table C1 in [Appendix C](#)). See Box 1 for Statistics Canada's standards for age.

Considerations

- There is variation in the structure and delivery of health care and social services over the lifespan that may influence age-related inequities. In order to determine appropriate age categories to uncover these inequities, it is important to consider how health care and social service delivery and eligibility/benefits change as an individual ages. In addition, there are changes in demographic and health patterns within broad age groups and subpopulations that should be taken into account when stratifying. Several examples of these variations are listed below. Consider also adjusting indicators of health care for health status to disentangle the effects of age from health when interpreting age-related inequalities.

- **Health service delivery:** Age 18 marks a transition period in health care services — children move from pediatric to adult services, which have different philosophies and approaches of care regarding individual responsibility for care and inclusion of family.³⁸ This may be particularly important when examining youth mental health services, because the transition from child/youth services to adult services often results in an interruption in or a reduction or loss of access to services.³⁹
- **Eligibility and benefits:** At age 65, many services become universally available in several provinces/territories, such as drug and eye care coverage.
- **Changing demographic and health patterns:** There is an emerging need to distinguish between younger and older seniors (e.g., 65 to 84 versus 85+) due to healthy aging and longer life expectancy. These patterns may differ across subpopulations (e.g., the age distributions of Indigenous and recent immigrant populations in Canada are younger than the average).^{40, 41} In addition, the distribution of the disease or outcome of interest across age groups should be considered even in narrow age ranges (e.g., the prevalence of dementia increases across older age groups 45 to 64, 65 to 79 and 80+).⁷
- **Other considerations for determining age categories:** Other considerations include life stage definitions (e.g., infants) developed by international or national organizations (see Table C1 in [Appendix C](#)) and data constraints, such as small population size.
- Consider whether age-standardization or age-stratification is appropriate. Although age-standardization can be used to enhance analysis, it can also mask age-related inequities in health care. We recommend age-standardization to compare results for the same indicator across different populations and over time; however, age-stratification should also be carried out as a key step for identifying age-related inequities. When stratifying by age, it may be appropriate to adjust indicators by health status, as receipt of health care and outcomes of care are related to an individual's general level of health. Poorer health status is typically correlated with older age.³⁷
 - Adjusting for health status helps to separate inequalities in health care that are based on need (i.e., older people tend to be sicker and need more health care) from those that may be considered inequitable.
 - Health status can be accounted for by adjusting indicators for factors such as self-assessed health, comorbidities (e.g., using the Charlson Comorbidity Index⁴²) and other risk factors.
 - The importance of adjusting for health status depends on the indicator. For example, indicators of appropriate health care may require adjustment (e.g., receipt of treatment in line with clinical guidelines), whereas indicators of patient experience of care may not.



Box 1: Statistics Canada’s standards for age

Age refers to the age of a person at his or her last birthday (or relative to a specified, well-defined reference date).⁴³

Statistics Canada’s standard classification for age recommends 5-year age categories.⁴⁴

- The 5-year age groups can be collapsed to form larger categories to suit a particular data set or analytical purpose. The collapsed categories should be created by combining entire 5-year age groups, respecting the category boundaries of this classification.
- When the population has a lower age limit, the first category should respect the category boundaries of the classification to the extent possible. For example, in health surveys where the population included is persons age 12 and older, the first category would be 12 to 14. Surveys of the population age 18 and older would have 18 to 19 as the first category.

A classification variant is broad age groups, consisting of the age categories 0 to 14, 15 to 64, 65 and older, and 85 and older.

Sex

Definition summary

Construct: Sex assigned at birth

Measure: 2 categories — Female and male

Sex assigned at birth

Sex is typically assigned at birth based on external anatomy. Other sex-related characteristics (e.g., chromosomal, hormonal, internal anatomy) generally correspond with external anatomy. Sex assigned at birth is recommended for measuring sex-related inequalities for its feasibility of reporting at the pan-Canadian level and is commonly used for data collection.^{45, 46}

Sex is a complex biological concept that includes anatomy, physiology, genes and hormones. It is generally considered binary, referring to female and male; however, there are a diversity of sex characteristics that do not fit in this classification system.⁴⁷ Although chromosomal sex does not change, physical and hormonal sex-related characteristics can change over the lifespan. Thus it is important to specify the characteristic of interest and the time point when collecting sex information.⁴⁶

2 categories for measuring sex assigned at birth: Female and male

Current practice in Canada is to assign sex as either female or male to all live births, including infants with an intersex^{iv} condition. See Box 2 for Statistics Canada's current sex standards.

iv. Intersex refers to a variety of conditions where a person has atypical development of sex characteristics, such as reproductive anatomy, sex chromosomes or sex-related hormones, that is not consistent with typical definitions of male or female.^{48, 49}

Considerations

- Consider information on both sex and gender together to measure health inequalities. A 2-step approach for the collection of sex assigned at birth and gender is considered best practice internationally (see Table C2 in [Appendix C](#)).^{51–55}
- There are currently discussions in Canada about including intersex as an option in birth registries. Individuals with intersex conditions account for an estimated 0.05% to 1.7% of the global population.⁵⁰ Currently, these infants are temporarily assigned “undetermined” at the time of birth. As noted in Box 2, Statistics Canada suggests coding this data as intersex if collected.



Box 2: Statistics Canada’s standards for sex

Sex refers to sex assigned at birth and is classified into 2 categories: male and female. Sex is typically based on a person’s reproductive system and other physical characteristics. A variant of the classification of sex includes a third category — intersex.⁵⁶

Gender

Definition summary

Construct: Lived gender

Measure: 3 categories — Female gender, male gender, gender diverse

Lived gender

Gender, along with sex assigned at birth, is recommended for measuring and reporting gender-related inequalities at the pan-Canadian level. Lived gender is the outward presentation or expression (e.g., through dress or behaviour) of an individual's gender identity^v in their daily life.⁵⁷ Lived gender may be more feasible than gender identity for data collection (e.g., in survey data collected by proxy respondents). See [Appendix C](#) for evidence supporting the association of gender with inequitable health care access, quality and outcomes.

Gender, broadly speaking, is an institutionalized system of social practices that seeks to distinguish people as socially different groups (generally as men and women).^{58, 59} The distinctions between men, women and gender diverse individuals are based on the normalized or idealized roles, behaviours and expressions constructed by a given society for each gender.⁶⁰

Gender encompasses gender identity and lived gender (i.e., gender expression) as man, woman, both, neither or anywhere along the gender spectrum,⁵⁷ gender norms (expected behaviours and attitudes for specific genders) and gender relations (power relations between genders).^{47, 61} The *Canadian Human Rights Act* was amended in June 2017 to include gender identity and gender expression as prohibited grounds for discrimination.⁶²

3 categories for measuring lived gender

Statistics Canada recently developed a new gender standard that will be implemented in the 2021 Census (see Box 3). Using this standard, the following categories can be used for stratifying health indicators:

- Female gender
- Male gender
- Gender diverse

v. Gender identity refers to an individual's internal sense of being a man, woman, both or anywhere along the gender spectrum.⁵⁷

Considerations

- Collecting information on both sex and gender enables measurement of inequalities that is gender-inclusive. For example, cross-classification of sex and gender categories can be used to derive cisgender and transgender populations.⁶³ Cisgender refers to individuals whose gender aligns with what is typically associated with their sex assigned at birth.^{64, 65} Transgender (or trans) refers to individuals whose gender identity or gender expression differs from what is typically associated with their sex assigned at birth. The term trans can include a variety of people, such as those who identify as non-binary, as well as trans men and trans women.⁶⁵
- Consider using the terms “man/boy” (instead of “male gender”), “woman/girl” (instead of “female gender”) and “gender diverse” when reporting gender-related inequalities in health. For example, “women with a potential need for arthroplasty were less likely than men to report having ever discussed arthroplasty with a physician.”⁶⁶
- To identify and interpret health inequalities between men, women and gender diverse individuals, it is important to consider how biological sex and socio-cultural gender identities interact to give rise to inequalities in health.^{47, 67} Such sex- and gender-based analyses move beyond simple sex disaggregation and incorporate gender analysis frameworks and questions that enable analysts to investigate why and how inequalities exist.⁶⁸ For example, susceptibility to certain health conditions may vary between sexes due to biological factors such as hormone levels.⁶⁹ Social factors may also play a role in explaining health inequalities through differential access to and control over resources, such as income and education,⁷⁰ related to the hierarchical nature of gender that tends to place men in positions of power.^{58, 59}
- An individual’s lived gender is not always consistent with their gender identity.⁷¹ For trans individuals, health inequalities observed related to lived gender may differ from those related to gender identity,¹⁴ as only about half the transgender population lives in their felt gender full time.^{72–74} Thus gender identity information has been collected alongside lived gender in some studies.^{63, 72}



Box 3: Statistics Canada’s standard for gender

Gender refers to the gender that a person internally feels (“gender identity”) along the gender spectrum and/or the gender a person publicly expresses (“gender expression”) in their daily life, including at work, while shopping or accessing other services, in their housing environment or in the broader community.⁷⁵ A person’s current gender may differ from the sex a person was assigned at birth (male or female) and may differ from what is indicated on their current legal documents. A person’s gender may change over time.⁷⁵

Statistics Canada’s classification of gender for reporting purposes consists of 3 categories: male gender, female gender and gender diverse.⁷⁵ Using this gender standard, as well as the standard for sex assigned at birth, will allow the classification of cisgender and transgender populations.⁷⁵

Examining inequities related to sexual orientation

Sexual orientation refers to an individual’s enduring romantic, emotional or sexual attraction to other people.⁶⁴ There are a number of different sexual orientations, such as straight (also known as heterosexual), bisexual, gay, lesbian, asexual and two-spirit. Two-spirit can also refer to gender identity and gender roles, as well as spiritual identity.^{76, 77} Sexual minorities, like gender minorities, face discrimination and stigmatization rooted in society’s bias for heterosexual relationships and gender binary.^{78, 79} Studies from the U.S. have found that sexual minorities are less likely than those identifying as straight to have a usual place to go for medical care,⁸⁰ and they are more likely to delay or not seek care when needed and more likely to experience mental health problems compared with those identifying as straight.⁸¹ A Canadian study found variation in consultation with health care providers (e.g., family doctor, mental health provider) based on sexual orientation.⁸² PHAC also reported lower rates of contact with a dental professional in the past year for bisexual individuals compared with straight individuals.⁸³

Statistics Canada includes a question on sexual orientation in the General Social Survey and CCHS, while the census identifies “same-sex” and “opposite-sex”^(p. 6)⁸⁴ couples who live together.^{84–86}

Income

Definition summary

Construct: Relative income

Measure: Income quintiles

Relative income

Relative income refers to a person's income compared with that of others in society.^{87, 88} It also reflects differences in socio-economic status and purchasing power, and typically categorizes the population along an income gradient.^{89, 90} Relative income is the recommended baseline approach for measuring the degree of income-related inequality in the population. This recommendation is based on the strength of evidence associating relative income with inequitable health care access, quality and outcomes, the feasibility of reporting at a pan-Canadian level and its widespread current use.

Income quintiles for measuring relative income

Income quintiles are created by ranking people according to their income, from lowest to highest. The ranked population is then divided into 5 groups of equal size known as quintiles.

Organizations such as WHO recommend using income quintiles for health inequalities reporting.⁹¹ Benefits of using quintiles are that they are easily communicated to non-technical audiences and have been widely applied in health reports.⁹¹ In addition, compared with more granular income categorizations such as income deciles, income quintiles are less likely to present sample size issues that would limit interpretation and reporting. In Canada, income quintiles are frequently used to measure inequalities by national organizations such as CIHI^{3, 92} and PHAC,⁹³ as well as by provincial^{22, 94, 95} and regional organizations.^{96, 97}

Considerations

The following considerations should be taken into account when deriving income quintiles. These may vary depending on the data source(s) available:

- Where possible, **consider income for all members of a family or household** (see Box 4 for Statistics Canada’s income standards and [Appendix D](#) for Statistics Canada’s standards for statistical units); this is recommended international practice, as income may be shared to cover expenses.⁹⁸
- Income should be **adjusted for the number of people in the household**. Doing so accounts for economies of scale and considers how a family’s financial needs increase as the number of family members increases, but at a decreasing rate with each additional member.⁹⁸ For example, the low-income cut-off (LICO) is an income threshold at which an economic family, or person not in an economic family, spends 20 percentage points more of their income on food, clothing and shelter than the average family.⁹⁹ LICOs are currently defined for 7 family sizes and 5 different community sizes.⁹⁹
- Income quintiles should be derived at the appropriate geographic level in order to **account for differences in income distribution between geographic areas**, such as provinces/territories or health regions. For example, if the goal is to report on inequalities at the national and provincial levels, provincially derived quintiles can be used to account for variations in income distribution between provinces.¹⁰⁰ If, however, the goal is to create a local income distribution, quintiles can be derived at the level of the census metropolitan area (CMA).⁹⁷
- It is good practice to **report whether before- or after-tax income is being used** to derive income quintiles. While after-tax data captures funds available for consumption, savings and investment,⁹⁸ before-tax^{vi} data is more commonly used when income information is obtained from self-reported survey data, such as the CCHS, and for existing measures of area-level income from the census using postal code conversion.¹⁷
- When reporting on health inequalities using income quintiles, it is helpful to **include summary measures** for each quintile, such as the median, standard error and range. This provides information on the absolute income differences across quintiles, which can help users interpret differences in inequalities over time and between populations.

vi. Note that in Statistics Canada’s income definitions, total income and before-tax income are synonymous.

- When possible, **both individual- and area-level income measures** should be used, as they provide complementary information.^{101, 102} Individual-level income measures can be conceptualized as capturing purchasing power and act as proxies for material well-being,⁹⁰ while area-level measures reflect social and economic characteristics of neighbourhoods, such as the built environment and access to services.¹⁰³ Area-level income measures may also provide a more stable measure of socio-economic status (i.e., less affected by yearly fluctuations).¹⁰² Area-level measures are often used as a proxy for individual-level characteristics; however, this substitution will be less valid for areas that have a high degree of variation in the socio-economic composition of their residents¹⁰⁴ (e.g., rural areas where postal codes cover large geographic areas,¹⁰⁵ urban centres where demographics of neighbourhoods may change quickly¹⁰⁶).
- Complementary approaches to income quintiles include more granular relative income categorizations such as income deciles; this can facilitate the use of inequality summary measures such as the concentration index, which is ideally calculated using a continuous value. Measures of absolute income, such as the Market Basket Measure (MBM),^{vii} could also be considered for complementary analysis.⁹⁹

vii. The MBM is a measure of low income based on the cost of a specified basket of goods and services representing a basic standard of living. It is updated annually and available for 50 different geographic areas. The MBM is calculated for each province, where applicable, for the following categories: rural areas; areas with populations less than 30,000; areas with populations between 30,000 and 99,999; areas with populations between 100,000 and 499,999; and specific CMAs.⁹⁹



Box 4: Statistics Canada's standards for income

Statistics Canada has several standard variables that measure respondents' relative level of income.

Low-income status refers to the income situation in relation to a specific low-income line in a reference year. Statistical units with income that is below the low-income line are considered to be in low income. Statistics Canada measures low-income status for 3 statistical units: economic family,¹⁰⁷ person¹⁰⁸ and private household.¹⁰⁹ Each of these has between 2 and 5 specific low-income measurements associated with them. The classification of low-income status¹¹⁰ includes all low-income status categories.

Adjusted after-tax income refers to after-tax income that is adjusted for economies of scale. The adjustment factor, also known as the equivalence scale, is the square root of the number of persons in the statistical unit. The adjusted after-tax income is calculated by dividing the after-tax income by this adjustment factor. Statistics Canada measures adjusted after-tax income for 3 statistical units: economic family,¹¹¹ person not in economic family¹¹² and private household.¹¹³ The adjustment made to income addresses the fact that individuals living together can share resources and that the marginal increase in need decreases as the number of individuals sharing resources increases.

Adjusted total income refers to total income that is adjusted for economies of scale. The adjustment factor, also known as the equivalence scale, is the square root of the number of persons in the statistical unit. Statistics Canada measures adjusted total income for the statistical unit of private household.¹¹⁴ The adjusted total income is calculated by dividing the total income by this adjustment factor. The adjustment made to income addresses the fact that individuals living together can share resources and that the marginal increase in need decreases as the number of individuals sharing resources increases.

Education

Definition summary

Construct: Educational attainment

Measure: Highest self-reported household educational attainment using 5 categories — less than high school, high school completion, post-secondary school completion below bachelor's degree, bachelor's degree completion and post-secondary school completion above bachelor's degree

Educational attainment

Educational attainment refers to the highest level of schooling achieved (see Box 5).¹¹⁵ It is recommended for measuring education-related inequalities for its feasibility of reporting at the pan-Canadian level. Additionally, educational attainment is associated with health literacy.¹¹⁶ Health literacy relates to a person's ability to comprehend complex treatment regimens and self-manage disease¹¹⁷ and affects health behaviour change.¹¹⁸

Highest self-reported household educational attainment using 5 categories

Self-reported measures of educational attainment are commonly available through national surveys, including the census¹¹⁹ and CCHS.¹² Educational attainment at the household level (see [Appendix D](#)) is recommended over person-level reporting. In this way, the highest level of education completed by any member of the household is applied to all members of that household. This approach allows for measurement of education-related inequalities for children and youth who have not yet completed their education, and for whom health care decisions, family environment and overall child and adolescent development are influenced by adult household members.¹²⁰ The household approach also allows consistent measurement of education across the life course. Moreover, analyses of education-related inequalities reveal similar trends when stratifying by individual and household education.⁸³

A 5-category approach^{viii} enables the measurement of inequality along the full gradient of educational attainment. Using data from the CCHS for demonstration purposes, Table 3 shows the distribution of the population age 12 and older by different categorizations of self-reported household education. A multi-category approach enables the identification of inequalities along the full gradient of educational attainment; however, where it is not possible to stratify into 5 categories (e.g., due to small sample sizes), categories can be rolled up into 4 categories or 2 categories. As shown in Table 3, 36.2% of Canadians were living in households with “bachelor’s degree completion and beyond” in 2013–2014; this was up from 29.6% in 2007 (data not shown).

Table 3 Proportion of population by household educational attainment

5 categories	%	4 categories	%	2 categories	%
Less than high school	6.3%	Less than high school	6.3%	Less than high school	6.3%
High school completion	15.1%	High school completion	15.1%	High school completion and above	89.2%
Post-secondary school completion below bachelor’s degree	38.0%	Post-secondary school completion below bachelor’s degree	38.0%		
Bachelor’s degree completion	23.0%	Bachelor’s degree completion and beyond	36.2%		
Post-secondary school completion above bachelor’s degree	13.2%				

Notes

Percentages do not total 100% as 4.5% of records are classified as “not stated.”

Percentages reflect responses to the survey question “What is the highest certificate, diploma or degree that [respondent name] has completed?”

Source

Statistics Canada. *CCHS 2013–2014 Data Dictionary*. 2015.¹²

^{viii}. A 5-category approach can be derived from Statistics Canada’s census, where Category 4.3 (university certificate, diploma or degree above bachelor level) corresponds to the highest educational attainment in a 5-category approach.¹²¹

Considerations

- The construct of educational attainment does not consider Indigenous knowledge systems or the experience of Elders, which may be as or more important to well-being for Indigenous peoples.¹²² Similarly, the highest level of education may not be as strongly correlated with health and health care for those educated outside of Canada compared with those educated in Canada, due to potential underemployment or over-qualification among immigrant populations.^{123, 124} These challenges emphasize the importance of examining multiple stratifiers and considering intersectionality when measuring inequalities in health and health care.
- Data linkage is providing new opportunities for measuring education-related inequalities. For example, Statistics Canada's linkage of long-form 2006 Census data to hospital data enables the measurement of education-related inequalities in hospitalizations.¹²⁵ Linking administrative education data to health data is an alternative approach for measuring inequalities by educational attainment. This approach may be advantageous for capturing marginalized populations who are underrepresented in surveys. To date, this approach to linking health and administrative education data has been carried out at the provincial level only, and has been limited to high school completion within a province (i.e., reporting does not track individuals through post-secondary education or capture high school completion in different provinces).⁹⁵
- Area-level educational attainment can be used when individual-level data is not available.¹²⁶ Such measures have been reported as the proportion of residents who have attained a specified level of education (e.g., high school completion) living in a defined geographic area (e.g., census dissemination area).⁸³



Box 5: Statistics Canada's standards for education

Statistics Canada has several standard variables for education.

Educational attainment refers to the highest level of education that a person has successfully completed.¹¹⁵ Successful completion of a level of education refers to the achievement of the learning objectives of that level, typically validated through the assessment of acquired knowledge, skills and competencies. The classification of highest educational attainment¹²¹ and classification of highest educational attainment — variant for alternate reporting¹²⁷ are used to classify educational attainment categories. The classification of highest certificate, diploma or degree¹²⁸ is used to classify categories of certificates, diplomas and degrees.

Geographic location

Definition summary

Construct: Urban and rural/remote place of residence

Measure: Statistical Area Classification type (SACtype) defined as urban (SACtypes 1, 2, 3) and rural/remote (SACtypes 4, 5, 6, 7, 8)

Urban and rural/remote

For health data, geographic location usually refers to an individual's place of residence, but it may also refer to the geographic location of a health service. Urban and rural/remote place of residence is recommended as a baseline approach for analysis of geographic-related health inequalities at a pan-Canadian level. Urban and rural/remote geographic location is frequently used to measure inequality, and there is a substantial body of evidence associating this construct with inequitable health care access, quality and outcomes (see [Appendix B](#)). Urban and rural/remote designations can be defined using a range of measures, including population size, population density and distance/travel burden¹³⁴ to an urban centre or to an essential service; the chosen measure determines which areas are considered rural.¹²⁹

Statistical Area Classification type for measuring urban and rural/remote

Currently available measures derived based on postal code were considered for operationalizing the construct of urban and rural/remote for the purpose of measuring health inequalities. This is because place of residence information in administrative health data, including all CIHI databases, is generally limited to postal code information.

With postal code, Statistics Canada's PCCF/PCCF+ can be used to categorize individuals using 2 possible measures that relate to geographic location: Statistical Area Classification (SAC) (see Box 6), which combines information on population size and commuter flow, and Population Centre (POPCTR) (see [Appendix D](#)), which combines information on population size and density.

At this time, the recommended baseline approach for measuring health inequalities is to use SACType as a 2-level stratifier comparing urban (defined as SACTypes 1 to 3) with rural/remote (defined as SACTypes 4 to 8) (see Table 4 and Box 6). Compared with POPCTR, SACType can be assigned more reliably based on postal code because it is defined at the census subdivision (CSD) level. As noted in the PCCF+ reference guide, POPCTR requires dissemination block precision; this cannot be reliably assigned for postal codes used by about 25% of the population (primarily those living in urban fringe and rural areas).¹⁷ It should be noted that this limitation would not be a consideration if the POPCTR classification was assigned using street address.

Table 4 Total Canadian population by Statistical Area Classification

SAC*	Total population*	% of total population*	Corresponding SACType from PCCF+	Recommended aggregation
CMA	23,488,393	70.2%	1	Urban
CA	4,150,389	12.4%	2, 3	Urban
Strong MIZ	1,927,385	5.8%	4	Rural/remote
Moderate MIZ	2,305,590	6.9%	5	Rural/remote
Weak MIZ	1,316,099	3.9%	6	Rural/remote
No MIZ	226,829	0.7%	7	Rural/remote
Territories	62,003	0.2%	8†	Rural/remote

Notes

† For the territories, all of Nunavut, including Iqaluit, is classified as SACType 8 and is therefore considered rural/remote.

Whitehorse and Yellowknife are classified as SACType 3 and are therefore considered urban.

SAC: Statistical Area Classification.

CMA: Census metropolitan area.

CA: Census agglomeration.

MIZ: Metropolitan influenced zone.

Source

* Statistics Canada. [Census of Population, 2011 \(2011 adjusted population by 2016 geography\)](#). Accessed January 23, 2018.

Considerations

- While it can be informative to analyze data along the urban/rural/remote continuum using all SACtype categories, there are limitations to using SACtype for distinguishing between rural and remote areas (see [Appendix C](#)). Given these limitations, a measure of travel burden is recommended for complementary analysis for measuring health inequalities related to geographic location. There is currently no standard approach for defining and measuring travel burden at a pan-Canadian level. Travel burden can be calculated using measures such as travel time, travel distance, travel cost in dollars and availability of transportation.^{131, 132} For example, travel burden can be defined on a study-specific basis to identify people who must travel longer than normal to access a particular health care service (e.g., one-way travel times greater than 1.5 hours from residence to a cancer centre were associated with high mastectomy rates).¹³³
- Measures of travel burden can be obtained from Geographic Information Systems tools and, more recently, through online routing websites such as Google Maps or Map Quest.¹³⁴ Another option is Statistics Canada's index of remoteness for Canadian CSDs; this index incorporates measures of travel cost along with population size. This is a continuous measure ranging from 0 to 1 (with 1 being the most remote), which can be converted into categorical classifications of remoteness.¹³⁵ By measuring proximity to population centres irrespective of commuting flows, and by considering the impact of smaller population centres outside of CAs and CMAs, the remoteness index captures a unique geographic dimension compared with other geographic classifications such as the SAC.¹³⁵ Statistics Canada is currently working with CIHI to apply this index to health data, with a view to developing meaningful categorizations for distinguishing between urban, rural and remote areas for measuring health inequalities.
- Other geographically defined subpopulations can also be used to measure health inequalities. These include health regions, as well as smaller geographic units such as sub-regions in Ontario and local health areas in British Columbia.^{ix}

ix. The B.C. Ministry of Health is currently developing a new geographic level called community health service areas within the local health areas.



Box 6: Statistics Canada's Statistical Area Classification standard

The SAC¹³⁶ groups CSDs¹³⁷ according to whether they are a component of a CMA, a CA¹³⁰ or a census metropolitan influenced zone (MIZ).¹³⁸ The MIZ categorizes all CSDs in provinces and territories that are outside CMAs and CAs. CSDs in provinces that are outside CMAs and CAs are assigned to 1 of 4 categories according to the degree of influence (strong, moderate, weak or no influence) that the CMAs or CAs have on them. CSDs in the territories that are outside CAs are assigned to a separate category.

The following are the categories of the SAC:

1. Census metropolitan area: Formed by one or more adjacent municipalities centred on a population centre (known as the core). A CMA must have a total population of at least 100,000, of which 50,000 or more must live in the core based on adjusted data from the previous Census of Population Program. To be included in the CMA, other adjacent municipalities must have a high degree of integration with the core, as measured by commuting flows derived from data on place of work from the previous census.
2. Census agglomeration: Formed by one or more adjacent municipalities centred on a population centre (known as the core). A CA must have a core population of at least 10,000, also based on data from the previous Census of Population Program. To be included in the CA, other adjacent municipalities must have a high degree of integration with the core, as measured by commuting flows derived from data on place of work from the previous census.
3. Strong MIZ: Includes CSDs in provinces where at least 30% of the CSD's resident employed labour force (excluding the category of no fixed workplace address) commutes to work in any CMA or CA. It excludes CSDs that had fewer than 40 persons in their resident employed labour force in the previous census.
4. Moderate MIZ: Includes CSDs in provinces where at least 5% but less than 30% of the CSD's resident employed labour force (excluding the category of no fixed workplace address) commutes to work in any CMA or CA. It excludes CSDs that had fewer than 40 persons in their resident employed labour force in the previous census.
5. Weak MIZ: Includes CSDs in provinces where more than 0% but less than 5% of the CSD's resident employed labour force (excluding the category of no fixed workplace address) commutes to work in any CMA or CA. It excludes CSDs that had fewer than 40 persons in their resident employed labour force in the previous census.
6. No MIZ: Includes CSDs in provinces where none of the CSD's resident employed labour force (excluding the category of no fixed workplace address) commutes to work in any CMA or CA. It also includes CSDs in provinces that had fewer than 40 persons in their resident employed labour force in the previous census.
7. Territories (outside CAs): Includes CSDs in the territories outside CAs.

Conclusion and next steps

Using the best available evidence, expert advice and established standards at this time, this document provides recommended definitions of age, sex, gender, income, education and geographic location as stratifiers for measuring health inequalities. This is by no means an exhaustive list of characteristics or identifiers that affect health care access, quality and outcomes. However, as a starting point, implementing these proposed definitions will facilitate a harmonized approach to using equity stratifiers in data collection, performance measurement and reporting initiatives. This in turn will enable comparisons across organizations and jurisdictions, sharing of best practices to improve health and health care access, quality and outcomes across subgroups of the population, and ultimately making progress in reducing health inequalities.

CIHI is also developing an equity stratification toolkit to accelerate the adoption of these equity stratifier definitions, as well as to facilitate and expand the measurement of health inequalities in analysis and reporting. This document will provide users with guidelines and resources on how to incorporate the measurement of health inequalities into their analytical work.

Expert working group members provided several suggestions for next steps (see Table E1 in [Appendix E](#)). These include suggestions to further evaluate and, if needed, to address limitations of current definitions of age, sex, gender, income, education and geographic location. For example, future work could focus on developing a measure of travel burden. Additional recommendations include working toward filling data gaps or addressing data collection bias to ensure all populations are represented.

In addition to the definitions provided here, work is under way to inform measurement of health inequalities by racial and ethnic identities. To support the development of these other definitions, CIHI is engaging a variety of partners — including PHAC, Statistics Canada, Ontario's Anti-Racism Directorate, the BC First Nations Health Authority and other Indigenous leaders and scholars, researchers and community organizations.

Appendix A: Working group members

CIHI would like to acknowledge and thank the following individuals who generously shared their time, experience and knowledge as members of the pan-Canadian expert working group or as peer reviewers to support the development of the equity stratifier definitions. Please note that the recommendations and conclusions in this document do not necessarily reflect those of the individuals or organizations listed below.

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Appendix B: Summary of literature by stratifier

The following provides a summary of evidence supporting the association between each of the equity stratifiers and health inequity, with a focus on inequity in health care access, quality and outcomes in Canada.

Age

Several studies have identified inequitable health care access, quality and outcomes related to age. For example, in 2013–2014, Ontarians with diabetes age 20 to 64 were 1.4 times less likely to get recommended eye exams compared with those age 65 and older.¹³⁹ Other examples include age-related inequity in access to cancer care,¹⁴⁰ use of mental health services,^{141, 142} quality of primary health care service delivery,¹⁴³ access to heart disease interventions,^{144–146} access to kidney transplantation,¹⁴⁷ access to palliative care¹⁴⁸ and utilization of cancer screening services.¹⁴⁹

Sex

Sex is used, or is recommended for use, to measure inequity by a number of health organizations.^{8, 83, 150, 151} Moreover, WHO recommends including sex as part of a minimum health equity surveillance system.² Although sex is often routinely collected in administrative databases, relatively few reports examine health inequalities between males and females.^{3, 83, 146, 152} Without disaggregation of data by sex, results may mask important differences between males and females. Disaggregating by sex can facilitate meta-analysis and prevent the need to repeat trials in clinical research.⁶¹

Studies that have stratified by sex have identified that inequalities in health and health care exist between males and females. For example, females live longer than males in Canada and other high-income countries.¹⁵³ Hospitalization rates for heart attacks, mental illness and motor vehicle traffic injuries are also higher for males than females.³ However, females are more likely than males to be misdiagnosed or under-treated for health conditions, such as mental health issues, lung disease or heart disease.¹⁵⁴ To understand these differences, it is important to consider biological differences (sex), social factors (gender) and their influence on the patient, health care provider and health system.^{47, 67, 155}

Individuals whose “bodies, reproductive systems, chromosomes and/or hormones are not easily characterized as male or female” are referred to as having an intersex condition.¹⁵⁶ This population is relatively small (0.05% to 1.7%); however, these individuals experience discrimination in the health care system as well, sometimes as soon as they are born.⁵⁰ For decades, it was common practice for infants with an intersex condition to be subjected to non-consensual medically unnecessary surgeries in order to change the child’s genitalia to look more male or female. This practice has become controversial and there is growing support to ban it entirely.¹⁵⁷ The limited research on the experiences of this population within the health care system demonstrates a lower quality of care as a result of a lack of training specific to intersex health needs among health care providers, withholding of health information from patients, use of insensitive language and lack of respect for their autonomy and rights.^{50, 157, 158}

Gender

WHO advocates for gender equality in health and acknowledges how gender norms, roles and relations contribute to health outcomes by influencing access and control over resources, such as income, time and education.⁷⁰ As a result of these differences, men, women and gender diverse individuals have different exposures to risk factors and experiences in the health care system. For example, research has demonstrated that masculine and feminine norms and ideals can be associated with certain risk factors and poor health outcomes related to cardiovascular disease.^{159, 160} Other studies have found inequitable receipt of services, such as admission to an intensive care unit for certain conditions (e.g., neurological bleeding) or referral for hip and knee replacement, which may be attributed to clinician biases based on patient gender.^{66, 161} Gender roles and beliefs may also influence utilization of and the ability to access care. For example, in society, the concept of masculinity is often associated with unhealthy behaviours and beliefs, such as disregarding physical discomfort and dismissing the need for medical care.^{162, 163}

It is necessary to consider both sex and gender data during collection and reporting in order to provide high-quality and patient-centred care for all people along the gender spectrum. The collection of both sex and gender is particularly important to adequately identify trans individuals through cross-classification. Extrapolating from U.S. data on the trans population, it is estimated that there are approximately 200,000 trans individuals in Canada.¹⁶⁴ Stigmatization is common among transgender populations and has been associated with poor health outcomes, such as suicidality,¹⁶⁵ depression and greater burden of HIV.^{166, 167} The literature demonstrates that this population experiences inequities in accessing appropriate medical care, such as preventive cancer screening, gender reaffirming treatment, prescription medication related to transitioning and mental health services, as well as negative experiences in medical settings, such as lack of knowledge of trans-related care by family physicians, insensitive language, verbal abuse and physical violence.^{14, 72, 164, 168–172} Discriminatory experiences have also contributed to the avoidance or delay of health care^{171, 173, 174} and high levels of stress that adversely impact health.¹⁷⁵

Furthermore, information on lived gender may be able to identify inequities experienced by transgender people related to discrimination and structural barriers within the health system.^{14, 63, 176} One study found that transgender patients encountered more discrimination by medical professionals when they were open about their trans status.¹⁴ Individuals who can be identified as transgender by others without being told experience discrimination in daily life more frequently (e.g., accessing hotels or restaurants)¹⁴ and also have higher rates of attempted suicide.^{14, 54}

Income

Income has been identified as one of the most influential social determinants of health^{93, 177–179} and is closely linked to many other factors such as education, occupation and housing.¹⁸⁰ Given that persons with lower socio-economic status, including income, have higher disease burden,¹⁸⁰ they would be expected to access more health care services. Yet there is evidence of income-related inequity in health care access and/or use, such as for primary health care,^{152, 181} specialists,^{182–184} screening and preventive services,^{94, 185} and diagnostic imaging.¹⁸⁶ Lower-income Canadians may also experience poorer quality of care: they are more likely to be hospitalized for ambulatory care sensitive conditions and to use the emergency department for care that could have been provided by a primary care provider.^{125, 187} They also have higher acute care readmission and emergency department return rates.¹⁸⁸ Lower-income Canadians on average have higher rates of chronic disease,^{3, 34, 189} hospitalized heart attack, stroke, self-injury,^{3, 92} and perceived poorer mental and general health.^{3, 22, 190}

There are different explanations for income-related health care inequities, such as material deprivation and lack of comprehensive health coverage, particularly for services not covered by provincial health care plans (e.g., pharmaceuticals, physiotherapy, dental care, counselling, eye care).¹⁹¹ Other access barriers reported by lower-income Canadians include transportation costs, difficulty getting time off work to attend appointments, and discrimination by health care workers related to poverty and social status.^{180, 191, 192} Proposed measures to reduce income-related health inequities include ensuring income and food security and affordable housing,^{179, 193} universal drug coverage^{194, 195} and ensuring all Canadians have access to a family doctor.¹⁹⁵ Increasingly, poverty screening tools are being used in primary care to help support lower-income people by identifying sources of financial aid.¹⁷⁹

Education

Education is a strong predictor of long-term health and quality of life^{2, 178, 193} and is considered a key measure of socio-economic status, strongly associated with many health care outcomes.³⁴ Education can impact health care at several levels: individual (e.g., ability to navigate health care, personal health behaviours), community (e.g., access to health care resources) and population (e.g., hospitalization rates).^{117, 196} At each of these levels, lower levels of education have been found to be associated with difficulties accessing health care,¹⁹⁷ risky health behaviours such as smoking and physical inactivity,¹³⁹ increased hospitalizations, greater emergency care use and poorer ability to interpret labels and health messages.^{196, 198, 199}

Programs to improve educational attainment provide academic support for disadvantaged youth, resulting in higher rates of high school completion,²⁰⁰ leading to healthy behaviours, improved health literacy and higher income potential.²⁰¹

Geographic location

Geographic location is recognized as an important determinant of health and access to health care.²⁰² Rural areas have different demographic characteristics than urban areas, with higher proportions of Indigenous peoples, children and older adults, and generally lower socio-economic status.²⁰³ People living in rural areas may face challenges accessing health care that relate to geographic remoteness, long distances to facilities, inclement weather conditions and health care services that are not tailored to cultural and linguistic differences.^{132, 203, 204}

Rural residents face difficulties accessing immediate care for non-life-threatening health problems²⁰⁵ and have limited access to physicians,^{206, 207} specialists^{206, 208} and dentists.²⁰⁹ Challenges in remote and sparsely populated communities may be even greater; for example, non-Indigenous residents of the territories are less likely to report having a regular doctor (territories, 67.0%; Canada, 83.9%); this difference is even more pronounced when examining the Indigenous population (territories, 31.1%; Canada, 76.4%).²¹⁰ Rural areas may also have poorer quality of care, as evidenced by northern residents being more likely to feel that their health care needs are not being met²¹¹ and rural residents having higher rates of avoidable hospital use.¹⁸⁷ In addition, patients with longer travel times are more likely to receive invasive breast cancer treatments.¹³³ Studies have also shown that some indicators of health outcomes are worse in rural areas, with higher mortality rates and lower self-reported health.²¹²

The urban and rural/remote construct captures the relationship between rural/remote and urban areas through commuting flows. As explained by Kulig and Williams, commuting flows are commonly used as a proxy for access to services such as health care, education, banking, shopping, and cultural and sports activities.²⁰³ Identifying inequities between urban and rural/remote areas is useful for health planning to improve access and quality of care at the health system level. For example, identifying inequities can help policy-makers target interventions,²⁰⁸ allocate health care resources and advocate for better health care for rural and remote locations.²¹³

Travel distance has been used as a proxy for access to health care and provides valuable contextual information when comparing service access across communities²⁰⁷ that can help distinguish rural and remote areas. Identifying inequities by travel burden informs health system planning, such as the need to address infrastructure issues to enable the use of technology in health care.²¹³

Appendix C: Supplementary information

Age

Table C1 Examples of age categorizations over the life course

Organization	Purpose	Categories
United Nations ²¹⁴	General purposes	High detail: Younger than 1; single years to 4; 5-year groups from 5 to 84; 85+ Medium detail: Younger than 1; 1 to 4; 5 to 14; 15 to 24; 25 to 34; 35 to 44; 45 to 54; 55 to 64; 65 to 74; 75+ Low detail: Younger than 1; 1 to 14; 15 to 44; 45 to 64; 65+
	Usage of health services	High detail: Younger than 1; single years from 1 to 24; 5-year groups from 25 to 54; single years from 55 to 74; 5-year groups from 75 to 84; 85+ Medium detail: Younger than 1; 1 to 4; 10-year groups from 5 to 74; 75+ Low detail: Younger than 1; 1 to 14; 15 to 24; 25 to 44; 45 to 64; 65+
PHAC ²¹⁵	Health promotion for childhood and adolescence	Infancy: younger than 2; childhood: 3 to 12; adolescence: 13 to 19
WHO ²¹⁶	Morbidity/mortality data for “lay reporting”	Younger than 7 days; 7 to 27 days; 28 days to younger than 1 year; 1 to 4 years; 5 to 14 years; 15 to 44 years; 45 to 64 years; 65+ years

Sex and gender

Table C2 Examples of additional approaches for collecting sex and gender with 2 or more questions*

Organization/author	Country	Approach	Categories
<p>Greta Bauer — Multidimensional Sex/Gender Measure (MSGM)^{63, 240}</p> <p>Note: This measure is new and few surveys that contain it have been published (for a published example, see the Ontario Human Rights Commission report <i>Taking the Pulse</i>²³⁹). It was developed through testing of the original multidimensional measure and consultations with experts in the areas of population survey design, Indigenous gender concepts and human rights. It has been recommended for further testing.⁶³</p>	Canada	1. What sex were you assigned at birth, meaning on your original birth certificate?	Male Female
		2. Which best describes your current gender identity?	Male Female Indigenous or other cultural gender minority identity (e.g., two-spirit) Something else (e.g., gender fluid, non-binary)
		The third question may be asked only of those who indicated a current gender identity different than their birth-assigned sex. If so, it can be forward-filled to code cisgender participants as living in their identified (and birth-assigned) sex/gender.	
		3. What gender do you currently live as in your day-to-day life?	Male Female Sometimes male, sometimes female Something other than male or female

Organization/author	Country	Approach	Categories
Williams Institute ⁵⁴	United States	1. What sex were you assigned at birth, on your original birth certificate?	Male Female
		Option 1: 2. How do you describe yourself (check one)?	Male Female Transgender Do not identify as female, male or transgender
		Option 2 (promising approach that requires further testing): 2. What is your current gender identity?	Male Female Trans male/trans man Trans female/trans woman Genderqueer/gender non-conforming Different identity (please specify)
		Where a 2-step measure cannot be implemented, a single item on trans/cisgender status is recommended.	
		1. Some people describe themselves as transgender when they experience a different gender identity from their sex at birth. For example, a person born into a male body but who feels female or lives as a woman. Do you consider yourself to be transgender?	Yes, transgender, male to female Yes, transgender, female to male Yes, transgender, gender non-conforming No
Population Assessment of Tobacco and Health (PATH) ²¹⁸	United States	1. Some people describe themselves as transgender when they experience a different gender identity from their sex at birth. For example, a person born into a male body but who feels female or lives as a woman would be transgender. Do you consider yourself to be transgender?	Yes No Don't know Refused Not sure
		The second question is asked only if the respondent answers "Yes" to the question above.	
		2. Do you consider yourself to be male to female, female to male or non-conforming?	Yes, transgender, male to female Yes, transgender, female to male Yes, transgender, gender non-conforming No Don't know Refused Not sure

Organization/author	Country	Approach	Categories
Wylie S, et al. ²²⁰	United States	Gender expression 1. A person's appearance, style or dress may affect the way people think of them. On average, how do you think people would describe your appearance, style or dress?	Very feminine Mostly feminine Somewhat feminine Equally feminine and masculine Somewhat masculine Mostly masculine Very masculine
		2. A person's mannerisms (such as the way they walk or talk) may affect the way people think of them. On average, how do you think people would describe your mannerisms?	Very feminine Mostly feminine Somewhat feminine Equally feminine and masculine Somewhat masculine Mostly masculine Very masculine
Australian Bureau of Statistics ²²¹	Australia	1. What is your sex? (select one)	Male Female Other, please specify: [Open text]
		2. What is your gender? (select one)	Male Female Other, please specify: [Open text]

Note

* The language used to describe some categories in this recommendation may no longer be considered appropriate (e.g., trans man, female to male). A number of other measures for collecting sex and gender were found in Canada and the United States.^{51, 52, 72, 171, 218–220} Some of these may also have outdated language.

Geographic location

SACtype is currently the recommended measurement approach to assigning urban and rural/remote when only postal code is available. However, there are 2 key limitations that make SACtype inadequate for distinguishing between rural and remote CSDs at a pan-Canadian level and led to the recommendation of grouping SACtypes 4 to 8 as rural/remote.

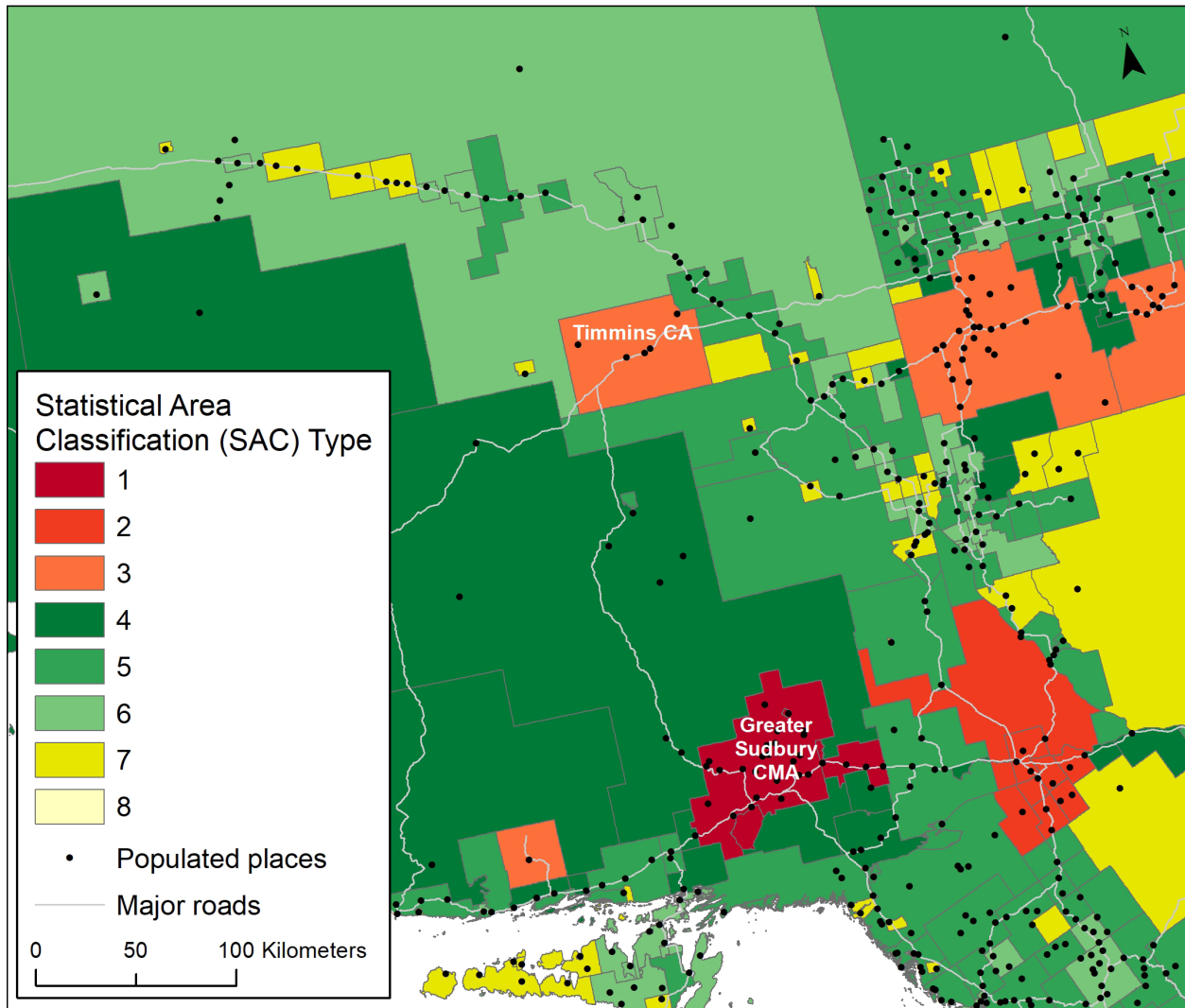
Limitation 1: Impact of large census subdivisions on SACtype

CSD size varies considerably, with more rural CSDs generally covering larger geographic areas than urban CSDs. Because SACtype is defined at the CSD level, these large CSDs can result in potentially unrealistic distinctions between rural and remote areas, largely due to the reliance on commuter flow for defining SACtype. For example, Figure C1 shows that using 2016 SACtype, the large CSD to the north of Timmins is assigned SACtype 6 (weak metropolitan influence), most likely because some people commute to the Timmins urban centre. However, this large CSD likely includes residents who would more realistically be classified as no metropolitan influence.

Limitation 2: Metropolitan influenced zone classification accounts only for commuting flows to urban centres (CMAs or CAs)

The MIZ classification is used to distinguish between CSDs outside of CMAs and CAs according to the degree of influence that these metropolitan areas have on them, as measured by commuting flows.²²² However, SACtype does not consider commuting flows between rural CSDs or account for CSDs that have high levels of self-employment (i.e., agricultural communities that may have low commuting flows while still being relatively close to an urban centre). For example, Figure C2 shows that in Saskatchewan, CSDs near Saskatoon and Regina are classified as SACtype 7 (no metropolitan influence). This classification may be caused by factors such as low commuter flows due to a high proportion of self-employed residents or reliance on tourism, rather than due to a true lack of metropolitan influence.

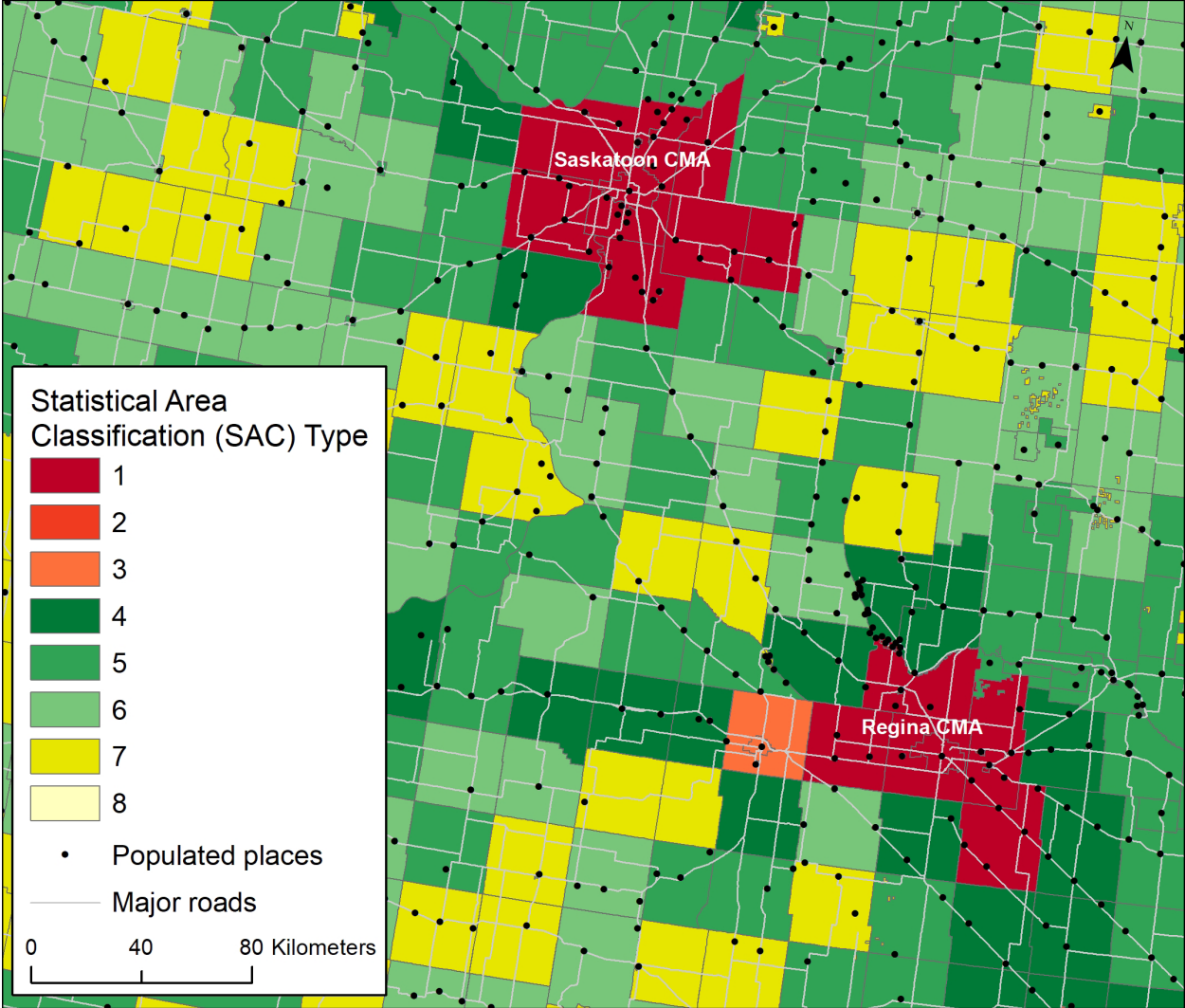
Figure C1 Northeastern Ontario by 2016 SACtype showing large CSD classified as SACtype 6 located directly above Timmins (classified as SACtype 3)



Source

Statistics Canada. 2016 Census — Boundary files (census subdivisions).²²³

Figure C2 Saskatchewan by 2016 SACtype showing CSDs classified as SACtype 7 located in close proximity to Saskatoon and Regina (classified as SACtype 1)



Source
Statistics Canada. 2016 Census — Boundary files (census subdivisions).²²³

Appendix D: Additional Statistics Canada standards

Education

Educational qualifications

Educational qualifications refers to the official confirmation, usually in the form of a certificate, diploma or degree, certifying the successful completion of an education program or a stage of a program.²²⁴ Successful completion of an education program refers to the achievement of specified learning objectives, typically validated through the assessment of acquired knowledge, skills and competencies. The classification of educational qualifications responses²²⁵ and classification of educational qualifications responses — variant for alternate reporting²²⁶ are used to classify educational qualification categories.

Geographic location

Geographic location refers to the physical place a statistical unit is located and for which statistics are collected and disseminated. In addition to the Statistical Area Classification described in Box 6, Statistics Canada has several other geographic classifications for use in Canada.

Standard Geographical Classification

The Standard Geographical Classification 2016 is Statistics Canada's main classification of geographic areas in Canada. It is designed to classify statistical information by geographic areas. The classification consists of 4 levels: geographic regions of Canada, provinces and territories, census divisions (such as counties and regional municipalities) and CSDs (such as municipalities). The 4 geographic levels are hierarchically related; a 7-digit code is used to show this relationship.²²⁷

Population Centre and Rural Area Classification

The Population Centre and Rural Area Classification can be used to measure urban and rural areas.

A population centre has a population of at least 1,000 and a population density of 400 persons or more per square kilometre, based on population counts from the current Census of Population. All areas outside population centres are classified as rural areas.²²⁸

Population centres are classified into 3 groups, depending on the size of their population:

- Small population centres have a population between 1,000 and 29,999.
- Medium population centres have a population between 30,000 and 99,999.
- Large urban population centres have a population of 100,000 or more.

Rural areas include all territory lying outside population centres. Rural population includes all population living in rural areas of CMAs and CAs, as well as population living in rural areas outside CMAs and CAs.²²⁹

Taken together, population centres and rural areas cover all of Canada.

Health regions

Health regions are legislated administrative areas defined by ministries of health. These administrative areas represent geographic areas of responsibility for hospital boards or regional health authorities.

Health regions 2017 includes provinces and territories, health regions level 2 and health regions level 3.²³⁰

Health regions for alternate reporting — Variant of HR 2017 includes provinces and territories, health regions level 2 for alternate reporting and health regions level 3 for alternate reporting.²³¹

Statistical units

Statistics Canada uses the following statistical units to define income and education variables.

Household refers to a person or group of persons who occupy the same dwelling and do not have a usual place of residence elsewhere in Canada or abroad.²³² The dwelling may be either a collective dwelling or a private dwelling. The household may consist of a family group such as a census family, of 2 or more families sharing a dwelling, of a group of unrelated persons or of a person living alone. Household members who are temporarily absent on reference day are considered part of their usual household.

Private household refers to a person or group of persons who occupy the same dwelling and do not have a usual place of residence elsewhere in Canada or abroad.²³³ The household universe is divided into 2 sub-universes on the basis of whether the household is occupying a collective dwelling or a private dwelling. The latter is a private household. Private household is the statistical unit used in most social surveys at Statistics Canada.

Census family is defined as a married couple and the children, if any, of either and/or both spouses; a couple living common law and the children, if any, of either and/or both partners; or a lone parent of any marital status with at least one child living in the same dwelling and that child or those children.²³⁴ All members of a particular census family live in the same dwelling. A couple may be of opposite or same sex. Children may be children by birth, marriage, common-law union or adoption regardless of their age or marital status as long as they live in the dwelling and do not have their own married spouse, common-law partner or child living in the dwelling. Grandchildren living with their grandparent(s) but with no parents present also constitute a census family.

Economic family refers to a group of 2 or more persons who live in the same dwelling and are related to each other by blood, marriage, common-law union, adoption or a foster relationship.¹⁰⁷ A couple may be of opposite or same sex. By definition, all persons who are members of a census family are also members of an economic family. Examples of the broader concept of economic family include the following: 2 co-resident census families who are related to one another are considered 1 economic family; co-resident siblings who are not members of a census family are considered 1 economic family; and nieces or nephews living with aunts or uncles are considered 1 economic family.

Appendix E: Future work

Table E1 summarizes recommendations specific to each stratifier from the expert working group members for future work and development. In addition, CIHI is currently engaging with experts to develop definitions for racial and ethnic identities. Other stratifiers identified at the pan-Canadian dialogue, such as language, sexual orientation, disability and immigrant status, will also be considered for development.

Table E1 Proposed future work for stratifiers defined in this report

Stratifier	Ideas proposed for future work by expert working group members
Age	<ul style="list-style-type: none"> Examine the need for and feasibility of developing guidelines for selecting or prioritizing indicators to measure age-related inequalities in health care.
Sex	<ul style="list-style-type: none"> Examine the development of (and need for) an additional stratifier to collect information on individuals who have changed their sex medically. This may include individuals who are trans or have an intersex condition.
Income	<ul style="list-style-type: none"> Examine the limitations of existing approaches for measuring income-related inequalities among older adults and, if needed, develop new methodologies. For example, while income remains an important indicator of socio-economic status among older adults, measures of wealth also show substantial and independent links with inequalities in health care services in this population (i.e., net of income and other socio-economic status indicators).^{184, 235–237}
Education	<ul style="list-style-type: none"> Investigate the potential for routine measurement of health literacy, since there is no current pan-Canadian source of literacy or health literacy data (a one-time survey was conducted by Statistics Canada in 2003).²³⁸ Examine the use of household educational attainment over time, as the education level of the population is increasing as a larger proportion of Canadians pursue post-secondary education over time.¹²
Geographic location	<ul style="list-style-type: none"> Evaluate new methodologies accounting for varying degrees of rurality to better distinguish between rural and remote areas at a pan-Canadian level (e.g., the new index of remoteness being developed by Statistics Canada).¹³⁵ Develop a recommended pan-Canadian approach to defining travel burden and guidelines for use. Work with jurisdictions and Indigenous partners to complement current geographical categorizations with information on Indigenous populations on reserve, given that their unique governance and organization of health services may help explain observed inequalities in health care access, quality and outcomes.

Appendix F: Text alternative for figures

Figure C1: Northeastern Ontario by 2016 SACtype showing large CSD classified as SACtype 6 located directly above Timmins (classified as SACtype 3)

This figure shows an enlarged section of northeastern Ontario by CSD and highlights a large CSD located directly to the north of Timmins that is assigned SACtype 6 and therefore considered rural/remote. The figure also shows that Timmins is classified as SACtype 3 and therefore considered urban. This figure illustrates a limitation of using SACtype, which is that the entire large CSD is classified as weak metropolitan influence because many people commute to the Timmins urban centre; however, this CSD likely includes residents who would more realistically be classified as no metropolitan influence.

Source

Statistics Canada. 2016 Census — Boundary files (census subdivisions).²²³

Figure C2: Saskatchewan by 2016 SACtype showing CSDs classified as SACtype 7 located in close proximity to Saskatoon and Regina (classified as SACtype 1)

This figure shows Saskatchewan by CSD and shows that CSDs located near Saskatoon and Regina are classified as SACtype 7 (no metropolitan influence) and therefore considered rural/remote. The figure also shows that Saskatoon and Regina are classified as SACtype 1 (CMA) and therefore considered urban. This figure illustrates a limitation of using SACtype, which is that the CSDs located near Saskatoon and Regina are classified as no metropolitan influence, possibly because of factors such as low commuter flows due to a high proportion of self-employed residents or reliance on tourism, rather than due to a true lack of metropolitan influence.

Source

Statistics Canada. 2016 Census — Boundary files (census subdivisions).²²³

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