

Urban Income-Related Health Inequalities in Canada

City-Level Results in Health System Use and Self-Reported Indicators

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About the Urban Public Health Network

The Urban Public Health Network (UPHN) is a network of Medical Health Officers working to address public health issues in urban populations in Canada. Its members are responsible for overseeing and administering public health systems and services in the largest urban centres in each province. Altogether, their combined jurisdiction spans more than half of the Canadian population. The network augments their efforts by partnering and collaborating with a variety of common-cause governmental and non-governmental organizations.



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Please note that the analyses and conclusions presented in this document reflect the views of the authors and do not necessarily reflect those of the individuals or organizations mentioned above.

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Executive Summary

Our cities, neighbourhoods and communities are the primary settings in which we live our lives and realize our health. This study provides a descriptive portrait of income-related health inequalities in the largest cities in each of Canada's provinces. We find that there are great differences in inequalities between cities and that much of this variation is driven by differences in the outcomes of their poorest communities. More research is needed to fully understand these differences so that we can more effectively reduce health inequalities and improve population health in urban Canada.

Income-related health inequalities are present across all of urban Canada and have detrimental physical, economic, and ethical implications for both individuals and populations. In this report, we report on overall population rates and health inequalities in 29 indicators of health spanning both health system use and self-reported indicators at the city level for 19 cities throughout the country over three five-year intervals (2001-2005, 2006-2010, and 2011-2015). We use neighbourhood income as our proxy for socioeconomic status and compare the health outcomes and health system use of Canadians residing in the richest and poorest neighbourhood income quintile in each city.

We find that health inequalities are common in all of the cities we considered. Although overall rates may have improved over time for some indicators since the early 2000s, inequalities therein have either not improved or, in a handful of instances, increased. Overall, health inequalities are highly variable between cities.

- The largest absolute differences in health system use indicators were observed in day surgery for early childhood dental caries, a condition that is preventable via both individual and population-level preventive action.
- The greatest income-related health inequalities appear to be found in Canada's medium to large cities, not in its largest cities.
- Inequalities also tend to be greater in certain regions. For instance, on the Prairies and in regions of Ontario that have historically been heavily reliant on manufacturing, inequalities were greater for hospitalizations for several ambulatory care-sensitive conditions and injury.
- The Prairies also tend to have greater inequalities in self-reported mental health and overall health.

- Higher inequalities in injury-related hospitalizations and self-reported stress are more commonly observed in the Maritime cities and in Victoria.
- Overall, health inequalities tend to be lower in the province of Quebec.

Most of the differences we observe between cities appear to be driven by differences in the outcomes of their poorest neighbourhoods and not their richest. That is, rates among the richest neighbourhoods in each city are less variable than those among the poorest.

Taken together, these results point to cities as critical locations for the realization of population health and health equity in Canada. Also, it is among their poorest neighbourhoods that efforts to reduce inequalities are most likely to be able to have the greatest impact. The results also underscore the need for sustained investment in city-level interventions that explicitly target inequalities and research so that we can better understand key mechanisms that operate at this level.

Key Findings

1. Income-related health inequalities are widespread in Canada's cities.
2. Income-related health inequalities vary considerably between cities and among indicators.
3. Differences in income-related health inequalities between cities are primarily driven by differences in the health outcomes of their poorest neighbourhoods.
4. Urban income-related health inequalities are not generally improving; most have persisted over the past fifteen years, and some have worsened.



Introduction

When international comparisons are made, Canadians continue to be among the healthiest in the world,^[1] but this health is not experienced equally across subpopulations.^[2–4] Our health is largely determined by factors such as our income, education, employment, and the environments in which we live and work, known collectively as the social determinants of health.^[5] Urban environments provide many opportunities to enhance our health, but also have the potential to be harmful, depending on their design and the programs and policies implemented.^[6,7]

“Health inequalities”¹ traditionally refer to differences in health due to either biology or social determinants, which include socioeconomic status. Many health inequalities are also health inequities: health inequalities that are the result of systemic factors and which are beyond any individual’s control.^[5,8] Broadly speaking, the health of the healthiest members of society provides us with a benchmark that all members of society should be able to realize. In our society, the healthiest members are most often its highest earners.^[9–12]

We explored neighbourhood income-related inequalities² in 19 cities³ across Canada in 29 indicators drawn from health system use data calculated by Canadian Institute for Health Information (CIHI) and self-reported survey data collected by Statistics Canada. The cities examined are members of the Urban Public Health Network (UPHN)—Victoria, Vancouver, Edmonton, Calgary, Saskatoon, Regina, Winnipeg, London, Hamilton, Toronto, Ottawa, Montreal, Sherbrooke, Quebec, Fredericton, Saint John, Moncton, Halifax, and St. John’s—and represent the largest urban centres in each province⁴, excluding Prince Edward Island⁵. The primary objective of this report is to provide a descriptive portrait of city-level inequalities in Canada in order to help inform local public health practice and motivate more in-depth study of local determinants going forward. In later sections of this report, we consider some of the mechanisms that may be driving differences in inequalities between cities.

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1. We use “health inequalities” in the plural to underline the multidimensional nature of health.
 2. We use the terms “income-related health inequalities”, “health inequalities”, and “inequalities” interchangeably.
 3. In this report, “city” refers to “Census Metropolitan Area (CMA)” and “municipality” refers to “Census Subdivision” as defined by Statistics Canada. Municipalities in Canada are defined jurisdictional boundaries that are oftentimes arbitrary, but CMAs reflect interconnected urban communities.^[13] The largest CMAs of Vancouver, Toronto, and Montreal contain multiple UPHN members.
 4. The exception is Kitchener-Cambridge-Waterloo, Ontario. Although this CMA is larger than the CMA of London, Ontario, we do not include it in this analysis as it lacks a primary large urban centre. Instead, it is made up of three medium-sized urban centres. Also, Kitchener, Cambridge, and Waterloo are not UPHN members.

We observed that income-related health inequalities are a universal feature of urban life in Canada—every city we examined had income-related health inequalities. However, different kinds of cities (for example, larger versus smaller cities or cities in specific regions) exhibited varying degrees of inequality, and much of the variation reflected differences in the health outcomes of people living in the poorest neighbourhoods. We also found that since the early 2000s, despite considerable changes in overall indicator rates, health inequalities tended to persist, and in a few instances worsened.

These findings suggest that cities are an important focus of influence for health in urban Canada. They also suggest that in the years ahead, addressing health inequalities and improving health in urban Canada will require investments and policy choices that are targeted at improving the capability of those living in the poorest neighbourhoods to achieve health.

Project and Report Background

A vast and growing majority of Canadians live in cities.^[15] This has important implications for people’s health. Urbanization poses many challenges to people’s health and the provision of health services, but it also offers opportunities.^[6,7] For example, while greater population density in cities can lead to overcrowding and pollution, people living in cities have better access to health services and are more likely to benefit from health promotion efforts.^[16–18]

In 2016, the UPHN began working with CIHI, Statistics Canada, and the Public Health Agency of Canada to update the record on urban health inequalities in Canada under the project banner “Measuring Trends in Health Inequalities in Cities” (MTHIC). Although health inequalities have been calculated for various health outcomes for several Canadian cities in recent years, a systematic and comparable study has not been undertaken since CIHI’s 2008 report, *Reducing Gaps in Health: A Focus on Socio-Economic Status in Urban Canada*.

This report presents a summary of results from the first phase of MTHIC. Hospital administrative and self-reported survey data were used to explore income-related health inequalities at the city and municipal levels over time, in each of the UPHN member cities.

5. Prince Edward Island is the only province in Canada that does not contain a Census Metropolitan Area.^[14]

Throughout Canada, income plays a critical role in determining access to health-related services and individuals capability to improve their own health. These factors in turn play a role in determining overall health status. [19,20] Still, there are many other individual, social, and environmental factors that mediate health inequalities. In future phases of MTHIC, we plan to explore the role of these other factors, and how they interact with income. We also plan to explore health inequalities in indicators found in other sources of data.⁶

Health Inequalities in Urban Canada

Recent studies exploring trends in health inequalities at the national and provincial levels found that inequalities are evident when several indicators of health are considered, and are present across and within populations disaggregated by ethnicity, socioeconomic status (SES) and immigration status.[2,3] However, the portrait of these inequalities at the city level is limited. Most of the studies that have been carried out have presented findings for Quebec or Ontario and a few have investigated urban inequalities in British Columbia or the Prairies. There are currently very few studies investigating health inequalities in cities in Atlantic Canada.

Previous studies examining health inequalities at a city level in Canada have found that regardless of the city, health outcome, or method of quantifying SES, the finding of pronounced health inequalities exists.[21–25] Studies have explored city-level health inequalities in a variety of indicators and outcomes, including general health,[26–30] mental health,[31–33] chronic conditions,[24,26,32,34,35] smoking,[23] and location of dental practices.[36] The majority of studies examining health inequalities at the city level have used education or income as a basis for quantifying inequality. However, a handful of studies have used indices related to place of birth, immigrant or refugee status,[37–41] employment,[42] and physical attributes of the neighbourhood.[43] Studies have also included mapping techniques to present inequalities geographically.[44,45]

The last report to systematically explore urban health inequalities in Canada was Reducing Gaps in Health: A Focus on Socio-Economic Status in Urban Canada, published by CIHI in 2008. Overall, this report found inequalities in health consistently across all 15 CMAs analyzed, with some indicators (i.e., substance-related disorders) having higher levels of inequality than others (i.e., injuries in children). Inequalities were also found to be highly variable between CMAs. When Reducing Gaps in Health was initially published, using data to explore city-level inequalities was a relatively new concept.[46]

6. For example, indicators of mortality found in vital statistics data or infection found in public health surveillance data.

Now, we can pool data to explore health inequalities at lower levels of geography than the city (e.g., at the municipality level) and over time.

The primary objective of MTHIC is to work with data sources in innovative ways to present a portrait of city-level health inequalities in Canada. Calculating health inequalities for many cities in the same fashion allows us to draw comparisons and provides us with an opportunity to learn from differences. In this report, we identify a number of key results and questions that can inform policy-making and practice, and future research.

Urban and Rural Contexts

There are important differences between urban, small-town, and rural environments and in how these differences are associated with health outcomes and health inequalities.[47–49] Urban populations represent more than 80% of the overall Canadian population and this share is increasing.[15] As such, an in-depth understanding of how health is mediated by urban environments is essential for understanding how health can be improved in Canada.[50]

Among other factors, the scope and diversity of opportunities and resources in urban areas tends to disproportionately attract both richer and poorer individuals resulting in a risk of greater social inequalities.[51] The causal processes that give rise to this are complex. On the one hand, cities attract individuals of high socioeconomic status by providing advanced employment opportunities and diverse lifestyle choices.[52] Urban populations also tend to be younger.[53] On the other hand, the scope and concentration of provision of public services in cities, such as affordable public transportation, attract individuals of lower socioeconomic status.[54,55]

“An in-depth understanding of how health is mediated by urban environments is essential for understanding how health can be improved in Canada.”

Considering urban and rural differences is important when assessing the impact of health systems. Low population density, seen in rural areas, mediates the way health care, and by extension health inequality, is managed.[56,57] For instance, people in cities are more likely to live near health service providers,[58,59] but the steeper social gradient and increased demand for services may also be more likely to crowd out individuals with lower income.[60,61] Olah et al. found that medical staff in Toronto were more responsive to the needs of researchers posing as high-income individuals than those posing as low-income individuals.

Rural communities also tend to be more geographically dispersed and less segregated than urban communities.[49,62] Whereas a neighbourhood of a few hundred people in an urban environment can live within one apartment block, people in rural settings can be spread out over several kilometres. In these cases, area-based measures of inequality such as the one used in this study may be a less effective indicator of socioeconomic status.[47]

Overall, the unique dynamics characteristic of urban settings tend to result in income-related health inequalities that are greater than those experienced in rural settings and may change as cities grow.⁷ Recognizing these dynamics is key to developing policy options that address the needs of disadvantaged groups.

Socioeconomic and Income-Related Health Inequalities

Income has been identified as one of the most influential social determinants of health[9–12] and is closely linked to many other factors such as education, occupation and housing.[65]⁸ Income and, more broadly, socioeconomic status[68] have been shown to be important determinants of nearly all health outcomes, including infant mortality, reduced life expectancy, mental illness and chronic conditions.[69–73] For example, in urban Canada, hospital admission for ambulatory care-sensitive conditions (ACSC)—that is, chronic conditions that are ideally treated in non-hospital environments—are consistently greater in neighbourhoods with low socioeconomic status than those with high socioeconomic status. For example, hospital admissions for the ACSC chronic obstructive pulmonary disease (COPD) were three times higher in low socioeconomic status neighbourhoods than in high socioeconomic status neighbourhoods.[70]

While lower socioeconomic status and income are not the only important stratifiers of health in Canada,[28,48,74,75] they reflect a critical dimension of access and opportunity that mediates inequalities in other stratifiers.[9–12,76] As such, investigations into health inequalities often begin by exploring those that are income-related.

7. For example, research has found that income inequalities tend to rise as cities grow.[63,64]

8. In the past, researchers have used more complex indicators of socioeconomic status, like Pampalon's Deprivation Index[66] or the Canadian Marginalization Index,[67] which take into account aspects of socioeconomic status other than income.

Measuring Urban Health Inequalities in Canada

Sources of Health Data

Health information in Canada is primarily available from four main sources: hospital records (administrative health data), self-reported survey responses, vital statistics, and public health surveillance.^[77] Presenting a complete portrait of health inequalities in Canada's cities entails making use of these data in a consistent and comparable way.

Hospital administrative data provides us with indicators of people's use of the health system. This study uses health system indicators from CIHI's^[78] Measuring Trends in Health Inequalities in Cities: Hospitalization and Day Surgery Indicator Results, Overall and by Census Metropolitan Area – Data Tables, which used demographic (e.g., age, sex), clinical (e.g., diagnosis) and administrative (e.g., data of admission/date of visit) information from several of its data holdings:

- Discharge Abstract Database–Hospital Morbidity Database (DAD-HMDB);
- National Ambulatory Care Reporting System (NACRS);
- Hospital Mental Health Database (HMHDB); and
- Ontario Mental Health Reporting System (OMHRS).

The self-reported survey data used in this study is from Statistics Canada's Canadian Community Health Survey (CCHS), which collects health and socio-demographic information on an ongoing basis for a large sample of Canadians 12 years of age and older. Please refer to associated technical notes for more information on CIHI's data holdings^[79] and our use of the CCHS.^[80]

In this project, Statistics Canada's Census Metropolitan Area (CMA)⁹^[13] was used to define a city.¹⁰ A CMA is not the same as a municipality, which is an administrative unit and whose boundaries are defined by local and regional governments. Rather, a CMA is a geographical unit created by Statistics Canada to more directly reflect the ways that people live in and experience their urban environments. At the risk of oversimplification, two municipalities are included in the same CMA if enough people live and work between them. See the technical notes^[79,80] for further details about the geographies used in this analysis.

9. See Footnote 2.

10. For example, in this report, when we say "Toronto" we are referring to the CMA of Toronto, which includes the municipality of Toronto as well as adjacent municipalities. Insofar as we wish to refer specifically to the municipality of Toronto, we say so in as many words, or we refer to it by its official name: City of Toronto.

Income-related health inequalities were examined in 19 CMAs, which reflect the UPHN membership and the urban centres in 9 of Canada's 10 provinces.¹¹ All individuals residing outside of the 19 selected CMAs were excluded from this project.¹²

Since the city level is a relatively small unit of analysis for health inequalities, data was pooled across five-year intervals between census years: 2001-2005 (not available in hospitalization data), 2006-2010, and 2011-2015. This approach is in line with best practices.^[81]

Indicators of Health System Use, Status and Behaviour

UPHN members were surveyed about the most important indicators for reporting on health inequalities in their communities. This consultation was used to prioritize the CIHI health system use indicators and self-reported indicators in the CCHS for inclusion in this project. The health system use indicators included in this project are those which are reported on by CIHI and which have the greatest data availability for the timeframe of interest. The indicators in this project are hospitalization for:

- Ambulatory care-sensitive conditions for adults less than 75 years of age (overall and for angina, asthma, congestive heart failure [CHF], chronic obstructive pulmonary disease [COPD], diabetes, and epilepsy) (fiscal years 2006-2007 to 2015-2016)
- Opioid poisonings (fiscal years 2007-2008 to 2015-2016)
- Conditions entirely caused by alcohol (fiscal years 2014-2015 to 2015-2016)
- Heart attacks (fiscal years 2011-2012, 2013-2014 to 2015-2016)
- Stroke (fiscal years 2011-2012 to 2015-2016)
- Injury (overall and by falls and motor vehicle accident) (fiscal years 2007-2008 to 2015-2016)
- Self-injury (fiscal years 2009-2010 to 2015-2016)
- Day surgery for childhood dental caries (fiscal years 2010-2011 to 2015-2016).

Health system use indicators are presented per 100,000 population, age-adjusted to the 2011 Canadian Standard Population. More detail on the indicators and data availability are provided in CIHI's technical notes.^[79]

11. See Footnote 4.

12. The Ottawa-Gatineau CMA is partially distributed in both Ontario and Quebec. This greatly complicates access to and analysis of health systems usage indicators. As a result, Quebec sections of the CMA were excluded from the analysis. They were included in the analysis of self-reported indicators.

Self-reported health outcome variables were selected to quantify health inequalities in Canada as broadly as possible while also taking into account limitations of the CCHS. Selected indicators needed to have been measured consistently over 15 years (from CCHS cycle 1.1 in 2000 until 2015). Due to the redesign of the CCHS in 2015, some indicators that were consistently reported in prior years are not reported in 2015 and subsequent years. Details pertaining to variable changes and availability are reported in the technical document.^[80]

The CCHS indicators included in this study are:¹³

- Excellent or very good self-reported health
- Excellent or very good self-reported mental health
- Physical inactivity during leisure activities
- BMI of 25 or greater (classified as overweight or obese)
- daily or occasional smoker
- Alcohol bingeing (having 5 or more drinks on one occasion, at least once a month)
- Presence of at least 3 chronic disease risk factors (self-reported physical inactivity, overweight or obese, current smoker or alcohol bingeing)
- Sometimes or often limited in the participation in activities due to a chronic condition
- Current influenza immunization (received flu shot within the last year)
- Diagnosed with diabetes
- Diagnosed with asthma
- Self-reported “not at all” or “not very stressful” days for age 15 and over
- Diagnosed with a mood disorder

All indicators were collected for every cycle of the CCHS. Due to relatively small sample sizes, results based on lower-incidence events, such as self-reported suffering from a diagnosed mood disorder, are less reliable. Self-reported outcomes are presented per 100 (proportion) and age-adjusted to the 2011 Canadian Standard Population. More information is available in associated technical notes.^[80]

13. For a few of our self-reported indicators, questions asked in the CCHS have changed in ways that either prevent us from being able to combine them over time or complicate how we do so. The technical notes^[79] detail which specific years were combined for each indicator and how.

Stratifying Indicators by Income

Income can be measured at the personal or area level.^[82,83] In many instances, using an area-level approach may be the only available option for measuring health inequalities, as health administrative databases often have limited scope in collecting equity stratifier data for individuals. Residential postal codes, however, are often available and can be used to obtain aggregate area-level equity stratifier data such as neighbourhood-level income.

Statistics Canada's Postal Code Conversion File Plus (PCCF+) is a widely used tool for carrying out area-level health inequalities analysis in Canada.^[84,85] The PCCF+ program assigns postal codes to a range of Statistics Canada's standard geographic areas and geographic identifiers such as area-level income quintiles that can act as area-level equity stratifiers. The assignment is based on population-weighted random allocation for postal codes that link to more than one geographic area.

In this project, the PCCF+ was used to assign neighbourhood-level income quintiles based on the latest census for each pooled five-year interval.¹⁴ The PCCF+ provides two different neighbourhood income quintile measures: CMA area-based (city level) and national-based. This study focuses on health inequalities between neighbourhood income quintiles created at the city level in order to control for regional differences in standards of living and buying power.

Individual- and area-level approaches provide different but complementary information.^[86,87] For instance, individual-level income measures can be conceptualized as capturing purchasing power and act as proxies for material well-being,^[88] whereas area-level income measures reflect social and economic characteristics of neighbourhoods, such as the built environment and access to services.^[89] Area-level measures of income may provide a more stable measure of socioeconomic status that is less affected by yearly fluctuations.^[90]

When only area-level measures are available, one should exercise caution using these aggregate measures as a proxy for individual-level characteristics. The substitution may not be valid, particularly in areas that have a high degree of variation in the socioeconomic composition of their residents. See the technical notes^[79,80] for more information on how the neighbourhood income quintiles were created by Statistics Canada for the PCCF+.

14. Specifically, 2001 for the 2001-2005 interval; 2006 for the 2006-2010 interval; and 2011 for the 2011-2015 interval.

Summarizing Inequalities

Measures of inequality summarize differences between less and more advantaged groups, and are an important tool for improving our understanding of diverse outcomes and informing decision-making. [91–96] This study summarizes inequalities using the rate ratio (RR) and rate difference (RD), as they are easy to understand, communicate to a variety of audiences and have been widely used in health inequalities monitoring.[84]

The rate ratio is commonly referred to as a relative measure of inequality. It is the indicator rate for the poorest neighbourhood income quintile divided by the rate of the richest neighbourhood income quintile. This measure is highly sensitive to the rate of the outcome in the poorest neighbourhood income quintile.

$$\text{Rate Ratio (RR)} = \frac{\text{Rate Among Poorest}}{\text{Rate Among Richest}} \quad (1)$$

The rate difference is commonly referred to as an absolute measure. It is the difference between the poorest neighbourhood income quintile and richest neighbourhood income quintile.

$$\text{Rate Difference (RD)} = \text{Rate Among Poorest} - \text{Rate Among Richest} \quad (2)$$

When reviewing health inequalities, it is helpful to keep in mind the underlying indicator rates, as these can greatly influence measures of inequality. For example, if one considers an indicator with low rates, such as opioid poisoning hospitalization, a small absolute difference can result in a large relative difference. For an indicator with high rates, such as day surgery for childhood dental caries, a large absolute difference can result in a small relative difference.

Please refer to technical notes [79,80] for more information on these measures. To learn more about measuring and reporting on health inequalities, see [CIHI's Measuring Health Inequalities: A Toolkit](#).

Comparing Rates and Inequalities Between Cities and Over Time

In this report, we present several comparisons in overall rates and inequalities between cities in 2011–2015 and within cities over time. In **Appendix A**, we provide a detailed breakdown of all of the rates and inequalities for each city and levels of statistical significance in regard to salient comparators.

Indicator rates and inequalities for individual cities were compared to the overall rate for all UPHN cities. If a city's rate was significantly higher than the overall rate, then that city's rate was considered greater than the overall rate. If its rate was significantly lower, then that city's rate was considered lower than the overall rate. RR and RD for indicators for individual cities were also compared to the overall RR and RD for the same indicator. If both the RR and RD for a city was significantly higher than the overall RR and RD for an indicator, the inequality was considered greater than the overall inequality for that indicator. If both the RR and RD for a city were significantly below the overall RR and RD for an indicator, the inequality was considered lower than the overall inequality for that indicator.

Indicator rates and RD for individual cities (2011–2015) were compared in the same ways to their rates at an earlier time point. With the exception of motor vehicle traffic injury (2007–2010), falls hospitalization (2007–2010) and self-injury hospitalization (2009–2010), the over-time comparison of health system use outcomes uses the pooled data from 2006–2010. Self-reported outcomes were compared to 2001–2005.

All comparisons discussed in this report were made at the 95% confidence level using two-sample t-tests. For comparisons of RR, the log of the RR was used to avoid statistical non-normality issues that arise when two ratios are compared.



Overall Indicator Results and Health Inequalities for UPHN Cities

This study found considerable variation in overall rates for both health system use and self-reported indicators. Health inequalities in Canada operate in many dimensions of health. **Figures 1** and **2** contrast age-standardized health outcomes in the poorest and richest quintiles in the 19 cities examined in this study. In each figure, the dark Orange bars depict the indicator rate among the poorest neighbourhood income quintile and the light orange the indicator rate among the richest neighbourhood income quintile. The rate difference is the difference in height between the two bars; the rate ratio is calculated by dividing the height of the dark bar by the height of the light bar.

An important finding, illustrated in **Figures 1** and **2**, is that health inequalities are widespread across all of the indicators, and while some are more pronounced than others, overall, the data indicates that the poorest neighbourhoods tend to experience significantly worse health outcomes than their richest counterparts. Some outcomes are higher for the richest neighbourhoods compared to the poorest (see **Figure 2**), but these are for positive outcomes, such as reporting having very good mental health or overall health.

“Overall, the data indicates that the poorest neighbourhoods tend to experience significantly worse health outcomes than their richest counterparts.”

The largest absolute difference in health system use indicators was observed in day surgery for early childhood dental caries. Between 2011 and 2015, 504 per 100,000 children living in the poorest neighbourhoods underwent surgery to treat dental caries (cavities or tooth decay)—an outcome that is preventable and, when caught early, treatable without surgery.^[97] In contrast, the rate for dental surgery was 60% lower for children living in the richest neighbourhoods (200 per 100,000 children). For self-reported health outcomes, the largest absolute differences between poor and rich neighbourhoods were observed in the proportion of respondents who reported being physically inactive in recent months (53% compared to 39% – a 14% difference), as well as those reporting that their health is very good or excellent (54% compared to 69% – a 15% difference).

15. In Figures 1 and 2, we rank differences between the poorest and richest quintiles by their absolute values because some differences are negative—that is, the healthier group exhibits more prevalent health outcomes than the less healthy group. This is because the health indicator measures a preferred outcome as opposed to an illness or risky behaviour.

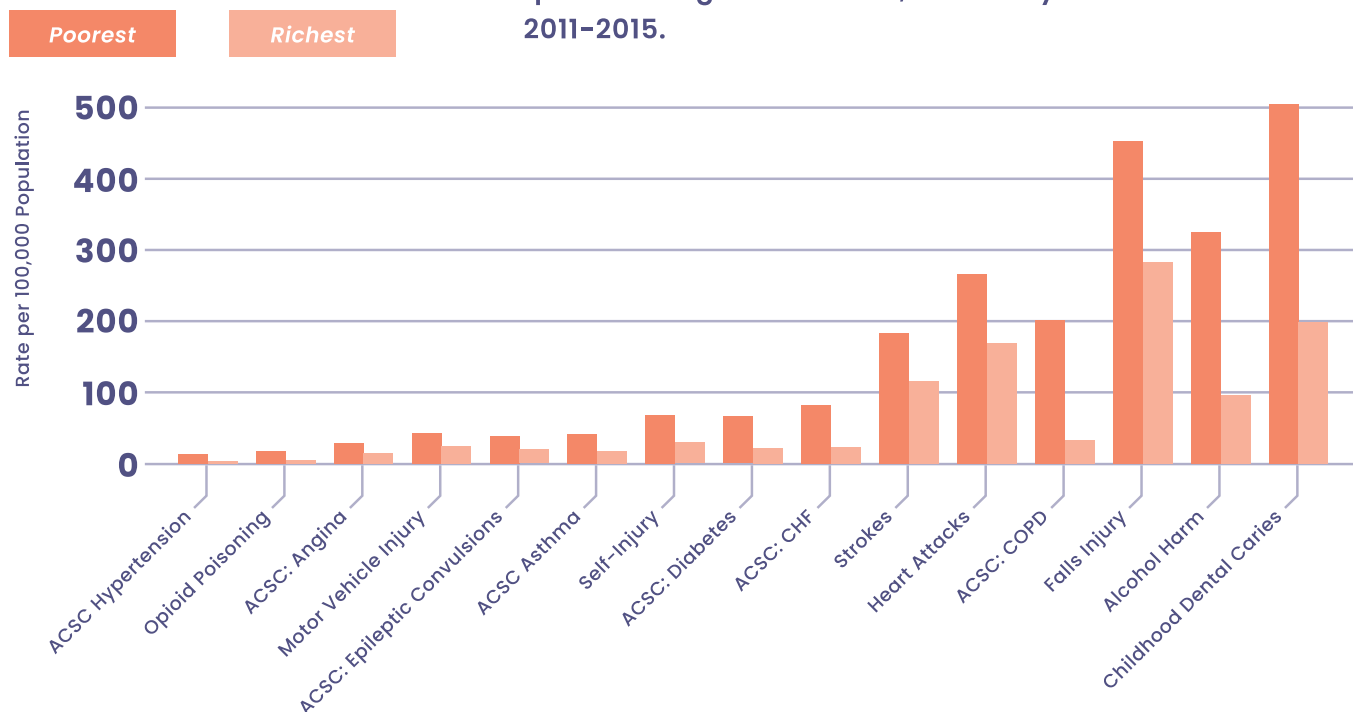
16. This study also found considerable variation in overall rates for both health system use and self-reported indicators. Complete detailed rates for every city are provided in Tables A1 and A2.

Large relative and absolute differences between poor and rich neighbourhoods with very good or excellent health (RR = 0.79; RD = -14.3%) and mental health (RR = 0.86; RD = -10.8%) suggest overall differences in well-being that cannot be attributed to a single illness or medical incident.¹⁷[98] For instance, a rate difference of -14.3% represents a difference in rates of individuals reporting very good or excellent health of no less than 14,300 per 100,000. This difference is considerably larger than the absolute differences observed among the health system usage indicators illustrated in *Figure 1*.

Inequalities across chronic disease risk factors such as smoking occasionally or more (RR = 2.15; RD = 12.6%) and having been physically inactive over the last three months (RR = 1.35; RD = 13.7%) are likely to be detrimental to health and increase the financial burden on the healthcare system.[99–101] “Multiple risk factors” from the CCHS is a composite measure that describes having at least three of the following risk factors: physically inactive during leisure activities, BMI of 25 or greater: classified as overweight or obese, daily or occasional smoker, and alcohol bingeing. Thirty percent of people from the poorest quintile reported having multiple risk factors, which was 8 percentage points higher than that of people from the richest quintile (22%).

Figure 1.

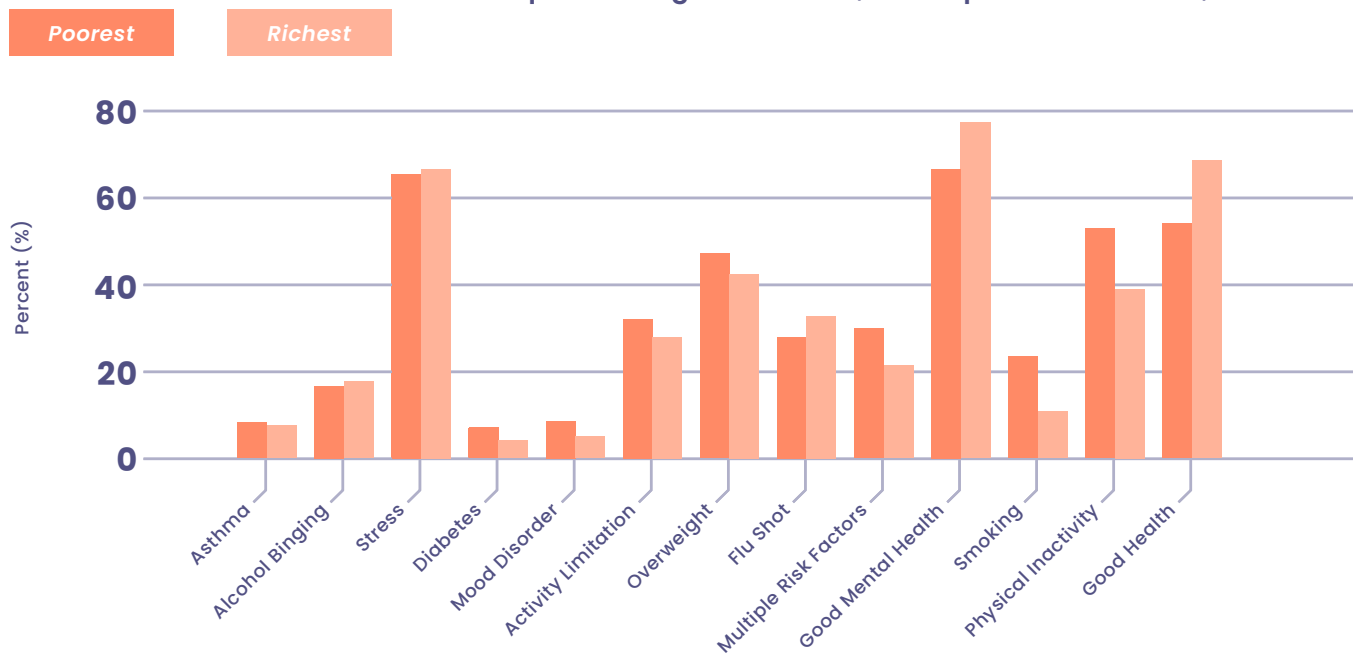
Overall age-standardized rates in richest and poorest income quintile neighbourhoods, health system use indicators 2011–2015.



Notes: Sorted from left to right by size of absolute inequality. ACSC: Ambulatory Care Sensitive Condition (hospitalizations for Canadians younger than 75). Alcohol harm data available only for 2014–2015 to 2015–2016. Data source: Measuring Trends in Health Inequalities in Cities: Hospitalization and Day Surgery Indicator Results, Overall and by Census Metropolitan Area — Data Tables, 2011–2105, CIHI.

Figure 2.

Overall age-standardized rates in richest and poorest income quintile neighbourhoods, self-reported indicators, 2011–2015.



Notes: Sorted from left-right by size of absolute inequality. Data source: Canadian Community Health Survey, 2011–2015, Statistics Canada.

The only instances where poorer health outcomes do not appear to differ between the richest and poorest quintiles occurred when people reported binge drinking during the past 12 months (RR = 0.94; RD = -1.0%) or whether they report feeling stressed most days (RR = 0.98; RD = -1.2). These results suggest that these experiences are common across income groups and that stratifying by other variables may provide further insight.

Differences in Inequalities Between Cities

With few exceptions, in every city examined, the poorest neighbourhoods were found to experience poorer outcomes for nearly every indicator. However, there were notable differences in the extent to which individual indicators identified inequalities. **Tables 1** and **2** summarize the indicator rates and inequality by city compared to all UPHN cities. As the data in **Tables 1** and **2** show, there is no simple or consistent story of health inequalities across Canada’s urban centres. There is no city in which health inequalities are all greater or lower than the combined group of all UPHN cities. Instead, we observe that different cities exhibit different patterns of health inequalities.

17. Rate ratio and rate difference for every city are provided in Tables A5, A6, A9, and A10.

Table 1

Differences in age-standardized rates and inequalities between each city and overall rate, health system use indicators, 2011–2015.

	Overall Rate			Inequalities (RD + RR)										
				Lower Than ↓			Similar				Higher Than ↑			
Victoria	↑	↑	↓	↓	↓	↑	↑	↓	↓	↓	↑	↑	↑	↑
Vancouver	↑	↑	↓	↓	↓	↑	↑	↓	↓	↑	↑	↑	↑	↑
Calgary	↑	↑	↑	↑	↑	↑	↑	↓	↓	↑	↑	↑	↓	↑
Edmonton	↑	↑	↓	↓	↑	↑	↑	↓	↑	↑	↑	↑	↑	↓
Saskatoon	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Regina	↑	↑	↑	↑	↑	↑	↑	↑	↓	↑	↑	↑	↑	↑
Winnipeg	↓	↓	↓	↓	↑	↑	↓	↓	↓	↑	↑	↑	↑	↑
London	↑	↓	↓	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Hamilton	↑	↓	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↓
Toronto	↓	↓	↑	↑	↓	↑	↓	↓	↑	↓	↓	↓	↓	↓
Ottawa-Gatineau	↑	↓	↓	↓	↑	↓	↓	↓	↓	↓	↓	↓	↓	↑
Montreal	↓	↓	↑	↓	↑	↓	↓	↓	↓	↑	↓	↑	↓	↓
Sherbrook	↑	↑	↑	↓	↓	↓	↓	↓	↑	↑	↑	↑	↑	↑
Quebec	↑	↑	↓	↑	↓	↓	↓	↓	↑	↓	↑	↑	↑	↑
Fredericton	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Saint John	↓	↓	↓	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Moncton	↓	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Halifax	↑	↑	↓	↑	↓	↓	↓	↓	↑	↓	↑	↑	↑	↑
St. John's	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↓	↑	↑

Notes: All illustrated differences are statistically significant at 95% or more (two-tailed tests). RR: Rate Ratio. RD: Rate Difference. ACSC: Ambulatory Care Sensitive Condition (hospitalizations for Canadians younger than 75) For Alcohol Harm data is only available for 2014–2015 to 2015–2016. For Heart Attacks, data is available for 2011–2012 and 2013–2014 to 2015–2016. Data source: Measuring Trends in Health Inequalities in Cities: Hospitalization and Day Surgery Indicator Results, Overall and by Census Metropolitan Area – Data Tables, 2011–2015, CIHI.

Tables 1 and 2 provide a bird’s-eye view of health inequalities among each of the UPHN cities between 2011 and 2015 and how each compares to inequalities in the group overall. These tables convey two different kinds of information. First, the arrows indicate whether a city’s overall rate has fallen above or below the rate for the group as a whole for each indicator. Second, the colour indicates whether their inequalities have fallen above or below inequalities in the group as a whole, with the darkness of the shade of orange indicating whether they fell above, were statistically similar, or fell below.¹⁸ Inequalities were coded as falling above or below group inequalities only if both the rate ratio and rate difference were different in the same direction.¹⁹

18. If there is no arrow or the colour is medium orange, then the difference between the city-level rate or inequality is not statistically different from the group average.

19. For instance, the rate ratio can rise (drop) and the rate difference drop (rise) if the rates for the poorest and richest neighbourhoods fall (rise) by the same amount.

Table 2

Differences in age-standardized rates and inequalities between each city and overall rate, self-reported indicators, 2011–2015.

	Lower Than ↓			Similar				Higher Than ↑					
Overall Rate													
Inequalities (RD + RR)	Light Orange			Medium Orange				Dark Orange			Lightest Orange		
Victoria	↑	↓	↑		↓		↓		↑				
Vancouver	↓		↑	↓	↓	↓	↓	↓		↓	↑	↓	↓
Calgary		↓					↓				↑	↑	↑
Edmonton	↑		↑	↑	↑				↑		↑		
Saskatoon		↓	↑	↑							↑		
Regina			↑	↑	↑				↑				
Winnipeg	↑			↑		↑	↓		↑				↓
London			↑	↑			↑				↑		
Hamilton			↑	↑	↑		↓		↑				
Toronto	↓				↓	↓	↑	↓	↓			↓	
Ottawa-Gatineau	↑		↑				↓				↑	↑	
Montreal			↓		↑		↑			↑	↓		↑
Sherbrook			↓								↓	↑	↑
Quebec		↓	↓			↑		↑			↓	↑	↑
Fredericton				↑		↑					↑		
Saint John			↑	↑	↑	↑		↑	↑		↑		
Moncton			↑	↑		↑			↑			↓	↓
Halifax			↑	↑	↑	↑	↓		↑		↑		
St. John's			↑	↑	↑	↑		↑	↑	↓	↓		↑
	Asthma	Diabetes	Mood Disorder	Obesity	Smoking	Alcohol Binging	Physical Inactivity	Multiple Risk Factors	Activity Limitation	Stress	Flu Shot	Good Health	Good Mental Health

Notes: All illustrated differences are statistically significant at 95% or more (two-tailed tests). RR: Rate Ratio. RD: Rate Difference. Data source: Canadian Community Health Survey, 2011–2015, Statistics Canada.

For example, in **Table 1**, we see that Vancouver has an overall rate of ACSC: diabetes hospitalizations that is greater than the rate in all 19 cities combined—as indicated by the upward-pointing arrow—but, as indicated by the light orange colouring, its levels of inequality in this indicator are lower. We can also see that Saint John has rates and inequalities in this dimension that exceed the combined group of all UPHN cities.

Health inequalities tend to be lower in the largest cities. As evidenced when we scan from left to right in **Table 1**, there are many more indicators that show lower (light-coloured) relative levels of inequalities in Vancouver, Toronto, and Montreal than there are in mid-sized cities such as Victoria, London or Hamilton, and Sherbrooke.

This is a particularly salient result, since it is often assumed that health inequalities will tend to increase along with income inequalities, which tend to rise as cities grow.^[63,64] The greatest income-related health inequalities appear to be found in Canada's medium to large cities.

“Differences in income-related health inequalities between cities appear to be driven primarily by differences in the outcomes of their poorest communities.”

Inequalities also tend to be greater in certain regions. For instance, on the Prairies and in regions of Ontario that have historically been heavily reliant on manufacturing like Hamilton, inequalities were greater for hospitalizations for several ACSCs and injury. The Prairies also tend to have greater inequalities in self-

reported mental health and overall health. Higher inequalities in injury-related hospitalizations and self-reported stress are more commonly observed in the Maritime cities and in Victoria. Overall, health inequalities tend to be lower in the province of Quebec.

Although noteworthy, city size and region cannot explain all the differences that this project observes between cities. For example, Calgary appears to have lower inequalities compared to Edmonton, despite being in the same region of the country and being of a similar size. Similarly, differences in inequalities in some indicators between Toronto and Hamilton are too great to be explained merely by their size difference. Further investigation at the local level is needed to learn about and better understand these differences.

City health inequalities in this study were found to be greater than those identified in previous reporting on many of the same indicators at the provincial level.^[3] This result is consistent with previous studies that have observed that area-based income-related health inequalities tend to be greater in urban areas than in rural areas.^[47–49]

There is more statistically significant variation between cities in our results based on health system use indicators than for self-reported indicators. This, in large part, reflects differences in their sample sizes and scales. Sample sizes are much smaller for the self-reported results and are therefore less capable of capturing small differences. Relatedly, self-reported rates are cast in terms of percentages and health system usage rates in terms of rates per 100,000. For example, holding all else equal, 1000 individuals per 100,000 would have to change their health status within the poorest or richest neighbourhoods to change a rate difference in percentages by one point.

However, differences in variation between health system usage and self-reported results between cities also likely reflect the fact that many of the self-reported indicators, like feelings of stress or self-rated health, reflect overall assessments of well-being.^[102,103] As such, they may be less likely to be moved by events or policy changes that affect only a few people or one aspect of a person's overall health.

In a few cases, cities exhibit health inequalities for the self-reported indicators that do not follow the same income gradient as the group. This may reflect the sampling methodology (smaller sample) and measurement error, particularly in smaller cities.

What is Driving These Differences?

The primary objective of this report is to provide a descriptive picture of the extent of health inequalities in the UPHN cities. It is difficult—and ill-advised—to draw inferences based on these kinds of results about the causal forces driving these differences. Nonetheless, our descriptive picture exhibits a couple of general features that suggest important directions for future more in-depth study. Specifically, differences in income-related health inequalities between cities appear to be driven primarily by differences in the outcomes of their poorest communities.

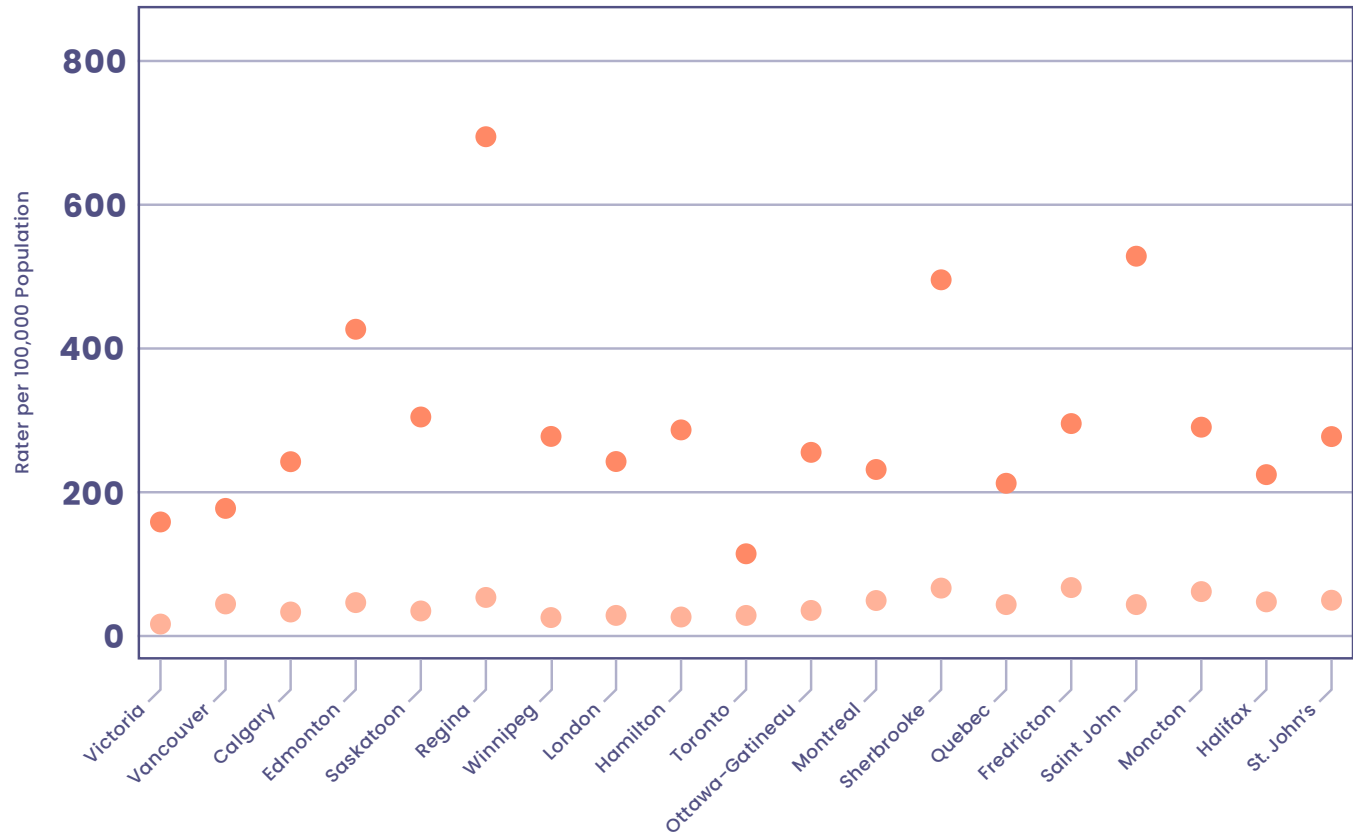
Figures 3 and **4²⁰** show the rates of ACSC: COPD hospitalizations and proportion of respondents reporting having very good or excellent mental health for the poorest and richest neighbourhood quintiles in each city. The rates among the richest quintiles are less variable than the rates among the poorest quintiles. These two examples are typical of what we observed in every other indicator except for two (self-reported obesity and feeling stressed most days). These results suggest that differences in income-related health inequalities that we are seeing between cities are driven by differences in the health of their poorest neighbourhoods.



Figure 3

Age-standardized rates for ACSC: COPD Hospitalizations for the poorest and richest income quintile neighbourhoods in each city, 2011–2015

● Richest ● Poorest



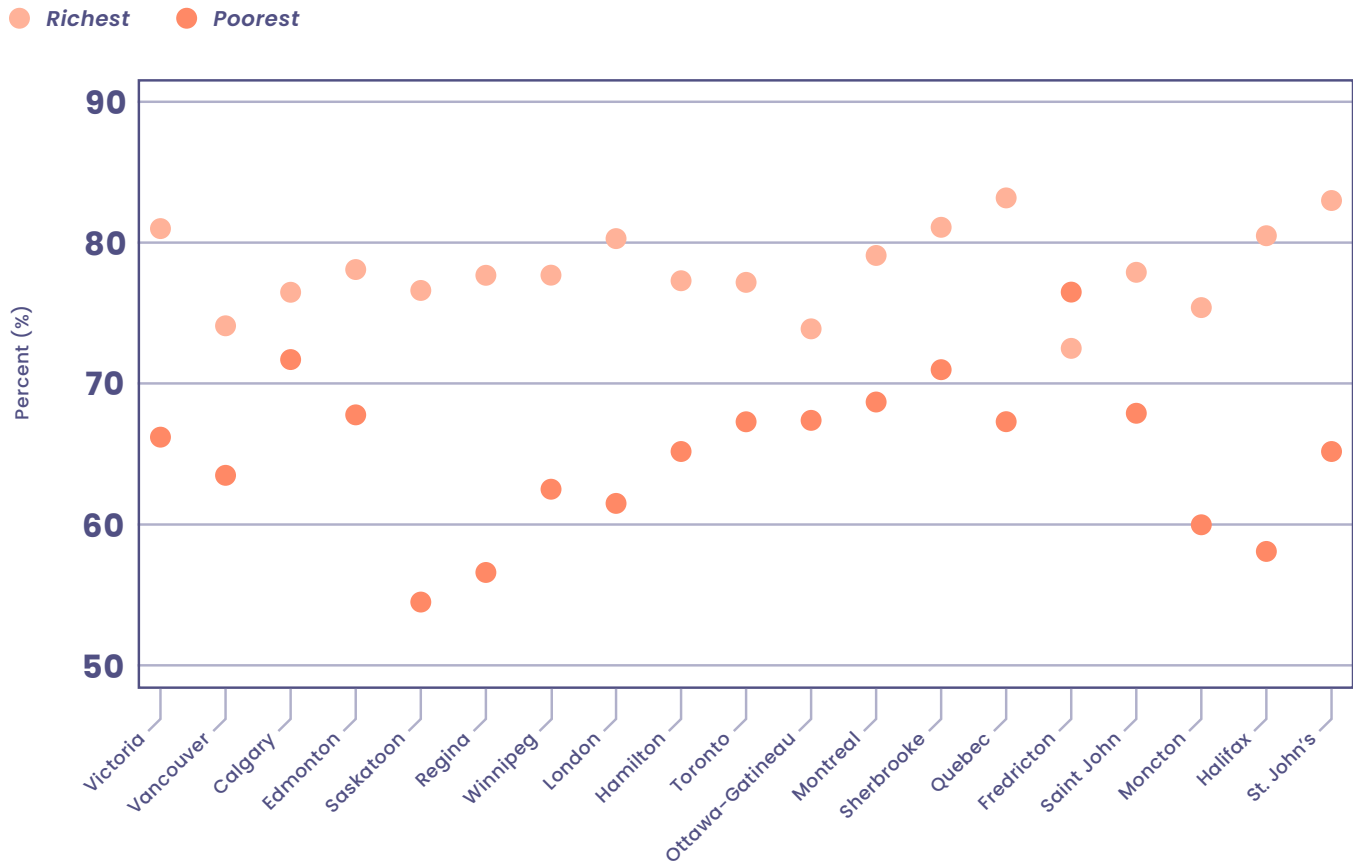
Notes: ACSC: Ambulatory Care Sensitive Condition (hospitalizations for Canadians younger than 75). COPD: Chronic Obstructive Pulmonary Disease. Data source: Measuring Trends in Health Inequalities in Cities: Hospitalization and Day Surgery Indicator Results, Overall and by Census Metropolitan Area – Data Tables, 2011–2015, CIHI.

Several factors are likely to contribute to differences in the health of poorer neighbourhoods between cities.^[104] The composition of poorer communities, differentiated by factors such as age, working status, marital status, income and immigrant status, is highly variable from city to city.^[105] Relatedly, poorer communities in different cities are likely to be presented with different opportunities. For example, Galster et al.^[106] found that individuals without full-time jobs and with children were more strongly impacted by neighbourhood inequality than others. Opportunities for employment, as well as the impacts of not finding employment, are likely to be largely determined by a combination of regional economic factors and social and health policies.^[107–110] Poorer neighbourhoods are also likely to be characterized by different natural and built environments.^[111–113]

20. Due to the large number of results generated in this study, this section illustrates patterns in a handful of indicators that are representative of overall patterns. Effort was made to select examples from each type of data used in this study.

Figure 4

Rate of very good or excellent self-reported mental health in poorest and richest income quintile neighbourhoods in each city, 2011–2015.



Data source: Canadian Community Health Survey, 2011–2015, Statistics Canada.

Tables 3 and **4** present summaries that are similar to those in **Tables 1** and **2**; however, rather than comparing each city’s rates and inequalities to those of the group, they compare each city in 2011–2015 to itself in an earlier period. Health system use indicator rates are compared to 2006–2010, and self-reported outcomes to 2001–2005.²¹

Between the early 2000s and 2015, there were considerable changes in overall rates among many of the indicators, but fewer changes in income-related inequalities (**Tables 3** and **4**). Inequalities in ACSC: COPD, CHF, and diabetes, and falls injury hospitalizations increased in several cities.²² There were no consistent changes across cities in health inequalities in any of the self-reported indicators.

21. Complete detailed changes in rates for every city are provided in Tables A3 and A4.

22. The changes in inequality measures for every city are provided in Tables A7, A8, A11, and A12.

Table 3

Change over time between 2006–2010 and 2011–2015 in age-standardized rates and inequalities for each city and overall rate, health system use indicators.

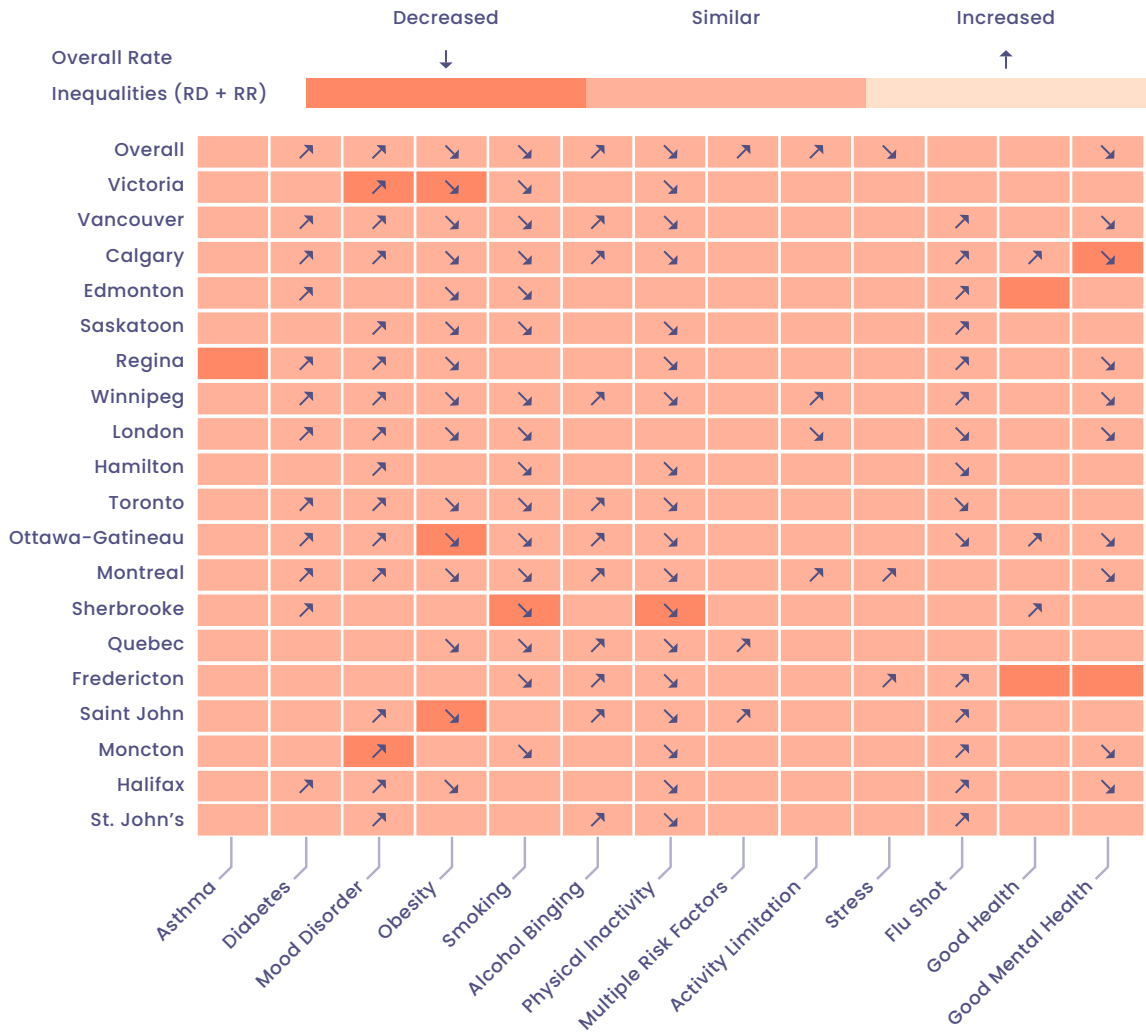
	Decreased ↓			Similar			Increased ↑				
Overall Rate											
Inequalities (RD + RR)											
Overall	↗	↘	↘	↗	↘	↘		↗	↘	↘	
Victoria	↗		↘		↗			↗	↘	↘	
Vancouver	↗	↘	↘			↗	↗	↗	↘	↘	
Calgary	↗	↘	↘		↗		↗	↗	↘		
Edmonton	↗	↘	↘	↗		↗	↗	↗	↘	↘	
Saskatoon	↗	↘				↗	↗		↘	↗	
Regina	↗	↘	↘	↗	↘		↗		↘	↗	
Winnipeg	↗	↘	↘	↘			↗		↘	↗	
London		↘	↘	↗	↗	↗	↗			↗	
Hamilton	↗	↘		↗	↘	↗	↗	↗	↘		
Toronto	↗	↘	↘	↘	↘	↗	↗	↗			
Fredricton		↘	↘	↘	↘		↘			↗	
Saint John	↗	↘	↘	↘				↘			
Moncton		↘	↘					↘	↘		
Halifax		↘	↘		↘		↗		↘	↗	
St. John's		↘	↘	↘	↘	↗		↗	↘		
	Opioid Poisoning	ACSC: Angina	ACSC: Asthma	ACSC: COPD	ACSC: CHF	ACSC: Diabetes	ACSC: Epileptic Convulsions	ACSC: Hypertension	Motor Vehicle Injury	Falls Injury	Self-Injury

Notes: All illustrated differences are statistically significant at 95% or more (two-tailed tests). RR: Rate Ratio. RD: Rate Difference. ACSC: Ambulatory Care Sensitive Condition (hospitalizations for Canadians younger than 75). Comparisons for Injury, Motor Vehicle Injury and Falls Injury were made between 2007–2010 and 2011–2015. Comparisons for Self-injury were made between 2009–2010 and 2011–2015. Quebec data prior to 2011–2012 was not available. Data source: Measuring Trends in Health Inequalities in Cities: Hospitalization and Day Surgery Indicator Results, Overall and by Census Metropolitan Area – Data Tables, 2006–2015, CIHI.

Figures 5 and **6** illustrate two examples that can help us to reconcile the dynamism in the overall rates with the apparent inflexibility of levels of inequalities. **Figure 5** shows the trend over time in the proportion of people in each income quintile for all the UPHN cities that report having received a flu shot within the past twelve months. While overall rates rose in many cities between the early 2000s and 2011–2015 (**Table 4**), they tended to rise only in the richest neighbourhoods and to remain the same or fall among the poorest neighbourhoods.

Table 4

Change over time between 2001–2005 and 2011–2015 in age-standardized rates and inequalities for each city and overall rate, self-reported indicators.



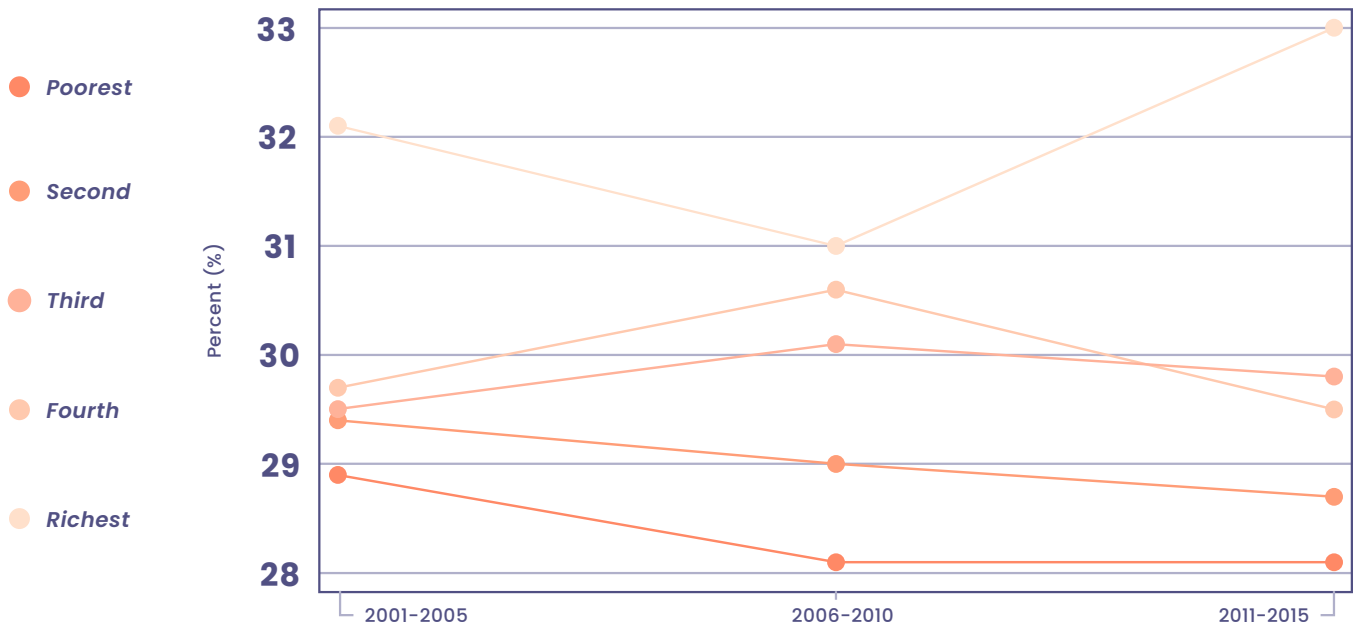
Notes: All illustrated differences are statistically significant at 95% or more (two-tailed tests). RR: Rate Ratio. RD: Rate Difference. Data source: Canadian Community Health Survey, 2011–2015, Statistics Canada.

Figure 6 shows the trend over time for the falls injury hospitalization indicator, which shows increased income-related inequalities in many cities (**Table 3**). The rate for the richest neighbourhood quintiles has decreased over time, which may reflect concerted policy efforts designed to reduce falls. However, since rates have been increasing among poorer quintiles, such efforts may not have been as effective at reaching them.

Taken together, these results suggest that population health in Canada’s cities is inseparable from the health outcomes of their poorest neighbourhoods. As such, it is among these populations that efforts to reduce inequalities are most likely to be able to have the greatest impact. Conversely, improvements in population health are at risk of being held back, or even undone, if they fail to reach and improve the health of poorer neighbourhoods.^[114]

Figure 5

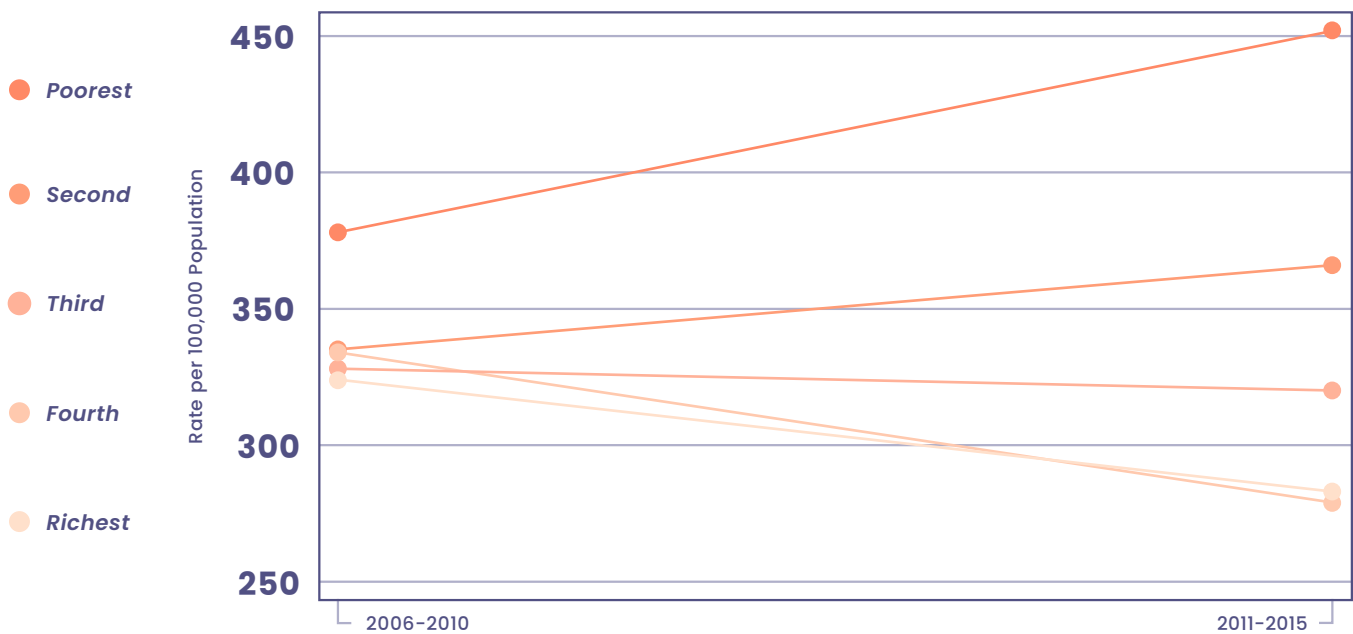
Overall trend over time in the rate of respondents reporting having received a flu shot in the past year in each neighbourhood income quintile, 2001-2015.



Notes: For the 2001 to 2005 period, data is only available for 2001, 2003, and 2005 and no data is available for 2006. Data source: Canadian Community Health Survey, 2001-2015, Statistics Canada.

Figure 6

Overall trend over time in age-standardized rates of hospitalizations for injuries related to falls by neighbourhood income quintile, for all UPHN cities combined, 2006-2015.



Notes: Data related to injuries related to falls were only available for 2007-2010 and not 2006. Data source: Measuring Trends in Health Inequalities in Cities: Hospitalization and Day Surgery Indicator Results, Overall and by Census Metropolitan Area – Data Tables, 2006-2015, CIHI.

City-Level Determinants of Health

The findings of this study suggest that urban health inequalities in Canada are as varied as the makeup of our cities. The structure of our cities, neighbourhoods and communities influences our experiences and how we live our lives, and many health policies and services are established and administered at the city level.^[115,116] This report provides a descriptive portrait of income-related health inequalities in the largest urban centres in each of Canada's provinces. In this section we reflect on some of the implications and opportunities for improving population health in Canada.

The results of this report should prompt policy-makers to put greater focus on city-level determinants of health. Although there are significant differences in the intensity of income-related health inequalities throughout the country, all cities examined in this study experienced health inequalities that have remained mostly unchanged since the early 2000s. City-level differences suggest opportunities to better understand health inequalities and identify mechanisms upon which public health practitioners and decision-makers can act.

Somewhat unexpectedly, health inequalities tend to be lower in the very largest cities in Canada. This is surprising, because we know that income inequalities tend to be greater in larger cities.^[63,64] On the one hand, increases in population size may give rise to greater diversity and less economic segregation across neighbourhoods. Or the nature of cities may change as they grow above a certain size. For instance, larger cities may be more likely to attract health specialists who focus on addressing the unique needs of low-income populations,^[117] or to be the beneficiaries of non-health public investments that address their needs, such as affordable child care facilities or public transit infrastructure.

Another factor that may be influencing the seeming discrepancy of lower inequality in the largest cities is that they are made up of a disproportionate share of immigrants.^[118] Immigrants tend to be relatively healthy compared to both the populations of their country of origin and the native-born population of the country to which they immigrate.^[119,120] This phenomenon, wherein immigrants increase the average health of the area in which they live, is known as the "Healthy Immigrant Effect". At the same time, immigrants are more likely to experience low income.^[121–123]

The differences that we observe in income-related health inequalities between cities should direct our attention to three additional questions. First, how do regional contexts mediate population health in Canada and interact with determinants at the micro and macro levels? Relatively large health inequalities in the Ontario “Rust Belt” [124] and parts of the Maritimes suggest an important interaction between deindustrialization and health, a phenomenon that has been recognized previously in other jurisdictions. [125,126] Meanwhile, the inequalities profiles of the Prairie regions should direct our attention to their relatively large Indigenous populations and associated histories of colonization and genocide, [127] modern jurisdictional concerns over the delivery and management of health on and off reserve, [128] and the pressing need for reconciliation.

Second, are there systemic factors that are unique to regional or city-level “population health systems”? [129] Regional and city-level similarities in health inequalities across indicators may reflect underlying commonalities and/or determinants. For example, relatively high levels of inequalities across multiple indicators of hospital admission for ACSC could point to more general regionally specific systemic barriers that hamper the treatment and prevention of chronic conditions in certain subgroups. Identifying these kinds of inter-indicator correlations could be an important first step toward identifying more fundamental causes of health inequalities and promising directions for upstream intervention.

Relatedly, studies that consider inequalities in only one or a couple of health outcomes risk telling an incomplete story. “Health inequalities” refer to inequalities in many dimensions of health and so inequalities in any one measure are capable of telling only a partial story. This also means that cities can suffer different kinds of health inequalities. As such, which indicators are most telling may be different from one city to another. For instance, greater inequalities in hospitalizations related to self-injury could be more useful for providing insight into how health inequalities operate in the Maritimes, where they tend to be relatively large, than in British Columbia, where they tend to be relatively small. On the other hand, inequalities in hospitalizations due to opioid poisoning may be a more telling indicator in British Columbia than in the Maritimes.

Broadly speaking, the results of this study suggest that even though health policy tends to be set at the provincial level in Canada, policy-makers should be mindful that this is not the only level at which health is being realized. Within-city differences in health inequalities lend support to voices calling for place-based approaches. [130–132] Provincial policy-makers may need to be more sensitive to city-level differences when designing and implementing policy.

Third, what are the steps we can take to ensure that population health interventions reach our poorest neighbourhoods? Trends suggest that although health inequalities may vary greatly between cities, they tend to persist. Despite mounting awareness about health inequalities and efforts to acknowledge and mitigate them in many jurisdictions in Canada, they have remained largely unchanged; in some instances, they have even widened. This suggests the need for a more coordinated and concerted approach to reducing health inequalities.[129]

Opportunities for Intervention

Previous research in Canada and internationally has shown that many persistent health inequalities are actually inequities.[2,7] Evidence reviews have shown that when jurisdictions choose to set targets and goals for decreasing these inequities and implement evidence-informed program and policy change, they can be successful.[133,134] These changes can be categorized into those taken within the health sector and those taken by other sectors that impact on the social determinants of health, such as those aimed at decreasing inequities in education, employment, social services and income supports.[134]

“Evidence reviews have shown that when jurisdictions choose to set targets and goals for decreasing these inequities and implement evidence-informed program and policy change, they can be successful.”

Health systems can improve inequities in health outcomes and health behaviours by ensuring equitable access to services and programs that are appropriate and acceptable to the populations affected and by embedding equity considerations into health system quality improvement methods and tools.[135] For example, ensuring equal access to immunization

clinics for young families in a standardized manner can help improve immunization coverage at a population level, but it may improve more quickly in selected sub-populations.[136]

It is important to note that the provision of equal access to programs and services does not necessarily translate into equitable access.[137] Such programs may not include important adaptations to ensure that specific subpopulations are able to benefit equitably; they may also inadvertently increase inequities.[114] Adaptations to the standardized approach may be needed to ensure equitable improvements among subpopulations with specific needs (cultural adaptations, translation services, transportation, clinic hours, building community trust).[138–140]

By embedding a stratified analysis of quality improvement data to determine if all those who might benefit from an intervention are accessing the service, completing the treatment or realizing the intended benefit, unanticipated barriers to access and outcomes are often uncovered. This applies across the continuum of care, from public health and preventive health services, through to primary health care, community services, acute care and specialist services. Public health services are obvious early adopters of the equity lens, since they work with various vulnerable groups and provide targeted interventions for specific public health issues.

However, different populations also have different rates of health conditions and health behaviours influenced by the social determinants of health. [5,7] While the health system needs to be part of the solution, addressing the implications of these determinants requires action from many others sectors as well.[141]

Data about health inequities can be seen as the end result of programs and policies currently in place in cities, provinces or countries. Reducing these health inequities is possible if the various sectors that impact the health of a population make improving health and well-being an overarching goal, using an all-of-government approach called “Health in All Policies”. [142] This approach recognizes that many policies aimed at improving the economy and the business sector, the education sector, the social safety net, the environment, agriculture and food systems, transportation infrastructure and even the design of our cities all have impacts (whether intended or not) on the health of individuals and populations.[143]

Therefore, both governments and non-government organizations would benefit from a formal process that requires proposed policies and programs to be assessed as to their potential impacts on the well-being and health of the population. This would ensure that all implications are being taken into account and options that might accomplish similar goals without the same harms to health and well-being are being considered. These intersectoral interventions can include:

- programs and policies that directly improve on one or more social determinants of health (such as investments in affordable housing, improvements to income supports, or job creation at a living wage)

- adaptations to existing policies and programs that may have indirect effects on these health determinants (such as ensuring all sectors are responding to the Calls to Action from the Truth and Reconciliation Commission report to improve the cultural safety experienced by First Nations, Métis and Inuit peoples in all programs and services), and
- foundational improvements aimed at changing the institutional culture and even mandate of an organization that is adding to inequities (such as naming and acting on insitutionalized racism and other forms of stigma and discrimination in procedures, programs, services, and legislation).

Increasingly, our society is recognizing that institutionalized racism and discrimination lie at the root of many of these inequities.^[144–146] All sectors need to take active steps to acknowledge this and implement action plans to change this reality experienced by too many in our society. Ultimately, improving health equity will require improvements at all these levels.

Continuing to Invest in Evidence

There is still more work that needs to be done to fully understand urban health inequalities in Canada. In this report, we present summary measures of health inequalities for indicators using CIHI’s hospital administrative data and self-reported outcomes from Statistics Canada’s CCHS. However, these are only two of the four leading sources of health information in Canada.^[2] The UPHN is working with Statistics Canada to explore city-level inequalities in vital statistics data. Steps are also being taken to begin to explore these outcomes in public health surveillance data.

While this study reports on the largest urban centres in each province, there are many small- and medium-sized cities that fall outside of the scope of this study. Inequalities in towns and rural regions also remain an understudied topic in Canadian health research.^[147,148] Income-related health inequalities of the sort that we investigate in this study are unlikely to operate in the same way in smaller towns and rural areas.^[47,49,149]

This report provides a descriptive portrait of income-related inequalities, but it does not identify the causes. More research is needed to better understand the impact of non-income-related determinants of health. The UPHN is working with Statistics Canada to explore how to create qualitative indicators of neighbourhood compositions that reflect the multidimensional nature of social life in urban Canada. An important aim of this ongoing research is to move beyond reducing social life to a single dimension of deprivation, as has been done to date by others.^[66,67]

Relatedly, this study considers only one stratifier of health outcomes: area-based income. More research is needed to more fully understand how other stratifiers determine health unequally in cities across the country. Additional stratifiers of health that have been highlighted in city-level research are age,[2] gender,[150] Indigenous status,[151] immigrant or refugee status,[37–41] education[152] and employment.[42]

Fortunately, new data linkages between administrative and survey data are making it possible to explore in greater detail social determinants of health at the individual and area levels simultaneously.[153,154] Big data is reshaping the world in which we live[155,156] and Canada is well poised to build on new opportunities to better surveil, understand, and take evidence-informed action to improve our health.

Conclusion

In this study, we present a descriptive summary of health inequalities in urban Canada. We calculated city-level health inequalities in indicators of health spanning health system use data and self-reported survey data for Canada's largest urban centres. We found that inequalities were present in almost every indicator in every city, and that they persisted or worsened in almost every case between the early 2000s and 2011–2015. Although health inequalities are widespread among Canada's cities, they are not uniformly so. Instead, cities appear to be characterized by different patterns of health inequalities depending on their size and location. The findings of this study suggest that these differences are driven primarily by the outcomes of their poorer neighbourhoods. Even though, in recent years, we have seen improvement in overall rates for many of the indicators we considered in this study, these improvements do not appear to have been distributed evenly.

In the past, it has not been possible to undertake large-scale comparative research on health inequalities in Canada at the city level, due to data constraints. However, this is quickly changing. The Canadian research community, including national organizations, should continue to monitor the inequalities reported on in this report and take advantage of new and emerging data to further advance our understanding of inequalities and identify mitigating strategies.

In order for population health interventions to have the greatest impact and ensure lasting improvements, they need to reach all people, including those living in our poorest communities. This can be achieved through adaptive strategies that take into account equity considerations and ensure that specific subpopulations have the opportunity to benefit and have their needs met. They can also be advanced by more systemic multi-sectoral interventions designed to operate on the social determinants of health more broadly.

Looking ahead, greater attention should be invested in understanding city-level determinants of health, both in terms of their composition and their governance. Further comparative research is needed to explore the causal determinants of urban health inequalities in Canada using newly available and increasingly rich sources of data.



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Table A1

Overall Age-Standardized Rates (per 100,000 Population), Health System Use Indicators, 2011-2015

	Oploid Poisoning	Alcohol Harm	ACSC: Angina	ACSC: Asthma	ACSC: COPD	ACSC: CHF	ACSC: Diabetes	ACSC: Epileptic Convulsions	ACSC: Hypertension	Heart Attacks	Strokes	Motor Vehicle Injury	Falls Injury	Self Injury	Childhood Dental Caries
Overall	9	160	21	30	86	43	37	26	8	214	143	32	328	41	406
Victoria	19 ***	279 ***	10 ***	30	65 ***	28 ***	42 **	29 *	6 **	151 ***	113 ***	36 **	360 ***	73 ***	922 ***
Vancouver	12 ***	251 ***	21	29 +	79 ***	40 ***	40 ***	28 ***	8	182 ***	150 ***	41 ***	379 ***	49 ***	701 ***
Calgary	12 ***	245 ***	25 ***	30	92 ***	51 ***	36	31 ***	11 ***	179 ***	142	39 ***	383 ***	38 ***	495 ***
Edmonton	16 ***	233 ***	18 ***	21 ***	132 ***	47 ***	44 ***	30 ***	6 ***	224 ***	147 *	53 ***	469 ***	53 ***	217 ***
Saskatoon	14 ***	185 ***	27 ***	31	117 ***	44	56 ***	36 ***	12 ***	205 +	160 ***	50 ***	411 ***	48 ***	2258 ***
Regina	18 ***	310 ***	22	58 ***	203 ***	69 ***	76 ***	43 ***	16 ***	203 *	145	48 ***	524 ***	66 ***	1334 ***
Winnipeg	8 *	163	15 ***	21 ***	92 ***	55 ***	31 ***	21 ***	4 ***	235 ***	143	35 **	351 ***	39 +	765 ***
London	17 ***	132 ***	22	31	111 ***	58 ***	61 ***	43 ***	9	217	152 **	36 **	365 ***	56 ***	446 *
Hamilton	17 ***	141 ***	33 ***	33 **	101 ***	67 ***	58 ***	38 ***	17 ***	245 ***	144	33	344 ***	46 ***	289 ***
Toronto	6 ***	102 ***	22 **	37 ***	53 ***	48 ***	34 ***	25 **	11 ***	184 ***	141 *	25 ***	267 ***	26 ***	362 ***
Ottawa-Gatineau	10 *	107 ***	17 ***	24 ***	97 ***	44	32 ***	20 ***	5 ***	215		25 ***	322 *	47 ***	
Montreal	5 ***	145 ***	23 ***	26 ***	123 ***	43	31 ***	22 ***	6 ***	249 ***		28 ***	381 ***	34 ***	
Sherbrooke	13 ***	233 ***	25 **	28	181 ***	44	37	26	6 *	302 ***		43 ***	412 ***	90 ***	
Quebec	9	169 **	29 ***	16 ***	97 ***	31 ***	23 ***	23 ***	4 ***	261 ***		29 ***	360 ***	62 ***	
Fredericton	10	182 *	89 ***	41 ***	155 ***	59 ***	66 ***	29	12 *	262 ***	151	47 ***	509 ***	66 ***	922 ***
Saint John	18 ***	175 +	12 ***	26 +	192 ***	92 ***	64 ***	41 ***	9	264 ***	153 +	36 +	378 ***	83 ***	1826 ***
Moncton	10	140 **	57 ***	33	133 ***	76 ***	63 ***	37 ***	10 +	282 ***	141	33	355 ***	61 ***	388
Halifax	8	189 ***	18 ***	31	96 ***	39 ***	34 *	25	6 ***	227 **	136 *	31	351 ***	57 ***	436
St. John's	10	201 ***	30 ***	32	141 ***	63 ***	84 ***	39 ***	16 ***	292 ***	155 **	39 ***	308 ***	73 ***	1388 ***

Notes: Statistical test compares each city and overall estimates; + p < .1; * p < .05; ** p < .01; *** p < .001 (two-tailed tests). ACSC: Ambulatory Care Sensitive Condition (hospitalizations for Canadians younger than 75) For Alcohol harm data is only available for 2014-2015 to 2015-2016. For Heart attacks data is available for 2011-2012 and 2013-2014 to 2015-2016. Data source: Measuring Trends in Health Inequalities in Cities: Hospitalization and Day Surgery Indicator Results, Overall and by Census Metropolitan Area – Data Tables: CIHI, 2019

Table A2

Overall Age-Standardized Rates (percent), Self-reported Indicators, 2011-2015

	Asthma	Diabetes	Mood Disorder	Obesity	Smoking	Alcohol Binging	Physical Inactivity	Multiple Risk Factors	Activity Limitation	Stress	Flu Shot	Good Health	Good Mental Health
Overall	7.9	6	6.9	46.9	17.3	18.1	46.7	27.6	30.1	65.7	29.9	61.1	72.3
Victoria	10.4 *	4.4 **	11.3 ***	44.7	14.7 *	18.5	32.2 ***	26.5	40 ***	63.5	32.4 +	63.2	71.9
Vancouver	6.8 **	5.5	7.9 *	39.8 ***	12.1 ***	15.5 ***	41.1 ***	24.5 *	30.9	63.4 **	32.8 ***	58.6 **	67.2 ***
Calgary	7.5	5.1 *	7	47.6	16.8	19.5	41 ***	28.1	32.3	63.8 +	36.1 ***	65.6 ***	74.4 *
Edmonton	9.4 *	6.4	8.1 *	51 ***	19.2 *	17.3	46.6	31.5 +	34 **	65.5	33.5 ***	61.1	72.6
Saskatoon	7.4	4.7 *	9 *	54.9 ***	18.6	20.3	44.6	26.9	33.6 +	63.3	33.2 *	62.6	70.3
Regina	9.3	7.7 +	9.3 *	52.5 ***	22.2 ***	20.5 +	45	27.8	35.1 *	66.6	31.6	58.2 +	69.8
Winnipeg	9.4 *	6.8	8.1 +	52.5 ***	18.5	20.9 **	43.3 *	31.2 +	37.7 ***	64.4	31.1	59.4	69.7 *
London	9.2 +	7.3 +	10 ***	50.6 **	17.8	18	49.8 *	26.7	31.7	65.8	35.4 ***	60.5	70.7
Hamilton	8.8	6.3	9.5 ***	55 ***	19.4 *	18.7	43.7 *	29.5	33.2 *	64.3	31.9 +	60.2	73.3
Toronto	6.7 ***	6.5 +	6.3 +	45.9	15.4 ***	14 ***	50.7 ***	23.3 ***	27.6 ***	66	30.8	59.8 *	72.4
Ottawa-Gatineau	9.6 **	5.8	8.9 ***	47	17	18.2	41.2 ***	28	31.8	64.4	35.6 ***	63.4 *	71.8
Montreal	8.6	6.4	5.1 ***	46.7	20.3 ***	18.6	50.3 ***	28.5	29	68 ***	22.8 ***	60.2	73.9 **
Sherbrooke	6.9	6.4	5 *	44.3	18.4	20.3	49.3	28.4	27.7	67.1	21.9 ***	64.6 *	76.6 **
Quebec	7.7	5.2 *	4.2 ***	46.4	17.1	26.1 ***	47.5	32.8 *	27.6	64.5	22.9 ***	64.4 **	77.3 ***
Fredericton	7.9	8.5	10.2 +	52.9 *	14.9	22.7 *	46.6	29.5	33.3	65.1	43.9 ***	60.2	73
Saint John	9.2	6.1	11.5 ***	56.7 ***	22.6 **	24.4 **	42.9 +	37.2 *	35.6 *	62 +	38.3 ***	58.3	69.6
Moncton	9.9	6.9	10.8 **	58.8 ***	20.2 +	22.6 **	45.1	28	35.4 *	62.8	33.5 +	55.1 **	67 **
Halifax	9.5 +	6.4	10.7 ***	52.7 ***	20.2 *	22.2 ***	41.2 ***	31.2	39.3 ***	63.7	48.3 ***	63.3 +	71.7
St. John's	7.7	7	8.9 *	60.4 ***	21.2 **	27.7 ***	47.3	35 **	35.3 **	61.4 **	26.9 *	63.9 +	75.1 *

Notes: Statistical test compares each city and overall estimates; + p < .1; * p < .05; ** p < .01; *** p < .001 (two-tailed tests). Sources: Canadian Community Health Survey, 2011 to 2015, Statistics Canada.

Table A3 Overall Change in Age-Standardized Rates (per 100,000 Population), Health System Use Indicators, 2006–2010 to 2011–2015

	Opioid Poisoning	Alcohol Harm	ACSC: Angina	ACSC: Asthma	ACSC: COPD	ACSC: CHF	ACSC: Diabetes	ACSC: Epileptic Convulsions	ACSC: Hypertension	Heart Attacks	Strokes	Vehicle Injury	Falls Injury	Self-Injury	Dental Carries
Overall	1 ***		-13 ***	-12 ***	3 ***	-6 ***	-1 **	0	1 ***			-9 ***	-7 ***	-3 ***	-183 ***
Victoria	4 **		-2 +	-9 ***	3	4 *	2	0	3 ***			-9 ***	-9	10 *	-169 +
Vancouver	2 ***		-7 ***	-3 ***	-1	-1	6 ***	2 **	3 ***			-7 ***	-6 *	-5 ***	-104 ***
Calgary	4 ***		-9 ***	-3 **	2	9 ***	2 +	4 ***	4 ***			-10 ***	-5	1	-108 ***
Edmonton	3 ***		-3 ***	-9 ***	6 *	-1	6 ***	5 ***	1 *			-6 ***	36 ***	-4 *	10
Saskatoon	5 ***		-19 ***	1	8 +	-4	10 ***	12 ***	2			-10 **	47 ***	3	627 ***
Regina	6 ***		-21 ***	-55 ***	32 ***	-18 ***	5	8 **	1			-14 ***	50 ***	7	519 ***
Winnipeg	2 **		-15 ***	-9 ***	-8 **	-1	-2	-4 ***	0			-6 ***	12 **	0	-407 ***
London	2		-11 ***	-5 **	15 ***	6 **	10 ***	15 ***	1			-2	43 ***	4	26
Hamilton	6 ***		-22 ***	-1	9 ***	-4 *	6 ***	3 *	3 **			-6 ***	-1	3	59 *
Toronto	1 ***		-14 ***	-8 ***	-6 ***	-4 ***	3 ***	4 ***	3 ***			0	3 +	0	2
Ottawa-Gatineau															
Montreal															
Sherbrooke															
Quebec															
Fredericton	0		-80 ***	-48 ***	-37 ***	-27 ***	-6	-15 ***	-1			-4	44 **	0	96
Saint John	7 **		-12 ***	-28 ***	-35 ***	6	3	-4	-4 *			-5	15	10 -9	
Moncton	3 +		-55 ***	-16 ***	-3	-7	6	-3	-4 *			-11 **	-8	4 -132	
Halifax	0		-9 ***	-34 ***	-3	-6 **	-2	4 *	1			-5 *	17 **	1 -33	
St. John's	2		-14 ***	-20 ***	-31 ***	-8 *	13 **	-2	5 **			-2	-21 *	0 -372 **	

Notes: Statistical test compares each city to itself overtime: + p < .1; * p < .05; ** p < .01; *** p < .001 (two-tailed tests). ACSC: Ambulatory Care Sensitive Condition (hospitalizations for Canadians younger than 75). Comparisons for Injury, Motor vehicle injury and Falls injury were made between 2007–2010 and 2011–2015. Comparisons for Self-injury were made between 2009–2010 and 2011–2015. Quebec data prior to 2011–2012 was not available. Data source: Measuring Trends in Health Inequalities in Cities: Hospitalization and Day Surgery Indicator Results, Overall and by Census Metropolitan Area – Data Tables; CIHI, 2019

Table A4

Overall Change in Age-Standardized Rates (percent), Self-reported Indicators, 2001–2005 to 2011–2015

	Asthma	Diabetes	Mood Disorder	Obesity	Smoking	Alcohol Binging	Physical Inactivity	Multiple Risk Factors	Activity Limitation	Stress	Flu Shot	Good Health	Good Mental Health
Overall	-0.3 +	1.9 ***	1.7 ***	-2.7 ***	-4.7 ***	3 ***	-3.6 ***	1.1 *	1.8 ***	-0.8 *	-0.1	-0.1	-2.2 ***
Victoria	2.2 +	0.5	3.7 **	-6.1 **	-3.4 *	2.7 +	-4 *	4.3	0.4	0.1	-0.5	-1	-2.4
Vancouver	-0.2	0.9 *	2.5 ***	-6.8 ***	-3.9 ***	3.2 ***	-2.4 *	1.8	1.7 +	0.7	3.1 ***	0.7	-3.4 ***
Calgary	-1.3 +	1.5 **	1.4 *	-5.9 ***	-4.4 ***	3.8 ***	-4.1 **	1.8	-1.6	-2.3 +	6.7 ***	3.4 *	-2.7 *
Edmonton	0.5	1.8 **	1.4 +	-4.1 **	-5.1 ***	2.1 +	-0.8	2.9	-0.8	0.2	4.6 ***	1.5	-0.6
Saskatoon	0.1	0.1	2.7 *	-5.8 **	-6.2 ***	3.3 +	-5 *	-2.3	-0.1	-2.2	10.5 ***	2.6	-3.8 +
Regina	0	4 ***	3.9 ***	-6.2 **	-2.5	3 +	-4.5 *	-0.6	-0.6	0.8	4.2 *	0.3	-7.7 ***
Winnipeg	1.1	2.3 ***	2.7 ***	-4.6 **	-3.4 **	4.6 ***	-8.4 ***	3.8	7.3 ***	-1.7	4.8 ***	-1.5	-4.5 ***
London	0.9	2.4 **	3.9 ***	-6.6 **	-3.3 **	2	0.5	-0.2	-3.7 *	-1.6	-8.8 ***	-0.4	-4.5 **
Hamilton	-0.4	0.7	2.3 **	-2.9 +	-4.8 ***	1.7	-4.6 **	2	-1.4	-1.7	-6.6 ***	0.5	-1
Toronto	-0.3	1.9 ***	1.4 ***	-5.2 ***	-4.2 ***	2.5 ***	-4.3 ***	0.1	-0.4	-0.6	-7.3 ***	0.4	-0.2
Ottawa-Gatineau	-0.1	1.4 **	2.6 ***	-7.4 ***	-5.3 ***	3.6 ***	-6.2 ***	2	-1.2	-1.1	-5.2 ***	3 *	-3.6 **
Montreal	-0.5	1.6 ***	1 **	-4.7 ***	-5.4 ***	4.3 ***	-5.1 ***	2.1 +	2.6 **	4.4 ***	0.6	0.9	-2.5 ***
Sherbrooke	0.3	3.1 ***	1.2	-2.9	-7 ***	3.1 +	-7 **	-2.4	-1.5	2	1.2	4.5 *	-1.1
Quebec	0	0.5	0.7	-3.1 *	-6.7 ***	8.1 ***	-3.8 *	5.9 *	2.8 +	0.4	-1	0.9	-1.9
Fredericton	-3.1	2.6		-6.3 +	-5.4 *	9 ***	-8.4 *	6.5	4.1	8.7 *	10.5 **	-1.7	-2.8
Saint John	0.8	1.1	4.9 **	-5.8 *	-0.7	5.5 *	-13 ***	8.7 *	2.2	0.1	12.6 ***	1.7	-1.3
Moncton	1.6	1.1	4.5 **	2.6	-5.4 *	2.7	-11.7 ***	-1	2.5	2.7	7.5 **	-2.1	-5.8 *
Halifax	-0.3	1.9 *	3.8 ***	-4.5 *	-3 +	2.3	-11.6 ***	1.9	1.5	-0.7	13.6 ***	0.7	-5.1 **
St. John's	-0.3	0.4	2.9 *	-0.6	-2	4.9 **	-8.9 ***	2.8	4 +	1.1	8.5 ***	-2.1	-2.7

Notes: Statistical test compares each city to itself overtime; + p < .1; * p < .05; ** p < .01; *** p < .001 (two-tailed tests). For the 2001 to 2005 period, data is only available for 2001, 2003, and 2005. Sources: Canadian Community Health Survey, 2001 to 2005 and 2011 to 2015, Statistics Canada.

Table A5 Ratio of Age-Standardized Rates (per 100,000 Population) Between Richest and Poorest Income Quintile Neighbourhoods in Cities, Health System Use Indicators, 2011–2015

	Opioid Poisoning Harm	Alcohol	ACSC: Angina	ACSC: Asthma	ACSC: COPD	ACSC: CHF	ACSC: Diabetes	ACSC: Epileptic Convulsions	ACSC: Hypertension	Heart Attacks	Strokes	Motor Vehicle Injury	Falls Injury	Self-Injury	Childhood Dental Caries
Overall	3	3.3	1.9	2.2	5.7	3.5	2.9	1.9	2.8	1.6	1.6	1.7	1.6	2.2	2.5
Victoria	2.6	3.2	1.5	2	9.4***	3.4	1.8***	2.2	1.8	1.7	1.7	1.4	1.8**	2.6	3.3+
Vancouver	2.1***	2.2***	1.2***	1.4***	4***	2.7***	1.7***	1.2***	2**	1.3***	1.3***	1.3***	1.5***	1.4***	2.4
Calgary	2.9	3.8**	2.5**	1.8**	7.1***	4+	3.2	1.7	2.9	1.8**	1.7	1.9	1.6	2.3	1.9***
Edmonton	5.5***	7.4***	2.6**	4.3***	9.1***	4.2**	4.2***	3.4***	3.5	1.9***	2***	2.2***	2.3***	4.2***	3.2*
Saskatoon	5.4*	6.4***	3*	2.3	8.7***	8.6***	3	3.4***	2.3	1.7	1.7	2.2*	1.9***	2.3	2.1*
Regina	3.2	7.3***	2.3	2.4	12.9***	5.7**	3.5	4.8***	2.3	2.1**	2*	2.8**	2.4***	3.4**	2.1
Winnipeg	8.0***	4.9***	2.8*	3.2**	10.7***	5.5***	3.3	2.4*	2.3	2.1***	2.1***	2.5***	2.5***	3.3***	6.1***
London	5.4**	5.2***	3.5***	4.5***	8.4***	4.4*	6***	2.7**	2.7	2***	1.9**	1.9	2.5***	4.5***	**
Hamilton	7.3***	3.5	1.9	3.8***	10.6***	5.7***	4.5***	3.3***	3.2	1.9***	1.9***	2.2**	2***	3.5***	4**
Toronto	2.5+	2.4***	1.8	2.4*	4***	3***	2.4***	1.8	2.7	1.5**	1.5**	1.5**	1.4***	1.7***	1.6***
Ottawa-Gatineau	4.2*	4.4***	1.8	1.7**	7.1***	4.3**	3.7**	2	3	1.8**	1.8	1.8	1.8***	2.6**	
Montreal	2.7	3.3	2	1.8***	4.6***	3.1**	3.9***	1.7*	2.5	1.3***	1.6	1.3***	1.3***	1.9**	
Sherbrooke	4.4	4.9***	2.2	3.6*	7.4**	3.6	3.5	1.3+		1.8	1**	1**	1.7	3.3**	
Quebec	3	3.1	1.4***	2	4.8**	3.1	3.4	1.5*	1.8+	1.3***	1.7	1.4***	1.4***	2.2	
Fredericton		4.5	3.1**	1.5+	4.4+	3.6	3.9	2.3		2*	1.8	1.9	1.8+	2.2	1.9
Saint John		4	2.3	3.5+	12***	4.5	6***	2.3		2.3***	1.6	2.1	2.5***	3.4**	2.3
Moncton		3	2.3	3.8*	4.7	4.1	2.5	1.8		1.6	1.7	2.7+	2.1***	4.7***	3.6
Halifax	5.7+	3.1	2	2.6	4.7*	2.4**	4.2*	1.7	3	1.7	1.6	1.6	2***	2.3	3.6*
St. John's		4.6*	3*	2.4	5.6	3.4	3.9*	2.6+	2.5	1.7	1.8	3.4***	2.2***	5.2***	2.4

Notes: Statistical test compares each city and overall log estimates; + p < .1; * p < .05; ** p < .01; *** p < .001 (two-tailed tests). ACSC: Ambulatory Care Sensitive Condition (hospitalizations for Canadians younger than 75) For Alcohol harm data is only available for 2014–2015 to 2015–2016. For Heart attacks data is available for 2011–2012 and 2013–2014 to 2015–2016. Data source: Measuring Trends in Health Inequalities in Cities: Hospitalization and Day Surgery Indicator Results, Overall and by Census Metropolitan Area – Data Tables; CIHI, 2019

Table A6

Ratio of Age-Standardized Rates (percent) Between Richest and Poorest Income Quintile Neighbourhoods in Cities, Self-reported Indicators, 2011-2015

	Asthma	Diabetes	Mood Disorder	Obesity	Smoking	Alcohol Binging	Physical Inactivity	Multiple Risk Factors	Activity Limitation	Stress	Flu Shot	Good Health	Good Mental Health
Overall	1.09	1.64	1.69	1.11	2.15	0.94	1.35	1.39	1.15	0.98	0.85	0.79	0.86
Victoria	1.38	1.19	3.25 *	1.25	2.2	1.56 *	1.31	1.16	0.98	1.25 ***	0.85	0.77	0.82
Vancouver	1.34	1.45	1.66	1.01	1.94	0.82	1.31	1.58	1.26	0.99	0.91	0.78	0.86
Calgary	0.81	1.73	1.72	1.07	2.83	1.1	1.25	1.48	0.96	0.88 *	0.82	0.8	0.94 *
Edmonton	1.02	1.69	1.64	1.14	2.14	1.38 *	1.27	1.53	0.97	1.06 +	0.88	0.86	0.87
Saskatoon	1.36	1.55	2.49	1.18	2.85	1.13	1.13	1.79	1.46	0.99	1.14 +	0.7	0.71 *
Regina	2.24 *	1.5	2.61	0.98	2.73	1.08	1.48	1.64	1.79 **	1.03	0.76	0.62 *	0.73 *
Winnipeg	0.98	1.36	1.71	1.02	2.7	1.02	1.56	1.29	1.07	0.92	0.61 **	0.76	0.8
London	1.68 +	1.2	1.91	1.07	3.5 *	1.05	1.4	1.65	0.93	0.93	0.93	0.7 +	0.77 *
Hamilton	1.13	2.03	2.3	1.09	2.54	0.73	1.3	1.53	1.43	0.98	1.07 *	0.72	0.84
Toronto	1.16	1.56	1.45	1.14	1.82	0.81	1.44	1.26	1.23	1.01	0.9	0.8	0.87
Ottawa-Gatineau	1.12	2.76 *	1.28	1.32 *	2.82 +	1.01	1.55	1.41	1.51 *	0.98	0.82	0.73	0.91
Montreal	0.94	1.72	1.45	1.12	2.11	0.97	1.27	1.4	0.99	0.94	0.71 *	0.81	0.87
Sherbrooke	1.19	1.42	3.61 +	1.04	3.59 *	0.93	1.49	1.32	1.39	0.91	0.72	0.71	0.88
Quebec	1.39	2.77 *	2.88	1.12	2.42	1.12	1.3	1.59	1.01	0.86 *	0.78	0.74	0.81
Fredericton	0.85	0.39 **	2.56	0.96	4.13 +	1.46	1.46	1.41	1.11	0.93	0.91	0.92	1.06 *
Saint John	2.17 +	1.48	1.85	1.41 +	2.26	0.92	1.48	2.53 +	1.29	1.17 +	0.87	0.71	0.87
Moncton	0.9	1.33	2.46	1.02	1.93	0.65	1.46	0.59 **	1.91 *	0.9	0.9	0.78	0.8
Halifax	0.98	2.89 +	1.97	1.08	3.56 *	1.2	1.71 +	2.1	1.48 +	1.14 *	0.84	0.71	0.72 **
St. John's	1.56	2.37	1.81	1.09	2.01	0.87	1.21	0.94 +	1.57 +	1.13 +	0.91	0.76	0.79

Notes: Statistical test compares each city and overall log estimates; + p < .1; * p < .05; ** p < .01; *** p < .001 (two-tailed tests). Sources: Canadian Community Health Survey, 2011 to 2015, Statistics Canada.

Table A7

Ratio Between the Ratio of Age-Standardized Rates (per 100,000 Population) Between Richest and Poorest Income Quintile Neighbourhoods in Cities, Health System Use Indicators, 2006–2010 to 2011–2015

	Opioid Poisoning	Alcohol Harm	ACSC: Angina	ACSC: Asthma	ACSC: COPD	ACSC: Diabetes	ACSC: Epileptic Convulsions	ACSC: Hypertension	Heart Attacks	Strokes	Motor Vehicle Injury	Falls Injury	Self-Injury	Childhood Dental Caries
Overall	0.9 +		1.2 ***	1.1 ***	3.3 ***	1.2 ***	1	1.2 *			1.1 ***	1.3 ***	1	1.1 *
Victoria	1		1.1	1	134.3 ***	1	1.3				1.3	1.3 ***	1.4	2.4 **
Vancouver	0.7 **		1	0.9	1.2	1	0.7 ***	1.1			0.9	1.4 ***	0.8 *	0.7 **
Calgary	1.1		2.2 **	0.9	10.0 ***	1.2 +	1	1.2			1.2 +	1.5 ***	1.2	1.2
Edmonton	1.1		3.3 ***	2.5 ***	20.1 ***	1.1	1.4 **	1.7 *			1.3 **	1.6 ***	1.4 *	1.8 *
Saskatoon			1.8	1.4	54.6 ***	1.1	1.6 +	0.5			1.3	1.5 ***	0.5 *	1.1
Regina			0.7	0.9	20.1	1.2	1.3	1			1.1	1.4 ***	0.7	0.9
Winnipeg	2.1 ***		1	0.9	66.7 ***	0.6 **	1.3 +	0.8			1	1.5 ***	1	1.3
London	1		3.7 *	1.9 **	5.5 +	2.6 ***	1	1			1	1.8 ***	1	1.1
Hamilton	1.3 *		0.9	2.2 ***	12.2 *	1.1	1.2	0.9			1.2	1.5 ***	1.1	1.7
Toronto	1.4 ***		1.2 *	1.1 **	2.0 ***	1.2 ***	1.1	1			1.2 ***	1.4 ***	1.2 **	1.1
Ottawa-Gatineau														
Montreal														
Sherbrooke														
Quebec														
Fredericton			1.6	0.7	3	1.2	1.6				1.4	1.1	1	
Saint John			0.8	1.7 +	5.5	1.9 *	1.5				1.7 +	1.7 ***	1	1
Moncton			2.2 *	1.7 +	8.2 ***	1.7 *	0.6 +				1.4	1.9 ***	1.9 +	
Halifax	0.9		1.2	1.2	2.2	1.4 +	0.9	1			1.3	1.5 ***	0.8	1.3
St. John's			2.7	1.3	10.0 ***	1.9 ***	1.5 +	2.1 +			1.9 *	1.8 ***	2.5 ***	1.5

Notes: Statistical test compares each city to itself overtime; + p < .1; * p < .05; ** p < .01; *** p < .001 (two-tailed tests). ACSC: Ambulatory Care Sensitive Condition (hospitalizations for Canadians younger than 75). Comparisons for Injury, Motor vehicle injury and falls injury were made between 2007–2010 and 2011–2015. Comparisons for Self-injury were made between 2009–2010 and 2011–2015. Quebec data prior to 2011–2012 was not available. Data source: Measuring Trends in Health Inequalities in Cities: Hospitalization and Day Surgery Indicator Results, Overall and by Census Metropolitan Area – Data Tables; CIHI, 2019

Table A8

Ratio Between the Ratio of Age-Standardized Rates (percent) Between Richest and Poorest Income Quintile Neighbourhoods in Cities, Self-reported Indicators, 2001–2005 to 2011–2015

	Asthma	Diabetes	Mood Disorder	Obesity	Smoking	Alcohol Binging	Physical Inactivity	Multiple Risk Factors	Activity Limitation	Stress	Flu shot	Good Health	Good Mental Health
Overall	1	0.93	1.1	1.02	1.24***	0.97	1.02	1.05	0.93+	0.99	0.94+	1	0.99
Victoria	1.33	0.57	2.23*	1.34*	0.92	1.02	0.96	0.66	0.83	1.18+	1.04	0.96	0.94
Vancouver	1.43+	0.99	1.01	0.89	1.18	0.88	0.94	1.24	1.06	0.97	0.97	1.1+	1.06
Calgary	0.48**	1.12	0.97	1	1.18	1.02	0.84	0.9	0.69*	0.88+	0.77+	1.13+	1.21***
Edmonton	0.95	0.88	1.02	0.93	1.02	1.37	0.91	1.29	0.62***	1.12+	0.93	1.21**	1.07
Saskatoon	0.93	0.6	1.75	1.05	1.28	0.88	0.69+	1.07	1	1.04	1.46+	0.96	0.89
Regina	3.39**	0.9	1.13	1.08	1.21	0.77	1.09	0.9	1.12	1.02	1.1	0.97	0.94
Winnipeg	0.86	0.96	1.71	0.93	1.5+	0.87	1.13	0.86	0.81	0.94	0.57***	0.95	0.98
London	0.92	0.85	0.85	0.87	1.39	0.87	1.01	0.95	0.66*	1.06	0.96	0.9	0.85**
Hamilton	1.01	0.93	1.78+	1.02	1.35	0.79	1.06	1.08	0.91	1	0.98	1.01	0.99
Toronto	1.32	0.68*	1.19	1.09	1.27*	1.09	1.07	0.92	1.14	1.03	1.02	0.92*	0.96
Ottawa-Gatineau	0.73	1.52	0.66	1.27**	1.25	1.13	1.22+	0.9	1.28+	0.91+	0.98	0.96	1.02
Montreal	0.8	1.2	0.89	1.04	1.31*	0.92	1	1.25	0.85	0.98	0.88	1.03	0.99
Sherbrooke	1.05	0.49	1.52	0.94	2.87***	0.71	1.35*	1.29	0.99	0.87	0.72	0.93	0.99
Quebec	1.03	1.99*	1.03	1.02	1.23	0.9	1.12	1.14	0.69*	0.91	0.95	0.9	0.9*
Fredericton	0.48	0.1**		0.86	1.89	0.99	1.26	0.66	0.81	0.92	0.93	1.48*	1.39**
Saint John	1.36	0.41	0.67	1.42*	1.24	1.12	1.18	1.96	0.87	1.19	0.86	0.9	1.14
Moncton	0.52	0.94	5.47**	0.89	1.37	0.59	1.17	0.57	1.32	0.85	0.83	1.04	0.95
Halifax	0.89	1.82	0.98	1.01	1.65+	1.11	1.2	1.6	1.31	0.98	0.9	0.93	0.84*
St. John's	1.41	2.49+	1.06	0.97	1.13	0.52**	1	0.73	1.18	1.2+	1.23	0.84+	0.8**

Notes: Statistical test compares each city to itself overtime; + p < .1; * p < .05; ** p < .01; *** p < .001 (two-tailed tests). For the 2001 to 2005 period, data is only available for 2001, 2003, and 2005. Sources: Canadian Community Health Survey, 2001 to 2005 and 2011 to 2015, Statistics Canada.

Table A9

Difference in Age-Standardized Rates (per 100,000 Population) Between Richest and Poorest Income Quintile Neighbourhoods in Cities, Health System Use Indicators, 2011–2015

	Overall	Victoria	Vancouver	Calgary	Edmonton	Saskatoon	Regina	Winnipeg	London	Hamilton	Toronto	Ottawa-Gatineau	Montreal	Sherbrooke	Quebec	Fredericton	Saint John	Moncton	Halifax	St. John's
Oploid Poisoning	12	22 *	10 +	17 **	36 ***	31 ***	35 ***	21 ***	31 ***	38 ***	6 ***	16 *	5 ***	24 *	10	298 +	274	186	14	316 **
Alcohol Harm	228	377 ***	233	426 ***	614 ***	460 ***	869 ***	321 ***	228	215	106 ***	188 ***	184 ***	470 ***	224	298 +	274	186	240	316 **
ACSC: Angina	14	4 ***	5 ***	27 ***	18 +	34 ***	20	16	28 ***	23 **	14	11	15	21	12	107 ***	10	49 ***	11	38 ***
ACSC: Asthma	23	22	9 ***	20	33 ***	28	56 ***	24	39 ***	42 ***	31 ***	14 ***	14 ***	42 **	10 ***	20	30	36 +	34 *	28
ACSC: COPD	165	142 **	133 ***	209 ***	380 ***	270 ***	641 ***	252 ***	214 ***	260 ***	86 ***	220 ***	182 ***	429 ***	169	228 **	485 ***	229 ***	177	228 ***
ACSC: CHF	59	43 **	45 ***	85 ***	82 ***	107 ***	147 ***	104 ***	85 ***	127 ***	61	69 **	51 ***	65	36 ***	69	126 ***	113 ***	38 ***	75 +
ACSC: Diabetes	44	32 +	24 ***	52 *	76 ***	75 ***	116 ***	44	99 ***	95 ***	34 ***	46	41 +	50	31 ***	89 ***	114 ***	64 +	51	122 ***
ACSC: Epileptic Convulsions	19	26	7 ***	19	47 ***	53 ***	76 ***	22	49 ***	50 ***	16 *	16	12 ***	7 *	9 ***	23	30	21	14	41 **
ACSC: Hypertension	9	5	6 **	15 **	10	13	15	4 ***	10	20 ***	12 ***	6 **	6 ***	3 ***	3 ***	180 **	199 ***	128	6	15
Heart Attacks	96	78	52 ***	113 *	153 ***	111	154 **	173 ***	141 ***	166 ***	76 ***	129 ***	67 ***	177 ***	69 **	180 **	199 ***	128	118	147 *
Strokes	67	57	43 ***	85 **	106 ***	90	104 *	110 ***	96 **	95 ***	61 +	129 ***	67 ***	177 ***	69 **	93	78	71	62	97 *
Motor Vehicle Injury	18	13	13 *	29 ***	48 ***	47 ***	54 ***	38 ***	23	27 **	12 ***	15	12 ***	1 *	15	27	28	29	16	48 ***
Falls Injury	169	222 ***	164	226 ***	452 ***	330 ***	543 ***	374 ***	336 ***	256 ***	100 ***	215 ***	87 ***	228 **	124 ***	312 ***	389 ***	286 ***	253 ***	261 ***
Self-Injury	38	86 ***	18 ***	39	94 ***	58 *	105 ***	58 **	84 ***	66 ***	17 ***	56 ***	20 ***	132 ***	50 *	60	121 ***	107 ***	58 **	134 ***
Childhood Dental Caries	304	907 ***	501 ***	301	210 ***	1470 ***	897 ***	1081 ***	164 **	297	140 ***	56 ***	20 ***	132 ***	50 *	495	1052 ***	344	440 *	1078 ***

Notes: Statistical test compares each city and overall estimates; + p < .1; * p < .05; ** p < .01; *** p < .001 (two-tailed tests). ACSC: Ambulatory Care Sensitive Condition (hospitalizations for Canadians younger than 75) For Alcohol harm data is only available for 2014–2015 to 2015–2016. For Heart attacks data is available for 2011–2012 and 2013–2014 to 2015–2016. Data source: Measuring Trends in Health Inequalities in Cities: Hospitalization and Day Surgery Indicator Results, Overall and by Census Metropolitan Area – Data Tables; CIHI, 2019

Table A10

Difference in Age-Standardized Rates (percent) Between Richest and Poorest Income Quintile Neighbourhoods in Cities, Self-reported Indicators, 2011–2015

	Asthma	Diabetes	Mood Disorder	Obesity	Smoking	Alcohol Binging	Physical Inactivity	Multiple Risk Factors	Activity Limitation	Stress	Flu Shot	Good Health	Good Mental Health
Overall	0.7	2.8	3.6	4.8	12.6	-1	13.7	8.4	4.2	-1.2	-4.9	-14.3	-10.8
Victoria	3.3	0.8	11.5**	9.4	12.2	8.8*	9.1	4	-0.8	13.9***	-4.9	-16.7	-14.8
Vancouver	2	2	3.9	0.4+	7.9**	-2.7	10.7	10.5	7.4	-0.9	-3.1	-14.2	-10.6
Calgary	-1.7	3.2	3.6	3.4	16.5	1.8	9.1	10.9	-1.3	-8*	-7.6	-14.3	-4.8+
Edmonton	0.2	2.7	4.3	6.4	13.4	5.3*	11.4	11.9	-1.1	4.1+	-4.3	-9.4	-10.3
Saskatoon	2.7	3	10.1	8.9	23*	2.3	4.6	13.8	13.8	-0.9	4.2+	-20.3	-22.1*
Regina	7.3*	2.5	9.5+	-1.3	21.3+	1.4	16.2	8.9	22.6**	1.9	-9.5	-26.6*	-21.1*
Winnipeg	-0.2	2	4.4	1	17.5+	0.4	19.6	7.8	2.9	-5.5	-15.8**	-16.3	-15.2
London	5.3*	1.4	6.1	3.3	19.5**	1	17.7	10.3	-2.2	11***	-2.6	-21.4+	-18.8*
Hamilton	1.1	3.8	8.6*	4.8	17.5+	-6	11.6	12.4	12.1+	-1.7	2.1*	-19.5	-12.1
Toronto	1	2.8	2.4	5.8	9.1*	-2.9	18.1+	5.2	5.7	0.9	-3.5	-13.6	-9.9
Ottawa-Gatineau	1.2	4.4	2.1	12.8*	17.8*	0.2	18.2	9.6	12.2*	-1.6	-6.5	-19.1	-6.5
Montreal	-0.5	3.4	1.7*	4.9	13.7	-0.5	11.5	8.4	-0.4+	-4.2	-7.6	-12.9	-10.4
Sherbrooke	1.1	2.5	6	1.9	20.5*	-1.2	19.7	8.8	9.7	-6.7	-7.5	-20.9	-10.1
Quebec	2.6	4.6	4.7	5.2	16	3.2	11.4	13.7	0.4	-9.8**	-5.8	-18.8	-15.9+
Fredericton	-1	-6.5*	8.4	-2.2	16.3	9.3	15	8.7	3.7	-5.1	-4.1	-5.1	4*
Saint John	7.6+	2.2	5.5	18.4*	16.2	-1.8	15.2	26.1*	10.2	9.4+	-5.4	-21.7	-10
Moncton	-1.2	1.7	9.8	1.2	14.3	-9.1	17.5	-19.7**	23.6**	-7.1	-4	-14.4	-15.4
Halifax	-0.2	6.8*	7	3.9	22.5**	3.7	21.1	21.8+	15.1*	8.4*	-8.5	-20.4	-22.4**
St. John's	3.8	5.9	5.2	4.9	14	-3.6	8.9	-1.9	17.9*	7.5+	-2.7	-17.6	-17.8

Notes: Statistical test compares each city and overall estimates; + p < .1; * p < .05; ** p < .01; *** p < .001 (two-tailed tests). Sources: Canadian Community Health Survey, 2011 to 2015, Statistics Canada.

Table A11

Change in Difference in Age-Standardized Rates (per 100,000 Population) Between Richest and Poorest Income Quintile Neighbourhoods in Cities, Health System Use Indicators, 2006–2010 to 2011–2015

	Opioid Poisoning	Alcohol Harm	ACSC: Angina	ACSC: Asthma	ACSC: COPD	ACSC: CHF	ACSC: Diabetes	ACSC: Epileptic Convulsions	ACSC: Hypertension	Heart Attacks	Strokes	Motor Vehicle Injury	Falls Injury	Self-Injury	Childhood Dental Caries
Overall	1 +		-4 ***	-5 ***	34 ***	6 ***	8 ***	1	2 ***			0	115 ***	1	-115 ***
Victoria	5		0	-3	44 ***	16 *	7	6				8	77 ***	40 ***	510
Vancouver	-1		0	-5 *	23 ***	13 ***	6 *	-8 **	3 *			-3	142 ***	-12 *	-319 ***
Calgary	7 **		9 *	-3	64 ***	31 ***	18 ***	2	9 ***			5	200 ***	15 *	41
Edmonton	13 ***		12 ***	18 ***	138 ***	20 ***	22 ***	22 ***	6 **			14 **	302 ***	16 *	94 +
Saskatoon			-15	11	68 ***	28 *	17	33 ***	0			9	231 ***	-7	505
Regina			-27 **	-67 ***	213 ***	-16	33 *	31 **	0			-10	254 ***	-28	185
Winnipeg	10 ***		-19 ***	-17 ***	23 *	9	-15 **	5	0			-2	178 ***	0	-557 ***
London	5	5		6	31 **	17 *	41 ***	21 **	2	-1			230 ***	7 21	
Hamilton	14 ***	-21 ***		21 ***	53 ***	28 ***	21 **	11 *	3	1			165 ***	6 131 +	
Toronto	3 ***	-2		1	17 ***	17 ***	11 ***	4 **	4 ***	7 ***			94 ***	7 *** 35	
Ottawa-Gatineau															
Montreal															
Sherbrooke															
Quebec															
Fredericton		-47 +		-46 *	-30	-18	1	5		13			65	13	
Saint John		-9		-9	-1	30 +	41 *	9		19			225 ***	12 -347	
Moncton		5		-3	95 ***	17	41 **	-17		3			266 ***	57 **	
Halifax		-5		-23 **	28 *	-15 +	5	-5	0	9			150 ***	-9	-43
St. John's		9		-4	43 *	23 +	70 ***	18 +	13 *	22 *			212 ***	72 ***	247

Notes: Statistical test compares each city to itself overtime; + p < .1; * p < .05; ** p < .01; *** p < .001 (two-tailed tests). ACSC: Ambulatory Care Sensitive Condition (hospitalizations for Canadians younger than 75). Comparisons for Injury, Motor vehicle injury and falls injury were made between 2007–2010 and 2011–2015. Comparisons for Self-injury were made between 2009–2010 and 2011–2015. Quebec data prior to 2011–2012 was not available. Data source: Measuring Trends in Health Inequalities in Cities: Hospitalization and Day Surgery Indicator Results, Overall and by Census Metropolitan Area – Data Tables; CIHI, 2019

Table A12

Change in Difference in Age-Standardized Rates (percent) Between Richest and Poorest Income Quintile Neighbourhoods in Cities, Self-reported Indicators, 2001-2005 to 2011-2015

	Asthma	Diabetes	Mood Disorder	Obesity	Smoking	Alcohol Binging	Physical Inactivity	Multiple Risk Factors	Activity Limitation	Stress	Flu Shot	Good Health	Good Mental Health
Overall	0	0.6	1.3 *	0.7	0.8	-0.6	-0.6	1.1	-1.6	-0.3	-1.7 +	0	-0.4
Victoria	2.9	-1.7	8 *	13.1 *	-3	3.4	-1.7	-8.1	-7.8	10.3 +	1.9	-2	-4.2
Vancouver	2.4 +	0.4	1.1	-5.2 +	-0.1	-1.8	-3.8	5.1	2.4	-2.4	-1.2	5.4 +	4.5
Calgary	-6.1 **	1.6	0.1	-0.1	-1	0.6	-8.1 +	-0.7	-12.5 *	-8 +	-9.5 *	7.4 +	13.7 ***
Edmonton	-0.4	0.3	0.7	-4	-4.4	5.2	-4.3	7	-16.1 **	7.2 +	-2.6	11 **	5.1
Saskatoon	-0.2	-1.7	7.9 +	2.2	1	-2.4	-18.5 *	-1.2	2	2.4	9.6	-0.9	-5.8
Regina	10.7 **	0.6	4.7	4.3	-0.4	-4.2	0.2	-5.8	5.9	1.4	0.8	-2.2	-2.6
Winnipeg	-1.4	0.4	4.4 +	-4.5	4.5	-2.1	3.4	-3.4	-6	-4.3	-17.7 ***	-2.8	-0.3
London	1.2	-0.1	1.8	-7.8	1.9	-1.8	1.1	-4.2	-13.9 *	3.9	-1.4	-5.8	-11.5 **
Hamilton	0	-0.6	6.5 *	1.2	2.1	-4.6	1.6	2.8	-4.1	-0.7	-1.1	0.3	-0.3
Toronto	1.8	-0.8	1.4	3.1	2.3	0.3	2	-1.6	3.6	2.2	1.2	-5.5 *	-3
Ottawa-Gatineau	-3.1	1.8	-1.8	10.9 **	0.4	1.9	7.2 +	-1.7	6.8 +	-6.7 +	0.5	-2.9	2.4
Montreal	-2	1.8	-0.3	0.9	2.5	-1.2	-1.4	5.5	-4.2	-1.5	-2.7	1.3	-1.1
Sherbrooke	0.3	-0.7	2.7	-3.1	14.6	-6.8	14.7 *	8.2	-0.8	-9.9	-7.5	-3.9	-0.5
Quebec	0.3	2.8	1.3	0.5	0	-0.9	4	5.1	-8.8 +	-6.4	-1.3	-6	-7.8 *
Fredericton	-9.4	-16.5 +		-8.7	-2.4	3.6	7.2	-14.1	-6.6	-5.8	-3.3	23.2 *	25 **
Saint John	3.6	-3.5	-1.2	19.1 *	0.7	2.1	2.8	18.1	-3.9	10.7	-5.6	-8.9	8.2
Moncton	-5.8	0.2	14.1 **	-6.4	6.4	-11.2	5.7	-20.4 +	12	-10.3	-6	2.8	-3.4
Halifax	-1.1	4.8 *	2.3	0	2.8	2	2.4	13.2	10.4	-1.5	-6.1	-3.4	-10.8 *
St. Johns	2.9	6.2 +	1.5	-2.3	0.9	-15.1 **	-0.9	-9.3	9.7	11.2 +	3	-10.6 +	-16.7 **

Notes: Statistical test compares each city to itself overtime; + p < .1; * p < .05; ** p < .01; *** p < .001 (two-tailed tests). For the 2001 to 2005 period, data is only available for 2001, 2003, and 2005. Sources: Canadian Community Health Survey, 2001 to 2005 and 2011 to 2015, Statistics Canada.

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