

# Workshop A: Using a toolkit to measure health inequalities in Canada

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Time	Topic
1:30 pm – 1:45 pm	<b>Introduction</b> <ul style="list-style-type: none"><li>○ Video: <i>Measuring health inequalities: An Introduction</i></li><li>○ Activity 1: Why measure health inequalities?</li></ul>
1:45 pm – 2:05 pm	<b>Plan your analysis</b> <ul style="list-style-type: none"><li>○ Activity 2: Complete an analysis plan</li></ul>
2:05pm – 2:15 pm	<b>Analyze your data</b> <ul style="list-style-type: none"><li>○ Video: <i>Interpreting Health Inequalities to Inform Action</i></li></ul>
2:15 pm – 2:35 pm	<b>Report your findings</b> <ul style="list-style-type: none"><li>○ Activity 3: Quantify inequalities using summary measures and present findings to your audience</li></ul>
2:35 pm – 2:45 pm	<b>Moving forward and questions</b>

# Canadian Institute for Health Information (CIHI)

## Vision

**Better data.  
Better decisions.  
Healthier Canadians.**

## Mandate

**Deliver comparable and actionable information to accelerate improvements in health care, health system performance and population health across the continuum of care**


# Examples of CIHI reports that measure inequalities



Trends in Income-Related Health Inequalities in Canada

Technical Report Revised July 2016

Factors Influencing Health



Canadian Institute for Health Information  
Institut canadien d'information sur la santé



Alcohol Harm in Canada

Examining Hospitalizations Entirely Caused by Alcohol and Strategies to Reduce Alcohol Harm



Canadian Institute for Health Information  
Institut canadien d'information sur la santé



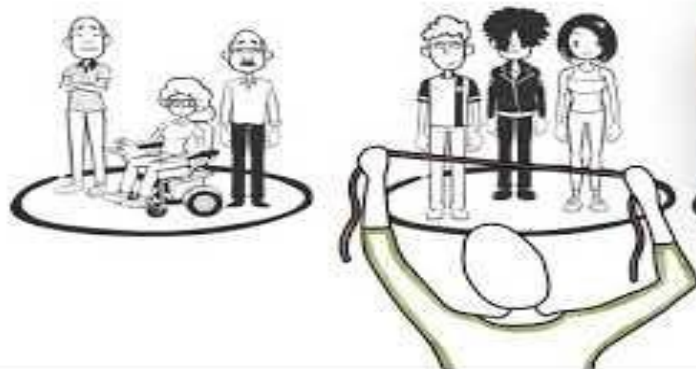
Drug Use Among Seniors in Canada, 2016



Canadian Institute for Health Information  
Institut canadien d'information sur la santé

# Measuring Health Inequalities: An Introduction

Measuring health inequalities: a critical



# Measuring Health Inequalities: A Toolkit



- Consists of guidelines and resources organized in 3 phases:



<https://www.cihi.ca/en/measuring-health-inequalities-a-toolkit>

# Handouts



Glossary of Terms | October 1, 2018

## Measuring Health Inequalities: A Toolkit — Glossary of Terms

**absolute inequality:** The magnitude of difference observed between population subgroups.

**area-level analysis:** Analysis using socio-economic or socio-demographic information aggregated by geographic areas such as neighbourhoods.

**complex measure of inequality:** A measure of inequality that incorporates data from all population subgroups (e.g., inequality across all income groups); it is a single number indicating the level of inequality. Examples include potential rate reduction (PRR) and population impact number (PIN).

**composite index:** An area- or individual-level measure consisting of a number of socio-demographic variables (or equity stratifiers) that aims to characterize the health status of an individual or population. Socio-demographic and socio-economic characteristics commonly used in calculating indices include income, education and unemployment (see the table).

**deprivation index:** A composite index that can identify population subgroups based on the level of deprivation using a number of variables (or equity stratifiers) (see *composite index*).

**equity stratifier:** A demographic, social, economic or geographic characteristic that can identify population subgroups for the purpose of measuring differences in health and health care that may be considered unfair and avoidable.

**health equity:** Absence of unfair and avoidable differences in health and health care access, quality or outcomes across the population. It is the ideal state in which all people are able to reach their full health potential and receive high-quality care that is fair and appropriate to them and their needs, no matter where they live, who they are or what they have.

**health indicator:** A measure designed to summarize information about a given priority topic in population health or health system performance. Health indicators provide comparable and actionable information across different geographic, organizational or administrative boundaries and/or can track progress over time.

**health inequality:** Any difference in health and health care access, quality or health outcomes between population subgroups. Health inequalities may be due to unavoidable biological and natural factors.



Resources | October 1, 2018

## Measuring Health Inequalities: A Toolkit — Supplementary Resources

This document contains a list of organizations that have helpful resources to support planning for, analyzing and reporting on health inequalities. Many of these resources informed the development of CIHI's Measuring Health Inequalities: A Toolkit. If you have suggestions for this list, please email [cehi@cchi.ca](mailto:cehi@cchi.ca).

**Table 1** Canadian organizations — National

Organization	Examples of resources
Canadian Council on Social Determinants of Health (CCSDH)	<a href="#">Communicating the Social Determinants of Health: Guidelines for Common Messaging (2013)</a>
Canadian Institute for Health Information (CIHI)	<a href="#">Trends in Income-Related Health Inequalities in Canada (2015)</a> <a href="#">Athlete Hospitalizations Among Children and Youth in Canada: Trends and Inequalities (2018)</a> <a href="#">CIHI's Indicator Library</a> <a href="#">A Performance Measurement Framework for the Canadian Health System (2013)</a> <a href="#">Health Inequalities</a>
Canadian Research Data Centre Network (CRDCN)	<a href="#">Information on how to access Research Data Centres for Statistics Canada survey, census and administrative data sets</a> <a href="#">Data set descriptions and resources</a> (e.g., search data sets such as <a href="#">PCCF</a> )
National Collaborating Centre for Determinants of Health (NCCDH)	<a href="#">A Guide to Community Engagement Frameworks for Action on the Social Determinants of Health and Health Equity (2013)</a>
Public Health Agency of Canada (PHAC)	<a href="#">Health Inequalities Data Tool</a> <a href="#">Key Health Inequalities in Canada: A National Portrait (2018)</a>
Statistics Canada	<a href="#">Data available in the Research Data Centres (RDCs)</a> <a href="#">Postal Code Conversion File Plus (PCCF+)</a>

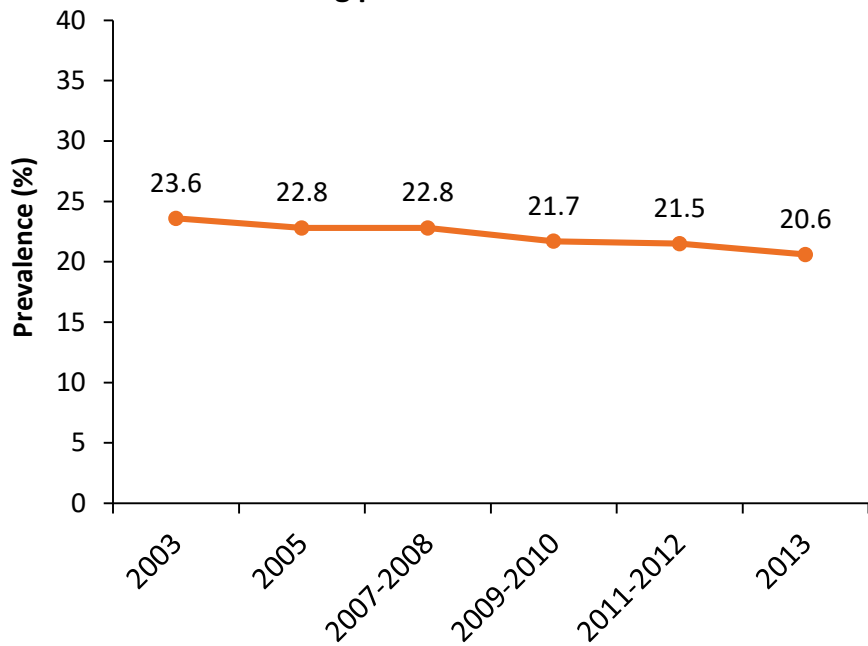


# Activity 1: Why measure health inequalities?

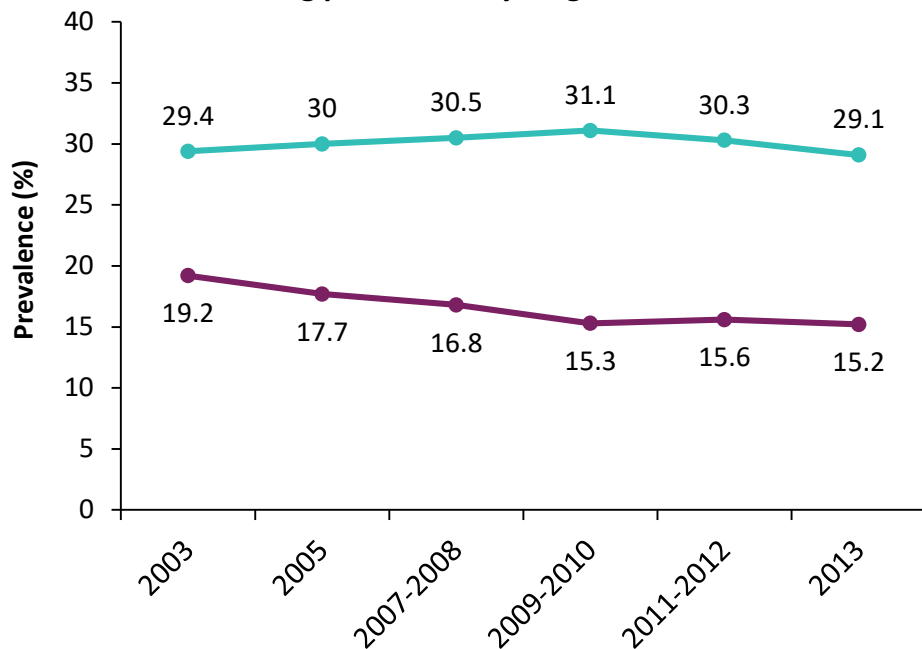
# Activity 1: Why measure health inequalities?



### Smoking prevalence over time



### Smoking prevalence by neighbourhood income



● Lowest-income (Quintile 1) ● Highest-income (Quintile 5)



# Plan your analysis

1. Select relevant equity stratifiers
2. Explore approaches for accessing equity stratifiers

# Select relevant equity stratifiers

- **Equity stratifier:** A socio-demographic characteristic that can identify population subgroups for the purpose of measuring health inequalities
- **20+ commonly used equity stratifiers**
- **Standard definitions for 6 equity stratifiers**
- **Toolkit resource – Literature Review Template (not shown)**



Pan-Canadian Dialogue to  
Advance the Measurement of  
Equity in Health Care

Proceedings Report



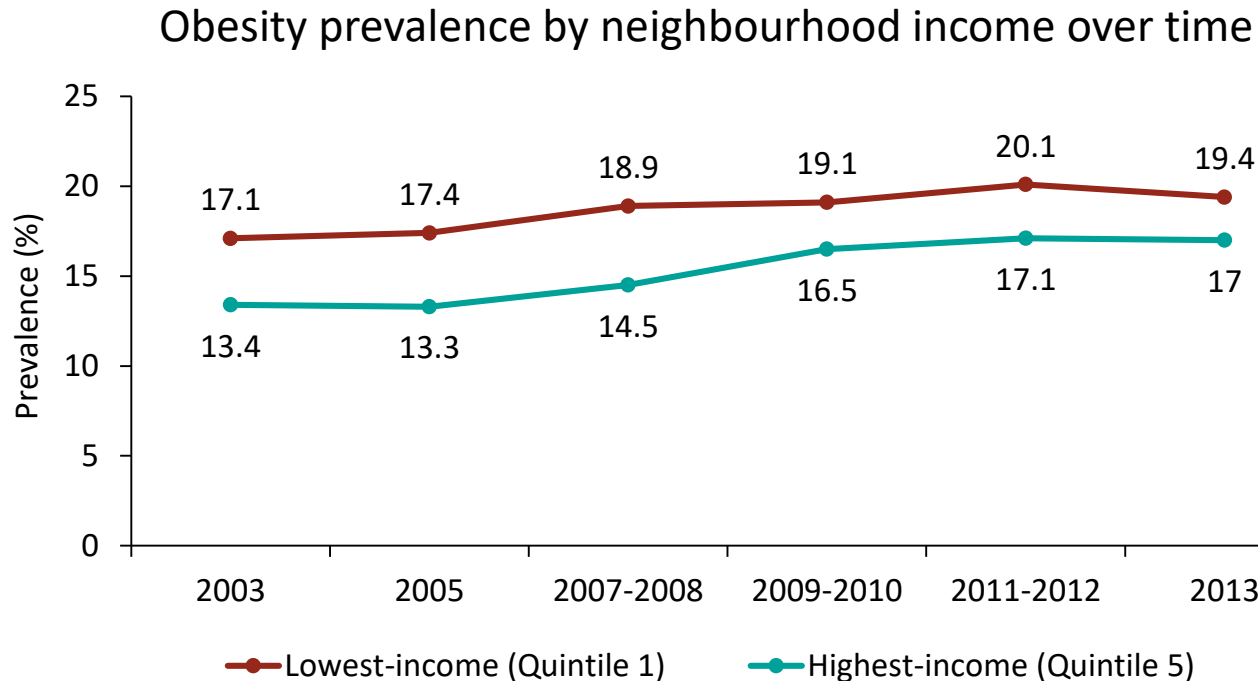
In Pursuit of Health Equity: Defining Stratifiers  
for Measuring Health Inequality

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

April 2018

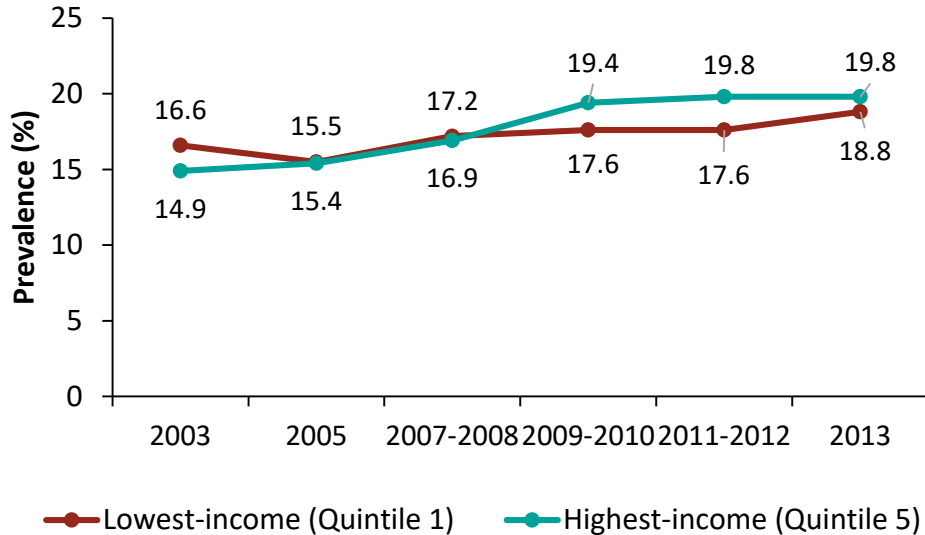


# Considering multiple stratifiers simultaneously: obesity by income

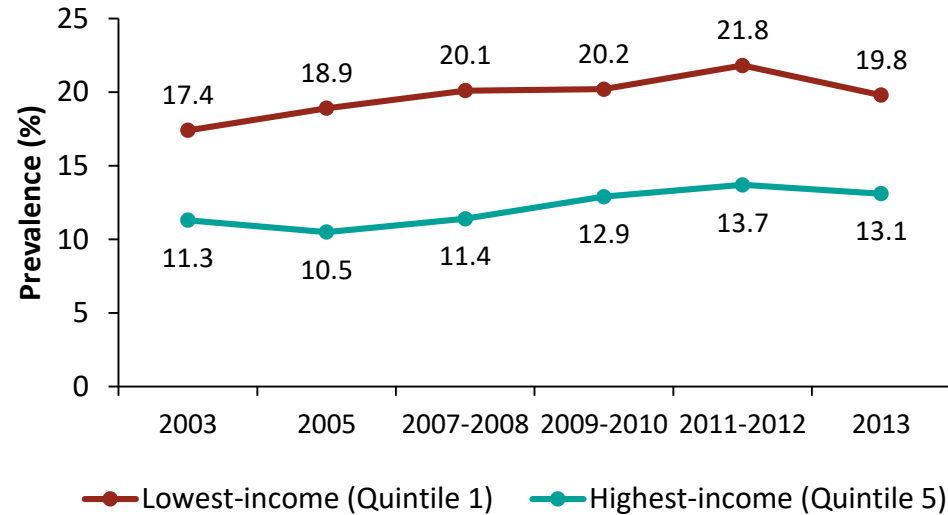


# Considering multiple stratifiers simultaneously: obesity by sex **AND** income

Obesity prevalence over time by neighbourhood  
income, men

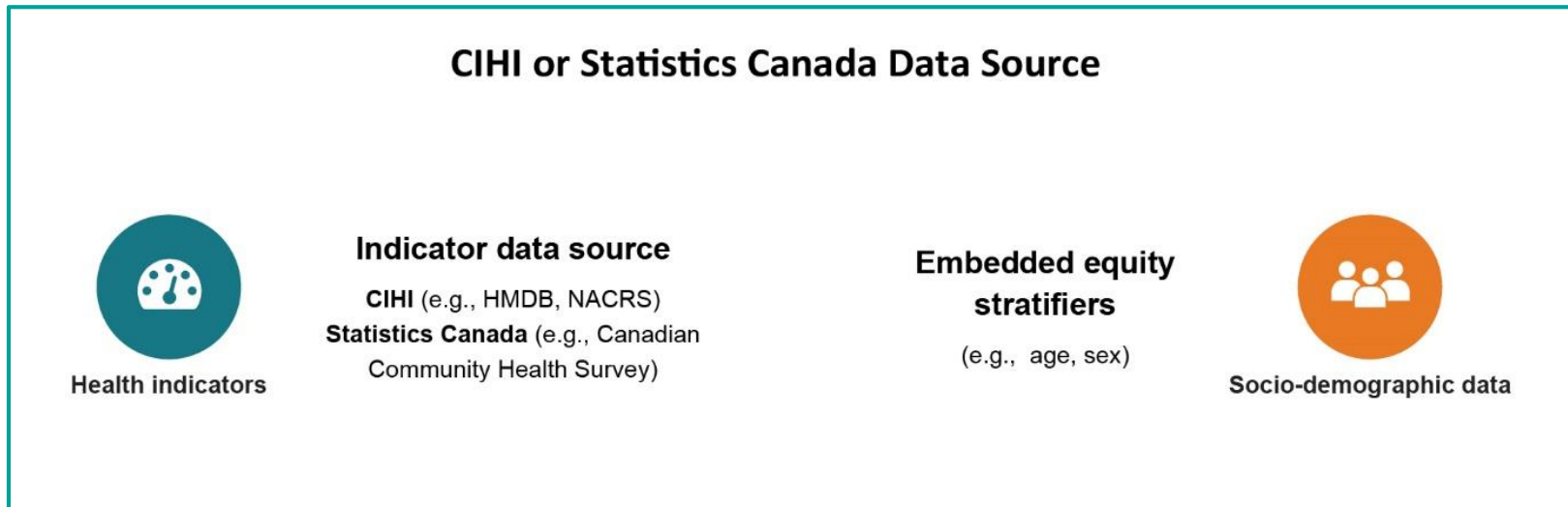


Obesity prevalence by neighbourhood income over  
time, women



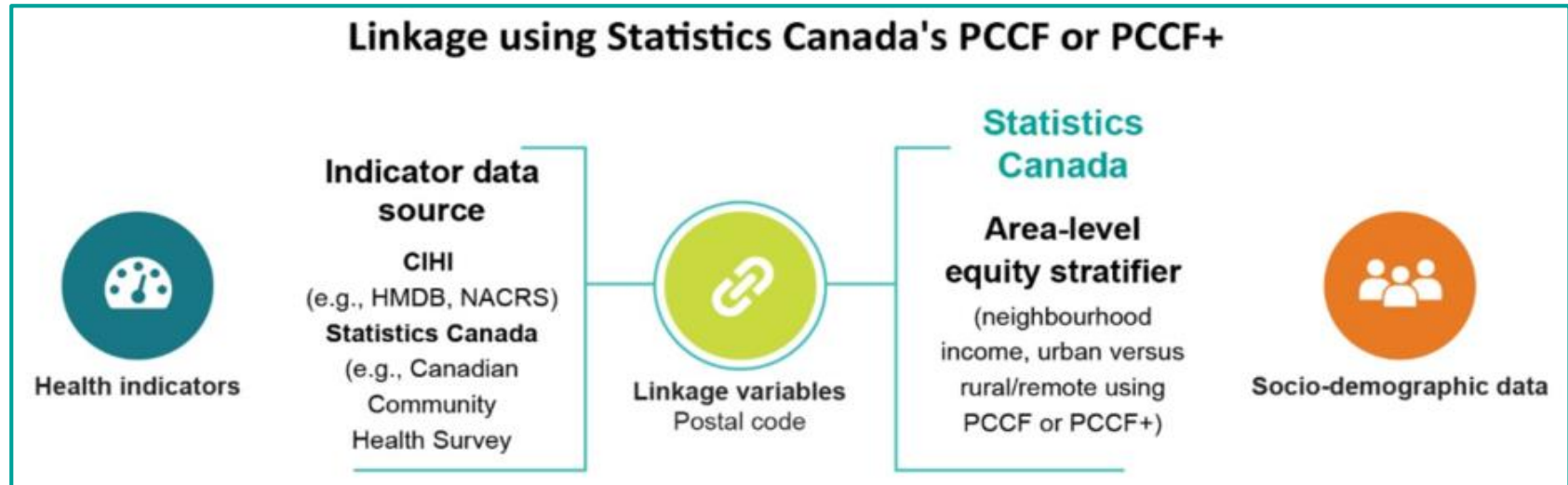
# Explore approaches for accessing equity stratifier data

- Approach 1: Use equity stratifier data embedded within health databases



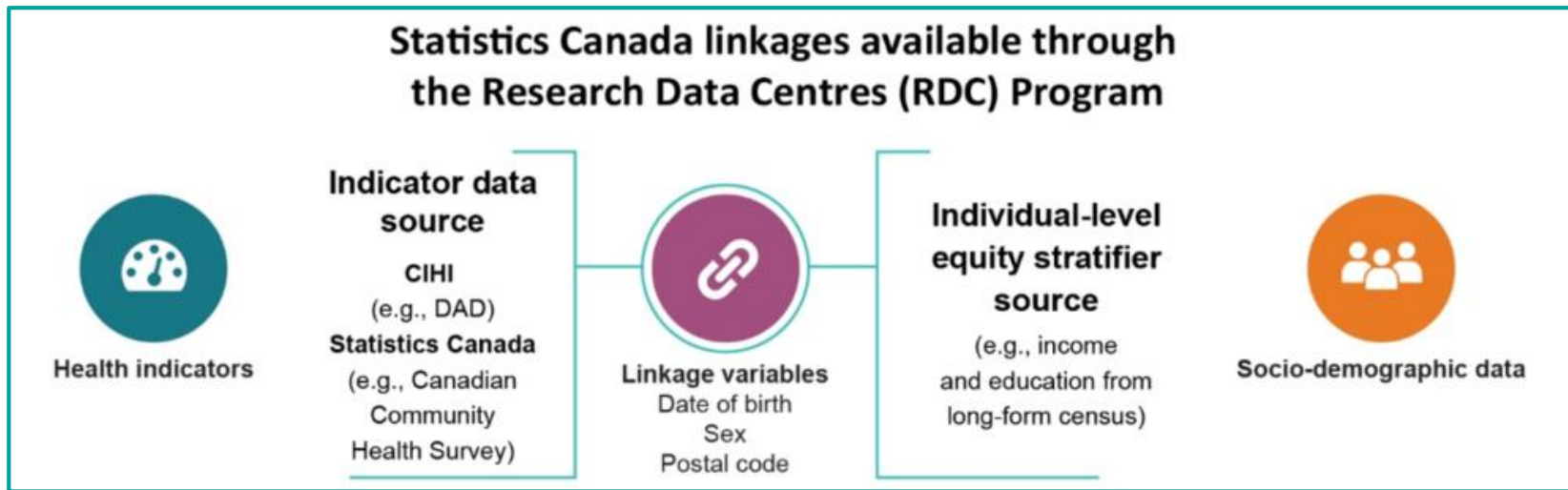
# Explore approaches for accessing equity stratifier data (cont'd)

- Approach 2: Link health and equity stratifier data at the area level



# Explore approaches for accessing equity stratifier data (cont'd)

- Approach 3: Link health and equity stratifier data at the individual level



# Key resource: Equity Stratifier Inventory



- Summarizes the availability of 19 equity stratifier in selected CIHI and Statistics Canada data sources
- Assess feasibility based on data availability and quality
- Can be used as a template

Stratifier	HMDB (DAD + MED-ÉCHO) 2016–2017	NACRS 2016–2017
	Age*	A
Sex*	A	A
Gender*	N	N
Income*	A <sup>1</sup>	A <sup>1</sup>
Education*	N	N
Geographic location (urban versus rural/remote)*	A <sup>1</sup>	A <sup>1</sup>
Ethnicity <sup>†</sup>	N	N
Racialized groups <sup>†</sup>	N	N
Indigenous identity <sup>‡</sup>	N	N
Disability	N	N
Employment status	N	N
Occupation	N	N
Homeless	P	P
Immigrant status	N	N
Language	N	N
Marital status	N	N
Sexual orientation	N	N
Social support	N	N
Health insurance	N	N
Residential postal code	A	A

# Key resource: Area-Level Equity Stratifiers Using PCCF and PCCF+ Guide



- Main differences between PCCF and PCCF+
- Key considerations for use
  - **Income-related analysis:** Use PCCF+
  - **Geographic location-related analysis:** Use either PCCF or PCCF+
- Information on data quality, accessing the PCCF and PCCF+ tools and definitions of census geographies



## Measuring Health Inequalities: A Toolkit

Area-Level Equity Stratifiers Using PCCF and PCCF+

# By the end of the planning phase, you'll have:

- ✓ **Selected relevant stratifiers (including interactions) for your indicator**
- ✓ **Decided how to define and access data for these stratifiers**
- ✓ **Created an analysis plan**



## Activity 2: Complete an analysis plan

# Activity 2: Complete an analysis plan



<b>Stratifier</b>	<b>Source of Stratifier Data</b>
<b>Age</b>	<b>Embedded within CIHI's HMDB</b>
<b>Sex</b>	<b>Embedded within CIHI's HMDB</b>
<b>Gender</b>	n/a
<b>Income</b>	<b>Link CIHI's HMDB with area-level data using PCCF+</b>
<b>Education</b>	<b>Explore Statistics Canada linkages of hospital and census data at the individual level</b>
<b>Geographic location</b>	<b>Link CIHI's HMDB with area-level data using PCCF</b>

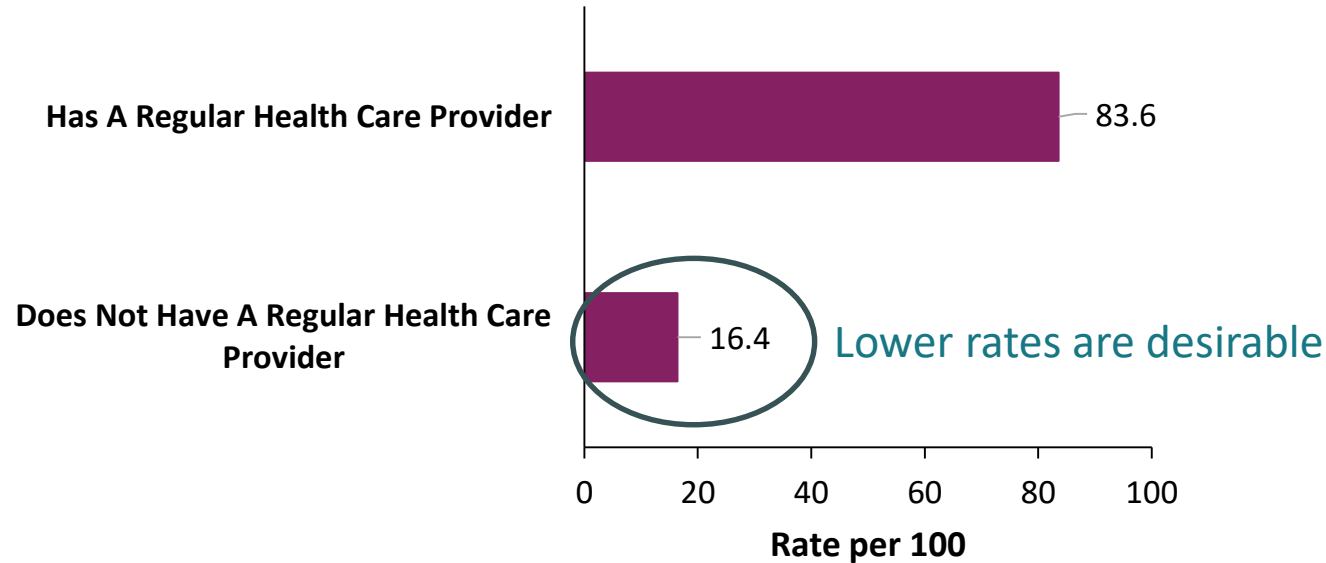


# Analyze your data

1. Carry out a stratified analysis
2. Quantify inequalities using summary measures

# Review your health indicator definition

- Consider the direction of your health indicator



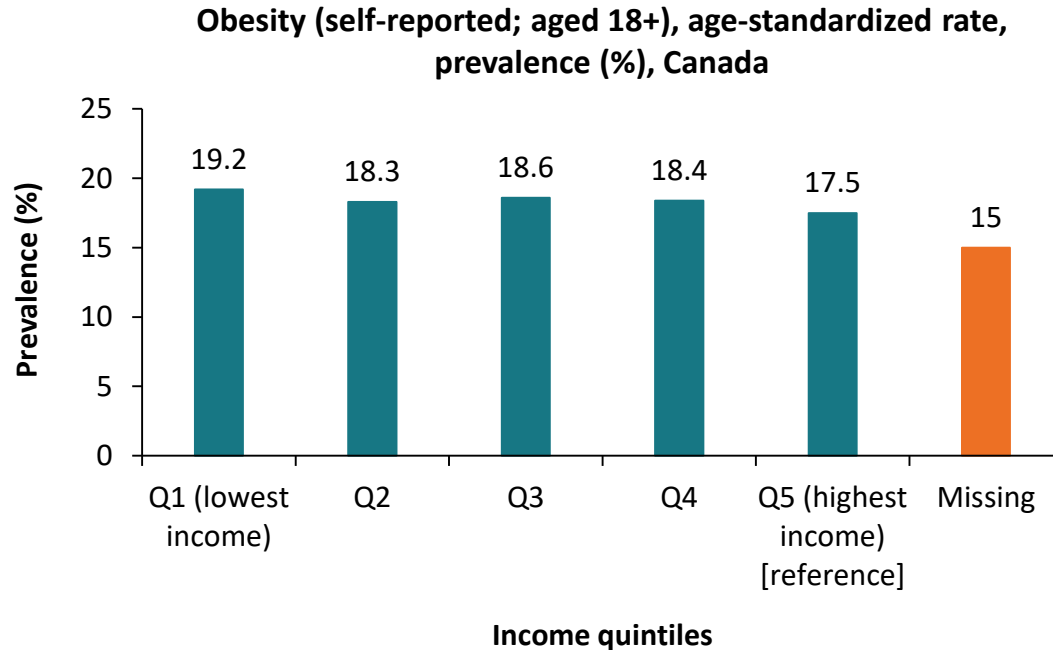
# Consider reporting crude and adjusted rates

- **Crude rates more closely reflect the actual number of people impacted by a health indicator in each population subgroup**
- **Adjusted rates facilitate comparisons between place and over time by accounting for differences in population characteristics. There are two types of adjustment:**
  - **Age-standardization** accounts for different age distributions
  - **Risk adjustment** accounts for differences in several population characteristics

# Obtain your equity stratifier data

<b>Stratifier</b>	<b>Source of Stratifier Data</b>
<b>Age</b>	<b>Embedded within CIHI hospital data</b>
<b>Sex</b>	<b>Embedded within CIHI hospital data</b>
<b>Income</b>	<b>Link hospital with area-level data using PCCF+</b>
...	...
...	...

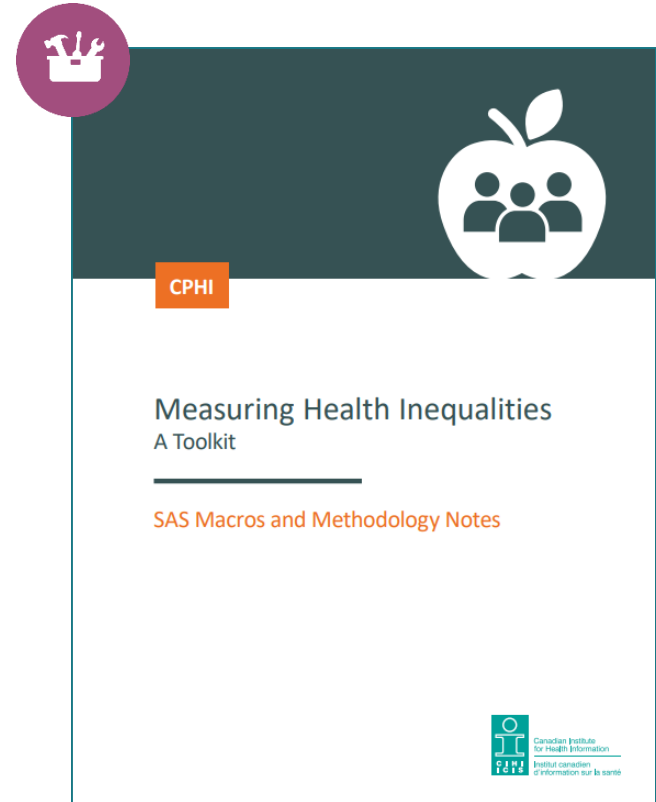
# Check your data for consistency, missing information and small numbers



**Source:** Pan - Canadian Health Inequalities Data Tool, 2017 Edition. A joint initiative of the Public Health Agency of Canada, the Pan - Canadian Public Health Network, Statistics Canada, and the Canadian Institute of Health Information.

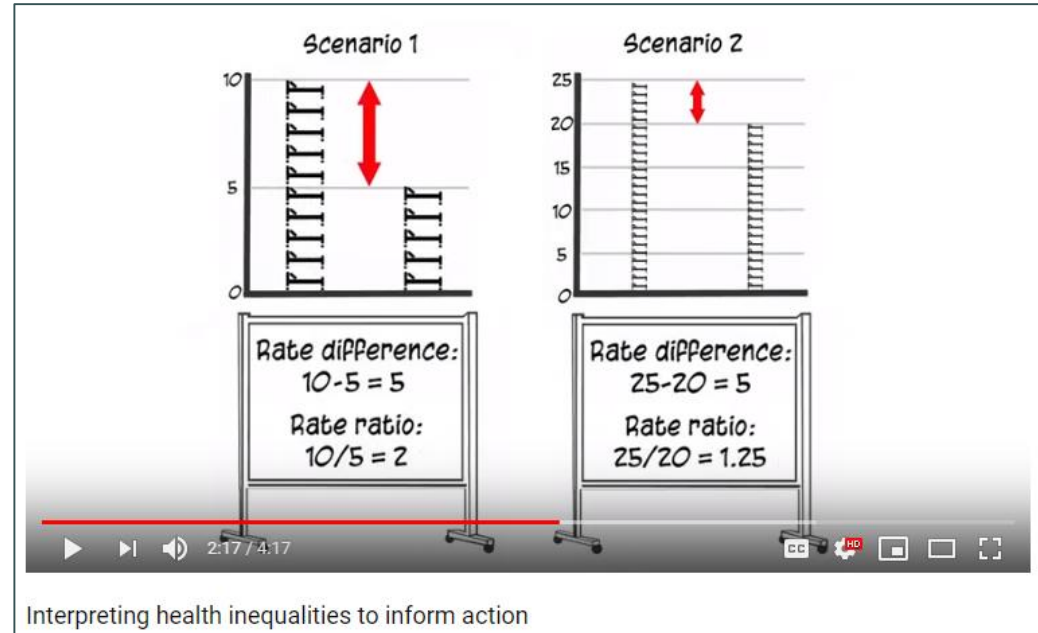
# Key resource: SAS Macros and Methodology Notes

- Calculate indicator rates, as well as variance estimates, stratified by income and geographic location
- Calculate summary measures of inequality



# Quantify inequalities using summary measures

- Use both absolute (difference-based) and relative (ratio-based) summary measures
- At a minimum, include rate ratio (RR) and rate difference (RD)
  - Simple to communicate and calculate



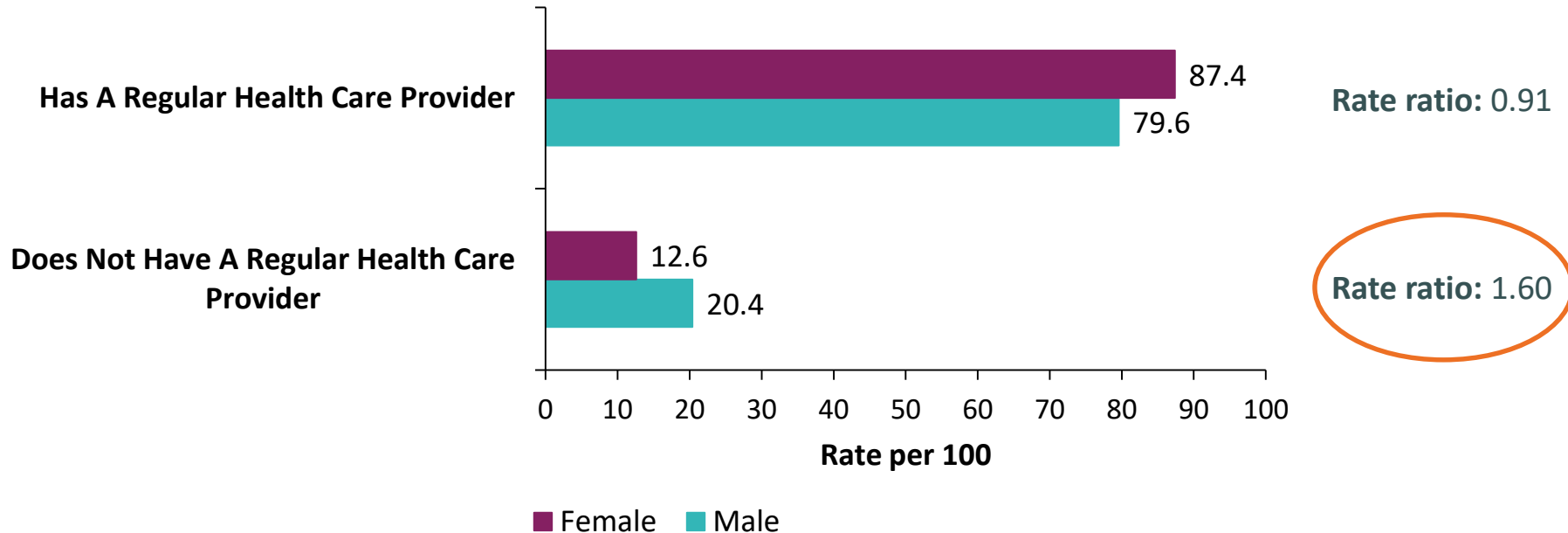
<https://youtu.be/XF1MagncBJc>

# Select your reference group

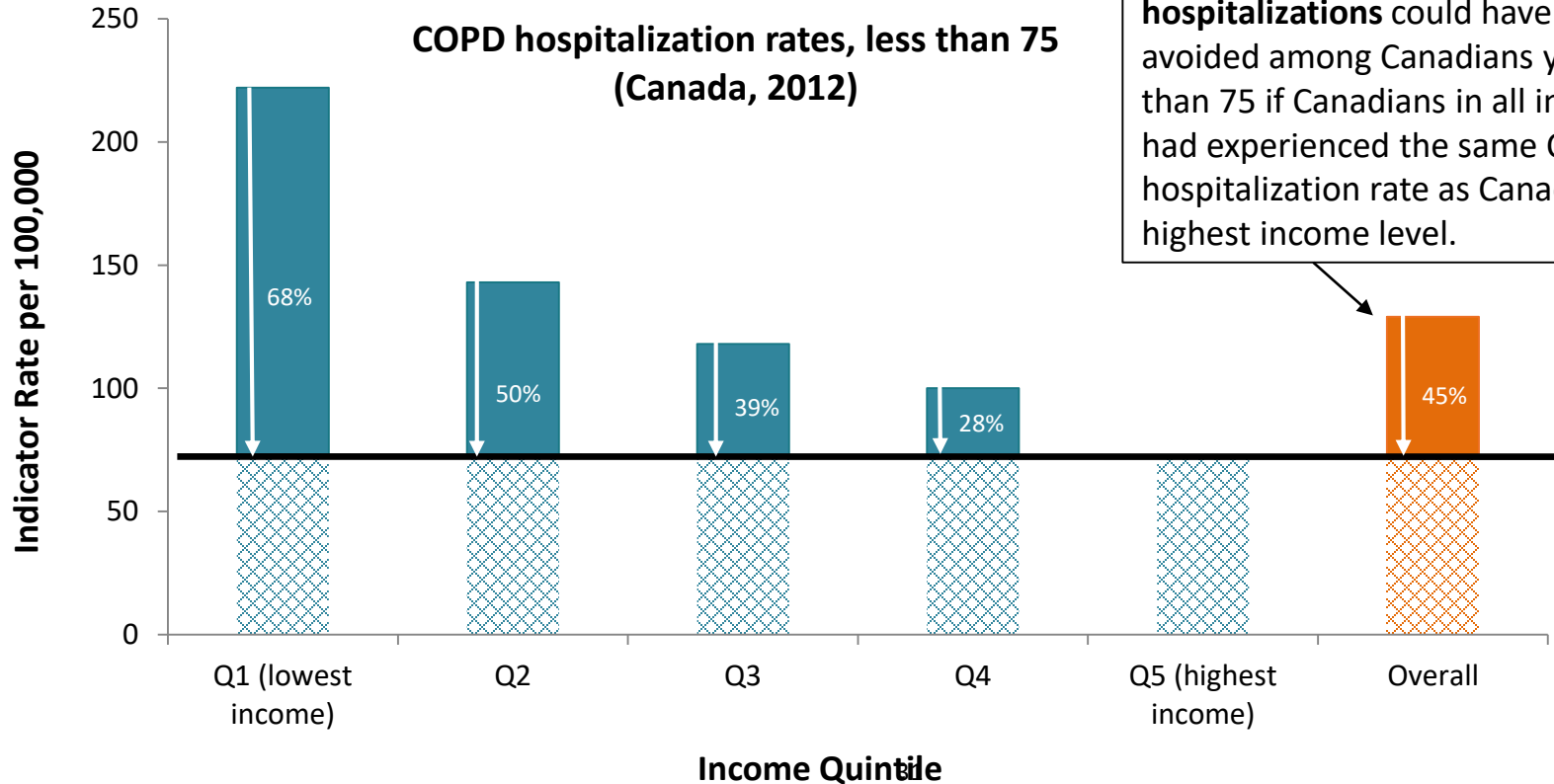
- Select the subgroup with most desirable rate
- For ordered stratifiers, such as income quintiles or educational attainment, the highest ranked group is usually selected.
- The majority subgroup may be selected for the reference group, even when this group does not have the most desirable rate. This approach is more commonly used for non-ordered stratifiers.
- If you are analyzing inequalities for multiple health indicators, it will be easier to interpret the results if all the indicators have the same reference group.

# Adapt summary measures based on desired direction of indicator

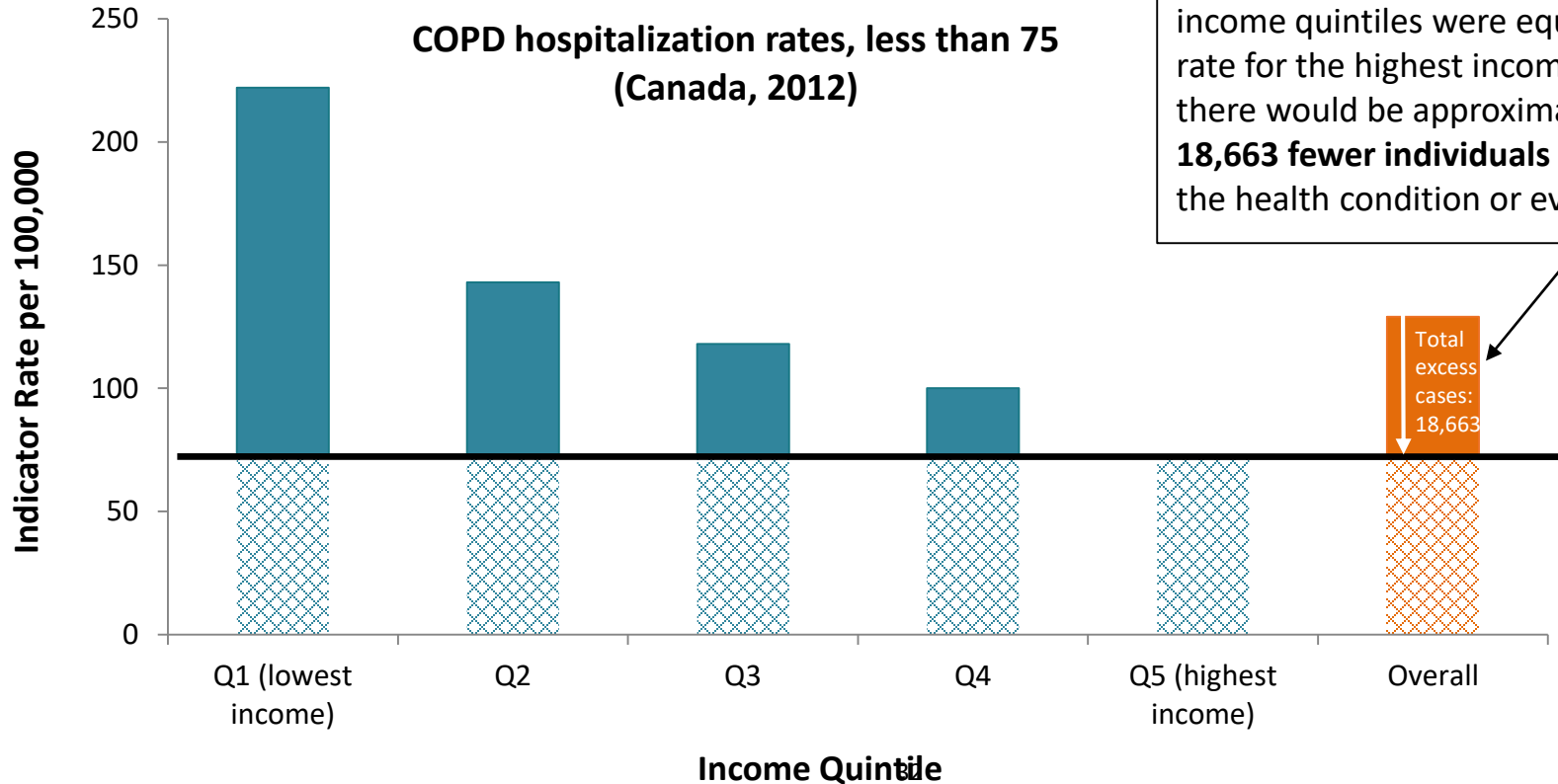
- Having a regular health care provider defined in 2 ways



# Complex inequality measures: Population Rate Reduction (PRR)



# Complex inequality measures: Population Impact Number (PIN)



# By the end of the analyzing phase, you'll have:

- ✓ **Obtained and prepared your equity stratifier data for analysis**
- ✓ **Calculated stratified indicator rates and considered crude and adjusted rates**
- ✓ **Selected a reference group for calculating summary measures of inequality**
- ✓ **Calculated relative and absolute simple measures of inequality**
- ✓ **Considered calculating complex measures of inequality**

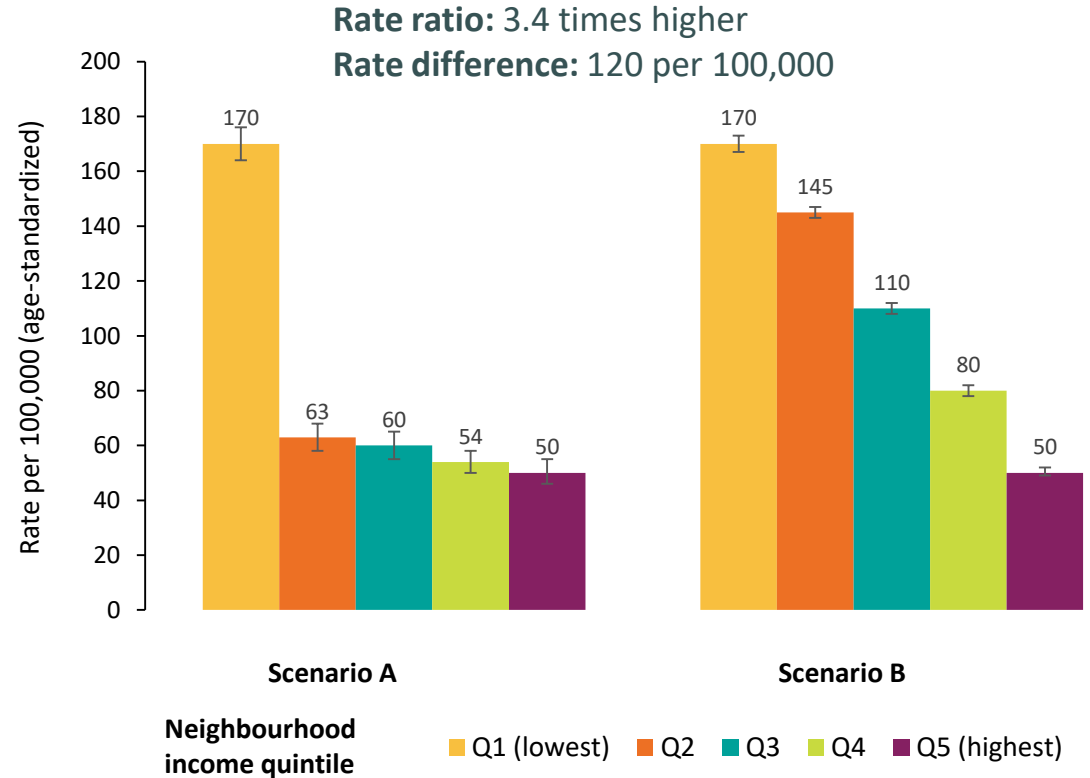


# Report your findings

1. Interpret results for key findings
2. Present findings to your audience

# Review results of your summary measures

- Review the results of your summary measures alongside the underlying indicator rates



# Statistical significance of summary measures

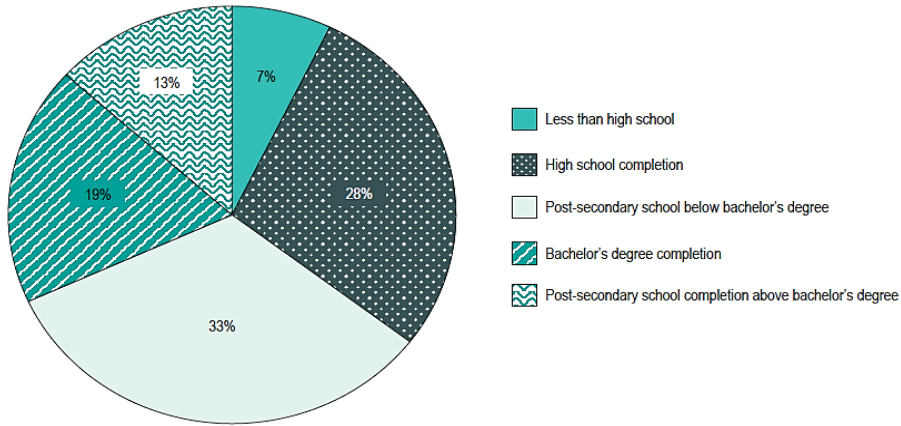
Measure	95% Confidence Intervals	Example comparing obesity prevalence for men vs. women
Rate ratio	Does not include 1	1.15; 95% CI (1.11-1.18)]
Rate difference	Does not include 0	2.5 percentage points; 95% CI [1.90-3.00]
Potential rate reduction	Does not include 0	6.79%; 95% CI [5.31-8.27]
Population Impact Number	Does not include 0	331,760; 95% CI [258,560-404,960]

- **When comparing two rate ratios or two rate differences, non-overlapping confidence intervals suggests statistical significance**

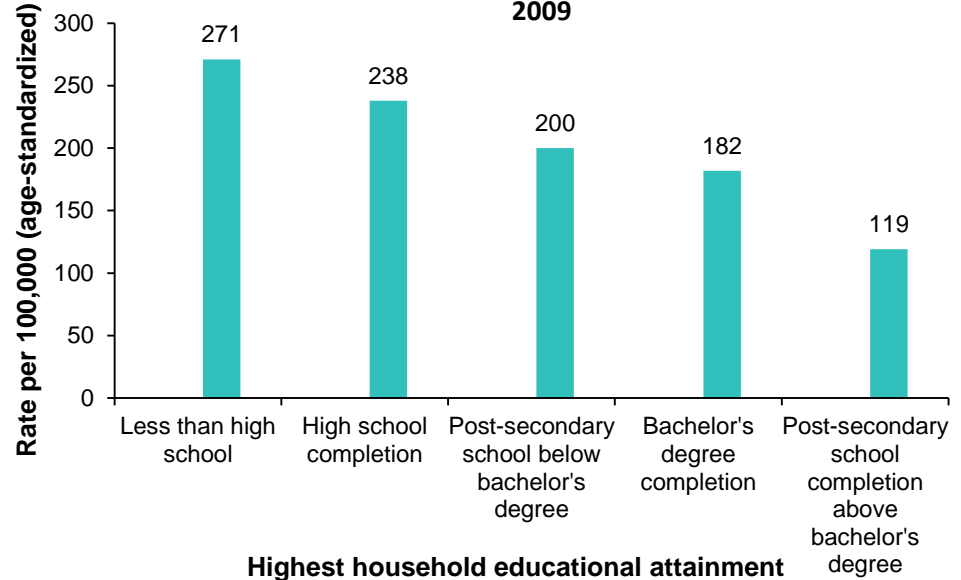
# Report percentages of population subgroups

- Consider reporting the percentage of the population in each subgroup

Distribution of household educational attainment (age 0 to 19), Canada (excluding Quebec), 2006



Asthma hospitalization (age 0 to 19), by household educational attainment and sex, Canada (excluding Quebec), 2006–2007 to 2008–2009



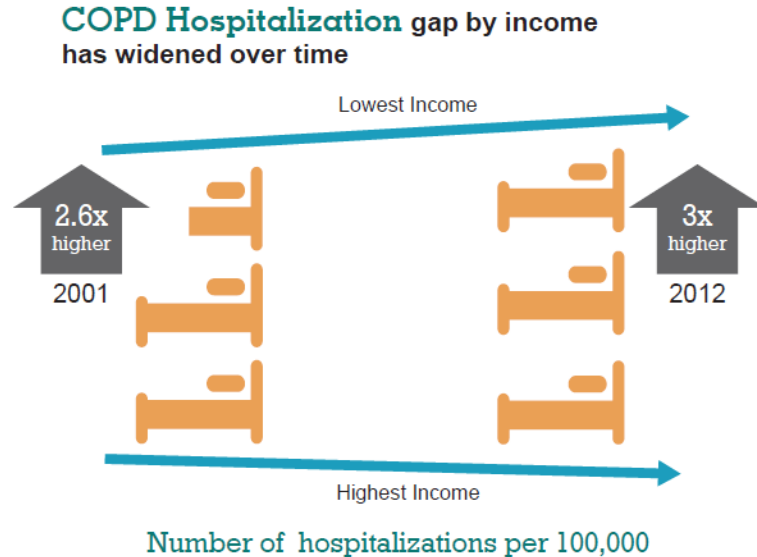
# Present findings to your audience

- **Review the literature to**
  - Consider the impact and context of your findings
  - Identify opportunities, such as policies and programs, for addressing the inequalities

## From the literature:

*....self-management planning includes a written asthma action plan and strategies to self-monitor symptoms using **user-friendly educational tools** (e.g., that remove unnecessary medical terms and include pictures).*

# Tailor your message and visualizations to your audience



If all Canadians younger than age 75 had the same low rate of hospitalizations for this chronic lung disease as those in the highest income level, in 2012 **there would have been about**

**\$150 million** less in health-sector spending.

**Source:** Canadian Institute for Health Information. *Trends in Income-Related Health Inequalities in Canada*. 2015.

# By the end of the reporting phase, you'll have:

- ✓ Reviewed the results of your summary measures and underlying indicator rates
- ✓ Considered the statistical significance of your findings
- ✓ Contextualized the impact of your findings by reviewing the literature
- ✓ Tailored your message and visualizations to your audience



Activity 3: Quantify  
inequalities using  
summary measures  
and present findings  
to your audience

# Activity 3: Quantify inequalities using summary measures and present findings to your audience



a) Identify a reference group and calculate the rate ratio and rate difference for both the 0-9 and 10-19 age groups.

## 0 – 9 year old age groups:

- ✓ Rate ratio:  $170/113 = 1.5$
- ✓ Rate difference = 57 per 100,000

## 10 – 19 year old age groups:

- ✓ Rate ratio:  $37/18 = 2.1$
- ✓ Rate difference = 19 per 100,000

- ✓ Because income is an ordered stratifier, the reference group is usually the highest ranked group, i.e., the highest income quintile.

# Activity 3: Quantify inequalities using summary measures and present findings to your audience



**b) Draw conclusions about the level of inequality for the two age groups. Hint: Consider both relative and absolute inequality.**

- ✓ Income-related inequalities for asthma hospitalizations are observed for both younger and older children
- ✓ Relative inequalities are higher among older children; absolute inequalities are higher among younger children
  - These patterns are related to the rates being higher in younger children

## Activity 3: Quantify inequalities using summary measures and present findings to your audience



**c) Your analysis indicates the potential rate reduction for the lowest income quintile among 0-9 year olds is 19.4%. What does this mean?**

✓ Almost 20% of hospitalizations could have been avoided if young children in all income levels had experienced the same rate of hospitalizations as those in the highest income level.

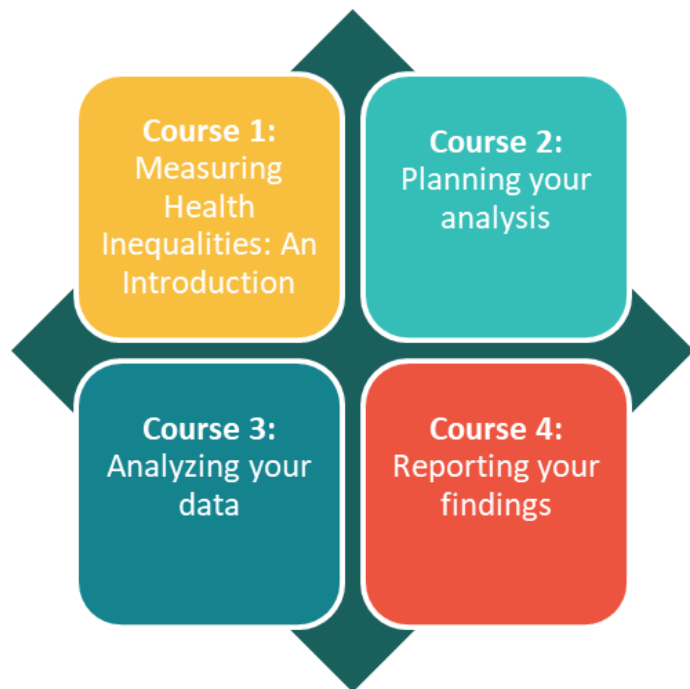
**d) How would a health system respond to these results?**



# Moving forward

# Next Steps

- **Bundle of 4 eLearning courses (available Winter 2019)**



# Discussion

- **Any sections that were not clear or difficult to understand?**
- **Anything we're missing? Do you have other resources and guidelines you would suggest we include?**
- **Would you be willing to share your experiences/learnings using the toolkit?**







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