

Guidance for evaluating the influence of the COVID-19 pandemic on Canadian Chronic Disease Surveillance System measures

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Context

Factors related to the COVID-19 pandemic, including changes in healthcare seeking behaviour, availability and use of healthcare services, and possible changes in health status, influenced Canadian Chronic Disease Surveillance System (CCDSS) measures. As such, CCDSS estimates should be used cautiously when making inferences about population health during this period.

This page provides data users with guidance and cautions regarding the use of CCDSS data from the pandemic period. CCDSS reporting is according to fiscal year (April–March), with the pandemic period beginning fiscal year 2020–2021 (April 2020), and the pre-pandemic period referring to fiscal years 2019–2020 and earlier (March 2020 and prior). The pandemic period addressed in this guidance pertains specifically to fiscal years 2020–2021 and 2021–2022.

Pandemic impact assessment

To quantify the impact of the pandemic on CCDSS measures (incidence, prevalence, all cause-mortality), one option is to compute the percent change (PC) in estimates (e.g., counts, age-standardized rates etc.) from a given pandemic year (e.g., 2020–2021) relative to the most recent pre-pandemic year (2019–2020).

To guide the interpretation of the PC, comparison to the average annual percent change (AAPC) over the 5 year period prior to the pandemic (2015–2016 to 2019–2020) is useful. Using an AAPC based on a 5 year period is less likely to be influenced by short term fluctuations or outliers compared to an AAPC founded on a shorter time period.

For a given CCDSS measure:

Step 1: Calculate the PC using estimates from the pandemic year(s) of interest to the most recent year prior to the pandemic (2019–2020):

$$PC (\%) = [(pandemic\ year - pre-pandemic\ year) / pre-pandemic\ year] \times 100$$

where:

pandemic year = estimate in pandemic year (e.g., 2020–2021)

pre-pandemic year = estimate in 2019–2020

Step 2: Calculate the AAPC over the 5 year period prior to the pandemic (2015–2016 to 2019–2020):

$$AAPC (\%) = [(APC_1 + APC_2 + APC_3 + APC_4)] / N$$

where:

APC1 = annual percent change in 2019–2020 to 2018–2019

APC2 = annual percent change in 2018–2019 to 2017–2018

APC3 = annual percent change in 2017–2018 to 2016–2017

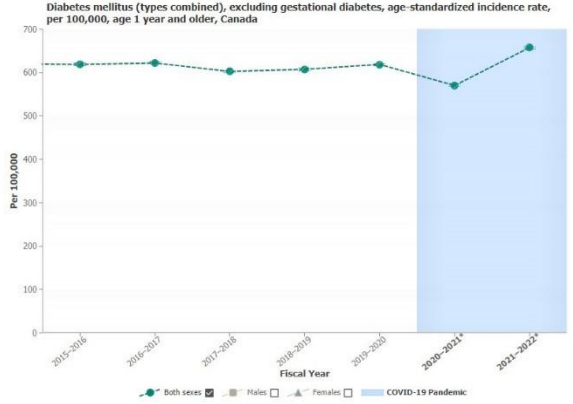
APC4 = annual percent change in 2016–2017 to 2015–2016

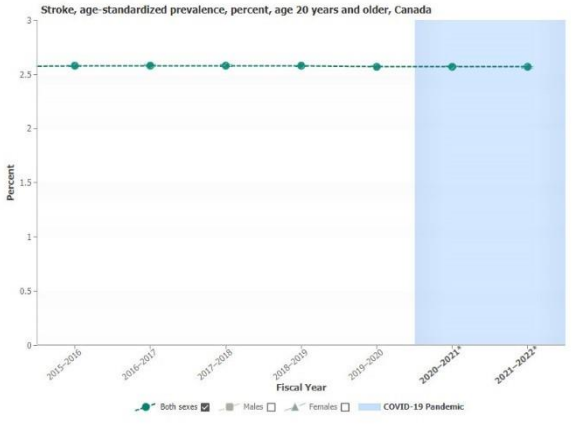
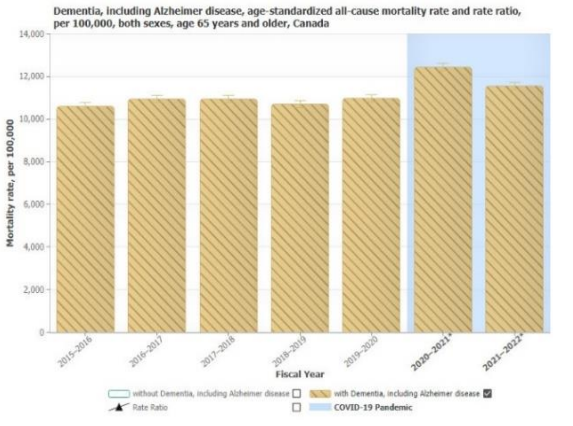
N = number of years prior to the pandemic - 1 (4 years)

Step 3: For context, compare the PC estimates from the pandemic year (e.g., 2020–2021) to the most recent year prior to the pandemic (2019–2020) (**Step 1**), with the AAPC over the 5 year period prior to the pandemic (**Step 2**). See example applications below.

Example applications:

To illustrate the potential impact of the pandemic on CCDSS measures, this table reports the PC in estimates from the first and second pandemic years (2020–2021 and 2021–2022, respectively) to the most recent pre-pandemic year (2019–2020), as well as the AAPC over the 5 year period prior to the pandemic (2015–2016 to 2019–2020). Examples are provided for a few different scenarios.

CCDSS measure	Pre-pandemic / pandemic scenario	2019–2020 estimate	2020–2021 estimate	PC ^a	2021–2022 estimate	PC ^b	AAPC in estimates over the 5 year period prior to the pandemic ^c	Interpretation
Diabetes mellitus (types combined) excluding gestational diabetes, age-standardized incidence rate, both sexes, age 1 year and older, Canada	<p>Pre-pandemic stable, Pandemic decrease followed by an increase</p>  <p>Diabetes mellitus (types combined), excluding gestational diabetes, age-standardized incidence rate, per 100,000, age 1 year and older, Canada</p>	618 per 100,000	570 per 100,000	-7.77%	658 per 100,000	6.47%	-0.02%	<p>In the first pandemic year (2020–2021), there was a 7.77% decrease in the age-standardized incidence rate for diabetes compared to the previous year (2019–2020). However, in the second pandemic year (2021–2022), there was a 6.47% increase compared to 2019–2020. The trend was stable over the 5 year period prior to the pandemic (AAPC = -0.02% from 2015–2016 to 2019–2020). Therefore, a decrease in diabetes incidence was observed during the first year of the pandemic period while an increase was noted in the second year.</p>

<p>Stroke, age-standardized prevalence, both sexes, age 20 years and older, Canada</p>	<p>Pre-pandemic stable, Pandemic stable</p> 	2.57%	2.57%	0.00%	2.57%	0.00%	-0.10%	<p>In the first and second pandemic years (2020–2021 and 2021–2022), there was no change in the age-standardized prevalence for stroke compared 2019–2020. The trend was stable over the 5 year period prior to the pandemic (AAPC = -0.10% from 2015–2016 to 2019–2020). Thus, there was no noticeable association between the pandemic and stroke prevalence during the first and second years of the pandemic period.</p>
<p>Dementia, including Alzheimer disease, age-standardized all-cause mortality rate, both sexes, age 65 years and older, Canada</p>	<p>Pre-pandemic stable, Pandemic increase</p> 	10,970 per 100,000	12,437 per 100,000	13.37%	11,538 per 100,000	5.18%	0.85%	<p>In the first pandemic year (2020–2021), there was a 13.37% increase in the age-standardized all-cause mortality for people diagnosed with dementia compared to the previous year (2019–2020). However, in the second pandemic year (2021–2022), there was only a 5.18% increase compared to 2019–2020. The trend was fairly stable over the 5 year period prior to the pandemic (AAPC = 0.85% from 2015–2016 to 2019–2020). Hence, there was an observed increase in all-cause mortality among those with dementia in the pandemic period, with the increase in the first year surpassing that in the second year.</p>

Abbreviations: AAPC: Average Annual Percent Change; PC: Percent Change; CCDSS: Canadian Chronic Disease Surveillance System

^aEstimates of PC (%) = [(pandemic year – pre-pandemic year)/(pre-pandemic year) x 100], where pandemic year = estimate in 2020–2021, and pre-pandemic year = estimate in 2019–2020.

^bEstimates of PC (%) = [(pandemic year – pre-pandemic year) / (pre-pandemic year) x 100], where pandemic year = estimate in 2021–2022, and pre-pandemic year = estimate in 2019–2020.

^cEstimates of AAPC (%) = [(APC₁ + APC₂ + APC₃ + APC₄)/N], where APC₁ = annual percent change in estimate 2019–2020 to 2018–2019, APC₂ = annual percent change in estimate 2018–2019 to 2017–2018, APC₃ = annual percent change in estimate 2017–2018 to 2016–2017, APC₄ = annual percent change in estimate 2016–2017 to 2015–2016, and N = 4 years.

Considerations:

- The inclusion of other complementary measures of change, such as the absolute difference between years, may aid in the interpretation of the PC.
- When examining an estimate for any given CCDSS measure (e.g., prevalence), estimates from other measures for the same condition (e.g., all-cause mortality) may provide additional insights.
- The unique contexts within each province and territory during the pandemic period may shed light on changes in the CCDSS estimates being examined. The [Canadian COVID-19 Intervention Timeline](#) from the Canadian Institute for Health Information may aid in the interpretation of specific provincial and territorial findings.

Longer-term trend analyses

Models that evaluate trends over time, such as Joinpoint Regression, are not designed to accommodate shorter-term changes in trends.¹ Therefore, when evaluating longer-term trends in CCDSS measures, consideration should be given to excluding data from the first (2020–2021) and second pandemic year (2021–2022) as their inclusion could bias trend estimates.

This guidance will be updated as more CCDSS data become available.

For more information, contact Public Health Agency of Canada at: infobase@phac-aspc.gc.ca

¹ National Cancer Institute. (n.d.). Joinpoint Regression Program - Setting Parameters. Retrieved January 31, 2024, from <https://surveillance.cancer.gov/help/joinpoint/setting-parameters/input-file-tab/independent-variable-1/exclude-last-data-point-covid-outlier>.