

Provisional death counts and excess mortality, January 2020 to June 2021

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COVID-19 continues to affect communities and families in Canada. Beyond deaths attributed to the disease itself, the pandemic could also have indirect consequences that increase or decrease the number of deaths as a result of various factors, including delayed medical procedures, increased substance use, or declines in deaths attributable to other causes, such as influenza.

To understand both the direct and indirect consequences of the pandemic, it is important to measure excess mortality, which occurs when there are more deaths than expected in a given period. It should be noted that, even without a pandemic, there is always some year-to-year variation in the number of people who die in a given week. This means that the number of expected deaths should fall within a certain range of values. There is evidence of excess mortality when weekly deaths are consistently higher than the expected number, but especially when they exceed the range of what is expected over several consecutive weeks.

From March 2020 to the beginning of June 2021, there were an estimated 23,547 excess deaths in Canada, or 6.7% more deaths than what would be expected were there no pandemic, after accounting for changes in the population, such as aging. Over this same period, 24,910 deaths were directly attributed to COVID-19. While COVID-19 deaths were still observed, significant excess mortality has not been observed nationally for the total population using the provisional death data since February 2021.

Building on insights based on excess mortality, age-standardized mortality rates for 2020—which are adjusted to account for changes in population size and age composition—are compared with previous years to better understand how overall mortality trends for certain age groups may have been driven by different causes of death.

Overall mortality rates in 2020 increased for all age groups compared with previous years—particularly for the youngest and oldest populations. However, while COVID-19 appeared to be the main driver for increased mortality rates in 2020 among older populations, for younger age groups, increases in unintentional poisonings (which includes overdoses) were also a factor.

As part of Statistics Canada's commitment to providing timely and relevant information on COVID-19 and its impact on Canadians, a new updated provisional dataset from the Canadian Vital Statistics Death Database, covering the period from January 2020 to June 2021, was released today. Updates were also made to the provisional death estimates, which have been adjusted, where possible, to account for the incomplete nature of the counts. The provisional estimates will continue to be revised in future releases, as more information is reported by provincial and territorial vital statistics agencies, and as estimation methods continue to be enhanced.

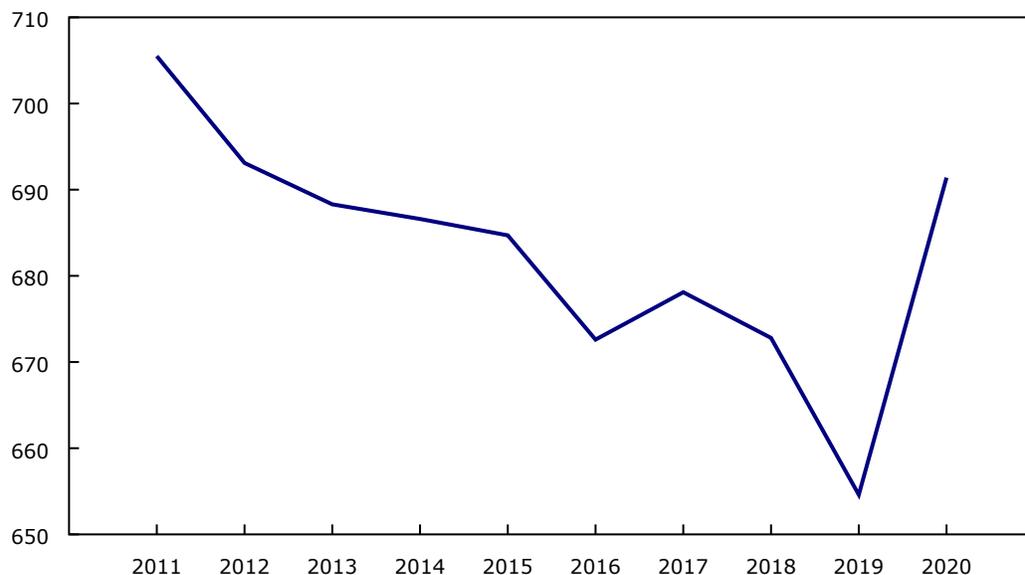
Increased deaths in 2020 reverse a decade of declines in national mortality rates

After experiencing years of relatively steady declines in mortality rates, Canada saw a significant increase in the overall age-standardized mortality rate for 2020. Over the past decade, the national overall mortality rate decreased by 7.2%, from 705.5 deaths per 100,000 population in 2011 to 654.6 in 2019. In 2020, this decline in national age-standardized mortality rates was reversed with a rate of 691.4—the highest overall national age-standardized mortality rate observed in 10 years.



Chart 1
Age-standardized mortality rates, all ages, both sexes, Canada, 2011 to 2020

deaths per 100,000 population



Source(s): Canadian Vital Statistics - Death database and Table [17-10-0005-01](#).

Overall, increases in the mortality rates in 2020 were closely aligned with mortality rates directly attributed to COVID-19. In 2020, the age-standardized mortality rate for deaths due directly to COVID-19 was 35.1 deaths per 100,000 population. This was similar to the increase of 36.8 deaths per 100,000 population in the age-standardized mortality rate from 2019 (654.6) to 2020 (691.4).

Analysis of excess mortality trends observed a similar alignment between the number of COVID-19-caused deaths and excess mortality. However, a closer examination reveals that this was not the case for some age groups. For example, 2,992 excess deaths were observed in 2020 in the 0-44 age category, while the same age group experienced fewer than 100 deaths attributed directly to COVID-19 over the same period.

Increases in mortality rates among those under the age of 45 are partly explained by increased overdoses

Whereas the overall age-standardized mortality rate was steadily declining in the years leading up to the pandemic, the same cannot be said for those in the 0-44 age group. From 2011 to 2015, the mortality rate for this age group stayed relatively stable at around 62 deaths per 100,000 population. However, this rose in subsequent years, peaking at 67.9 in 2017 and then dropping to 64.5 in 2019. This pattern coincided with increased mortality due to unintentional poisonings, which includes deaths associated with overdoses. From 2011 to 2016, the mortality rate for unintentional poisonings in this age group increased from 4.3 deaths per 100,000 population in 2011 to 9.5 in 2016. In 2017, the mortality rate for this cause of death among those younger than 45 peaked at 12.9 deaths per 100,000 population, before the rates started to decline, to a low of 8.3 in 2019.

While the overall mortality rate for those younger than 45 was in decline in 2019, this changed in 2020. For this age group, the mortality rate rose 17.4% from 2019 to 75.7 deaths per 100,000 population in 2020—the highest rate observed since 1999.

This increase in age-standardized mortality rates among those younger than 45 cannot be fully explained by deaths attributed directly to COVID-19. For this age group, the mortality rate due to COVID-19 was 0.44 deaths per 100,000 population in 2020, which amounted to fewer than 100 deaths attributed directly to the disease. On the other hand, similar to the overall trend for this age group, the age-standardized mortality rate for unintentional poisonings in the 0-44 age group increased by 41% from 2019 to 11.7 deaths per 100,000 population in 2020, reversing the decline observed from 2017 to 2019.

Age-standardized mortality rates for 2020 were relatively stable among the natural causes of death that are most common in the 0-44 age group. Cancers (8.0 deaths per 100,000 population) and heart disease (3.2 deaths per 100,000 population) in 2020 remained similar to rates reported in 2018 and 2019.

Although cause of death information for all ages is 97% complete for 2020, 22% of the cause of death information on the 0-44 age group remains incomplete, pending additional investigation. Therefore, there is a possibility that the specific cause of death rates reported above may increase as information continues to be reported.

Unintentional poisonings and COVID-19 leading to increased mortality rates for those aged 45 to 64

Similar to overall trends, the 45-64 age group had experienced steady declines in age-standardized mortality rates leading up to the COVID-19 pandemic, hitting a low of 379.5 deaths per 100,000 population in 2019. However, in 2020, the mortality rate for this age group rose to 411.2 deaths per 100,000 population, which was 8.3% higher than in 2019 and the highest rate for this age group since 2012 (412.1).

Looking at patterns by cause of death, deaths due to both COVID-19 and unintentional poisonings have contributed to the increase in 2020. The age-standardized mortality rate for COVID-19-caused deaths was 7.8 deaths per 100,000 population for this age group. On the other hand, the mortality rate for unintentional poisonings increased by 35.2% among 45-to-64-year-olds, from 12.5 deaths per 100,000 population in 2019 to 16.9 in 2020.

Nearly 8% of the cause of death information for the 45-64 age group in 2020 is incomplete, pending further investigation. Therefore, there is a possibility that the specific cause of death rates reported for this age group may also increase as information becomes more complete.

COVID-19 driving increased mortality rates for those aged 65 and older

Among those aged 65-84, age-standardized mortality rates had been in steady decline over the years, dropping from 2,490.0 deaths per 100,000 population in 2011 to 2,236.4 deaths per 100,000 population in 2019. In 2020, the rate increased to 2,313.7 deaths per 100,000 population—the highest it has been since 2017.

At the same time, the age-standardized mortality rate for COVID-19-caused deaths in 2020 among those in the 65-84 age category was 113.7 deaths per 100,000 population. The fact that the COVID-19 mortality rate is higher than the overall increase in this age group's mortality rate compared with 2019 suggests that rates for other causes of death have declined.

In fact, the age-standardized mortality rates for those aged 65-84 for cancer, heart disease and chronic lower respiratory infections have all experienced a steady decline since 2011 and this trend continued in 2020.

For those aged 85 and older, from 2011 to 2019, age-standardized mortality rates fluctuated, but generally declined from 12,804.7 deaths per 100,000 population in 2011 to 12,223.7 in 2019. Mortality rates for this age group increased by 5.1% to 12,847.2 deaths per 100,000 population in 2020, marking the highest mortality rate for this age group in Canada since 2010.

Similar to the trend for those aged 65-84, the COVID-19 mortality rate for the 85-and-older age group outpaced the overall increase in the mortality rate from 2019 to 2020. The age-standardized mortality rate for COVID-19-caused deaths among individuals aged 85 and older was 982.3 deaths per 100,000 population in 2020.

The emergence of COVID-19 variants of concern and the rollout of COVID-19 vaccines in Canada will likely have an impact on mortality trends. Statistics Canada will continue to provide timely information on a regular basis on excess deaths, causes of death and comorbidities as it becomes available.

Note to readers

A new updated provisional dataset from the Canadian Vital Statistics Death Database, covering the period from January 2020 to June 2021, was released today. Updates were also made to the provisional death estimates, which have been adjusted, where possible, to account for the incomplete nature of the counts. The provisional estimates will continue to be revised in future releases as more information is reported by provincial and territorial vital statistics agencies and as estimation methods continue to be enhanced.

The data released today are provisional, as they are not based on all deaths that occurred during the reference period because of reporting delays, and they do not include Yukon. Provisional death counts are based on what is reported to Statistics Canada by provincial and territorial vital statistics registries. Provisional death estimates have been adjusted to account for incomplete data, where possible. The numbers of excess deaths discussed in this analysis refer to provisional estimates. Information on the methods used can be found in the "Definitions, data sources and methods" section for [Canadian Vital Statistics - Death Database](#).

The provisional death counts and estimates released today may not match figures from other sources, such as media reports, or counts and estimates from provincial and territorial health authorities and other agencies.

There are a number of ways to measure excess mortality, and each has its strengths and weaknesses. There are also a number of challenges with measuring excess mortality, most importantly, properly estimating the number of expected deaths that would occur in a non-COVID-19 context as a comparison basis for the current death counts. Important variations may be observed from year to year in the annual death counts, in particular in the less populated provinces and in the territories. Moreover, yearly death counts may be affected by changes in the composition of the population, in regard to age more particularly, and changes in mortality rates (e.g. improvement of mortality). In the Canadian context, with an aging and growing population, the number of deaths has been steadily increasing over recent years and so a higher number of deaths in 2020 and 2021 would be expected regardless of COVID-19.

A second challenge is the difficulty of collecting timely death counts. In Canada, death data are collected by the provincial and territorial vital statistical offices. The capacity to provide death data to Statistics Canada in a timely manner varies greatly. Taking these considerations into account, the method chosen by Statistics Canada—which has also been adopted by organizations in several other countries, including the US Centers for Disease Control and Prevention—to estimate expected deaths, is adapted from an infectious disease detection algorithm which has been largely utilized in the context of mortality surveillance in recent years.

Rates are a useful tool for comparing characteristics across different populations, different segments of a population, or the same population over time. One type of rate is a percentage, i.e. the number of individuals exhibiting a characteristic or particular behaviour per 100 people. When rates are used to examine unusual events, such as death due to a particular cause, they are often expressed as the number of people or occurrences per 100,000 population in the population. As with percentages, these rates take into account the underlying population size.

This article uses age-standardized mortality rates to show the number of deaths per 100,000 population that would have occurred by specified age groups and selected causes of death in Canada if the age structure of the population was the same as the age structure of a specified standard population. The advantage of using age-standardization mortality rates is that they allow for the comparisons across different geographies and over time, because age-standardization removes the effects of differences in the age structure of populations. The standard population used for this analysis was the 2011 population. For more information on age-standardized mortality rates, please consult the [Vital Statistics Death Database – Glossary](#).

The tabulation of the causes of death is based on the underlying causes of death, which is defined by the World Health Organization as the disease or injury that initiated the train of events leading directly to death, or as the circumstances of the accident or violence that produced the fatal injury. The underlying cause of death is selected from the causes and conditions listed on the medical certificate of cause of death completed by a medical professional, medical examiner or coroner. More information on causes of death, including the certification and classification of COVID-19 deaths, can be found in the study "[COVID-19 death comorbidities in Canada](#)."

The provisional figures on the number of deaths, the causes of death and excess mortality will continue to be updated as more information is reported to Statistics Canada by the provinces and territories and as further enhancements are made to the estimation models. More information on excess mortality during the COVID-19 pandemic in Canada is available in the article, "[Excess mortality in Canada during the COVID-19 pandemic](#)." Detailed information on the causes of death in Canada for 2020 will be released on January 24, 2022.

References to the period from March 2020 to beginning of June 2021 refer to the period from the week ending March 28, 2020, to the week ending June 5, 2021.

References to 2020 are to the period from January 1, 2020 to December 31, 2020, inclusive. Exceptionally, when discussing the excess mortality and the number of deaths due to COVID-19, the "2020" refers to the period from the week ending January 4, 2020 to the week ending January 2, 2021, inclusive.

Correction note

Some figures included in this release were revised. The analysis focused on age-standardized mortality rates, including breakdowns by broad age group (i.e., under 45, 45-64, 65-84, and 85 and older). All mortality rates were calibrated to 5-year age groups in order to make the comparisons more representative over time. However, the figures broken down by broad age group were calibrated to the total population instead of the population of the broad age group. While this had no impact on the overall mortality rates or any of the trends or analysis, the individual mortality rates by age group required revision to reflect their respective population size.

Available tables: [13-10-0768-01](#), [13-10-0783-01](#), [13-10-0784-01](#), [13-10-0792-01](#) and [13-10-0810-01](#).

Definitions, data sources and methods: survey number [3233](#).

To facilitate the identification of trends in excess deaths by province or territory, the product "[Provisional weekly estimates of the number of deaths, expected number of deaths and excess mortality: Interactive Tool](#)" has been updated.

To facilitate the identification of trends in the number of weekly deaths by age group and sex and by province or territory, the product "[Provisional weekly death counts: Interactive tool](#)" has also been updated.

For more information, or to enquire about the concepts, methods or data quality of this release, contact us (toll-free 1-800-263-1136; 514-283-8300; STATCAN.infostats-infostats.STATCAN@canada.ca) or Media Relations (613-951-4636; STATCAN.mediahotline-ligneinfomedias.STATCAN@canada.ca).