



Thank you for joining us – the
webinar will start shortly

What happened in 2022?

The Canadian excess mortality conundrum, what caused it and will it continue?

Thursday October 19th, 2023

9am (PT) / 12pm (ET)



[linkedin.com/company/club-vita](https://www.linkedin.com/company/club-vita)



[@ClubVita](https://twitter.com/ClubVita)

Our expert panel



Alexandra Sonnenwirth
Client delivery Director
Club Vita



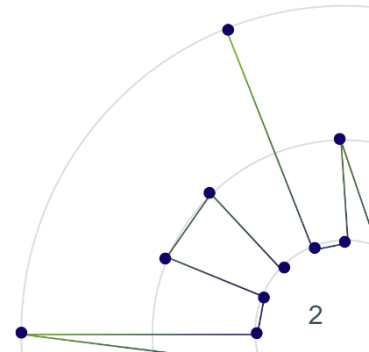
Erik Pickett
Actuary & Chief Content Officer,
Club Vita



Dan Ryan
Chief Research Officer,
COIOS Health

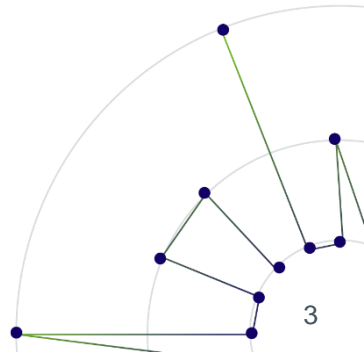


Timothy Meagher
Vice President and Medical Director,
Munich Re



Agenda

- 1 What happened in 2022?
- 2 What caused it and will it continue?
- 3 Q&A

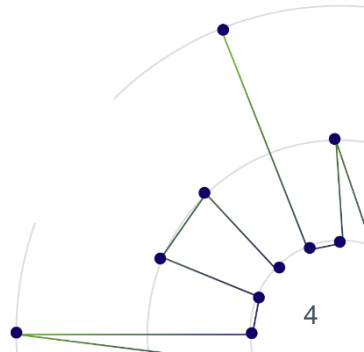


Poll



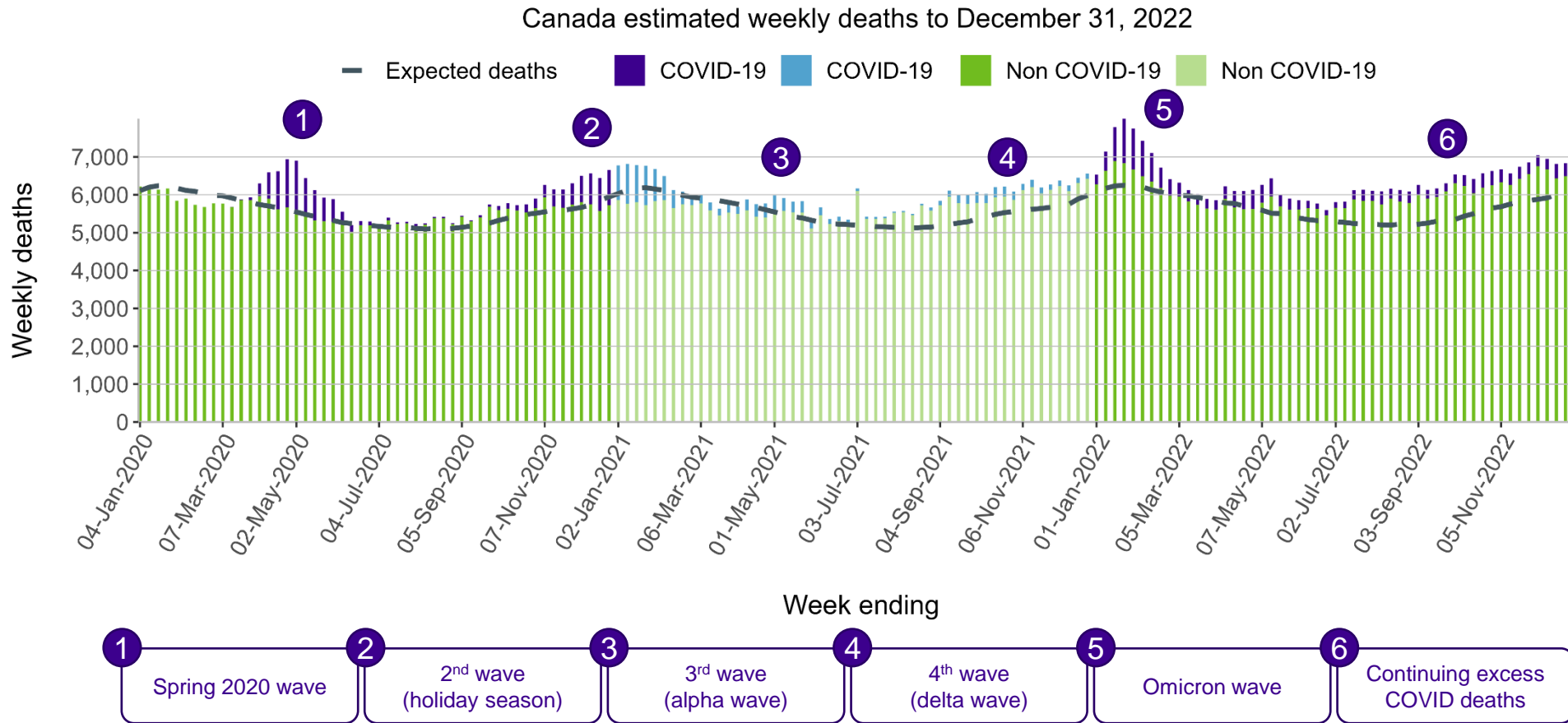
Is 2022 mortality data
representative of the future?

1. Yes, the full year
2. Yes, part of the year
3. No

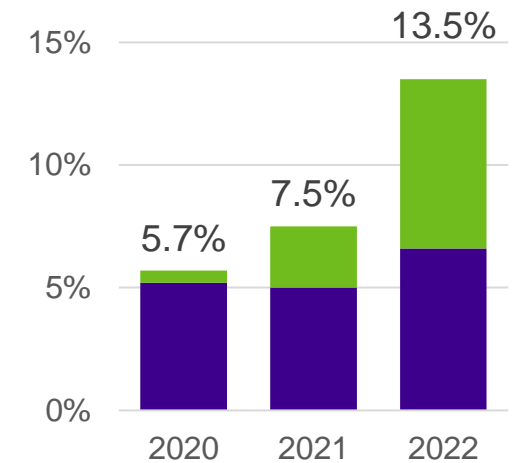


What happened in 2022?

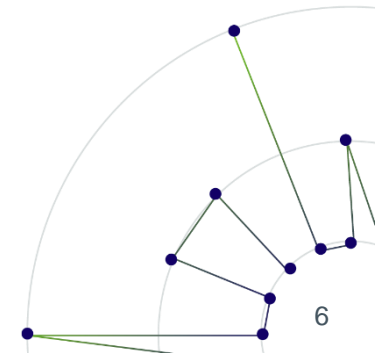
Canadian population excess deaths



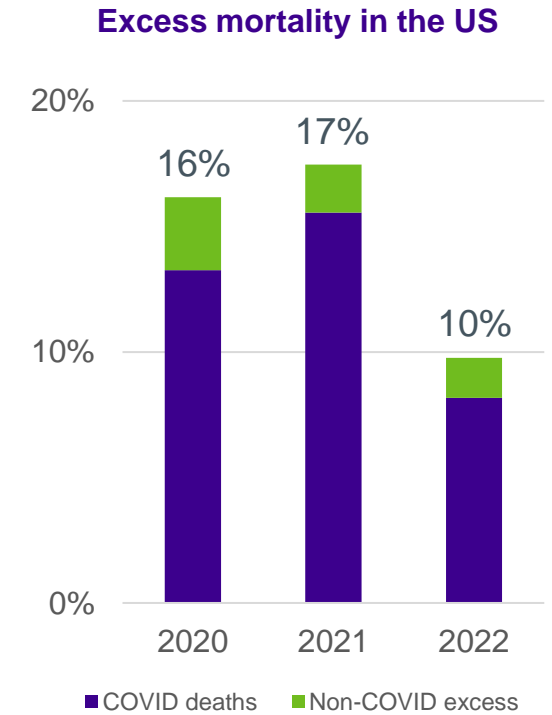
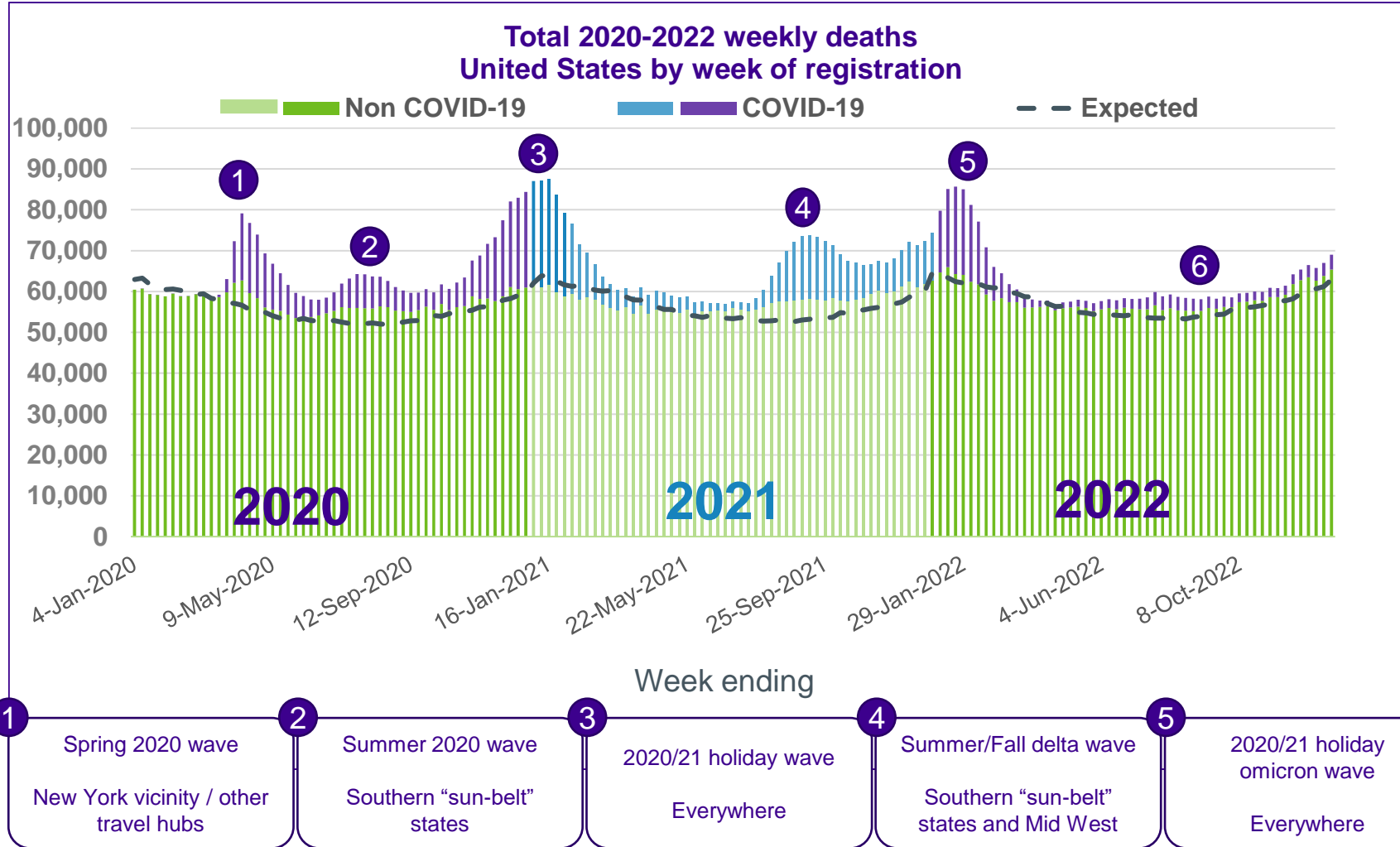
Excess mortality in Canada



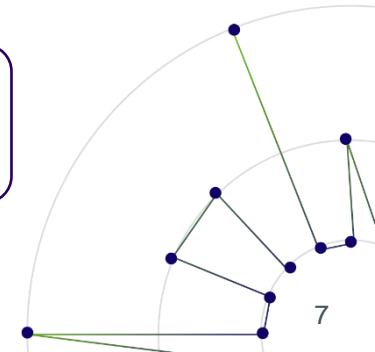
Source: Statistics Canada ([Table 13-10-0792-01](#)). Manitoba data is only available until July 16, 2022.



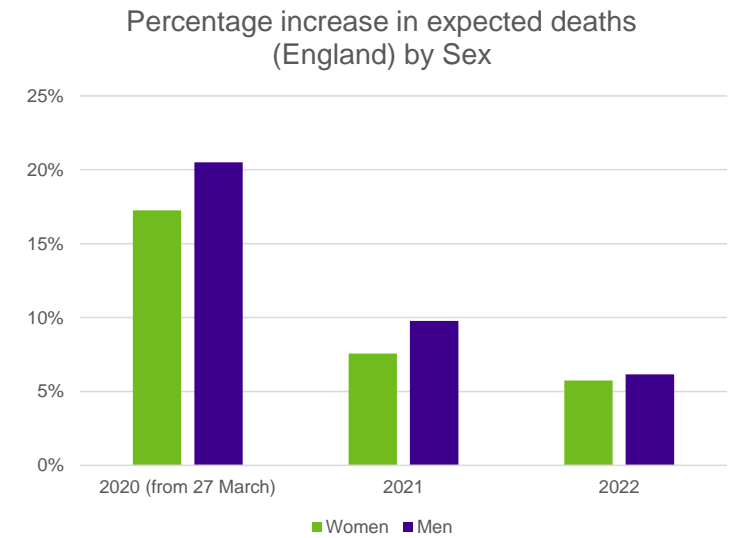
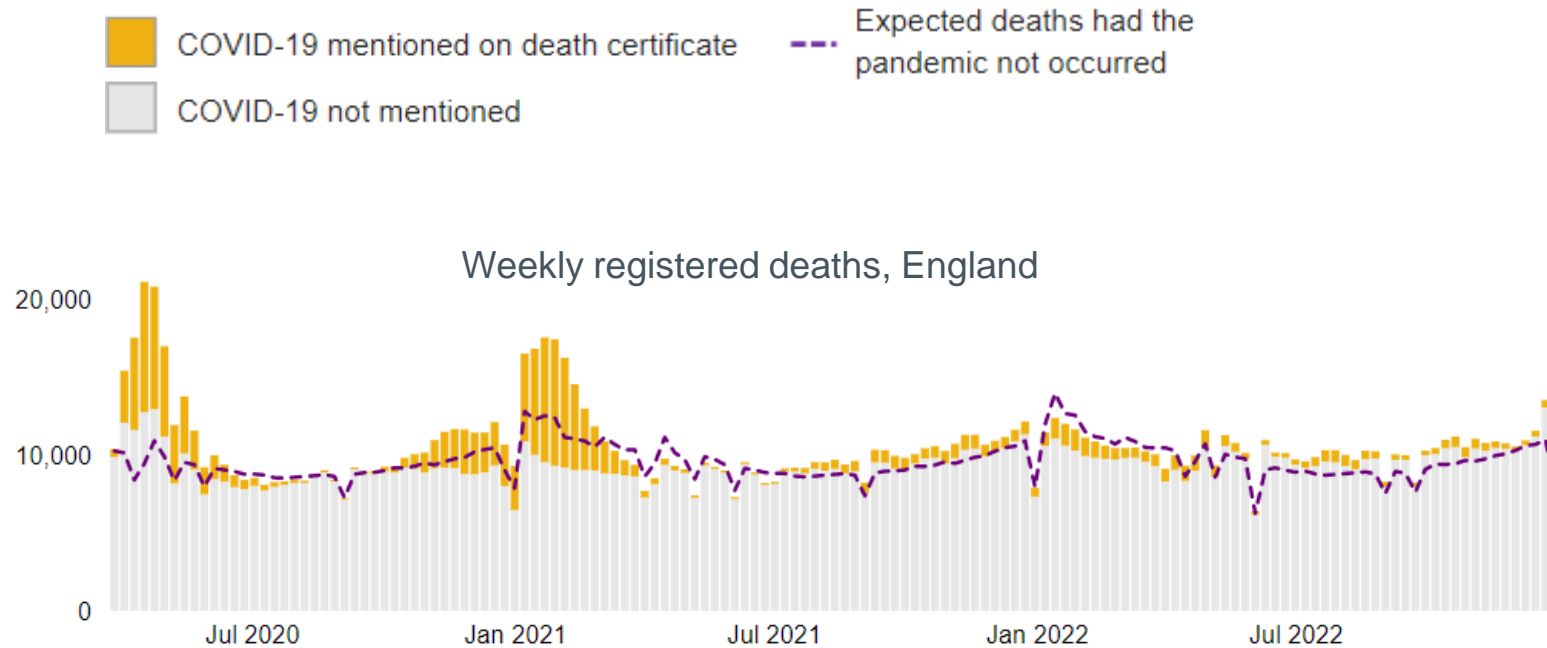
US population excess deaths



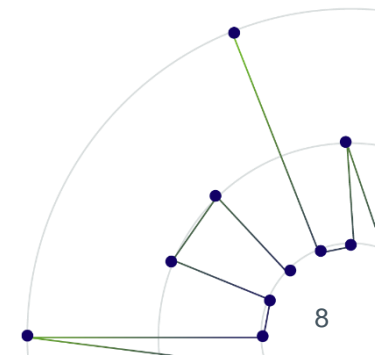
Source: CDC weekly death data available as at February 23, 2023. Expected deaths show the continuation of the linear trend in 2015-2019 deaths.



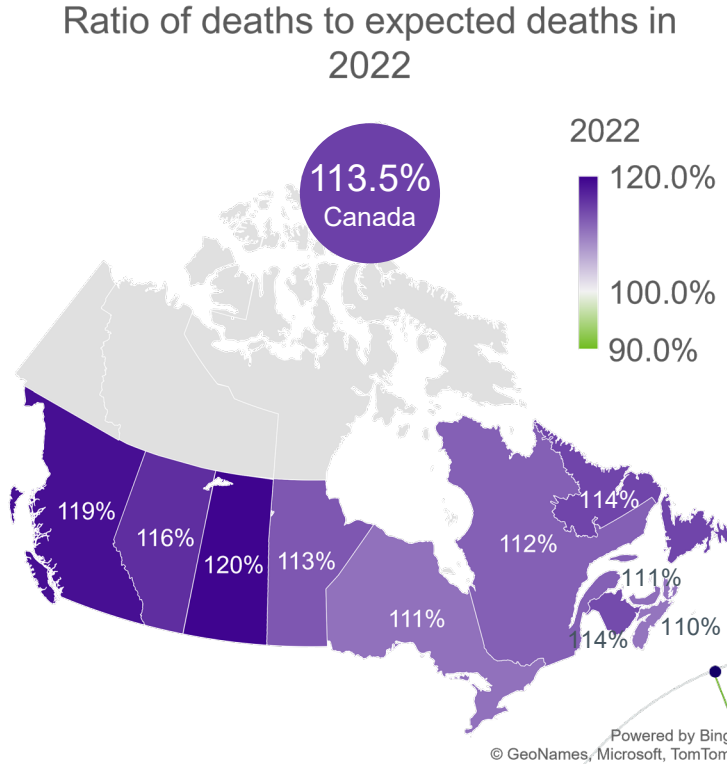
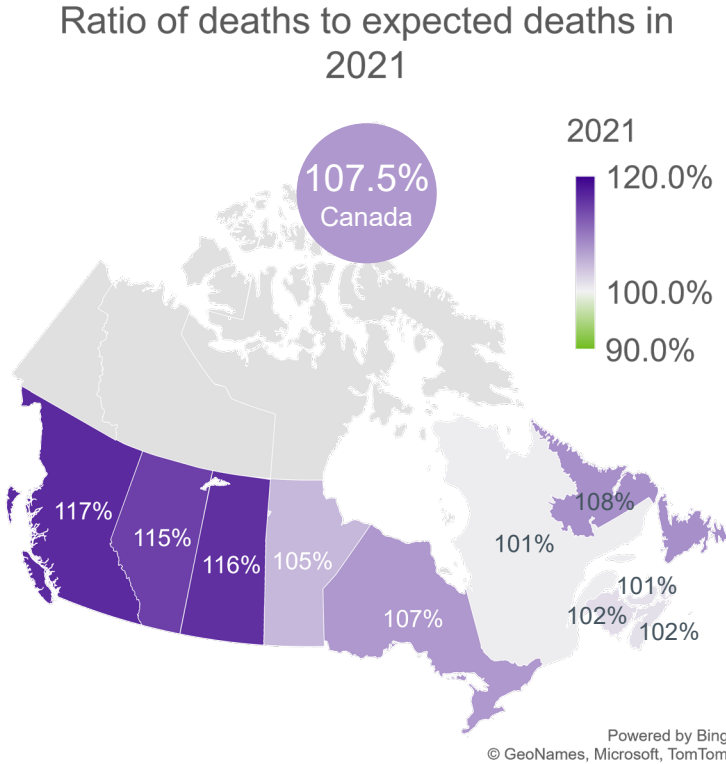
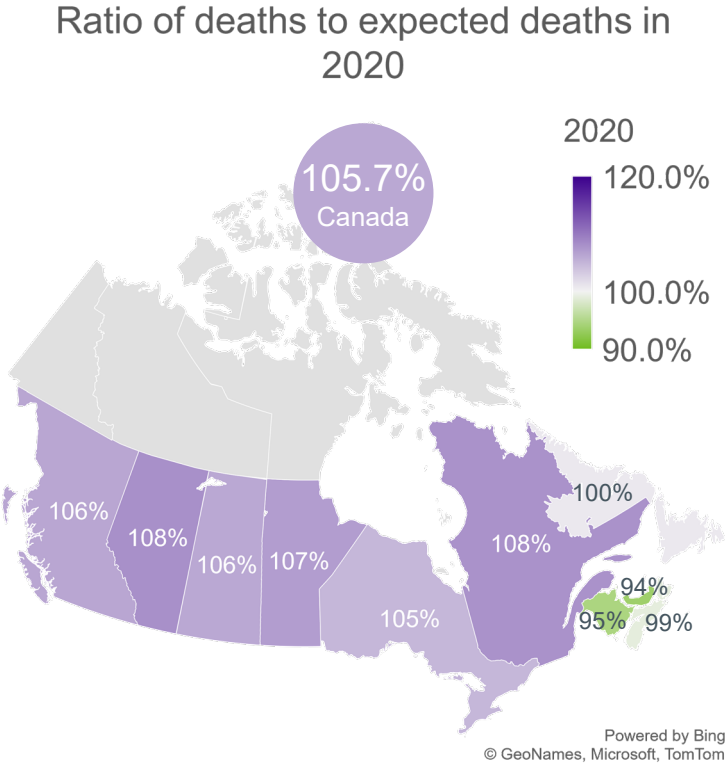
English population excess deaths



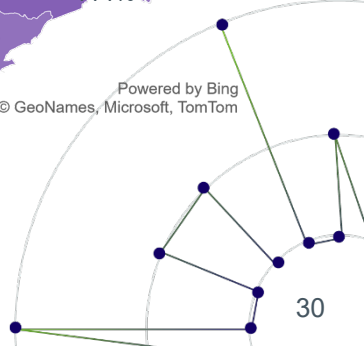
Source: Office for Health Improvement and Disparities ([Excess mortality in England dashboard](#))



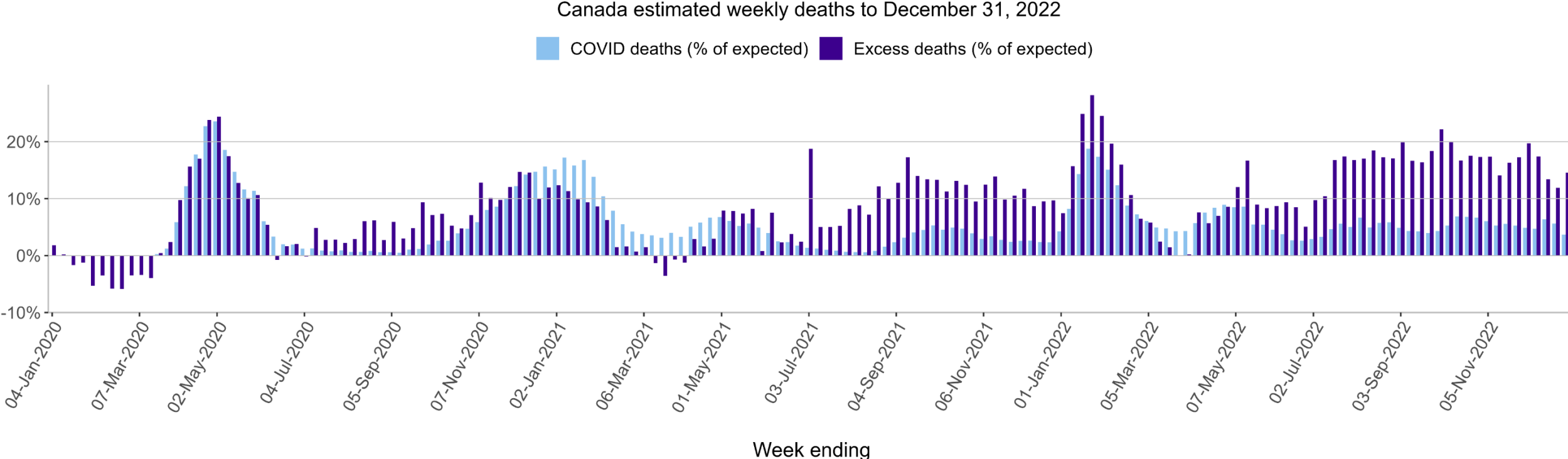
Excess deaths varied significantly across Canada and have steadily increased since 2020



Source: Statistics Canada ([Table 13-10-0792-01](#)). Manitoba data is only available until July 16, 2022.



Noticeable increase in non COVID-19 related excess deaths since summer 2021 in Canada



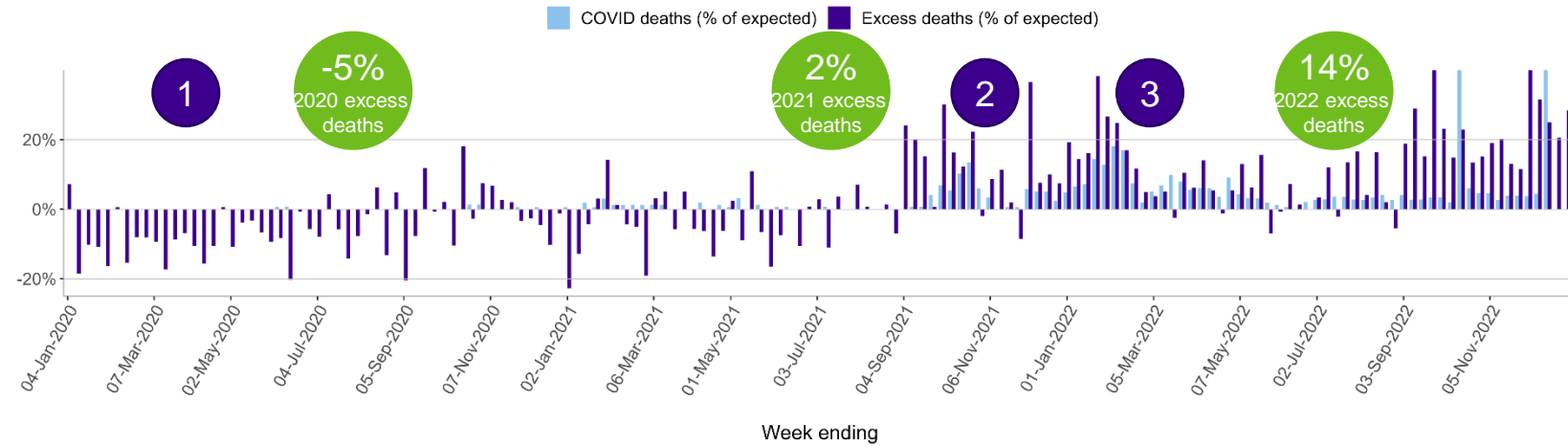
Source: Statistics Canada ([Table 13-10-0792-01](#)). Manitoba data is only available until July 16, 2022.

The Atlantic region experienced higher levels of excess mortality starting in 2022

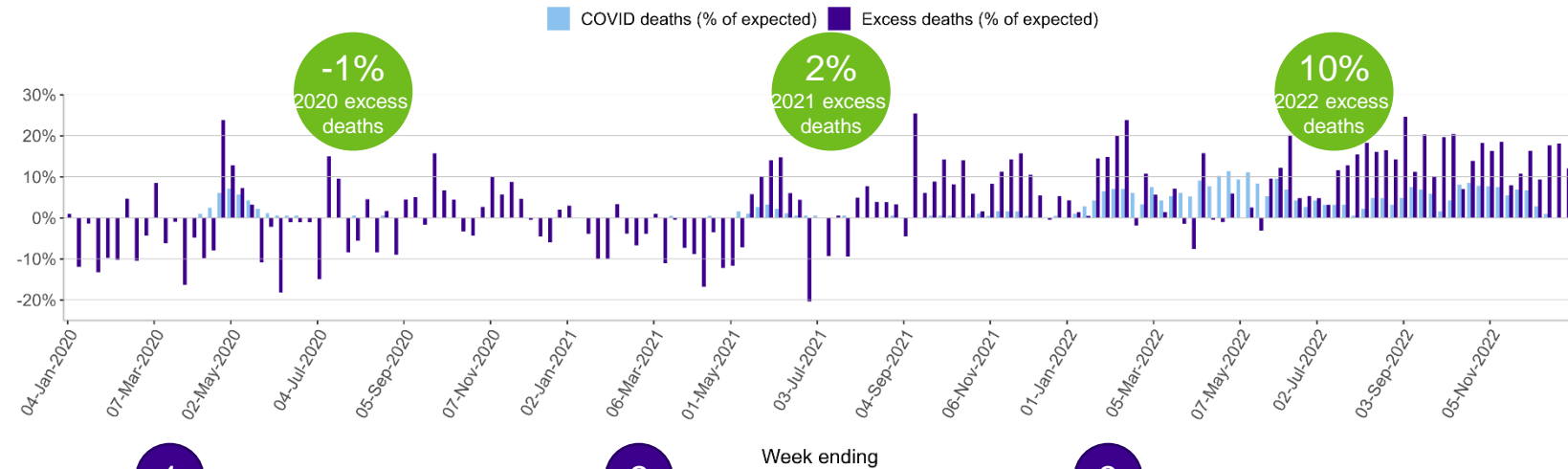
The COVID-19 pandemic was felt very differently across Canada and the Atlantic “bubble” experienced the lowest levels of excess deaths at first.

Newfoundland (not shown here) is the only province in the Atlantic region that experienced significant excess deaths levels in 2021 (approx. 8%).

New Brunswick estimated weekly deaths to December 31, 2022



Nova Scotia estimated weekly deaths to December 31, 2022



1 Generally fewer deaths than expected in 2020
low number of deaths attributable to COVID-19

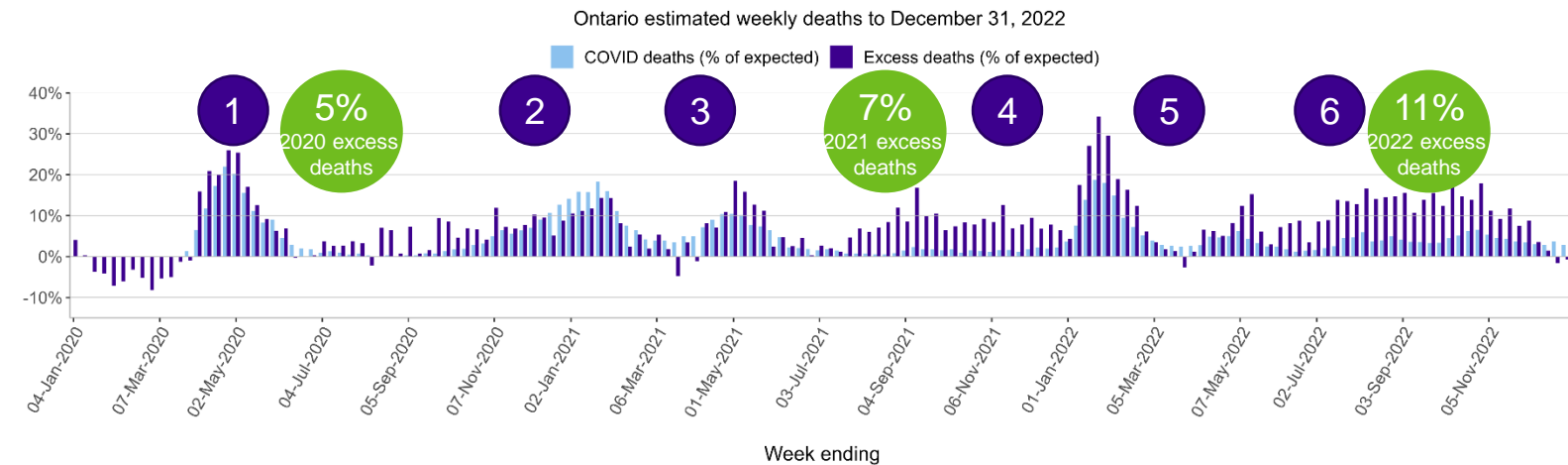
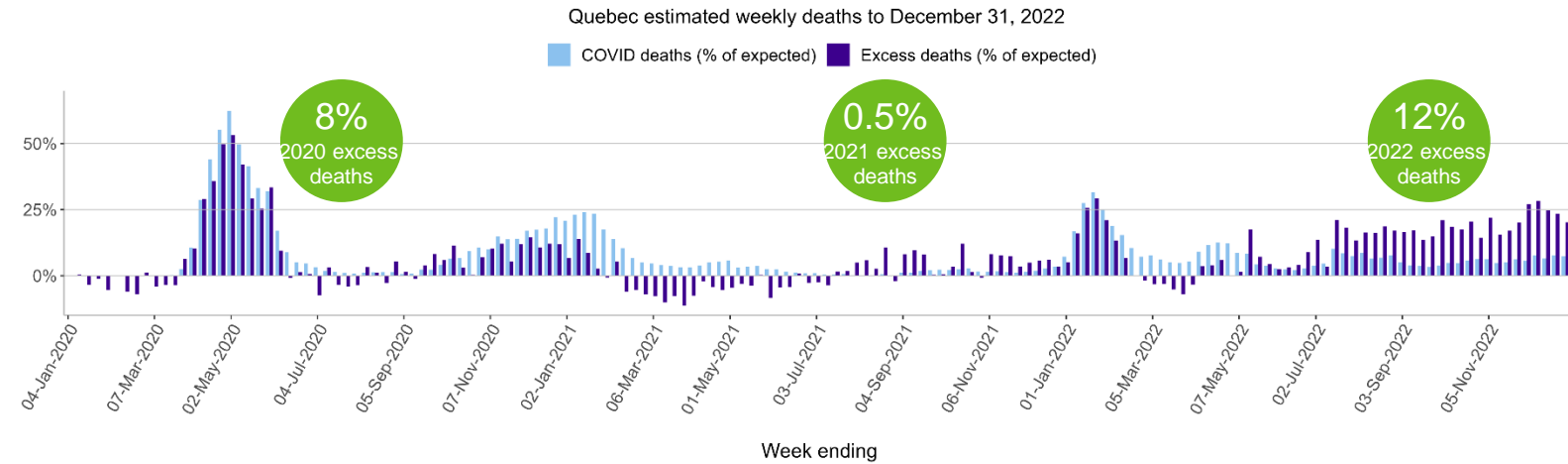
2 Increase in deaths recorded – both COVID (Delta wave) and non-COVID related deaths

3 Omicron variants, followed by persistent excess deaths

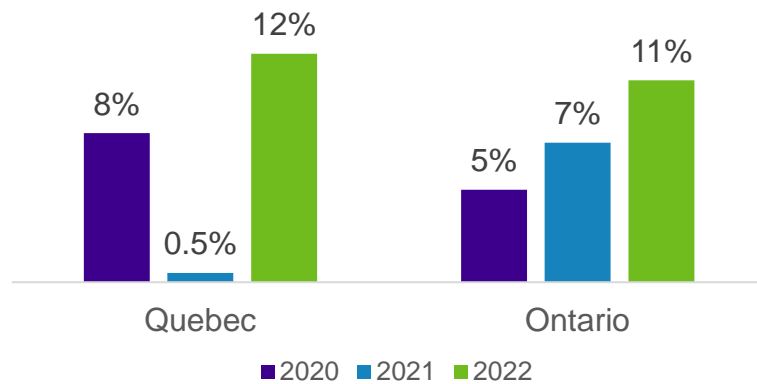
Source: Statistics Canada ([Table 13-10-0792-01](#))

Quebec and Ontario were the first hit by the pandemic

Quebec and Ontario initially experienced higher levels of deaths compared to the rest of the country because of the timing of spring break in those provinces.



Excess mortality in Quebec and in Ontario

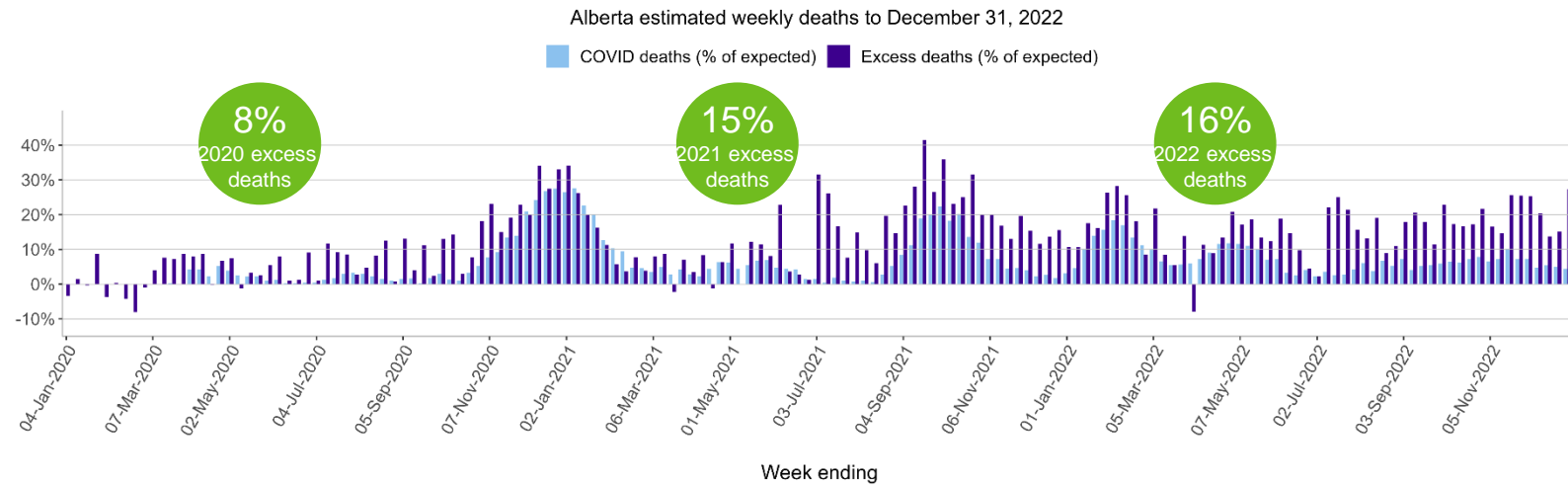
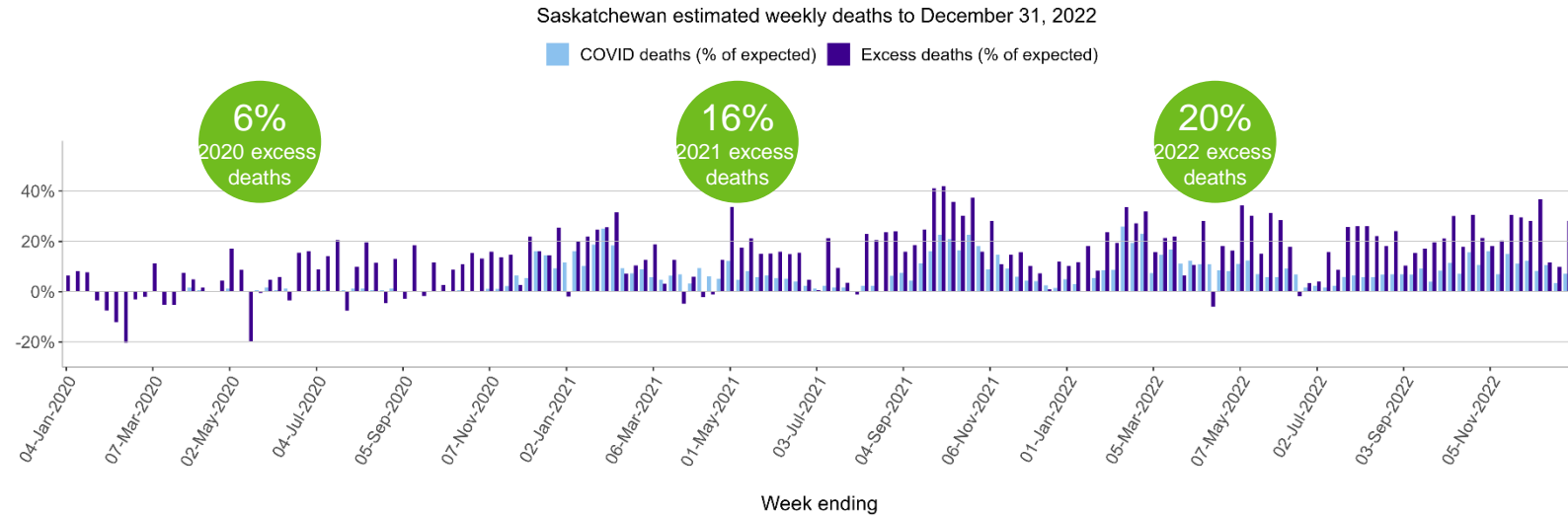


Source: Statistics Canada ([Table 13-10-0792-01](#))

Saskatchewan and Alberta recorded some of the highest excess deaths levels in Canada throughout the pandemic

The Canadian prairies (Alberta, Saskatchewan and Manitoba) did not experience the spring 2020 COVID wave, but later experienced the same patterns as Quebec and Ontario – at much higher rates.

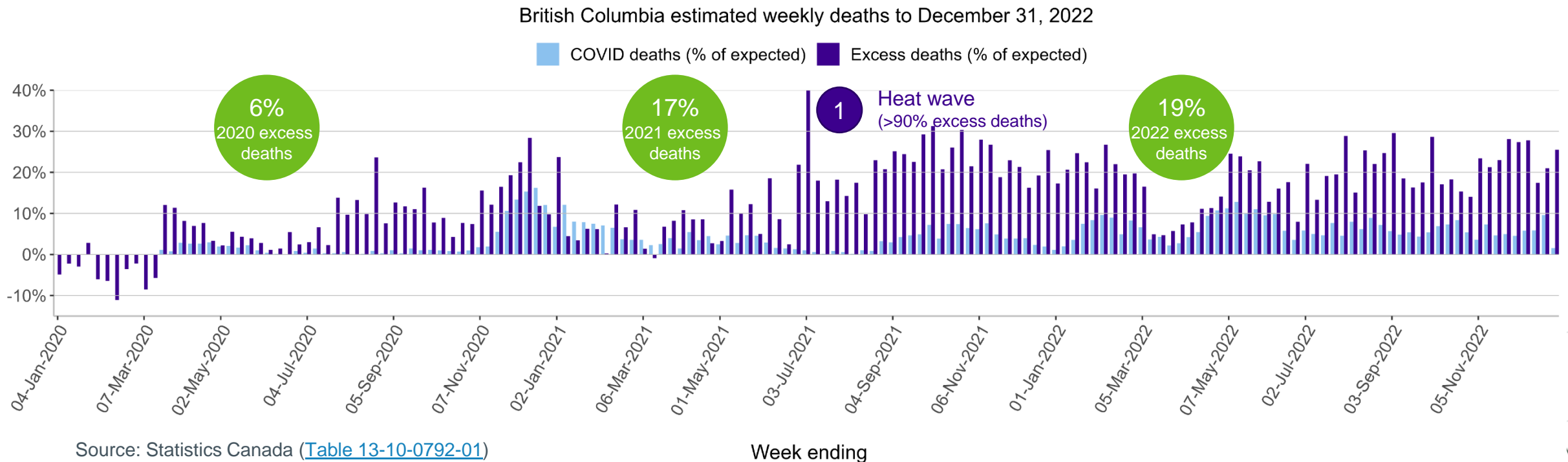
Data for Manitoba is incomplete for 2022, but 2021 data shows that although excess deaths followed similar patterns to the other prairie provinces, excess deaths were at much lower levels (5% vs 15-16%).



Source: Statistics Canada ([Table 13-10-0792-01](#))
Manitoba data not shown here since it is only available until July 16, 2022

British Columbia has one of the lowest mortality rates due to COVID-19, but has some of the highest levels of excess deaths

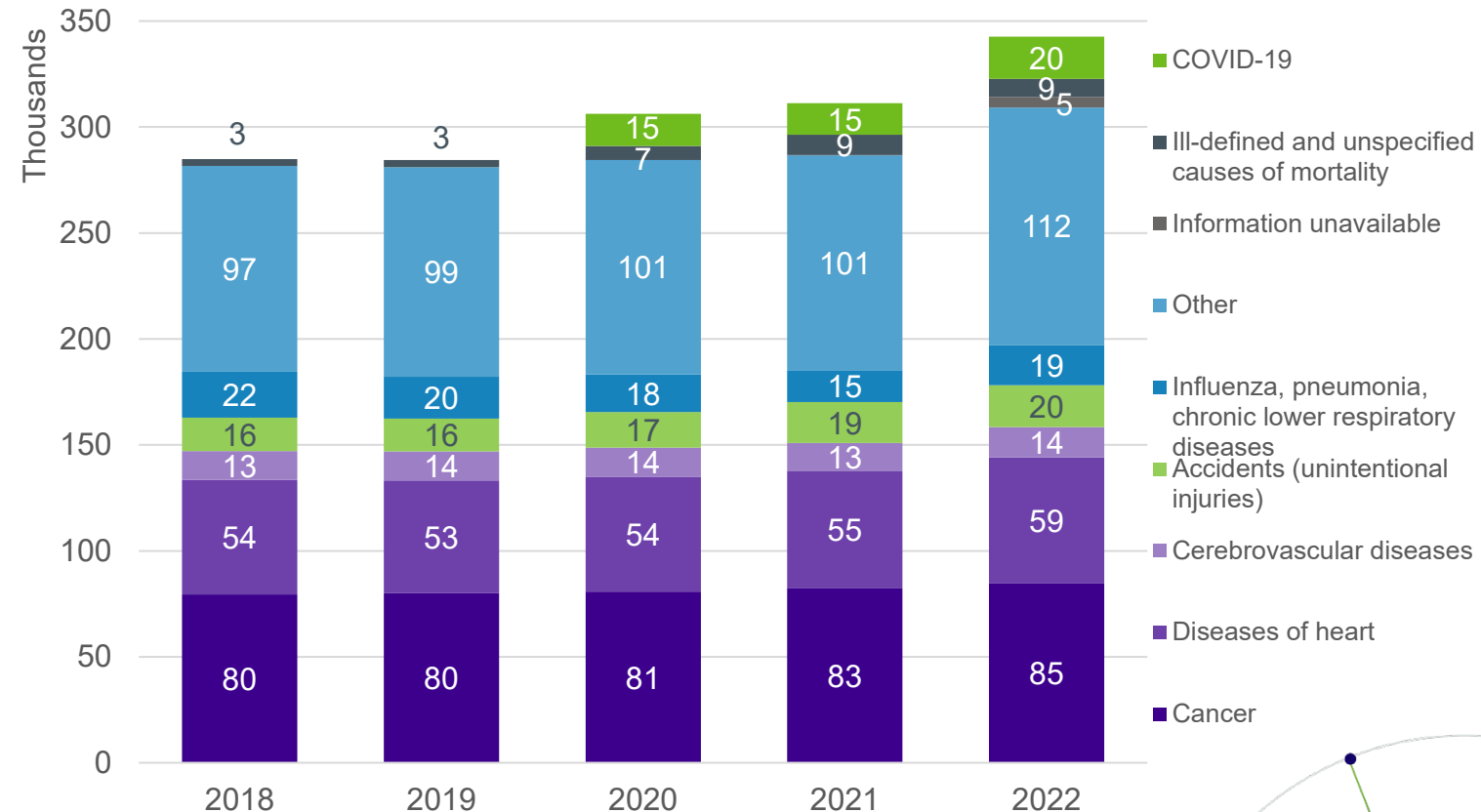
BC experienced similar patterns as its neighboring provinces (Alberta and Saskatchewan), but recorded a very low number of COVID-19 deaths. While there are certain factors that can explain some non COVID-19 related excess deaths (e.g. heat wave in at the end of June 2021, and the ongoing opioid crisis), it is possible that there is significant number of underreported COVID-19 deaths.



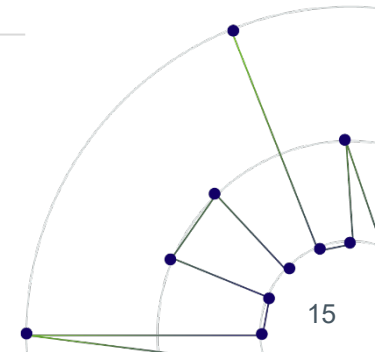
Causes of death

- Since 2020:
 - COVID-19 as a new cause of death
 - Decrease in influenza deaths
 - Significant increase in ill-defined and unspecified causes of mortality
 - Increase in “Other” deaths
 - Increase in accidents
- Looking at 2022:
 - 4% of causes of death are unavailable
 - Increase in COVID-19 deaths

Causes of death in Canada



[Statistics Canada. Table 13-10-0810-01 Provisional weekly death counts, by selected grouped causes of death](#)

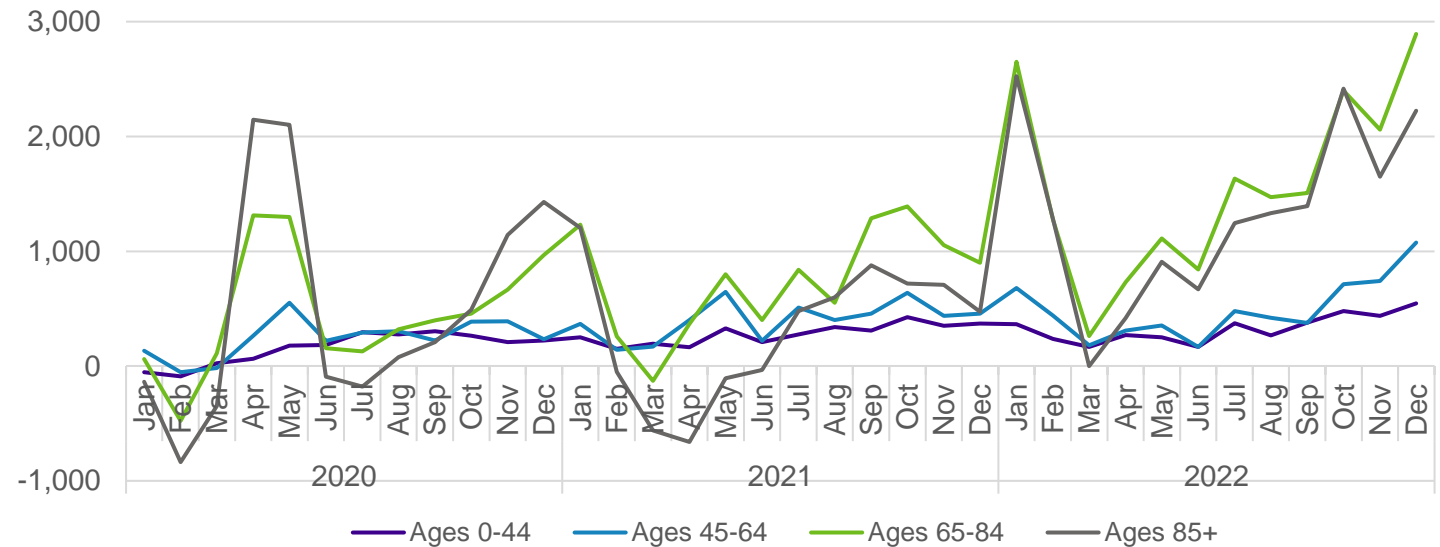


Excess mortality concentrated at older ages, but youngest age group saw the most significant increase in excess deaths

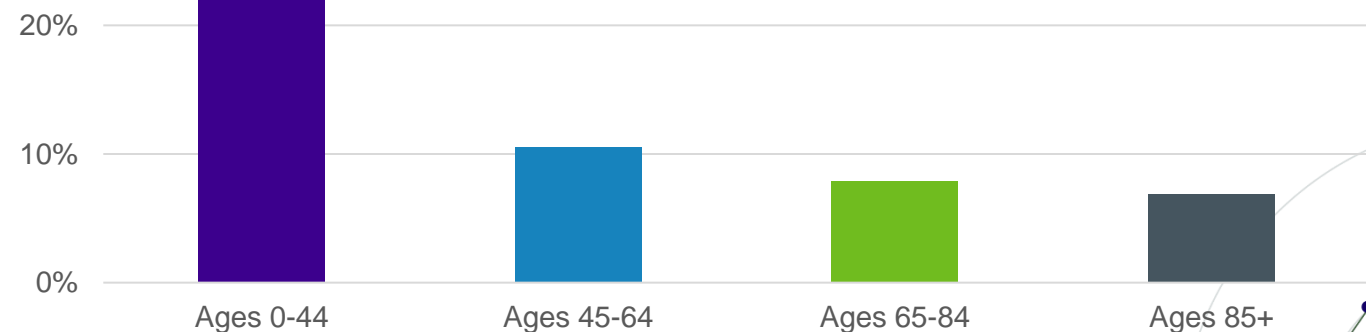
- Initial spike at older ages (March 2020) attributable to deaths in poorly managed long term care homes
- Ages 0-44 experienced the most significant increase in excess deaths between 2020 and 2022 relative to pre-pandemic expectations

Source: Statistics Canada. [Table 13-10-0792-01 Provisional weekly estimates of the number of deaths, expected number of deaths and excess mortality, by age group and sex](#)

Excess mortality estimates in Canada by age groups



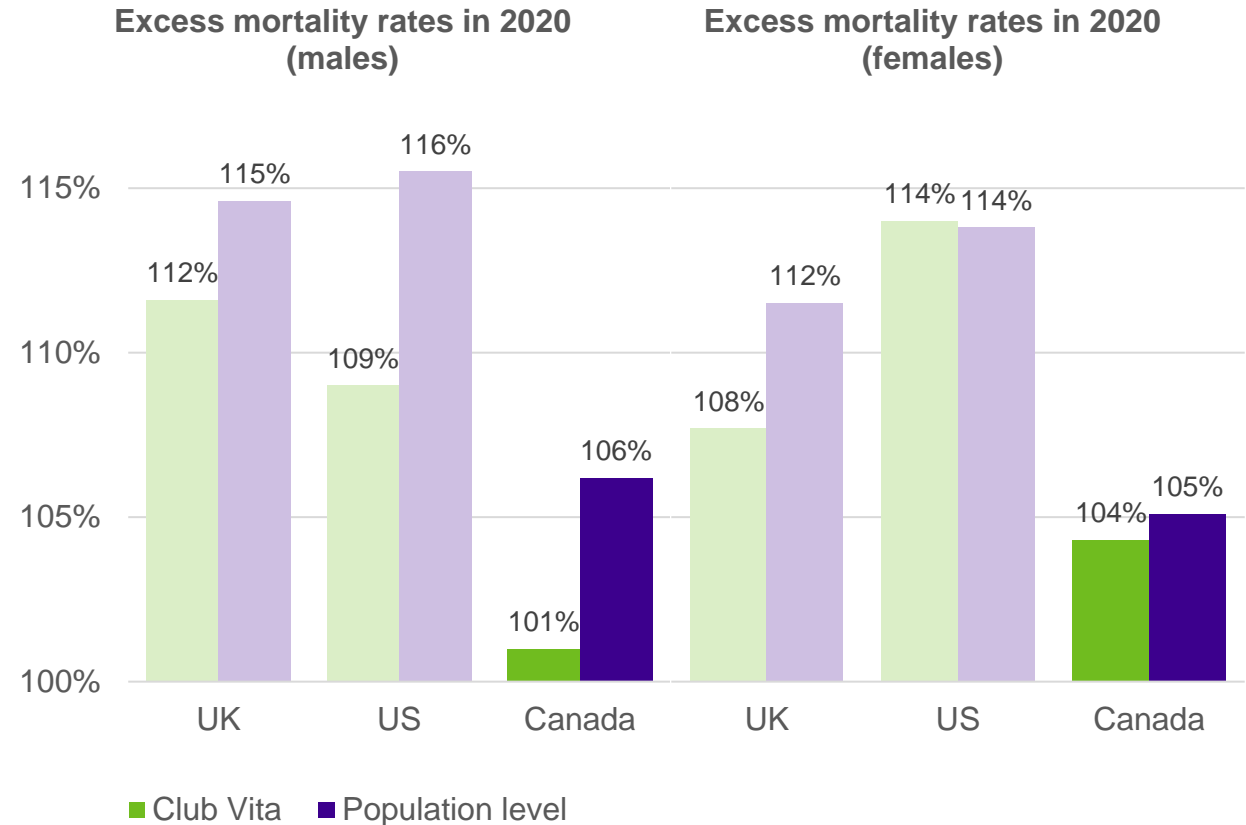
Excess mortality in Canada as a percentage of expected deaths, by age group (January 2020 to December 2022)



DB population vs general population in 2020

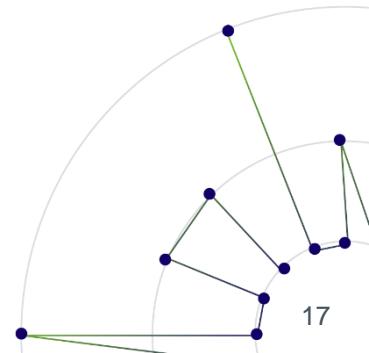
In general, we noted less excess mortality in the Club Vita dataset compared to the general population.

In 2020, Canada saw significantly lower excess mortality rates compared to the US and the UK.



Note: consistent with CV22 calibration.

Source: Statistics Canada ([Table 13-10-0792-01](#)) and Club Vita data.

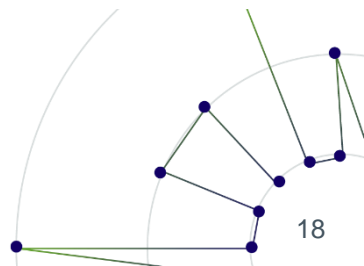


Poll



What was the main cause of excess deaths in 2022?

1. Acute COVID-19 infections
2. Long-term effects of COVID
3. Impact of delays in preventative care
4. Strain on the medical system
5. Something else



What caused it and will it continue?

What caused excess deaths in 2022 and will it continue?



Immediate impact of COVID-19



Long-term effects of COVID



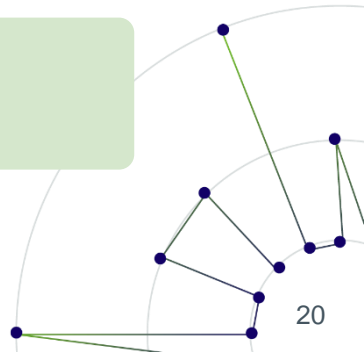
Delays in treatment/preventative care



Healthcare systems under strain



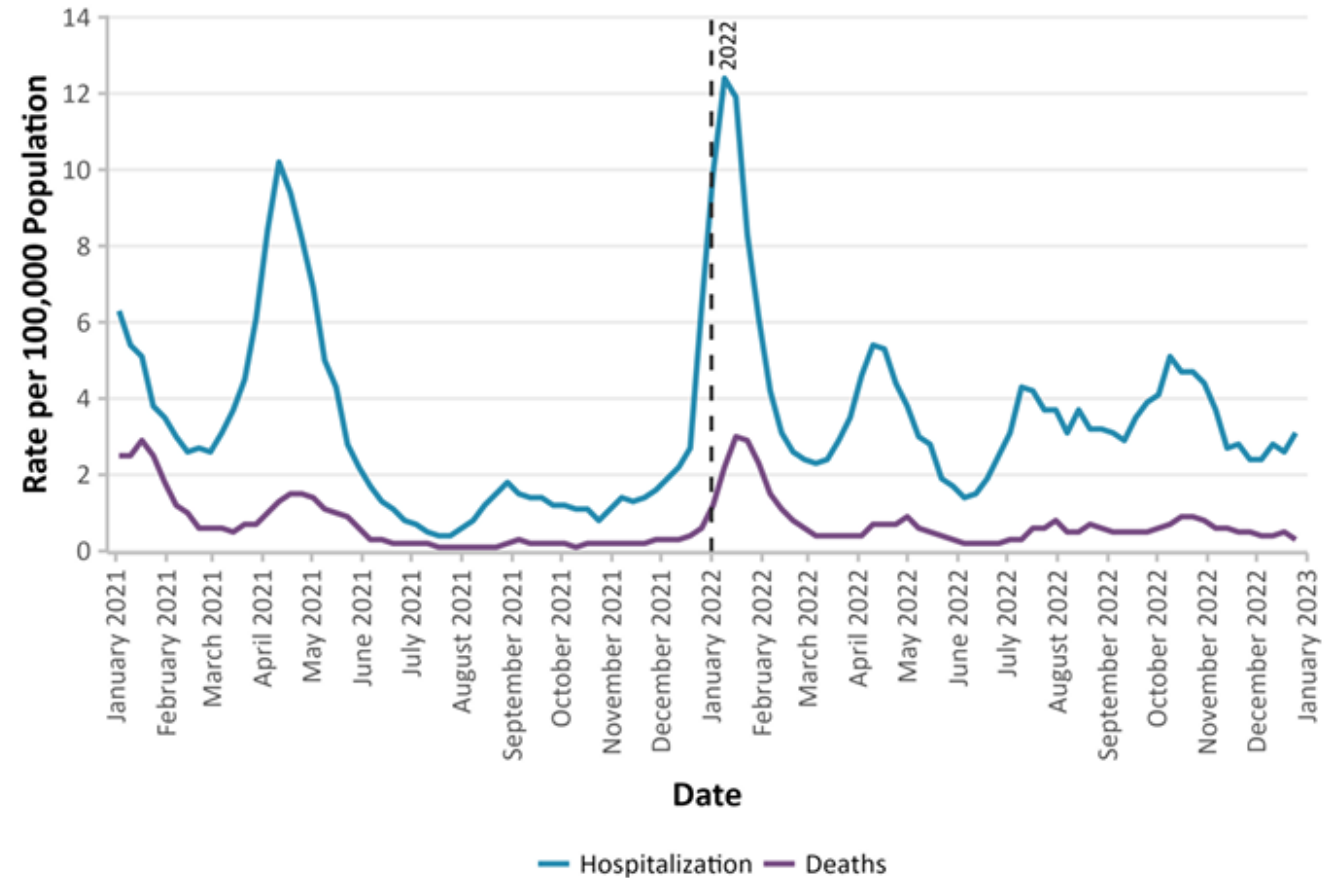
Other possible explanations



Is it COVID?

- Figure 1 shows COVID-19 hospitalization and death rates in Ontario in 2021 and 2022
- Similar trends observed in both COVID-19 hospitalizations and deaths, i.e. increase in COVID-19 hospitalizations results in an increase in deaths
- Quality of COVID-19 surveillance decreased since 2022 and recorded numbers may be severely understated

Figure 1: COVID-19 Hospitalization and Death Rates per 100,000 population in Ontario for 2021 and 2022

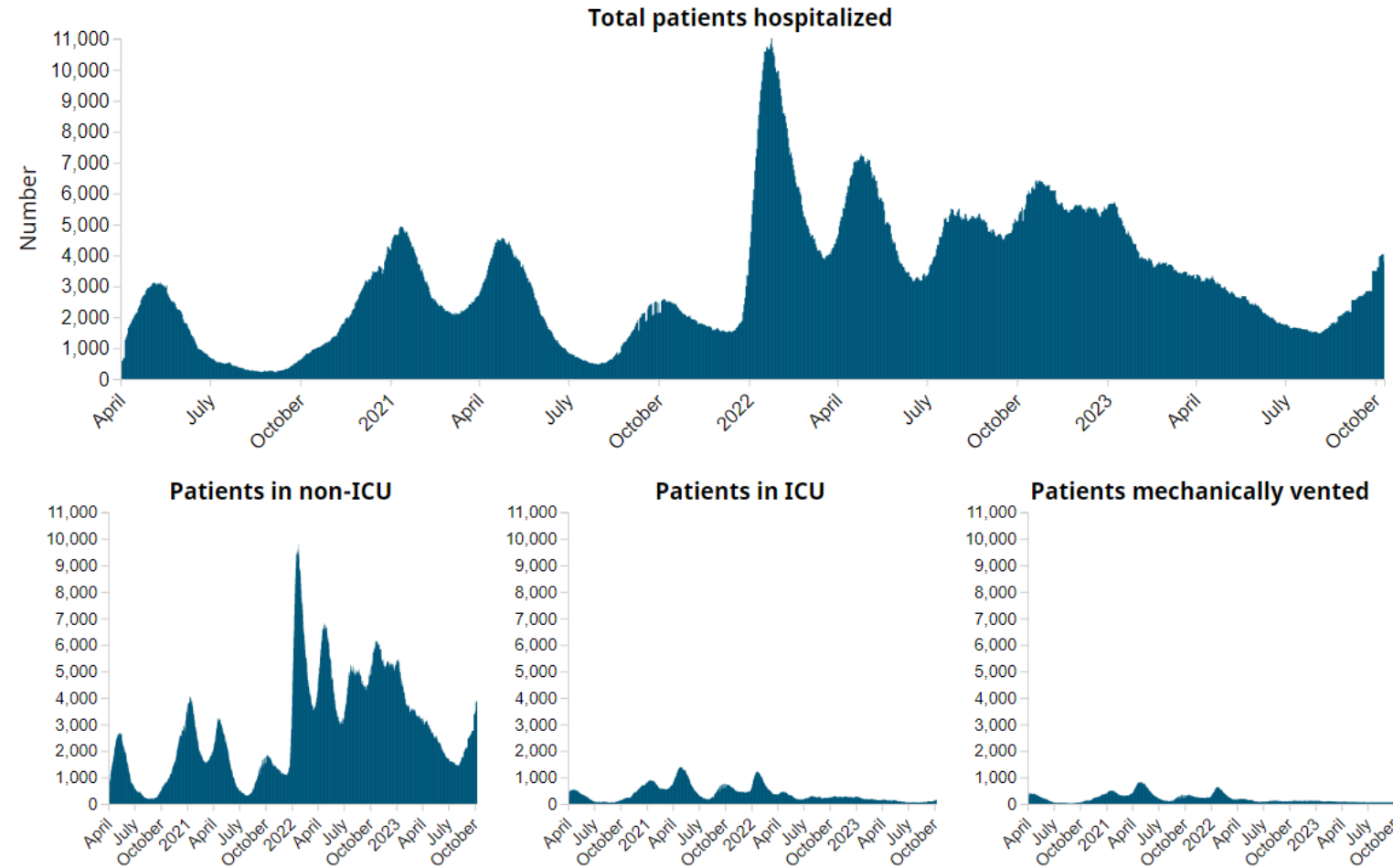


Source: [Comparison of COVID-19 Hospitalizations and Deaths in 2022 and 2021](#)

Recent increase in COVID-19 hospitalizations, but low proportion of ICU admissions

Recent increase in hospitalizations, but large majority of patients in non-ICU beds.

Figure 5. Daily number of hospital beds and ICU beds occupied by COVID-19 patients as of October 10, 2023



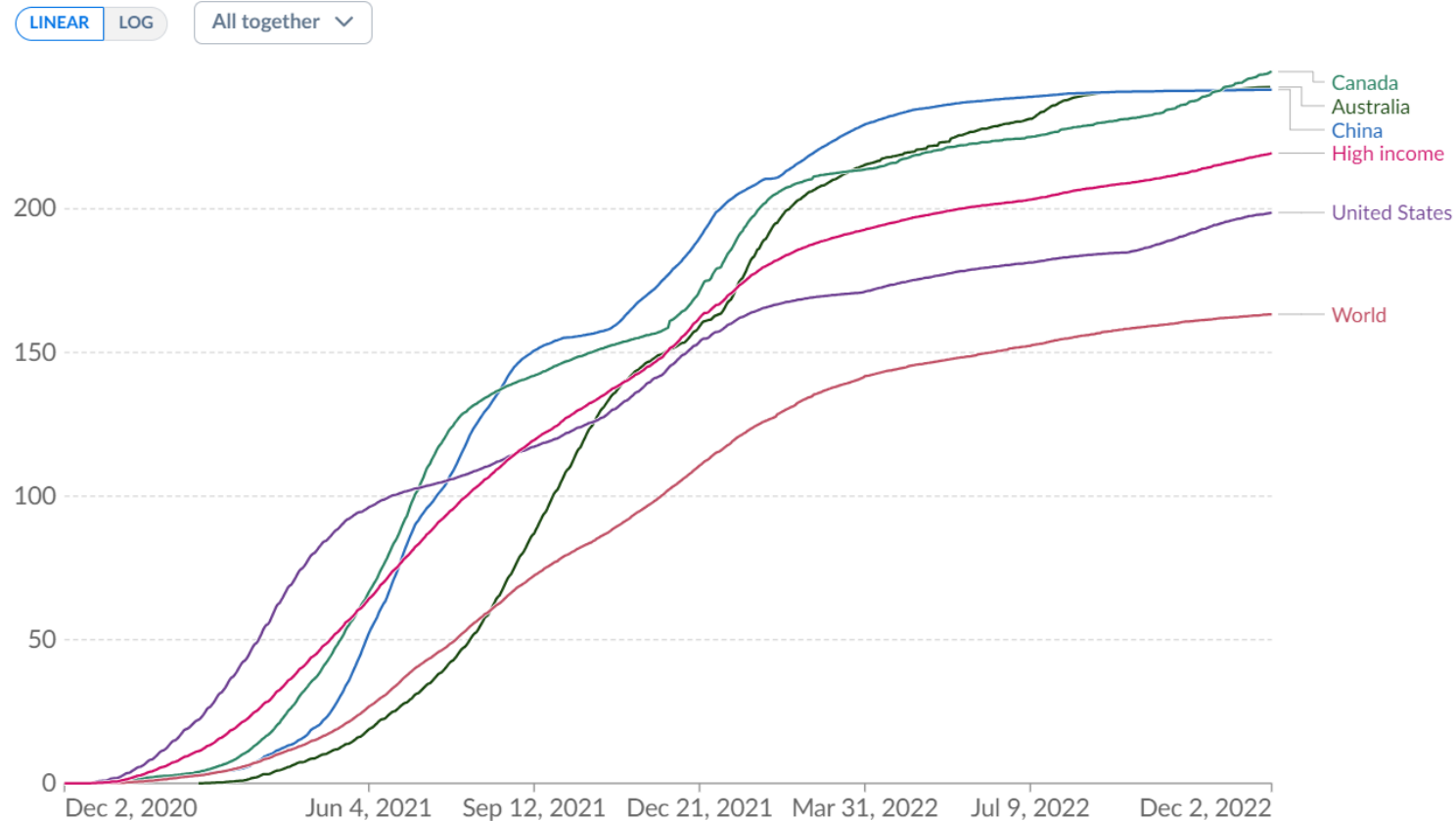
Source: <https://health-infobase.canada.ca/covid-19/current-situation.html>

International comparisons of vaccination programmes

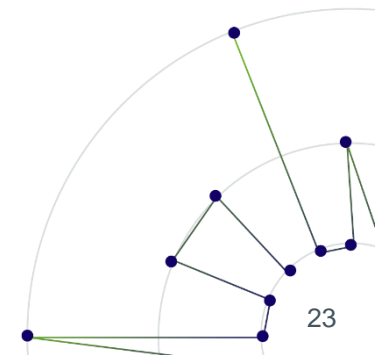
COVID-19 vaccine doses administered per 100 people

All doses, including boosters, are counted individually.

Our World
in Data

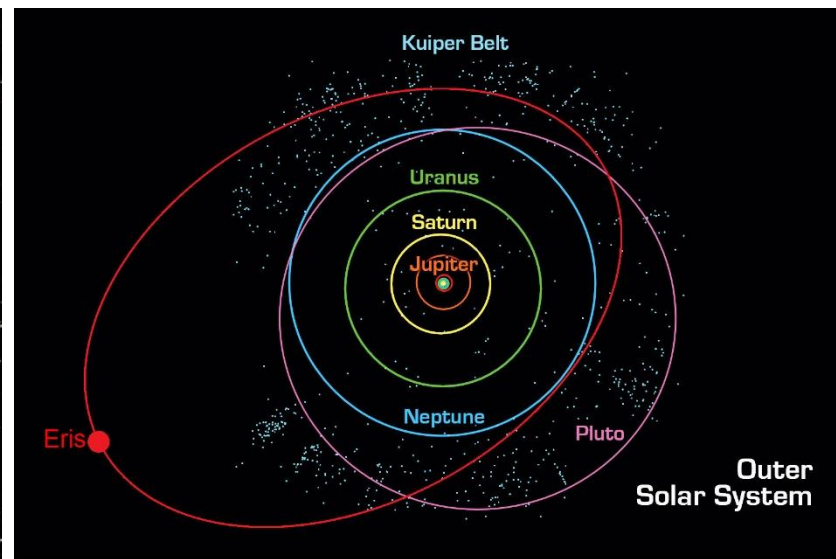
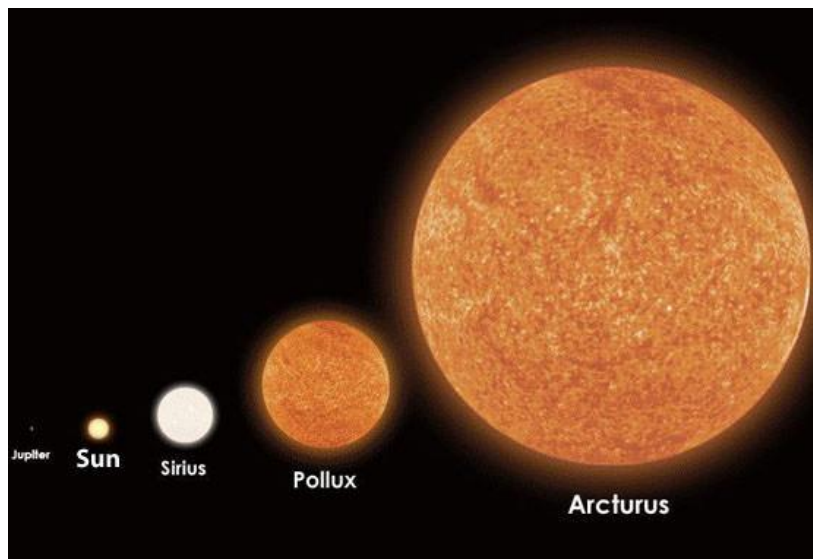


Source: <https://ourworldindata.org/covid-vaccinations>

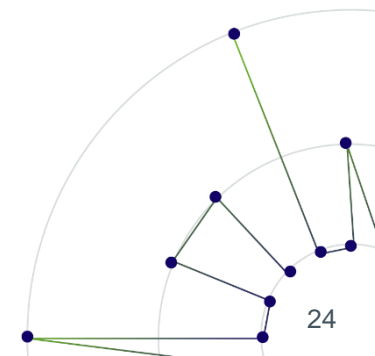
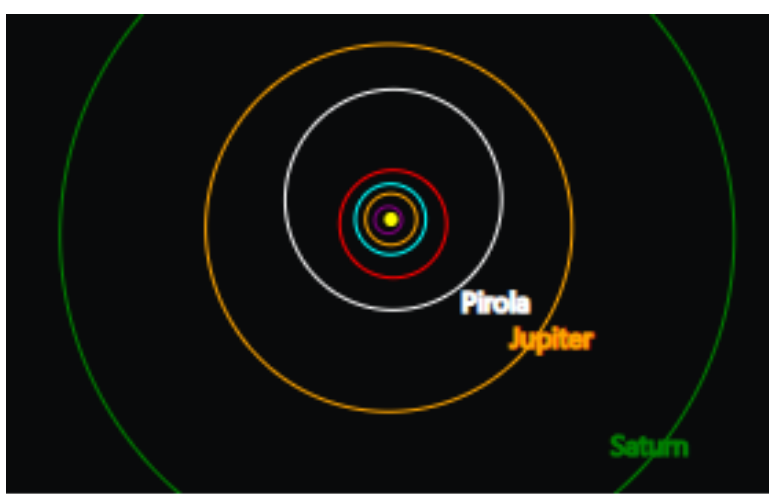
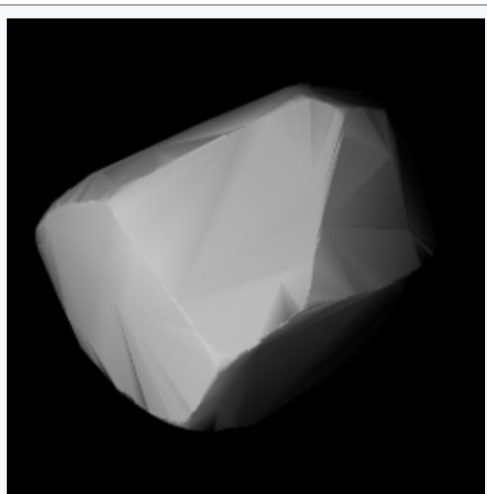


Evolution of Omicron

Acturus followed by Fornax, Eris & Pirola



1082 Pirola



New vaccines approved for XBB1.5

Animal tests suggest strong immune response for BA.2.86

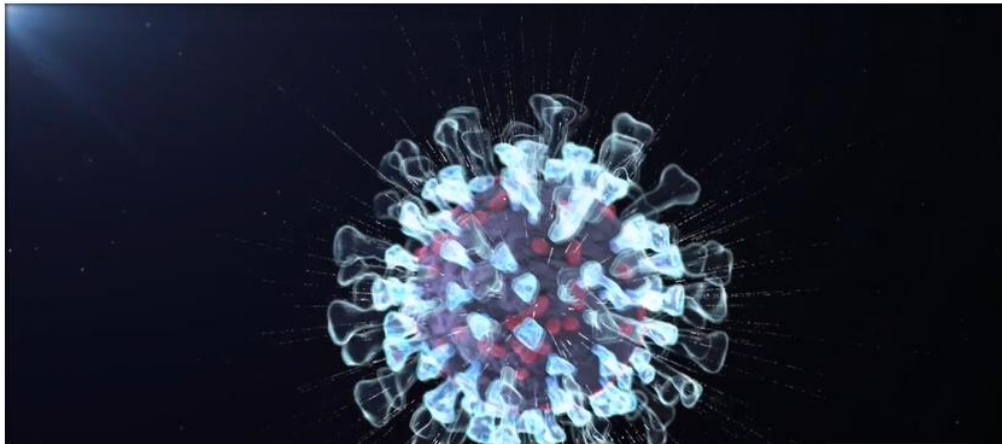
HEALTH

Moderna's updated COVID vaccine targeting XBB.1.5 approved in Canada



By **Katie Dangerfield** · Global News

Posted September 12, 2023 10:41 am · Updated September 15, 2023 12:32 pm



 cbc.ca [+ Follow](#)

Quebecers can now get a new COVID-19 shot. What you need to know about the virus and vaccines

Story by Sabrina Jonas · 1w

MODERNA CLINICAL TRIAL DATA CONFIRM ITS UPDATED COVID-19 VACCINE GENERATES STRONG IMMUNE RESPONSE IN HUMANS AGAINST BA.2.86

September 6, 2023

 Download

CDC notes that the BA.2.86 (Pirola) variant may be more likely to break through existing immunity from previous vaccination or infection, highlighting the need for vaccination with an updated COVID-19 vaccine for the fall 2023 season

Clinical trial data from research assay confirmed Moderna's updated COVID-19 vaccine showed an 8.7 to 11-fold increase in neutralizing antibodies against circulating variants, including BA.2.86, EG.5, and FL.1.5.1 variants

With governments accelerating the timing of COVID-19 vaccination campaigns due to the potential risk of BA.2.86, Moderna has shared this data with regulators and is ready to supply its updated COVID-19 vaccine pending regulatory approval

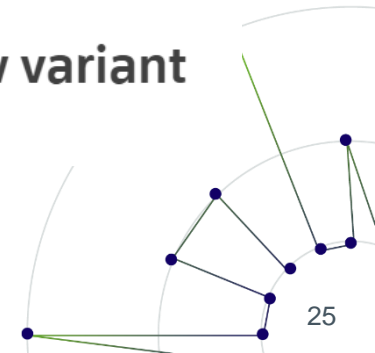
CAMBRIDGE, MA / ACCESSWIRE / September 6, 2023 / Moderna, Inc. (NASDAQ:MRNA) today announced that clinical trial data from its research assay confirm its updated COVID-19 vaccine, which is pending approval by the U.S. Food and Drug Administration for the fall 2023 vaccination season, generates an 8.7-fold increase in neutralizing antibodies in humans against BA.2.86 (Pirola), a variant under monitoring. The Centers for Disease Control (CDC) indicates that the highly mutated BA.2.86 variant may be more capable of causing infection in people who previously had COVID-19 or were vaccinated with previous vaccines, noting that updated COVID-19 vaccines may be effective in reducing severe disease and hospitalization.



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Healthcare & Pharmaceuticals | COVID-19 | Regulatory Oversight | Regulatory | Public Health

Pfizer says updated COVID shot generated strong reaction vs new variant in mice



What caused excess deaths in 2022 and will it continue?



Immediate impact of COVID-19



Long-term effects of COVID



Delays in treatment/preventative care



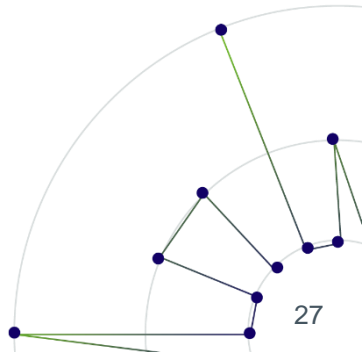
Healthcare systems under strain



Other possible explanations

Exploring the different post-pandemic cohorts

- Full recovery
- Covid-19 complications, e.g., lung, kidney damage
- Aggravation of pre-Covid comorbid illnesses
- Long Covid
- Protracted SARS-Co-V-2 infection



Bringing clarity to our understanding of COVID

NICE National Institute for Health and Care Excellence

Ongoing symptomatic COVID-19

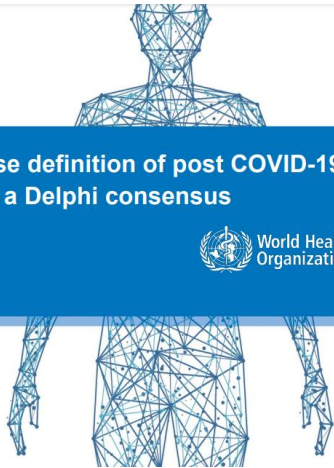
Signs and symptoms of COVID-19 from 4 weeks up to 12 weeks.

Post-COVID-19 syndrome

Signs and symptoms that develop during or after an infection consistent with COVID-19, continue for more than 12 weeks and are

A clinical case definition of post COVID-19 condition by a Delphi consensus

6 October 2021



*“Post COVID-19 condition occurs in individuals with a history of probable or confirmed SARS-CoV-2 infection, usually **3 months from the onset of COVID-19**, with symptoms that last for at least 2 months and cannot be explained by an alternative diagnosis.”*

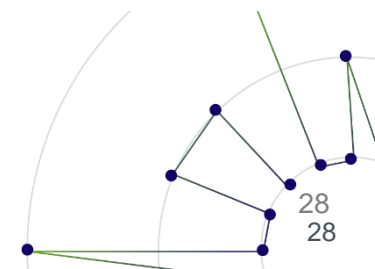
Long COVID

Long COVID is broadly defined as signs, symptoms, and conditions that continue or develop after initial COVID-19 or SARS-CoV-2 infection. The signs, symptoms, and conditions

- are present four weeks or more after the initial phase of infection;
- may be multisystemic;
- and may present with a relapsing–remitting pattern and progression or worsening over time, with the possibility of severe and life-threatening events even months or years after infection.

Long COVID is not one condition. It represents many potentially overlapping entities, likely with different biological causes and different sets of risk factors and outcomes.

US HHS, collab with CDC, NIH



Long-term impact of COVID

nature medicine

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Postacute sequelae of COVID-19 at 2 years

[Benjamin Bowe](#), [Yan Xie](#) & [Ziyad Al-Aly](#) 



Cardiac risk factors and prevention



OPEN ACCESS

Original research

Cardiovascular disease and mortality sequelae of COVID-19 in the UK Biobank

Zahra Raisi-Estabragh ^{1,2}, Jackie Cooper,¹ Ahmed Salih,¹ Betty Raman,³ Aaron Mark Lee,¹ Stefan Neubauer,³ Nicholas C. Harvey,^{4,5} Steffen E. Petersen ^{1,2,6,7}

Long-term mortality following SARS-CoV-2 infection: A national cohort study from Estonia

Anneli Uusküla,^{a,} Tuuli Jürgenson,^{b,c} Heti Pisarev,^a Raivo Kolde,^d Tatjana Meister,^a Anna Tisler,^a Kadri Suija,^a Ruth Kalda,^a Marko Piirsoo,^e and Krista Fischer^c*

^aDepartment of Family Medicine and Public Health, University of Tartu, Tartu, Estonia

^bInstitute of Mathematics and Statistics, University of Tartu, Estonia

^cInstitute of Genomics, University of Tartu, Estonia

^dInstitute of Computer Science, University of Tartu, Estonia

^eInstitute of Technology, University of Tartu, Estonia

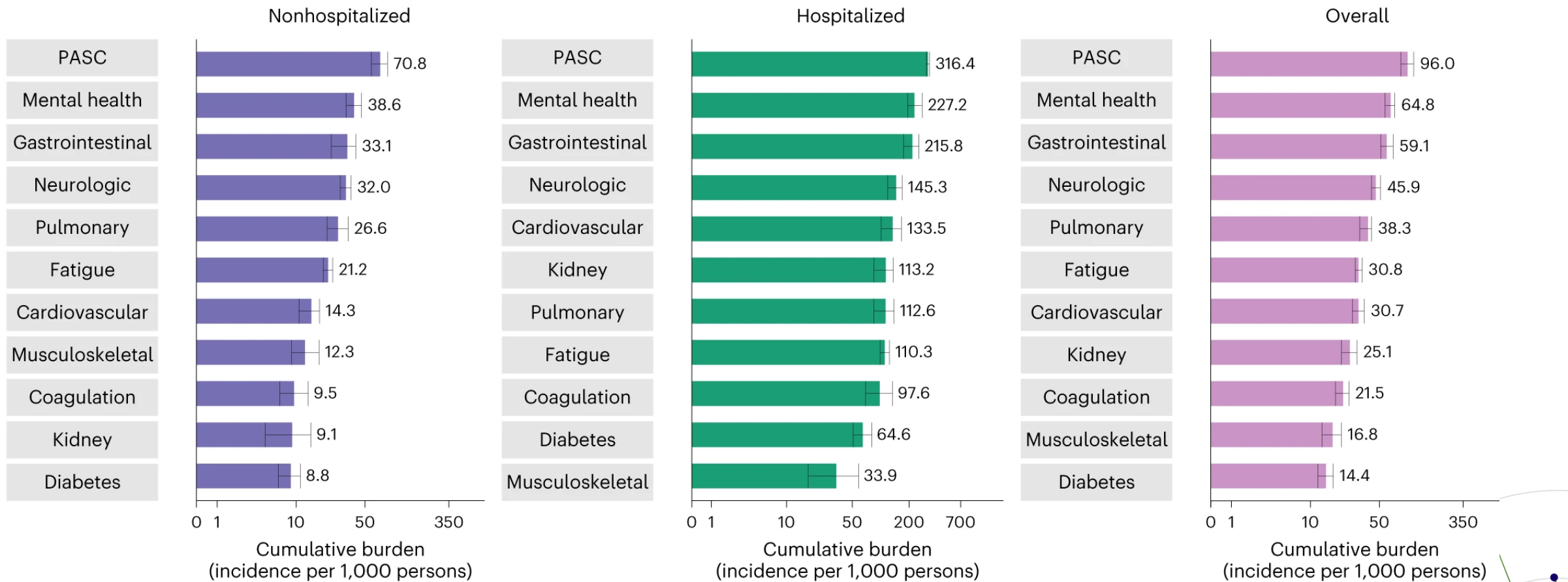
JAMA Health Forum™

Original Investigation

One-Year Adverse Outcomes Among US Adults With Post-COVID-19 Condition vs Those Without COVID-19 in a Large Commercial Insurance Database

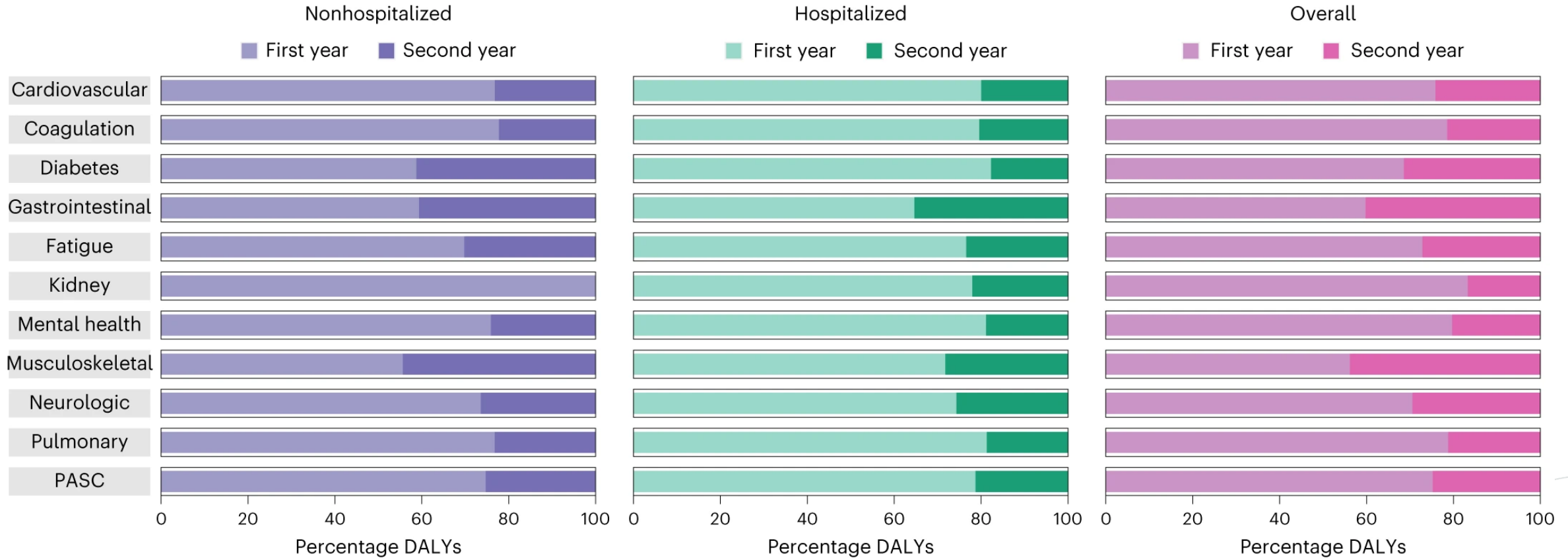
Andrea DeVries, PhD; Sonali Shambhu, BDS, MPH; Sue Sloop, PhD; J. Marc Overhage, MD, PhD

Cumulative incidence at 2 years after infection



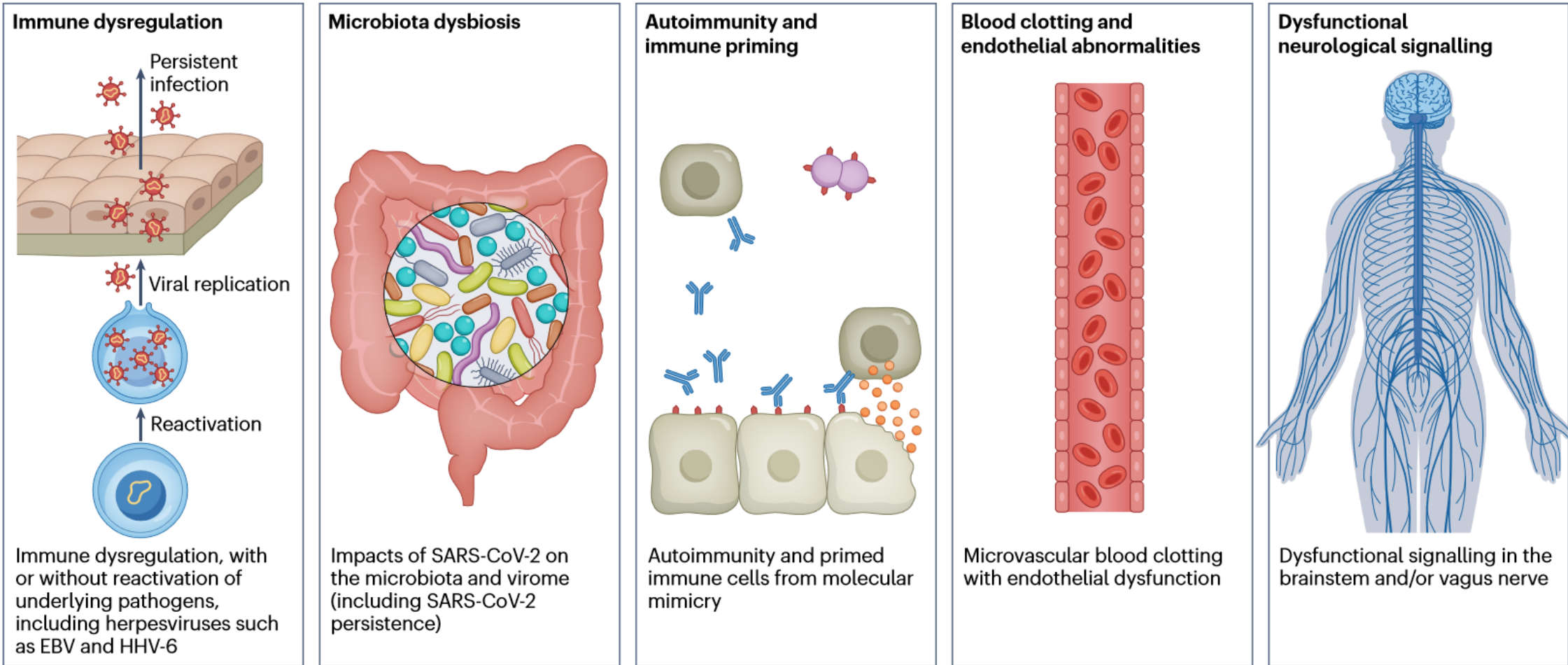
Source: [Postacute sequelae of COVID-19 at 2 years](#)

Cumulative disability for 1st/2nd years after infection



Source: [Postacute sequelae of COVID-19 at 2 years](#)

Different theories on Long COVID



Source: [Long COVID: major findings, mechanisms and recommendations](#)

What caused excess deaths in 2022 and will it continue?



Immediate impact of COVID-19



Long-term effects of COVID



Delays in treatment/preventative care

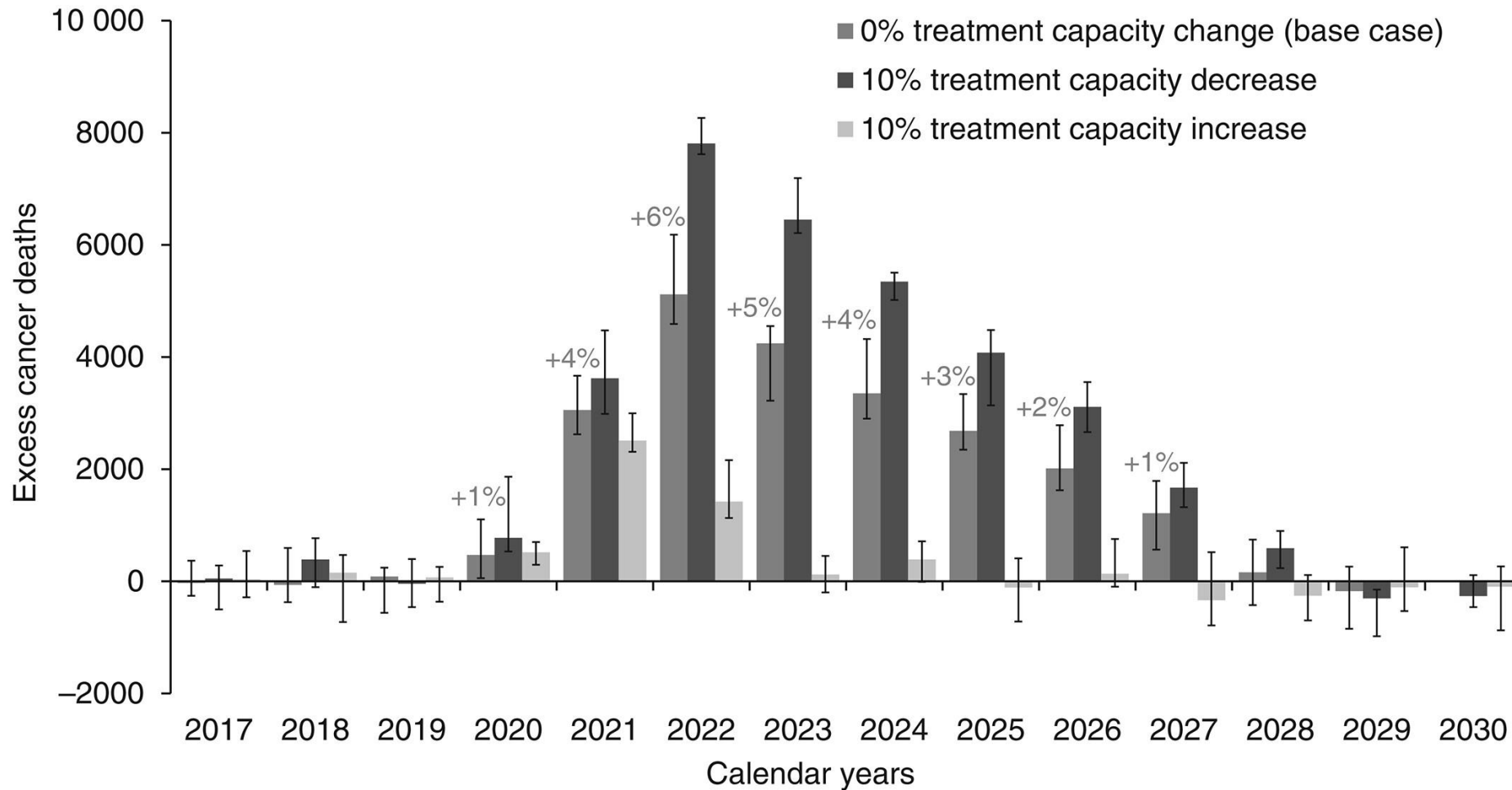


Healthcare systems under strain

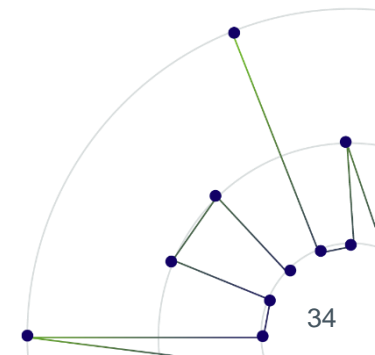


Other possible explanations

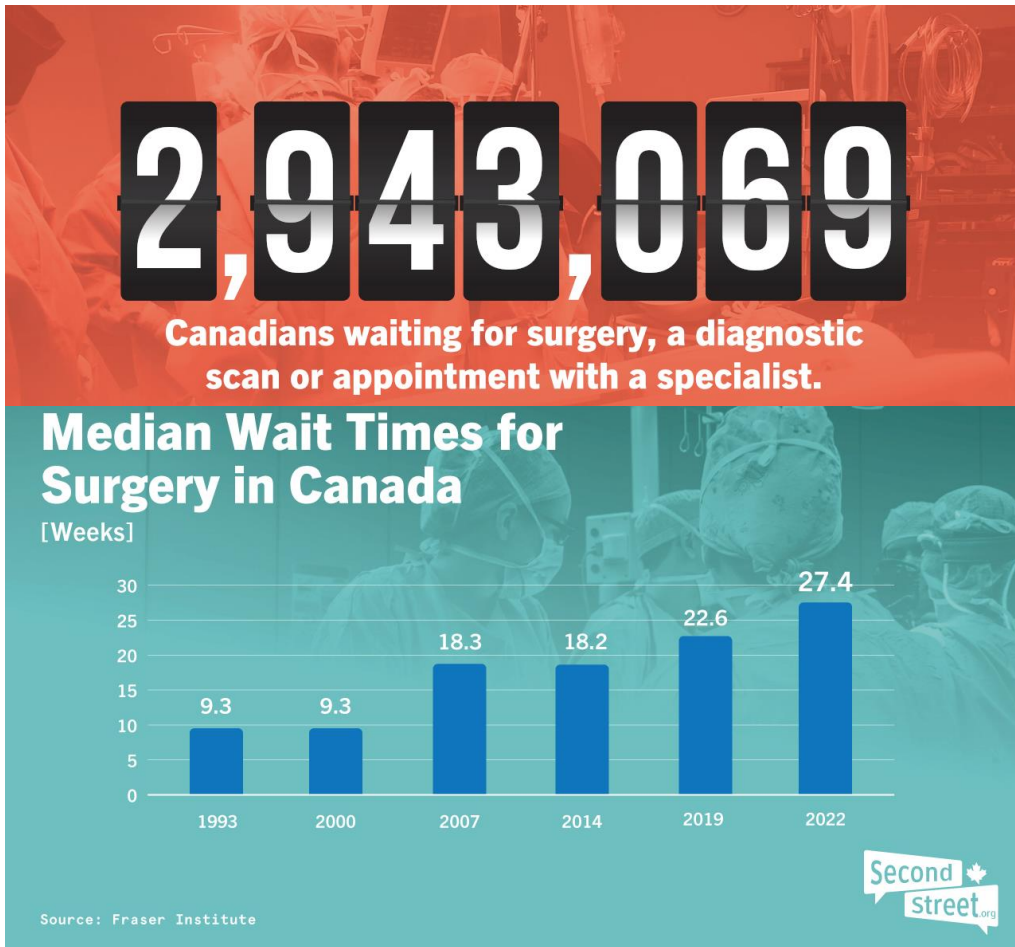
How delays in treatment impact mortality



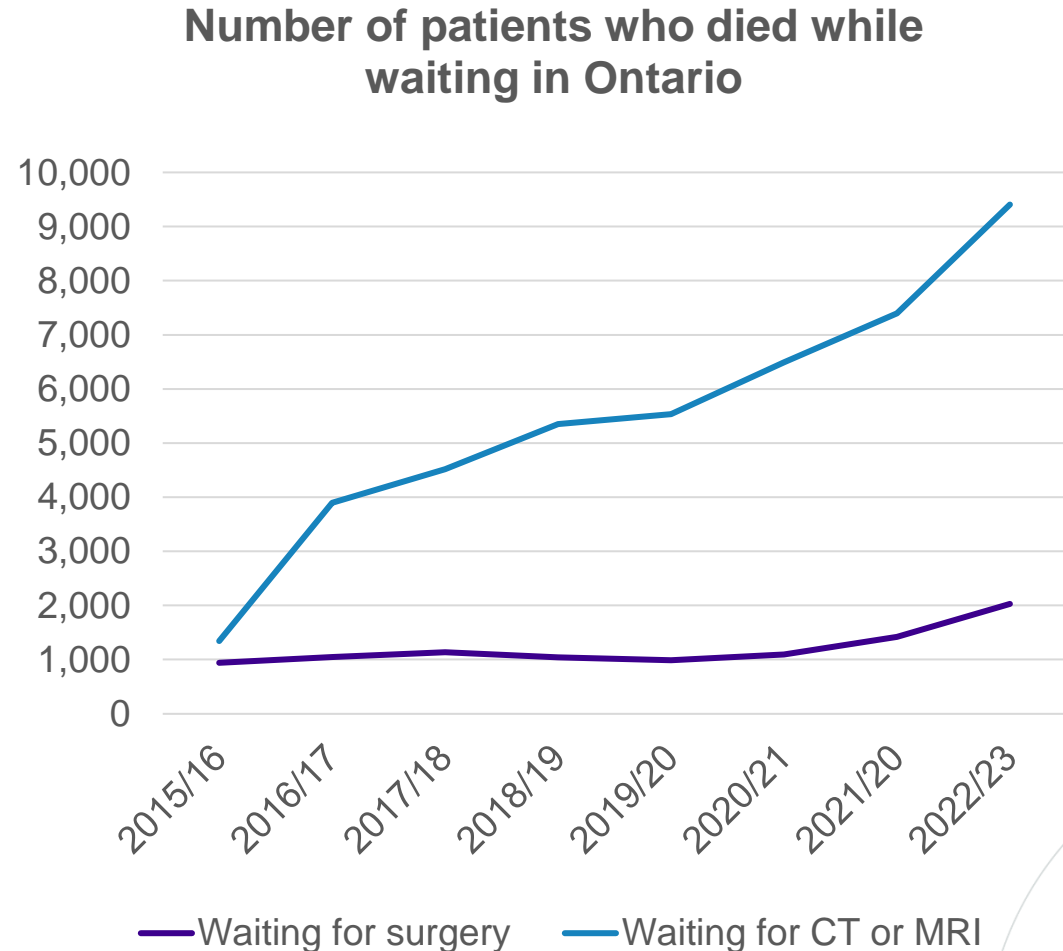
Source: [Predicted long-term impact of COVID-19 pandemic-related care delays on cancer mortality in Canada](#)



Significant growth of waiting lists and surge of deaths on waiting lists



Source: [Freedom of Information request by SecondStreet.org](#)



What caused excess deaths in 2022 and will it continue?



Immediate impact of COVID-19



Long-term effects of COVID



Delays in treatment/preventative care



Healthcare systems under strain



Other possible explanations

How healthcare systems are struggling



A struggling system

Understanding the health care impacts of the pandemic

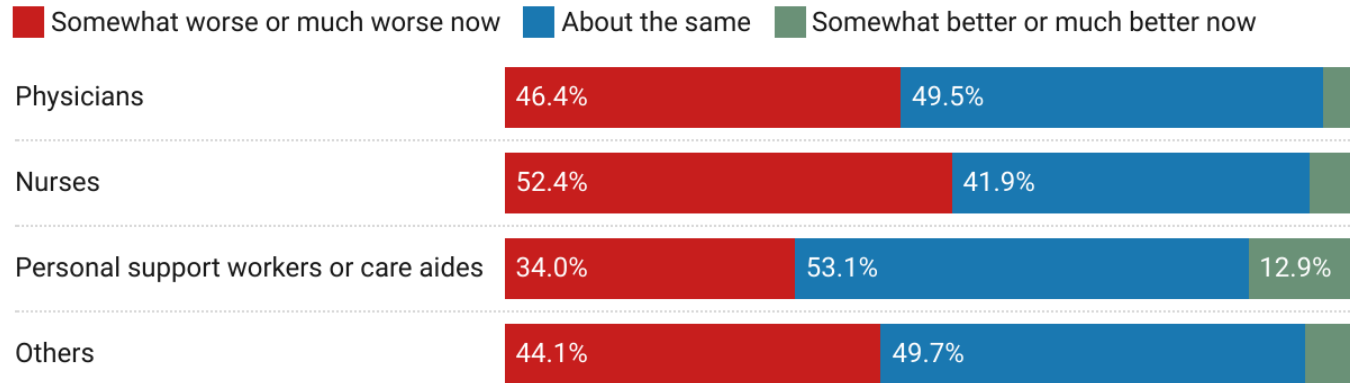
Source: [Deloitte & Canadian Medical Association](#)

Key drivers of future health demand due to pandemic

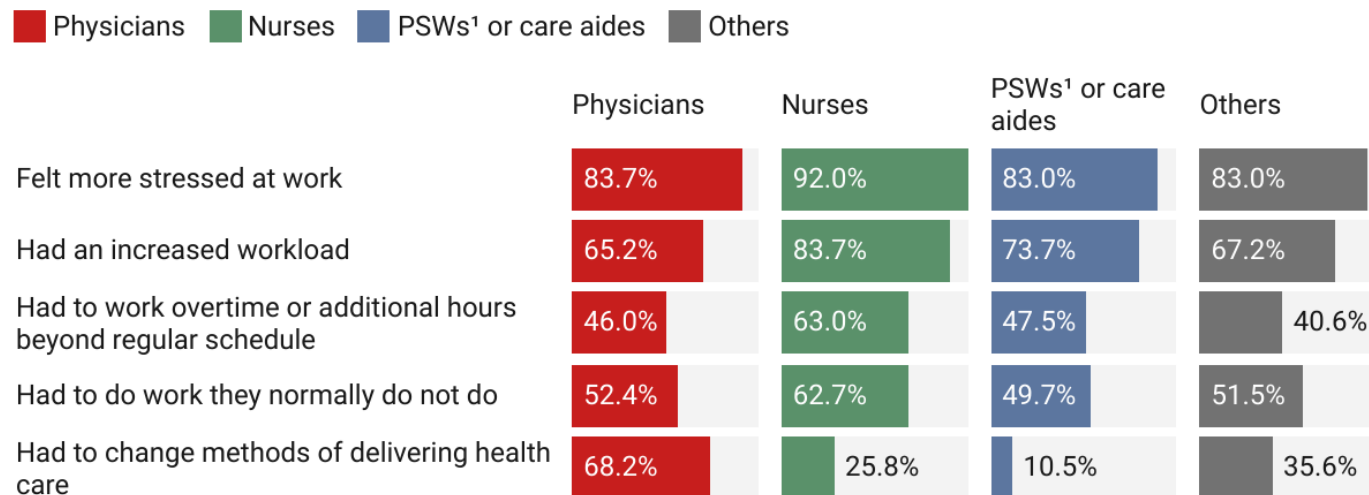


Impact of pandemic on mental state of HCW

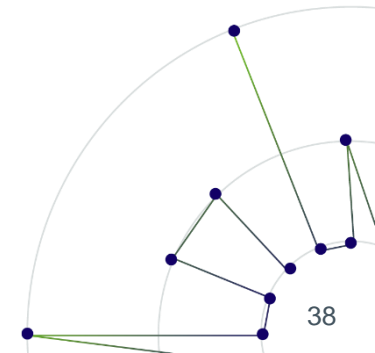
Health care workers' mental health status compared with before the pandemic



Impacts experienced by health care workers during the COVID-19



Sources: [CTV News](#) and [Statistics Canada](#)



Capacity not meeting demand before pandemic

Financial Accountability Office of Ontario in report of March 2023 found that the Province was spending enough to support programs and commitments and would have less capacity by 2027-2028 than before the pandemic.

Figure 3

Growth in elderly Ontarians has exceeded growth in the number of hospital beds

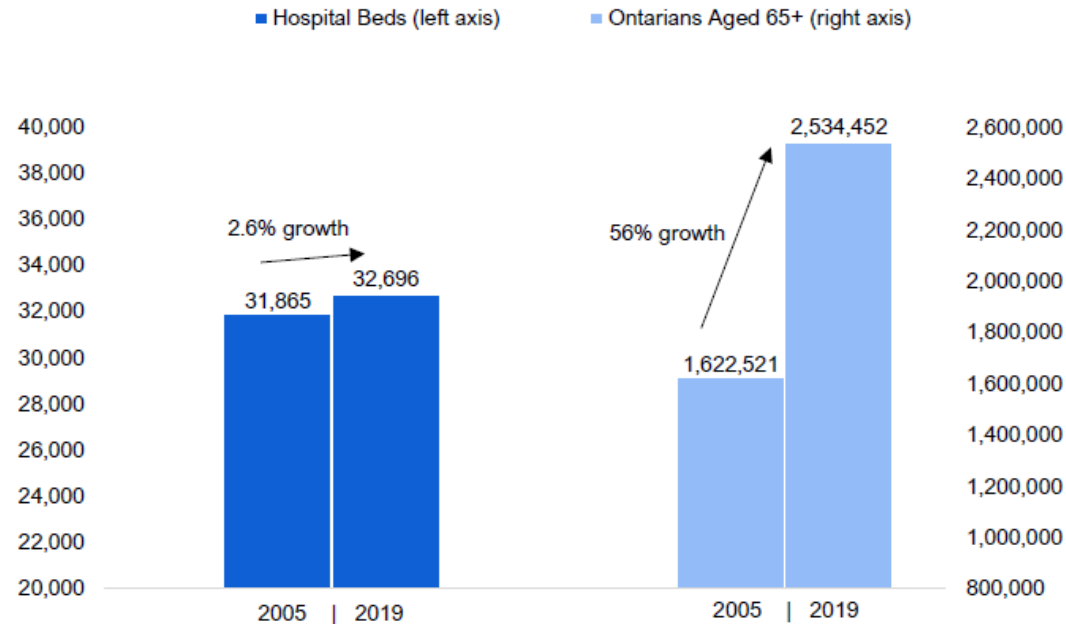
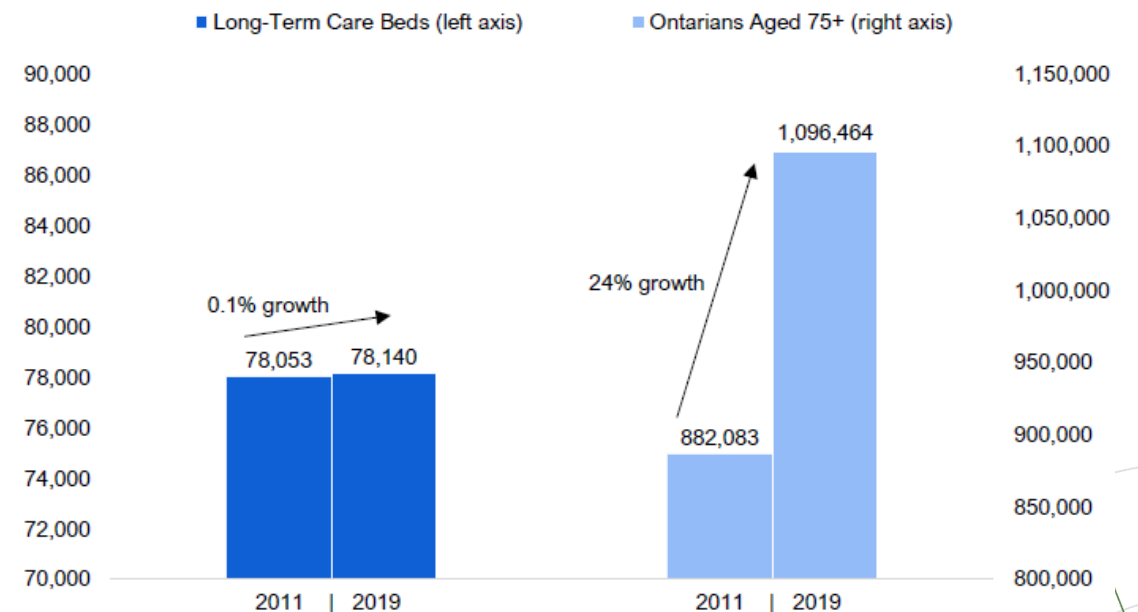


Figure 9

Growth in elderly Ontarians has exceeded growth in the number of long-term care beds



Source: [Financial Accountability Office of Ontario](#)

Recognizing concerns of healthcare workers

Percentage of healthcare workers intending to leave their current job or change jobs within the next 3 years

Healthcare Sector	17.9
Nurses	24.4
Personal Support Workers or Care Aides	16.4
Physicians	11.1
Other Healthcare Workers	13.6

Reason for healthcare workers wishing to change jobs (%)

Job Stress of Burn-out	63.2
Job Stress or Burn-out (Nurses)	70.9
Concerns over Mental Health and Well-Being	53.0
Lack of Job Satisfaction	48.8



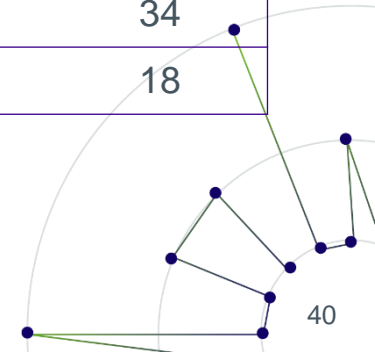
The Impact of COVID-19 on Long-Term Care in Canada

Focus on the First 6 Months

Formal LTC workers per 1,000 inhabitants aged 65 and over in OECD countries

Norway	120
Switzerland	84
Japan	67
Germany	54
Spain	49
USA	48
Korea	45
Ireland	36
Canada	34
Portugal	18

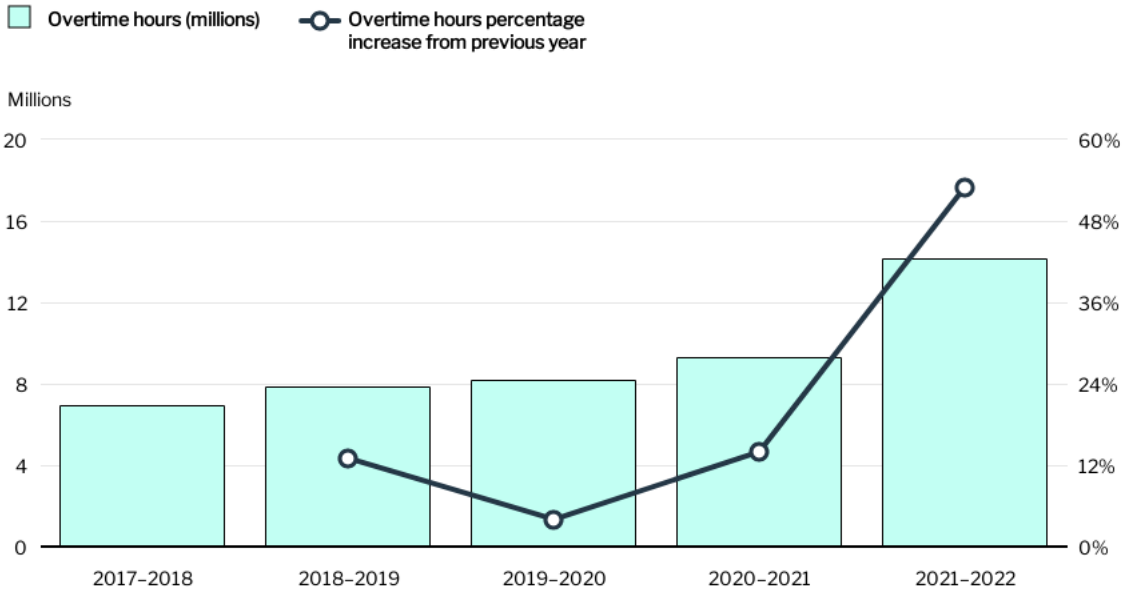
Source: [Troubles in Canada's Health Workforce: The Why, The Where and the Way Out of Shortages](#)



Evidence of challenges in delivering care

Overtime volume and increase

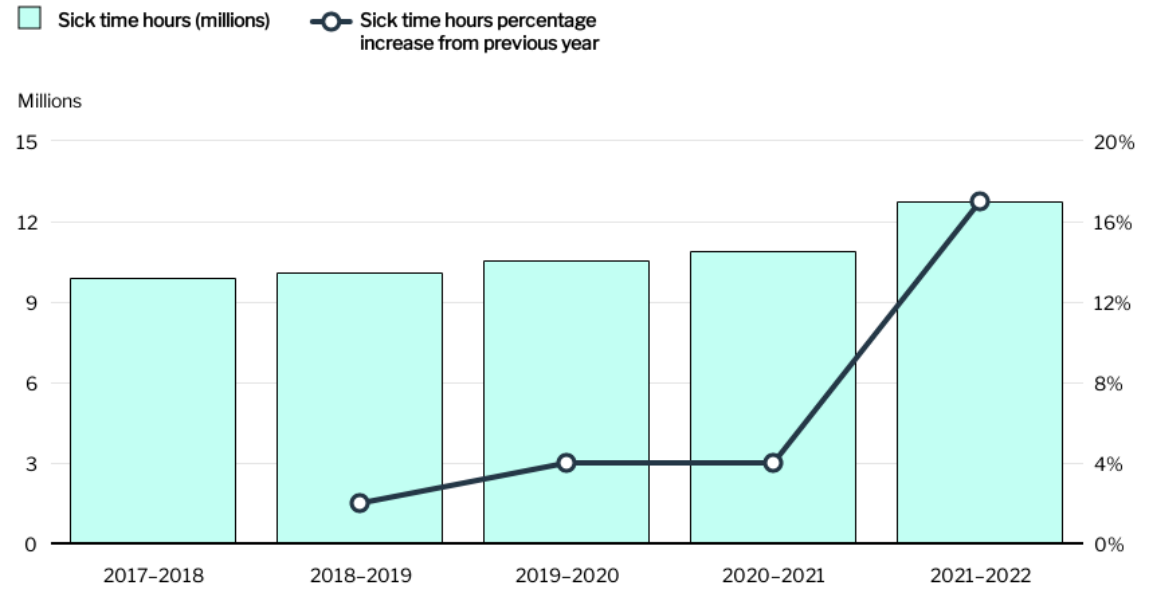
Number and percentage change from previous year in hospital inpatient services hours, non-physician inpatient unit staff, provinces/territories with available data, 2017-2018 to 2021-2022



Combination bar and line chart to show volume of overtime hours as well as year-over-year growth.

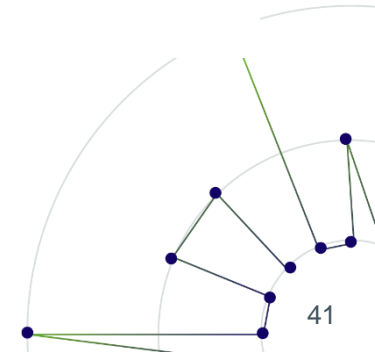
Sick time volume and increase

Number and percentage change from previous year in hospital inpatient services hours, non-physician inpatient unit staff, provinces/territories with available data, 2017-2018 to 2021-2022



Combination bar and line chart to show volume of sick time hours as well as year-over-year growth.

Source: [Hospital staffing and hospital harm trends throughout the pandemic](#)



Steps to address health workforce shortages

CANADA

Health ministers wrap up meetings in P.E.I. with a plan to grow the health workforce

Health ministers wrap up meetings in P.E.I.

CHARLOTTETOWN – The federal health minister says Canada intends to tackle its health workforce shortages by making it easier for nurses and doctors to practice in other provinces, streamlining credentials for internationally-trained health workers and through a new nursing retention program.

Thursday, October 12, 2023 | 2 min to read

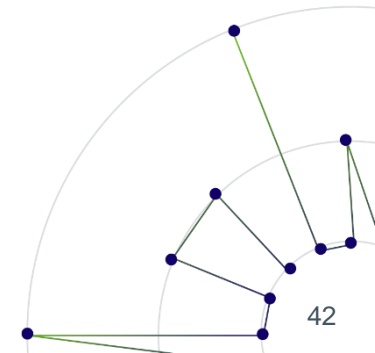
Article was updated 14 mins ago



JOIN THE CONVERSATION

5-point plan introduced by Federal Government:

1. Retention – reducing stress, improving culture, flexibility and wellness
2. Domestic education supply and demand – enhancing capacity with wider opportunities
3. Foreign credential recognition – reduce time for international HCW to join workforce
4. Labour mobility – support agile and flexible workforce
5. Health workforce and data planning – improve availability, sharing and standardisation of health force data



What caused excess deaths in 2022 and will it continue?



Immediate impact of COVID-19



Long-term effects of COVID



Delays in treatment/preventative care



Healthcare systems under strain



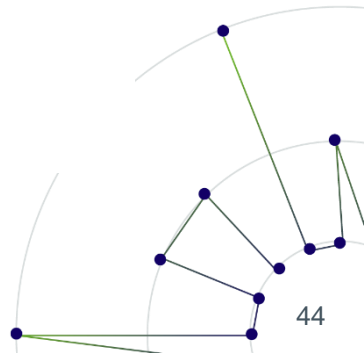
Other possible explanations

Poll



Is 2022 mortality data
representative of the future?

1. Yes, the full year
2. Yes, part of the year
3. No

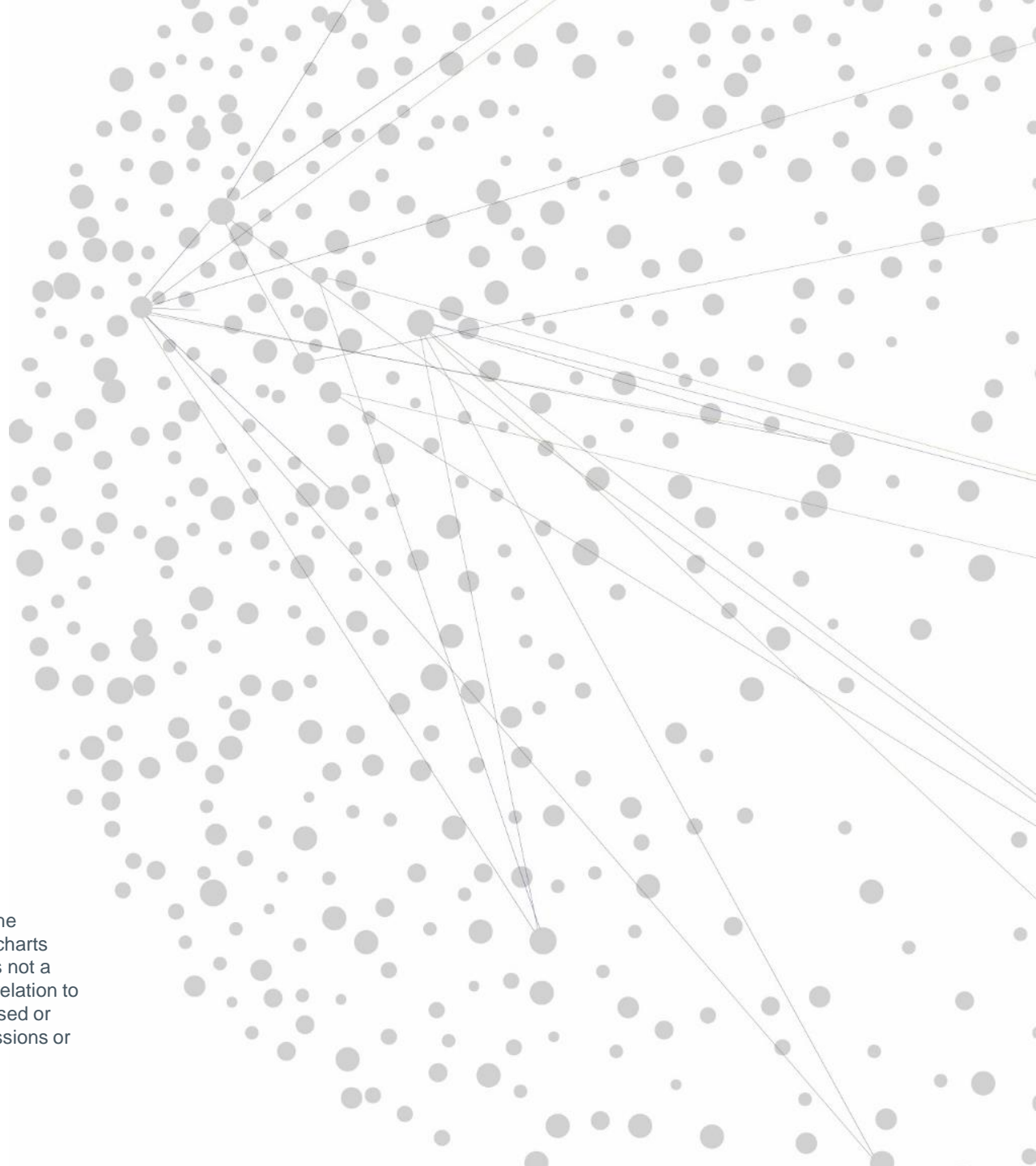


Q&A



Thank you

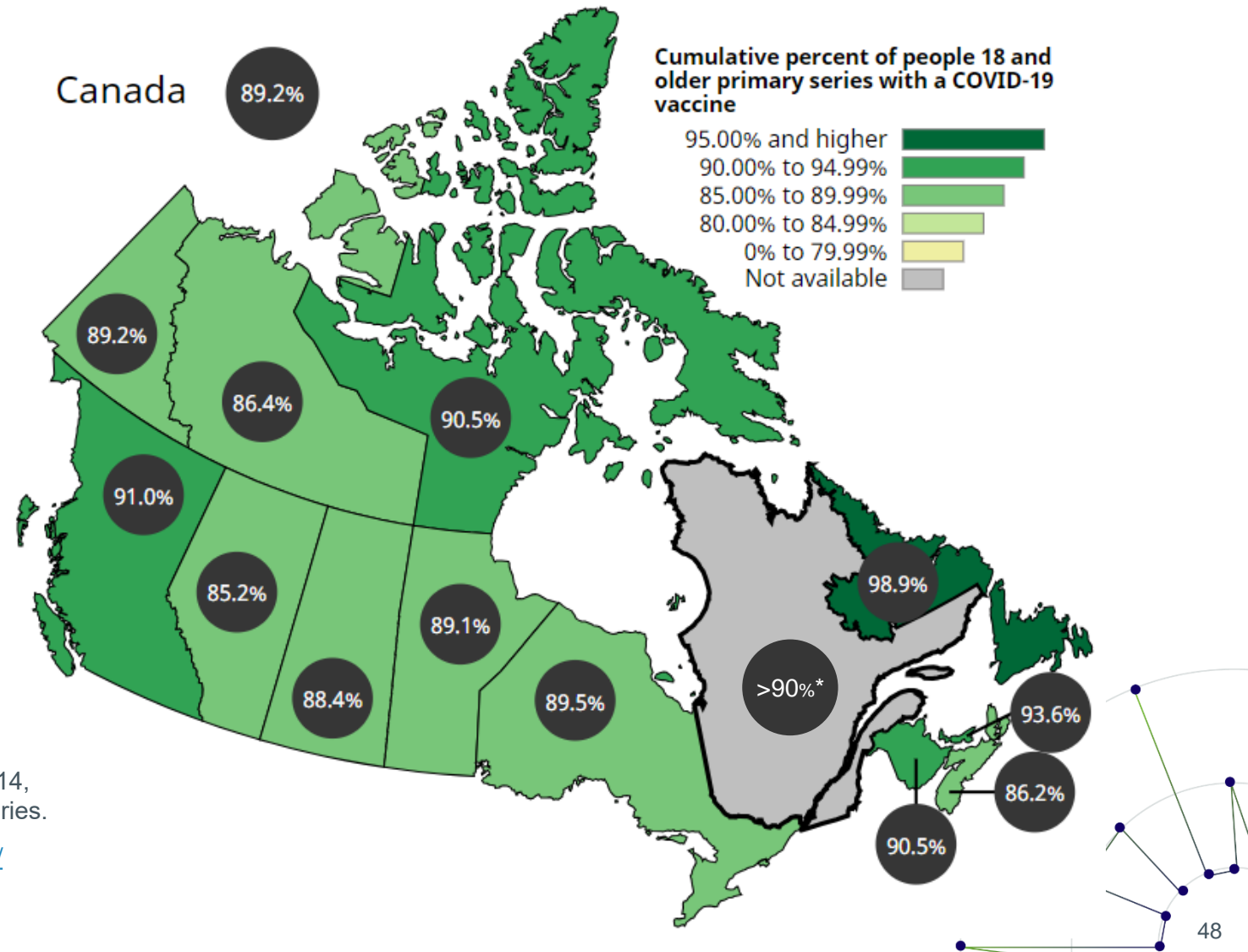
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Appendix

89.2% of Canadians over the age of 18 are “fully” vaccinated

Cumulative percent of people 18 and older who have completed primary series with a COVID-19 vaccine in Canada by jurisdiction, September 10, 2023



*The “primary series completed” category excludes Quebec from August 14, 2022, and onward, due to changes in Quebec’s vaccination status categories.

Source: <https://health-infobase.canada.ca/covid-19/vaccination-coverage/>