

# PUBLIC HEALTH LEADERSHIP COMMITTEE

## Meeting Agenda

Friday, February 19<sup>th</sup>, 2021 ~ 11:30 AM – 1:00 PM  
Zoom Coordinates in Calendar Invite

### Committee Members:

Albert De Villiers (IHA)	Dennis Cleaver (NHA)	Murray Fyfe (VIHA)
Andrew Gray (NHA)	Elizabeth Brodtkin (FHA)	Patty Daly (VCH)
Andrew Larder (BCCDC) ( <i>Chair</i> )	Helena Swinkels (FNHA)	Perry Kendall (BCCSU)
Bonnie Henry (OPHO)	Ingrid Tyler (FHA)	Réka Gustafson (BCCDC)
Brian Emerson (OPHO)	Jong Kim (NHA)	Richard Stanwick (VIHA)
Catherine Elliott (YK)	Marianne Henderson ( <i>Secretariat</i> )	Shannon McDonald (FNHA)
Daniele Behn Smith (OPHO)	Mark Lysyshyn (VCH)	Silvina Mema (IHA)

### Guests:

Ian Rongve (MoH)	Lorie Hrycuik (MoH)	Veronic Clair (BCCDC)
Mel Krajden (BCCDC)	Linda Hoang (BCCDC)	Chris Mill (BCCDC)
Darlene Therrien (MoH)	Kate Smolina (BCCDC)	

## AGENDA

ITEM	TIMING	DESCRIPTION	LEAD
1	11:30	Welcome and roll call	Andrew
2	11:32	Approval of agenda / addition of other items	Andrew
3	11:35	Testing/surveillance strategy	Mel/Linda
4	11:55	VOC case and contact management	Veronic
5	12:15	Excess deaths in BC	Chris/Kate
6	12:30	Treasury Board Assumptions	Darlene
7	12:45	VPs of COVID update	Ian
8	1:00	Adjournment	Andrew

## Summary report on all-cause and cause-specific mortality across British Columbia in 2020 compared with prior years

This document provides an executive summary of multiple analyses done to examine 2020 mortality in British Columbia (BC) and to compare 2020 with previous years. The methods have not been fully described for the sake of efficiency, but details are given in the figure captions and their footnotes where relevant. Further information is available if needed. A file including several supplementary plots has been attached without numbers or captions, though they have clear titles. These plots all show information that is captured or referenced in the text presented here.

### Overall Summary

The COVID-19 pandemic was associated with above-expected mortality in BC during the 2020 calendar year. Using methods consistent with those used by Statistics Canada, the estimated total number of excess deaths was approximately 2000. The number of deaths attributed to COVID-19 during the same period was 940, and the number of deaths attributed to illicit drug toxicity was approximately 1700.

When weekly deviation from expected mortality was plotted for the period covering 2009 through 2020, the magnitude of the above-expected mortality in 2020 was consistent with that observed during the extreme 2016/2017 influenza season, though the duration was longer. When the plots were stratified by age category, the above-expected mortality was most sustained for deaths in those <60 years, even during periods when provincial COVID-19 infections were low. Very few of the deaths in the <60 year age category were attributed to COVID-19 (Figure 1).

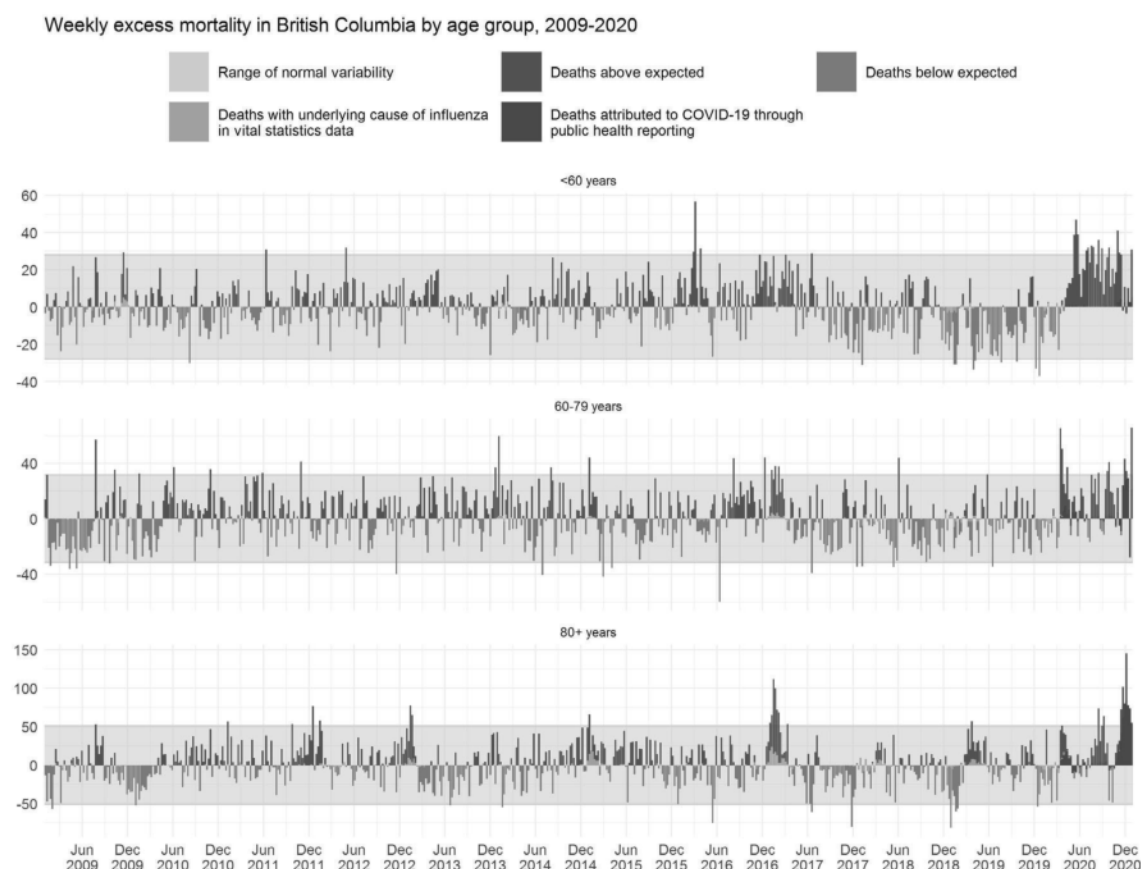
When annual mortality rates for 2009-2020 were directly age- and sex-standardized to the 2016 BC population, three years were elevated over the 12-year average: 2017, 2020, and 2009 in ranked order. All three of these years were affected by pandemic viruses (H1N1 in 2009, SARS-CoV-2 in 2020) or severe influenza (2017). Both 2017 and 2020 were also affected by the ongoing overdose emergency, which was declared in 2016 (Figure 2).

Data from BC Vital Statistics, the BC Coroners Service, and the BC Centre for Disease Control were used to examine the percentage of deaths and potential years of life lost (PYLL) for mortality from multiple causes from 2017-2020. Comparisons between years are somewhat complicated by deaths currently coded in Vital Statistics as R99, which often indicates that an investigation is pending. The R99 code is commonly used for deaths among younger people due to complex causes such as illicit drug toxicity, self-harm, and accidents (Figure 3).

Information about deaths due to illicit drug toxicity has been received directly from the BC Coroners Service for these analyses, allowing comparison with deaths due to COVID-19 and other causes that have not been coded as R99 in the Vital Statistics records. Available information on deaths in 2020 was assessed in two ways: percentage of deaths due to different causes and potential years of life lost (PYLL) due to different causes. The latter compares the age at death to life expectancy for an individual of that age and sex. Malignant cancer was the leading cause of death in both analyses; illicit drug toxicity was ranked #4 by percentage and #2 by PYLL. In 2017-2019, illicit drug toxicity was ranked #7-9 by percentage and #3-4 by PYLL. In 2020, COVID-19 was ranked as #8 by percentage and #10 by PYLL, with the caveat that BC has enacted quite stringent public health measures. All of these rankings may change as R99 codes are resolved in the Vital Statistics data (Figure 4).

When the available 2020 cause of death rankings were stratified by month, the relative rankings of illicit drug toxicity and COVID-19 change throughout the year. In January, illicit drug toxicity was ranked #8, and it had progressed to #4 for May through October. Illicit drug toxicity was ranked between #5 and #9 in all months of the prior three years. COVID-19 was ranked between #9 and #15 from March through May of 2020, and was not in the top 15 for June through August. It ranked #14 and #13 in September and October, respectively, and then moved to #3 in both November and December. Influenza and pneumonia ranked #3 in January of 2017 during the last severe influenza season. November and December were the only months during which illicit drug toxicity had a lower rank than COVID-19 in 2020 (Figure 5).

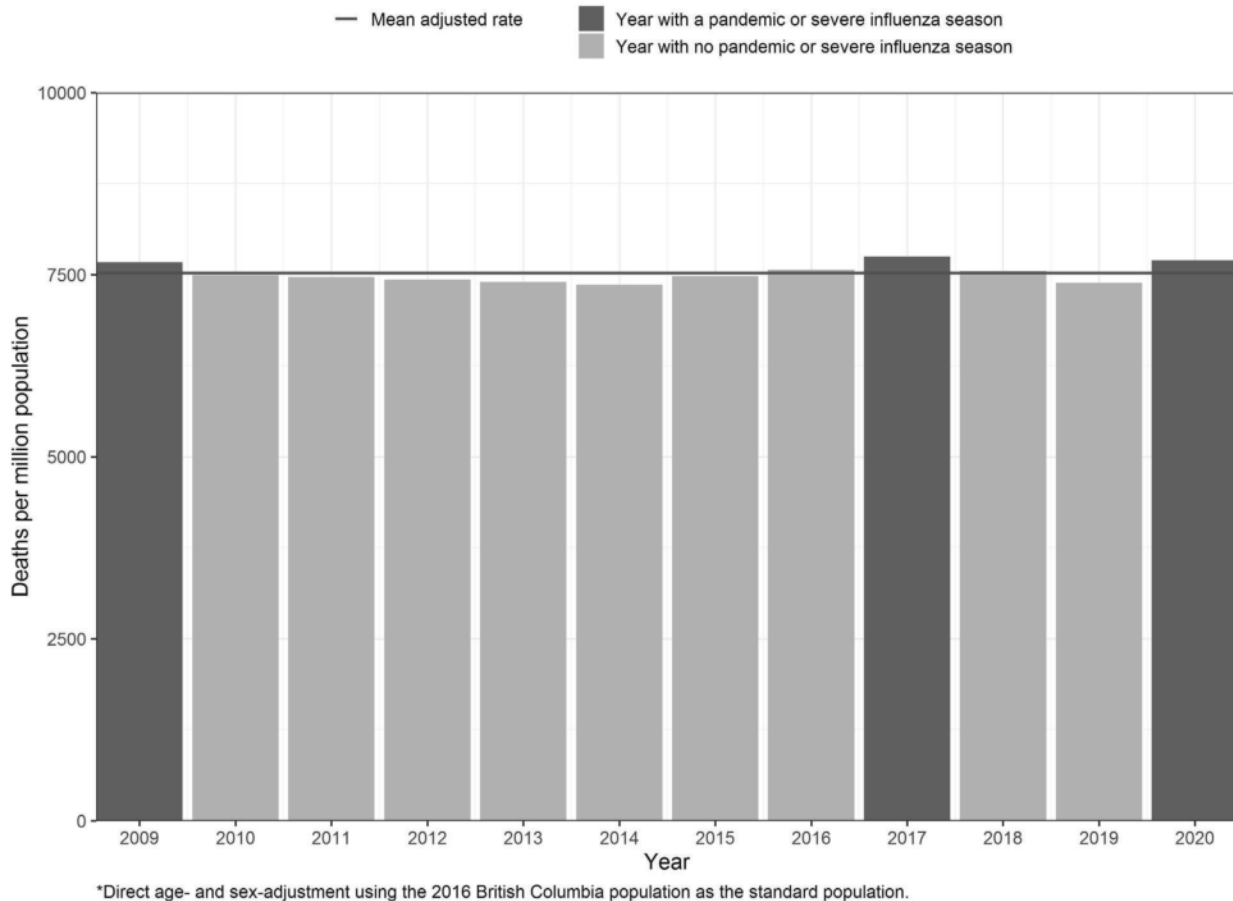
When the available 2020 cause of death rankings were stratified by age, illicit drug toxicity was #1 for those aged 10-19 and 20-39, and #2 for those aged 40-59. Data on illicit drug toxicity come directly from the Coroners Service, so the percentage of deaths due to this outcome will not change as the R99 codes are resolved in the Vital Statistics data. However, more than 70% of the 2020 deaths in the 10-39 age range are currently coded as R99, so the rankings of other causes of death are likely to change over time. In 2017-2019 the top three causes of death in these age categories included accidents, illicit drug toxicity, intentional self-harm, and malignant cancers (Figure 6).



**Figure 1.** Weekly estimates of all-cause mortality deviation from expected counts for 2009-2020 in three age categories based on regression methods used by Statistics Canada.<sup>1</sup> The y-axis is different for all three plots, so the magnitudes shown are not directly comparable. The COVID-19 pandemic in British Columbia started in mid-March 2020, and all-cause mortality was elevated above expected values in all three age categories for the duration of the year. Among the 80+ age category, the magnitude of the increase over expected values was consistent with that observed during the 2016/2017 influenza season, though there were three distinct peaks. Of particular importance is the peak between June and September, when COVID-19 infections and associated deaths were low throughout the province. Increased mortality during this period may have been associated with extreme environmental conditions, including unseasonably hot weather and a prolonged wildfire smoke episode. Among the <60 age category, mortality increases started approximately four weeks after the increases in the other categories, and remained steadily sustained for the duration of the year. Very few of these deaths were attributed to COVID-19; the deviation from expected mortality was driven by deaths due to illicit drug toxicity, which are also apparent through 2016 and 2017. Among the 60-79 age category, deviation from expected has been more variable and the direct effects of COVID-19 were not apparent until November and December. In all three age categories, several weeks of below-expected mortality were observed prior to mid-March 2020, suggesting that some deaths during the early pandemic may have been displaced, especially in the older age groups.

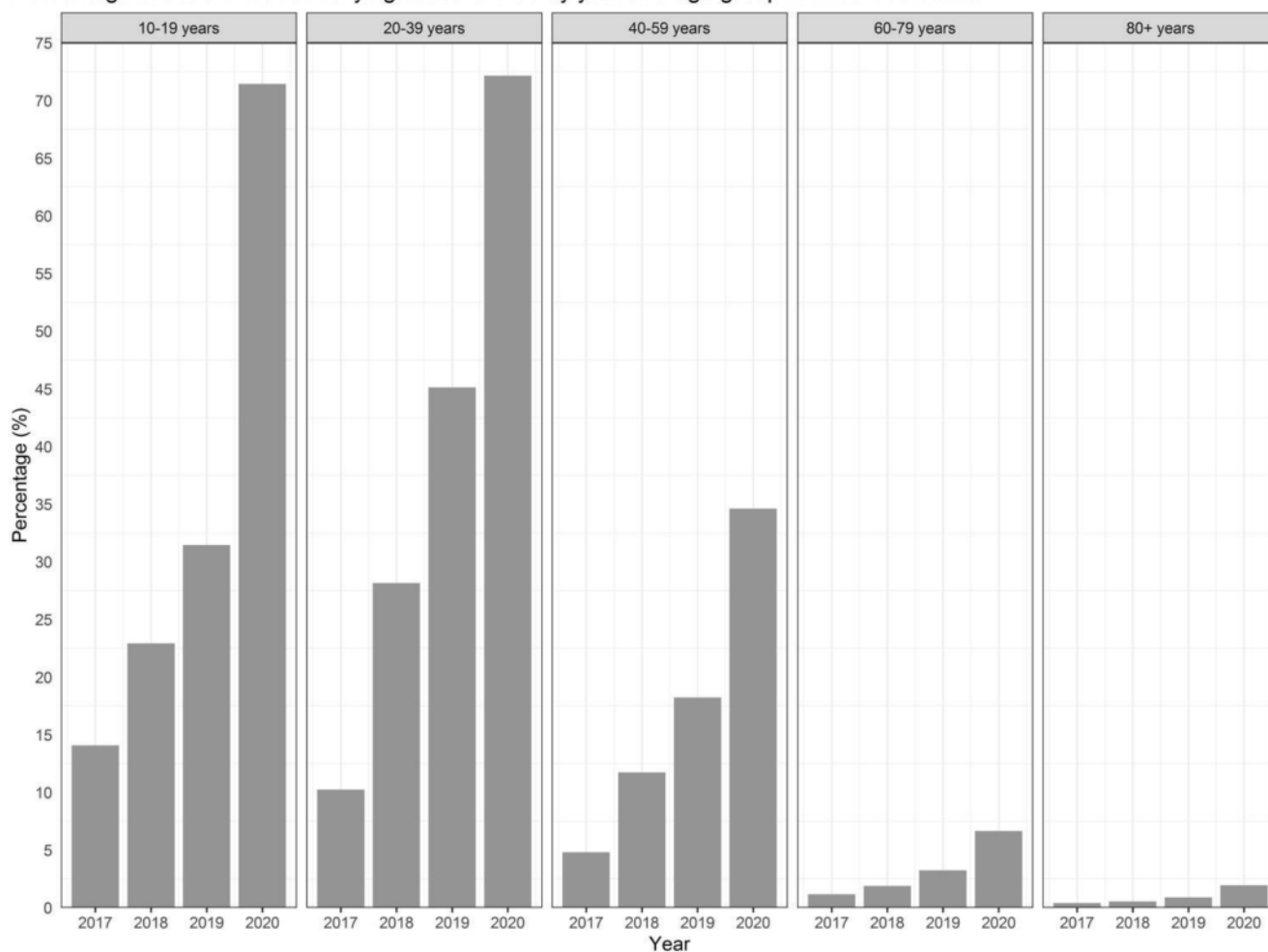
<sup>1</sup> Salmon M, Schumacher D, Höhle M (2016). "Monitoring Count Time Series in R: Aberration Detection in Public Health Surveillance." *Journal of Statistical Software*, 70(10), 1–35. doi: 10.18637/jss.v070.i10.

### Age- and sex-adjusted all-cause mortality rates in British Columbia, 2009-2020\*



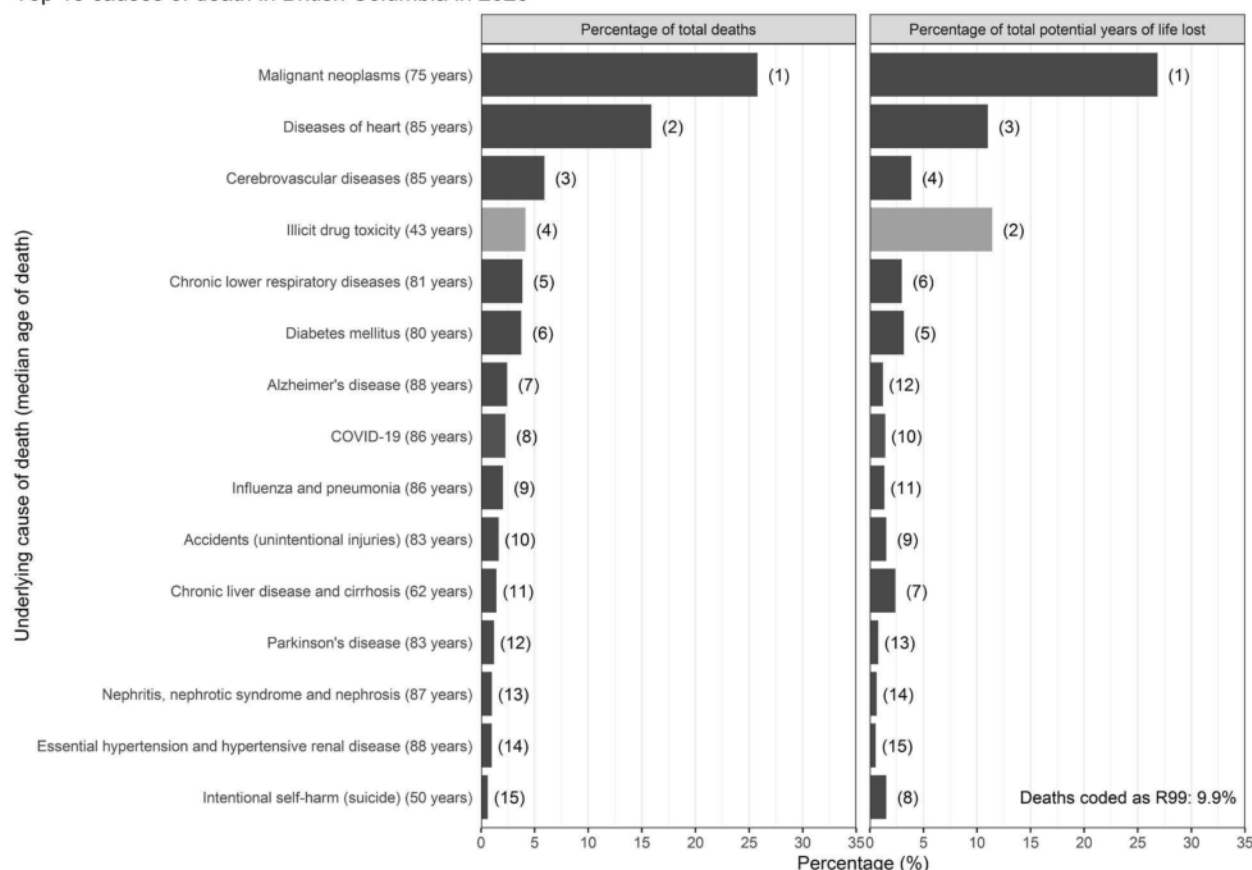
**Figure 2.** Standardization is a method used to make populations with different sizes, age structures, and sex distributions comparable with each other. This plot shows the directly age- and sex-standardized mortality rates (per million population) in British Columbia from 2009-2020. The provincial population in 2016 (a census year) was used as the standard population for the analysis. The red line indicates the mean rate across all 12 years. Years with pandemic viruses (H1N1 in 2009 and SARS-CoV-2 in 2020) or severe influenza (2017) are shown in dark grey. All of these years had mortality rates that were higher than average. Both 2017 and 2020 were also affected by the ongoing overdose emergency, which was declared in April 2016. The highest standardized mortality rate was observed in 2017, followed by 2020 and 2009. The lowest rates were observed in 2014 and 2019.

Percentage of deaths with underlying cause of R99 by year and age group in British Columbia



**Figure 3.** Data from BC Vital Statistics provide useful information on deaths and their causes, but some records can take a long time to complete. Deaths due to underlying causes such as illicit drug toxicity, self-harm, and accidents may require medical and legal investigation. In such cases the International Classification of Diseases (ICD) code R99 is used as a placeholder until the cause is finalized. This plot shows the proportion of R99 codes across five different age categories from 2017-2020. In every age category the percentage of R99 codes decreases over time, but many deaths have persistent R99 codes in the younger age groups, especially for those <40 years. Many deaths due to illicit drug toxicity will be coded as R99, but the BC Centre for Disease Control receives this information directly from the Coroners Service and is therefore able to quantify the impact. Many other deaths due to self-harm and accidents cannot be quantified at this time, which leads to uncertainty in the following cause of death rankings. For example, accidents currently stand as the fourth leading cause of death in 2017 and 2018, the sixth leading cause in 2019, and the tenth leading cause in 2020. These rankings may change as more of the R99 codes are resolved, particularly in the later years.

# Top 15 causes of death in British Columbia in 2020



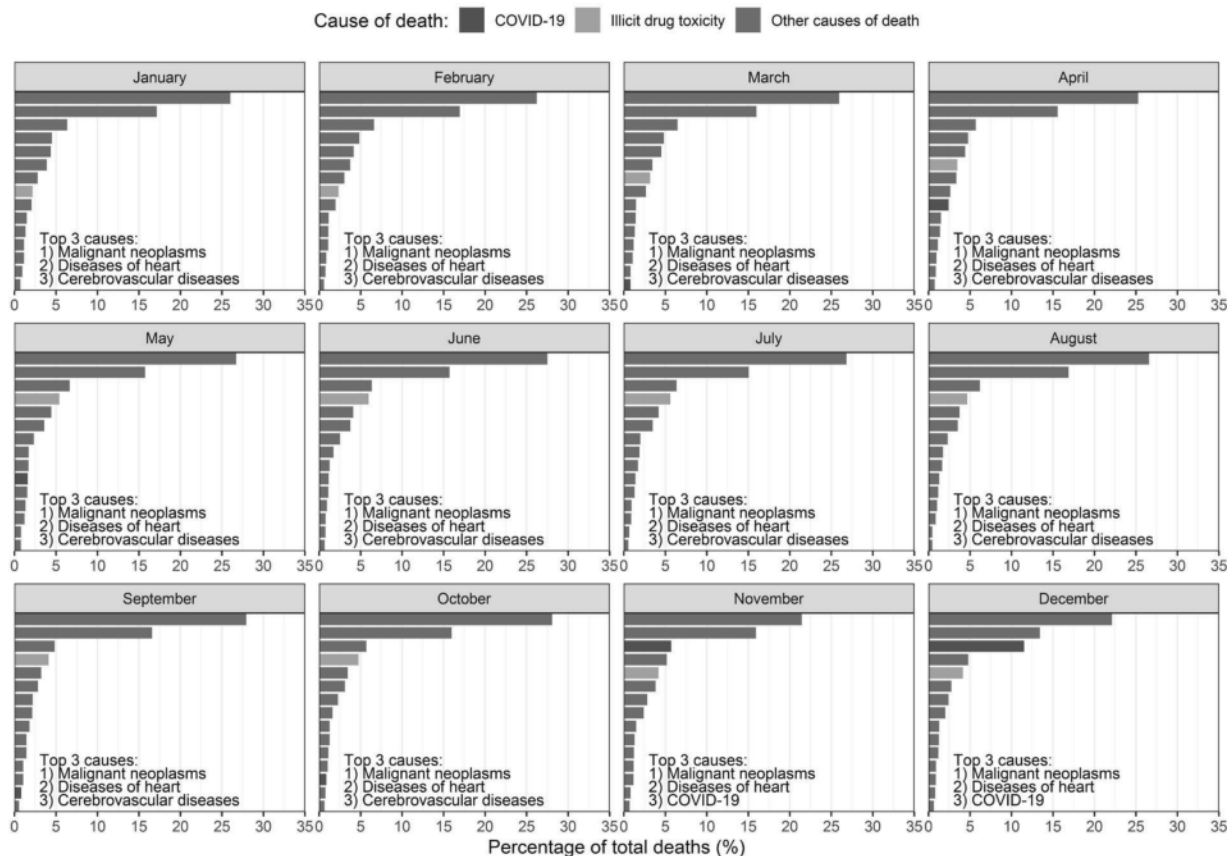
External causes of death (other than illicit drug toxicity) incomplete due to reporting delay.  
Data sources: 1) BC Vital Statistics; 2) COVID-19 deaths reported by public health; 3) Data on illicit drug toxicity deaths provided to BCCDC by BC Coroners Service and extracted on February 4 2021; 4) Statistics Canada Table 13-10-0114-01 Life expectancy and other elements of the life table, Canada, reference period 2017-2019.

**Figure 4.** Deaths in 2020 ranked by percentage and potential years of life lost (PYLL) based on the available data from the BC Coroners Service (illicit drug toxicity), BC Centre for Disease Control (COVID-19), and Vital Statistics (all other causes). Deaths from the Vital Statistics data were categorized according to the list for ranking leading causes of death used by Statistics Canada.<sup>2</sup> Note that deaths currently coded as R99 in the Vital Statistics data (9.9% of the total) have been included in the denominator, but cannot yet be included in the numerators. Deaths due to accidents and intentional self-harm are likely to increase in rank as the Vital Statistics data become more complete over time. Deaths associated with the two ongoing public health emergencies are shown in red (the COVID-19 pandemic) and orange (opioid-related overdose). The PYLL were estimated using life expectancy values published by Statistics Canada for British Columbia.<sup>3</sup> The life expectancies at death for all deaths within a category were summed to yield the total potential years of life lost for that cause. The percentage of total PYLL for each category was calculated using the total PYLL for the year.

<sup>2</sup> Statistics Canada. Table 13-10-0801-01 Leading causes of death, total population (age standardization using 2011 population). <https://doi.org/10.25318/1310080101-eng>

<sup>3</sup> Statistics Canada. Table 13-10-0114-01 Life expectancy and other elements of the life table, Canada, all provinces except Prince Edward Island. <https://doi.org/10.25318/1310011401-eng>

## Top 15 causes of death by month in British Columbia for 2020



External causes of death (other than illicit drug toxicity) incomplete due to reporting delay.

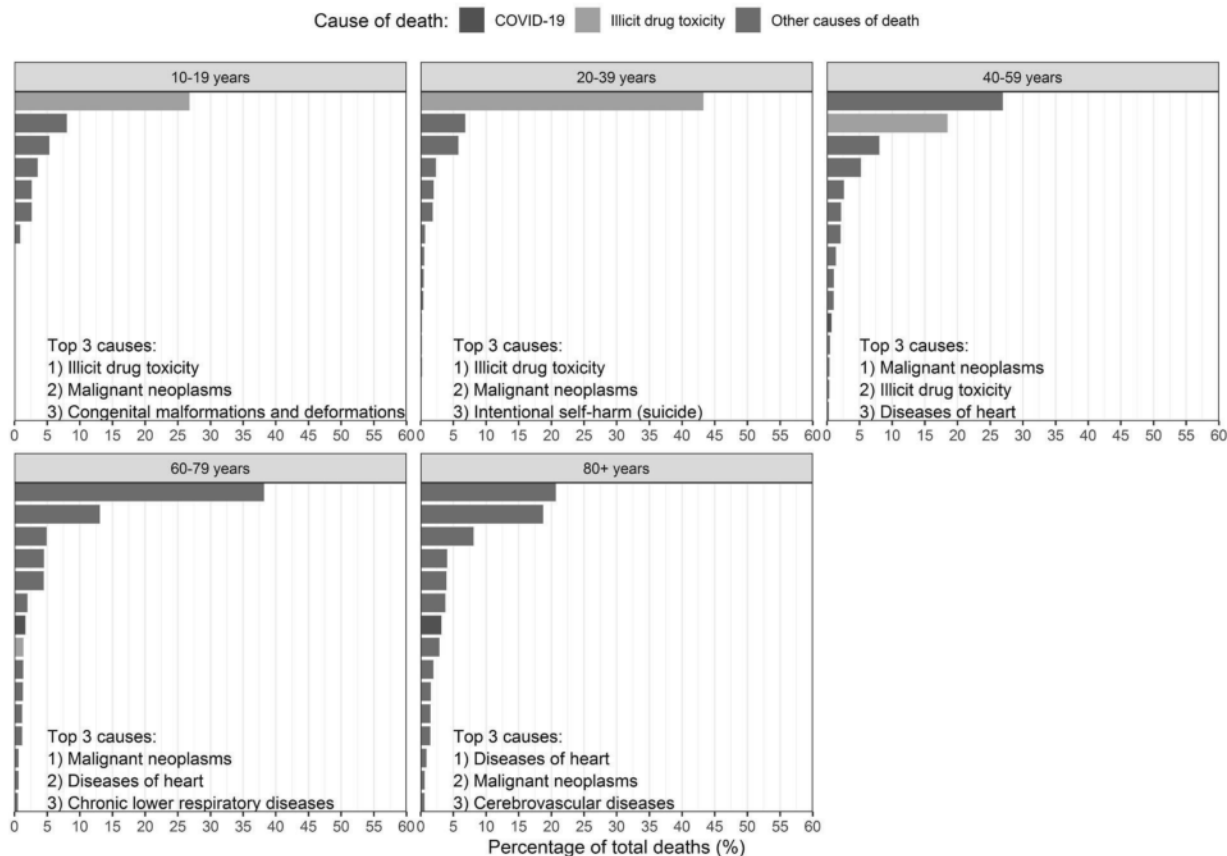
Data sources: 1) BC Vital Statistics; 2) COVID-19 deaths reported by public health; 3) Data on illicit drug toxicity deaths provided to BCCDC by BC Coroners Service and extracted on February 4 2021; 4) Statistics Canada Table 13-10-0114-01 Life expectancy and other elements of the life table, Canada, reference period 2017-2019.

**Figure 5.** Monthly deaths in 2020 ranked by percentage based on the available data from the BC Coroners Service (illicit drug toxicity), BC Centre for Disease Control (COVID-19), and Vital Statistics (all other causes). Deaths from the Vital Statistics data were categorized according to the list for ranking leading causes of death used by Statistics Canada.<sup>4</sup> Note that deaths currently coded as R99 in the Vital Statistics data have been included in the denominator, but cannot yet be included in the numerators. Given that these deaths are resolved over time, the fraction of deaths with an R99 code will decrease as the year progresses and deaths due to accidents and intentional self-harm are likely to increase in rank as the Vital Statistics data become more complete. The top three causes of death are indicated for each month, and deaths associated with the two ongoing public health emergencies are shown in red (the COVID-19 pandemic) and orange (opioid-related overdose).

<sup>4</sup> Statistics Canada. Table 13-10-0801-01 Leading causes of death, total population (age standardization using 2011 population). <https://doi.org/10.25318/1310080101-eng>



## Top 15 causes of death by age group in British Columbia for 2020



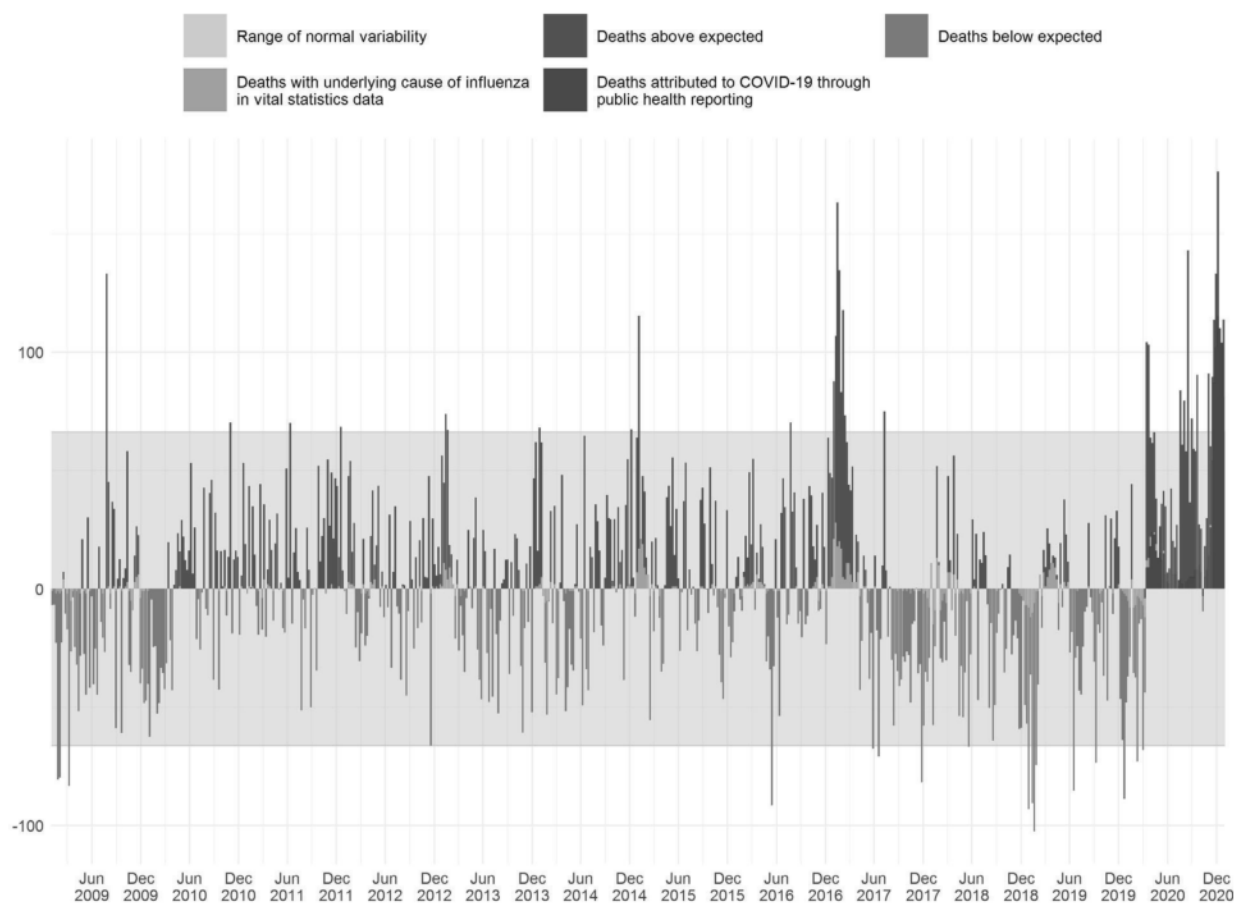
External causes of death (other than illicit drug toxicity) incomplete due to reporting delay.

Data sources: 1) BC Vital Statistics; 2) COVID-19 deaths reported by public health; 3) Data on illicit drug toxicity deaths provided to BCCDC by BC Coroners Service and extracted on February 4 2021; 4) Statistics Canada Table 13-10-0114-01 Life expectancy and other elements of the life table, Canada, reference period 2017-2019.

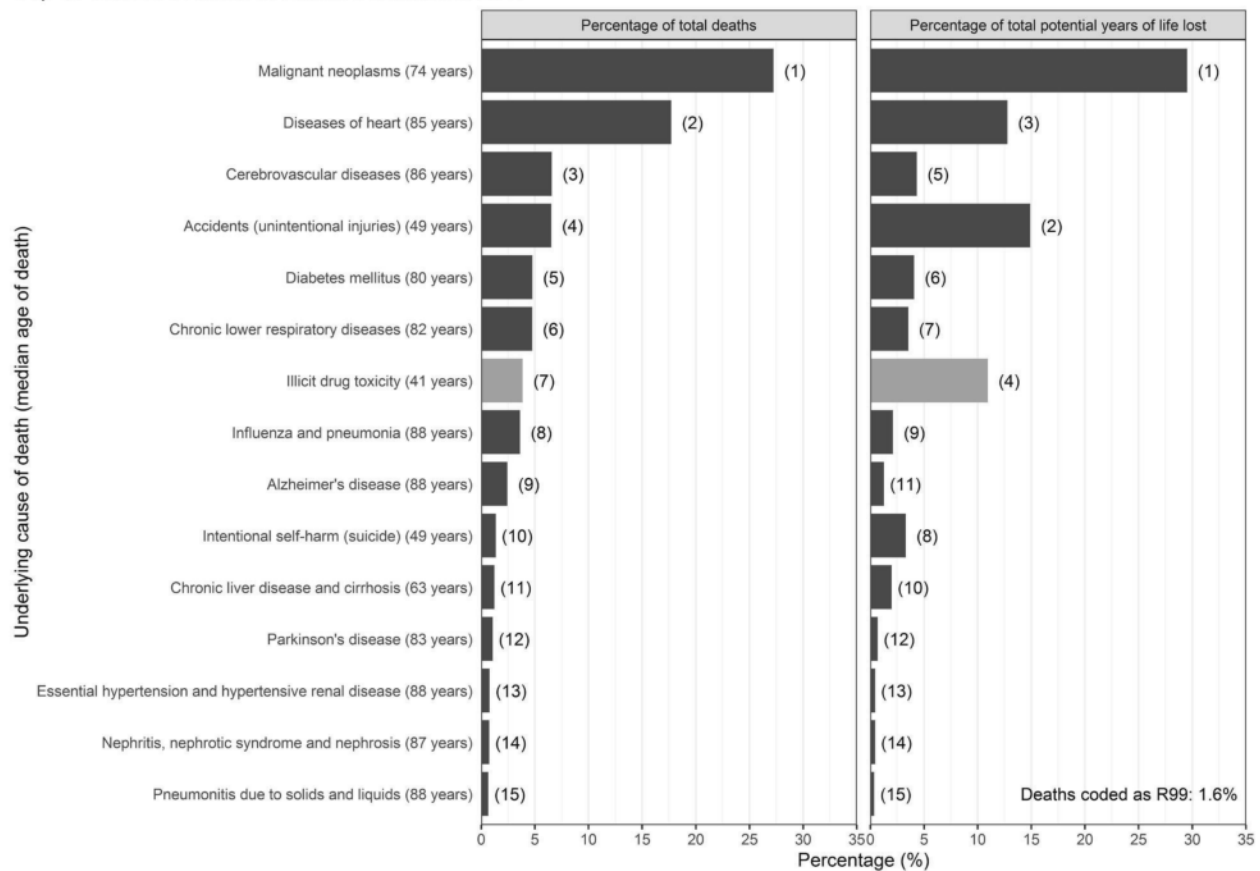
**Figure 6.** Deaths in 2020 stratified by age and ranked by percentage based on the available data from the BC Coroners Service (illicit drug toxicity), BC Centre for Disease Control (COVID-19), and Vital Statistics (all other causes). Deaths from the Vital Statistics data were categorized according to the list for ranking leading causes of death used by Statistics Canada.<sup>5</sup> Note that deaths currently coded as R99 in the Vital Statistics data have been included in the denominator, but cannot yet be included in the numerators. Most of these deaths are in people 10-59 years (Figure 3), making the current rankings uncertain for these age categories. Accidents, intentional self-harm, and illicit drug toxicity were the top three causes of death in those aged 10-39 in almost all of 2017-2019, and the same is likely to be true for 2020 when the Vital Statistics records are resolved. Data on deaths due to illicit drug toxicity come directly from the BC Coroners Service, and are considered complete.

<sup>5</sup> Statistics Canada. Table 13-10-0801-01 Leading causes of death, total population (age standardization using 2011 population). <https://doi.org/10.25318/1310080101-eng>

# Weekly excess mortality in British Columbia, 2009-2020

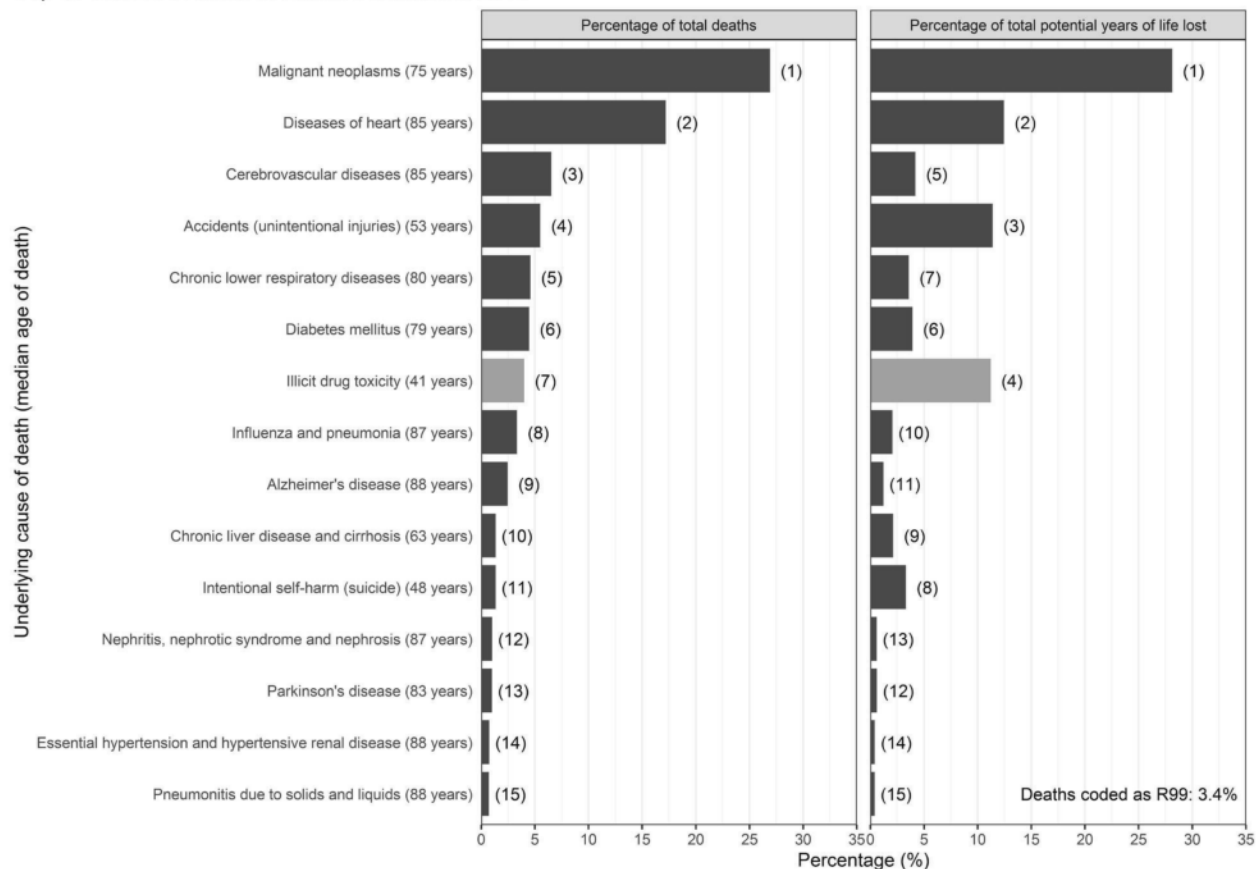


# Top 15 causes of death in British Columbia in 2017



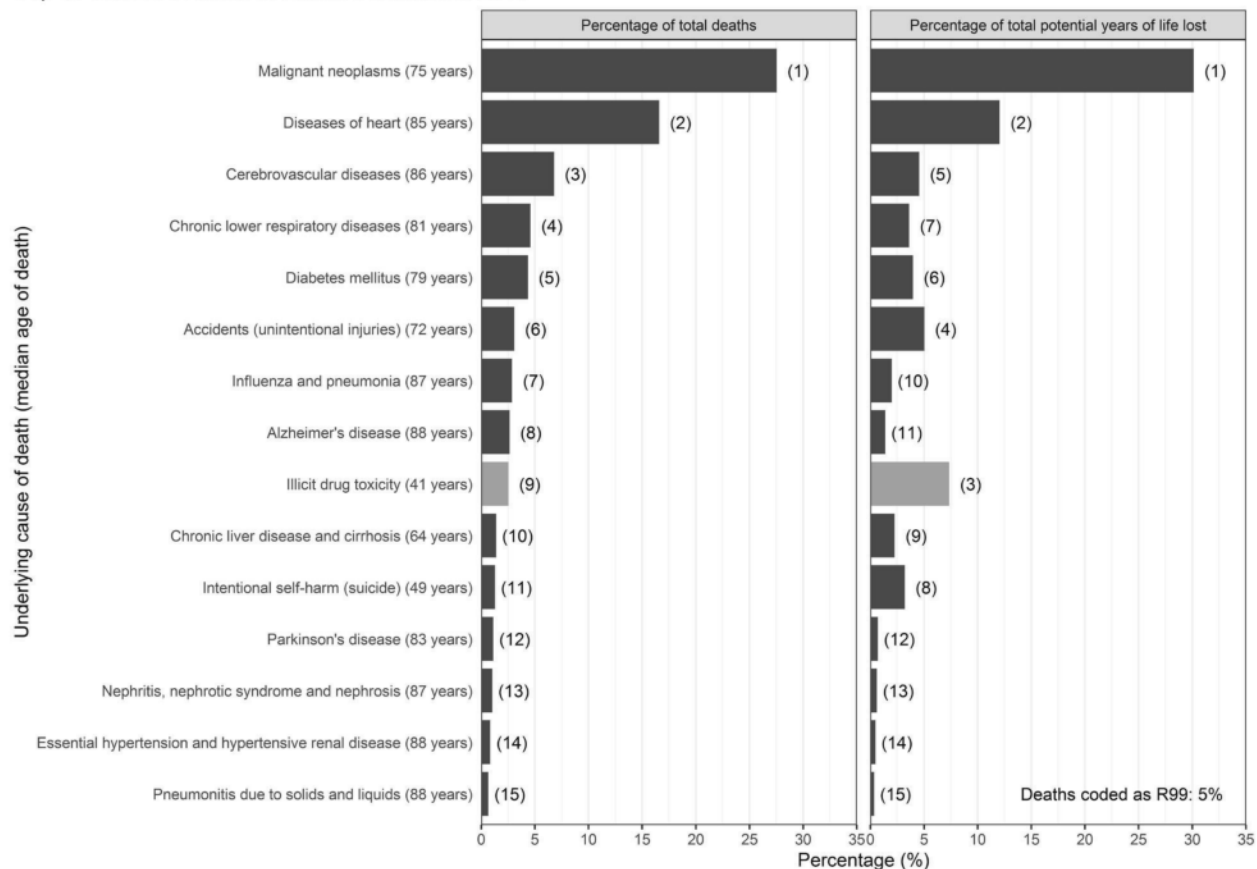
External causes of death (other than illicit drug toxicity) incomplete due to reporting delay.  
 Data sources: 1) BC Vital Statistics; 2) Data on illicit drug toxicity deaths provided to BCCDC by BC Coroners Service and extracted on February 4 2021; 3) Statistics Canada Table 13-10-0114-01 Life expectancy and other elements of the life table, Canada, reference period 2017-2019.

# Top 15 causes of death in British Columbia in 2018



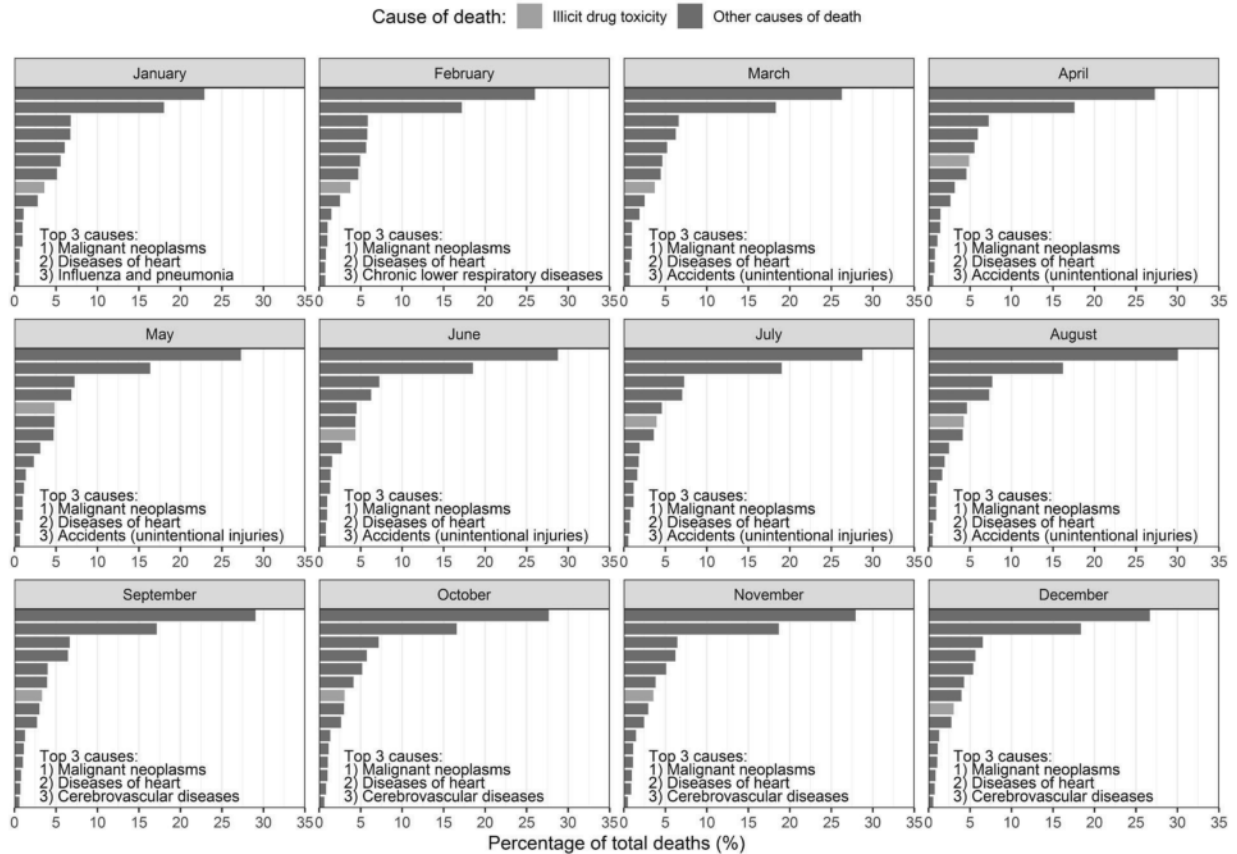
External causes of death (other than illicit drug toxicity) incomplete due to reporting delay.  
Data sources: 1) BC Vital Statistics; 2) Data on illicit drug toxicity deaths provided to BCCDC by BC Coroners Service and extracted on February 4 2021; 3) Statistics Canada Table 13-10-0114-01 Life expectancy and other elements of the life table, Canada, reference period 2017-2019.

# Top 15 causes of death in British Columbia in 2019



External causes of death (other than illicit drug toxicity) incomplete due to reporting delay.  
Data sources: 1) BC Vital Statistics; 2) Data on illicit drug toxicity deaths provided to BCCDC by BC Coroners Service and extracted on February 4 2021; 3) Statistics Canada Table 13-10-0114-01 Life expectancy and other elements of the life table, Canada, reference period 2017-2019.

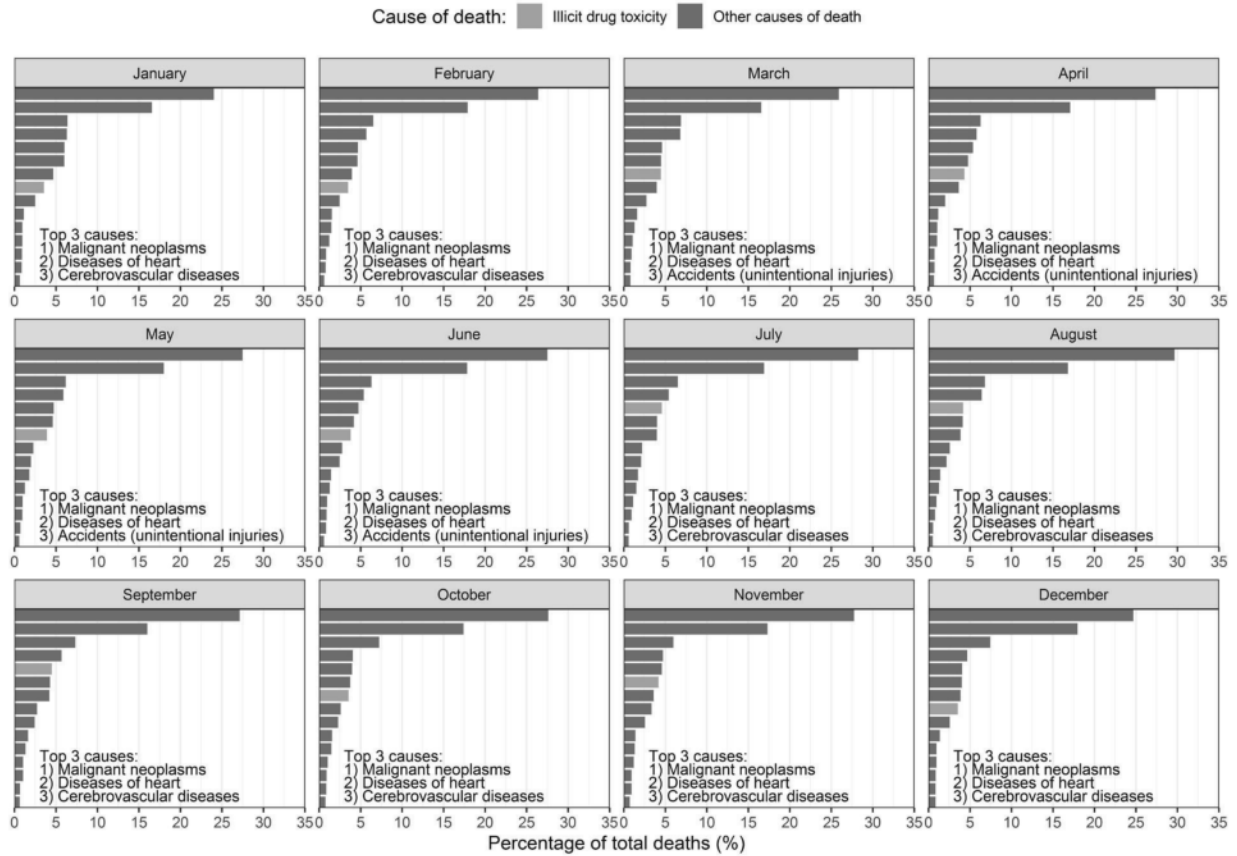
# Top 15 causes of death by month in British Columbia for 2017



External causes of death (other than illicit drug toxicity) incomplete due to reporting delay.

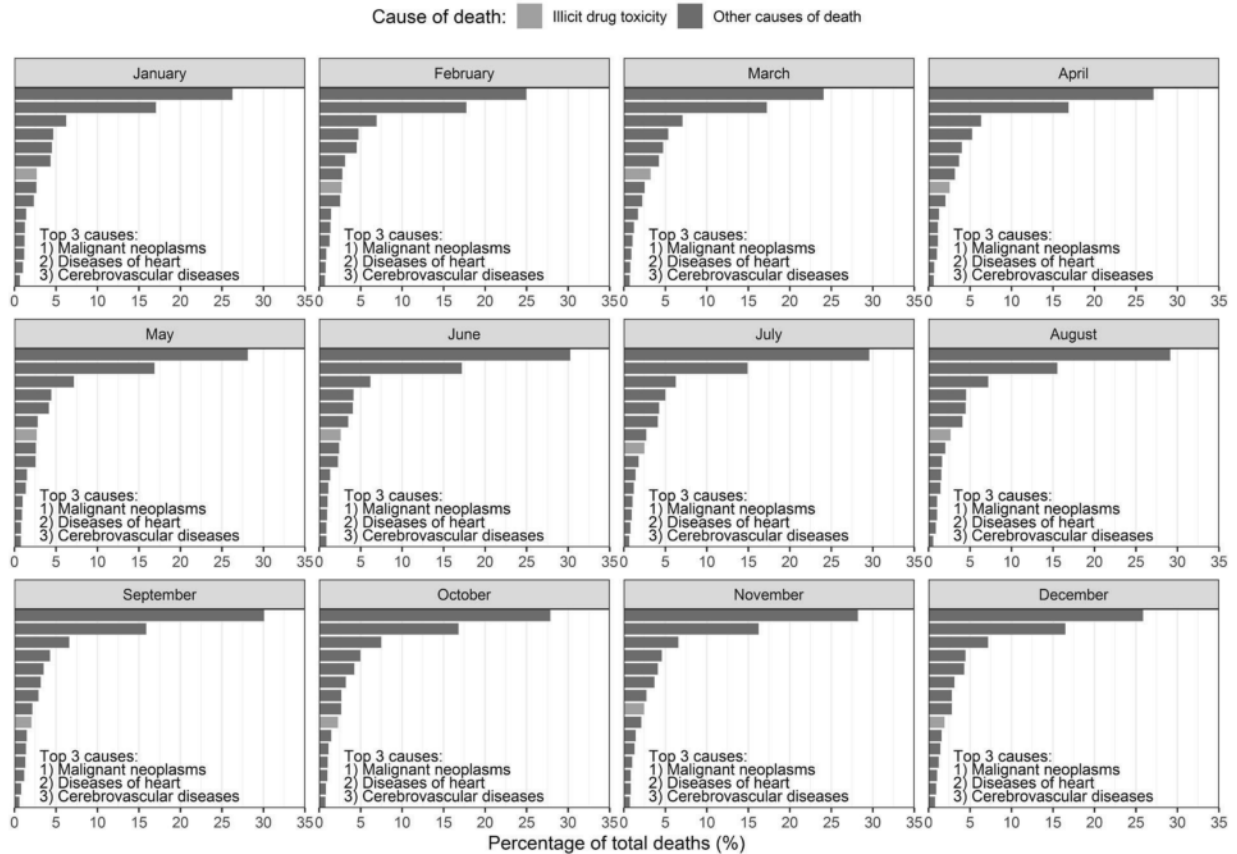
Data sources: 1) BC Vital Statistics; 2) Data on illicit drug toxicity deaths provided to BCCDC by BC Coroners Service and extracted on February 4 2021; 3) Statistics Canada Table 13-10-0114-01 Life expectancy and other elements of the life table, Canada, reference period 2017-2019.

# Top 15 causes of death by month in British Columbia for 2018



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 Data sources: 1) BC Vital Statistics; 2) Data on illicit drug toxicity deaths provided to BCCDC by BC Coroners Service and extracted on February 4 2021; 3) Statistics Canada Table 13-10-0114-01 Life expectancy and other elements of the life table, Canada, reference period 2017-2019.

# Top 15 causes of death by month in British Columbia for 2019

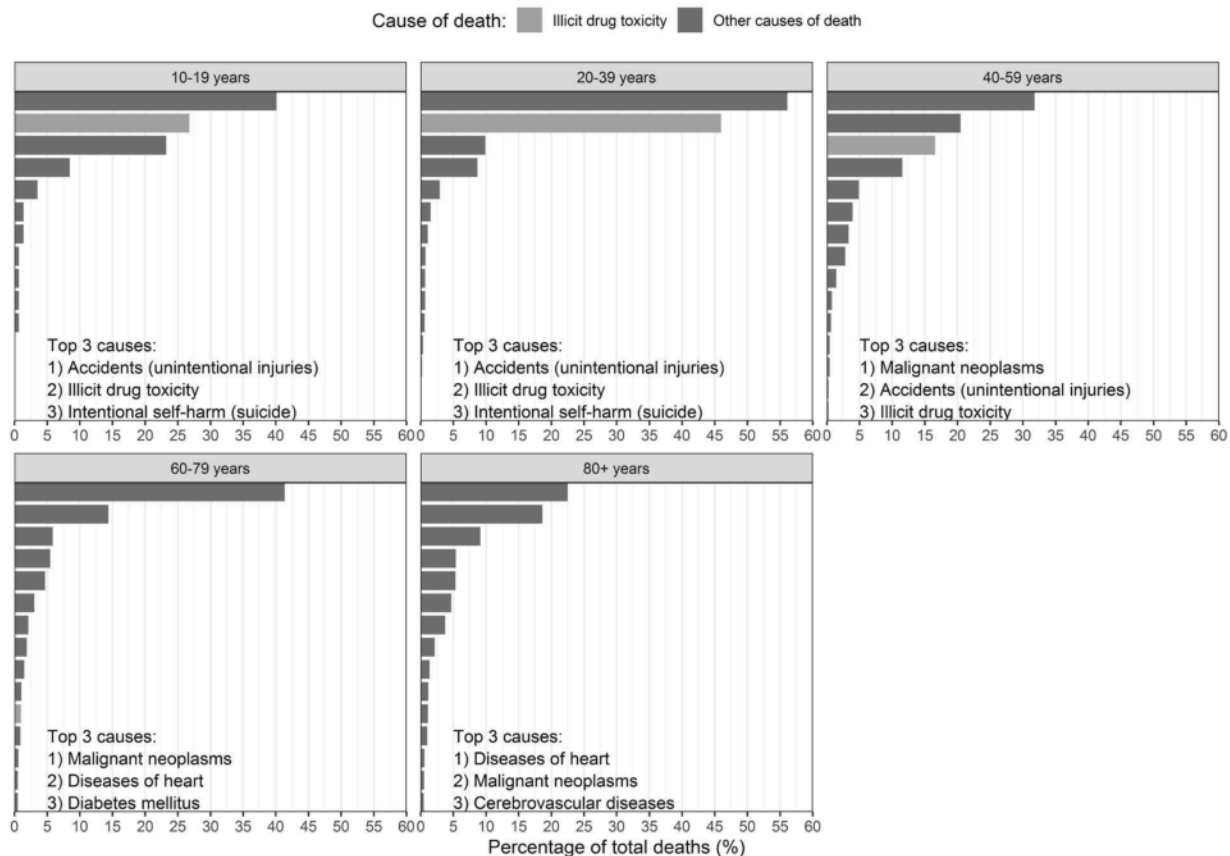


External causes of death (other than illicit drug toxicity) incomplete due to reporting delay.

Data sources: 1) BC Vital Statistics; 2) Data on illicit drug toxicity deaths provided to BCCDC by BC Coroners Service and extracted on February 4 2021; 3) Statistics Canada Table 13-10-0114-01 Life expectancy and other elements of the life table, Canada, reference period 2017-2019.

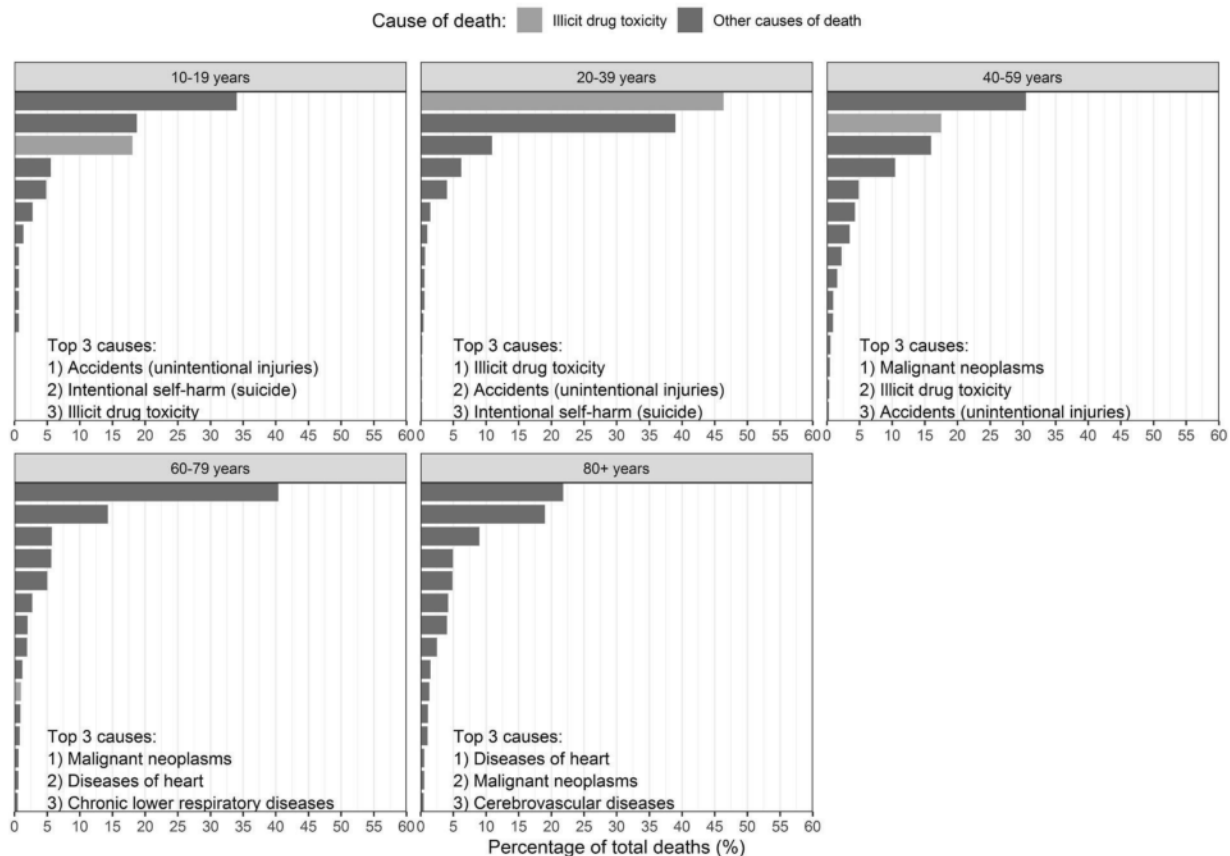


# Top 15 causes of death by age group in British Columbia for 2017



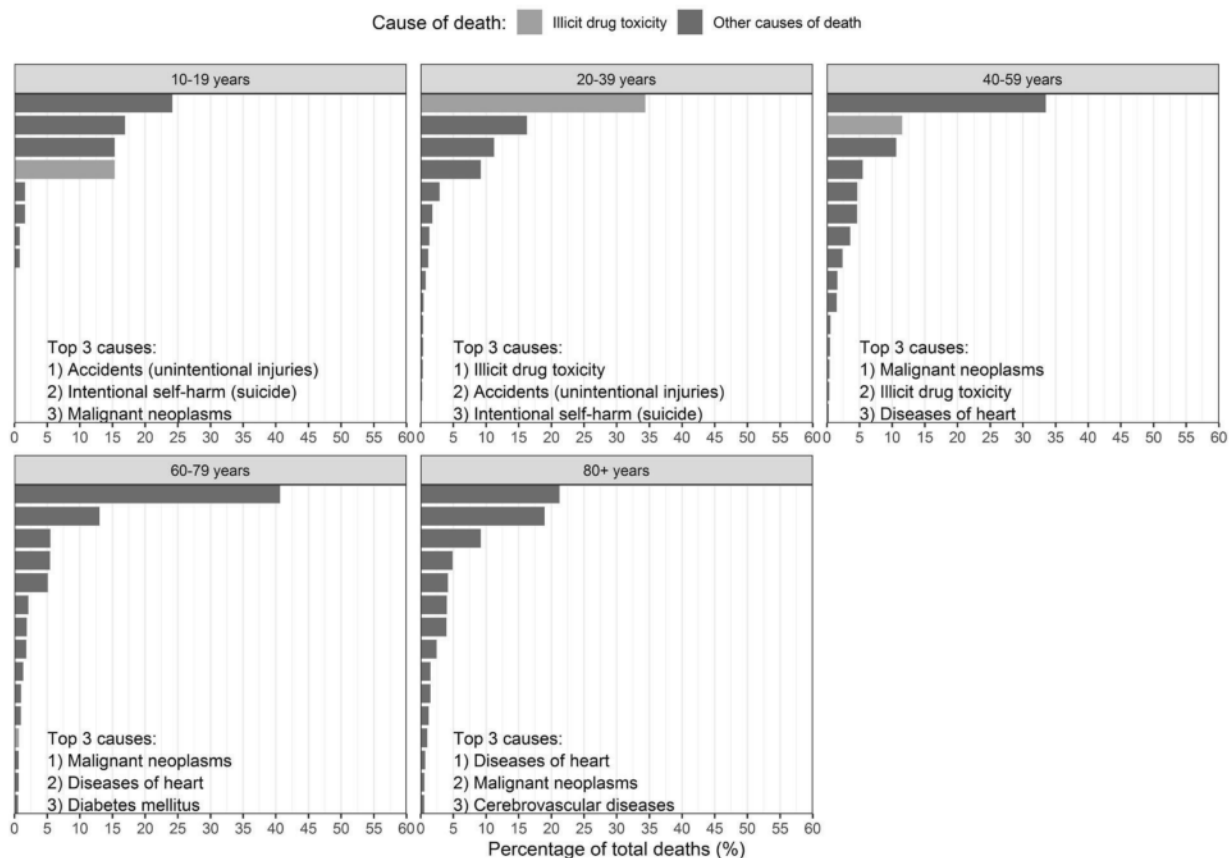
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 Data sources: 1) BC Vital Statistics; 2) Data on illicit drug toxicity deaths provided to BCCDC by BC Coroners Service and extracted on February 4 2021; 3) Statistics Canada Table 13-10-0114-01 Life expectancy and other elements of the life table, Canada, reference period 2017-2019.

# Top 15 causes of death by age group in British Columbia for 2018



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 Data sources: 1) BC Vital Statistics; 2) Data on illicit drug toxicity deaths provided to BCCDC by BC Coroners Service and extracted on February 4 2021; 3) Statistics Canada Table 13-10-0114-01 Life expectancy and other elements of the life table, Canada, reference period 2017-2019.

## Top 15 causes of death by age group in British Columbia for 2019



External causes of death (other than illicit drug toxicity) incomplete due to reporting delay.

Data sources: 1) BC Vital Statistics; 2) Data on illicit drug toxicity deaths provided to BCCDC by BC Coroners Service and extracted on February 4 2021; 3) Statistics Canada Table 13-10-0114-01 Life expectancy and other elements of the life table, Canada, reference period 2017-2019.

## **Kevin & Jonathan Craib's Report on COVID-19 Mortality – December 31, 2020**

**Question #1:** In each province and territory of Canada, what is the current estimated probability a person (from the general population) has died from COVID-19?

**TABLE 1:** This tabular summary shows: (1) Number of reported COVID-19 deaths, (2) estimated probability of COVID-19 related death in the general population, and (3) crude mortality rate for the general population (per million people) for provinces and territories of Canada. (Source: World Health Organization, 12/31/20)

Location	#Deaths	P(death)*	#deaths per million**
Quebec	8165	0.000963	963
Manitoba	661	0.000520	520
Ontario	4499	0.000331	331
Alberta	1046	0.000237	237
British Columbia	893	0.000175	175
Saskatchewan	154	0.000138	138
Nova Scotia	65	0.000069	69
Yukon	1	0.000026	26
New Brunswick	8	0.000011	11
Newfoundland & Labrador	4	0.000007	7
Prince Edward Island	0	0.000000	0
North West Territories	0	0.000000	0
Nunavut	0	0.000000	0

\* Estimated probability of death from Covid-19

\*\*Estimated number of Covid-19 deaths for one million people from the general population in the selected location

Prepared by: Kevin Joseph Patrick Craib, M.Math (Statistics), Ph.D. (Epidemiology), P.Stat (Canada)

Jonathan Edward Joseph Craib, B.A. (Liberal Studies)

Date: December 31, 2020 at 6:00 AM PST North Vancouver, BC, Canada

**Question #2:** How does the current COVID-19 mortality rate in British Columbia (for the general population) compare with other causes of death?

**TABLE 2: Mortality rates (per million people from the general population) for the top 10 causes of death in British Columbia (in 2019). For comparison, crude mortality rates related to illicit drug overdoses and Covid-19 (in 2020) have been included.**

Cause of death	Mortality rate per million population*
Malignant neoplasms (cancer)	1742
Diseases of heart	1088
Cerebrovascular diseases (stroke)	354
<b>Illicit drug overdoses (as of 11/30/20)**</b>	<b>304</b>
Chronic lower respiratory disease	284
Accidents	199
Diabetes mellitus	183
<b>Covid-19 (as of 12/31/20)***</b>	<b>175</b>
Alzheimer's disease	168
Influenza and pneumonia	123
Chronic liver disease and cirrhosis	96
Intentional self harm (suicide)	86

\*Source: Statistics Canada; age-standardized mortality rates (both sexes)

\*\* Source: Province of British Columbia, BC Coroners Service; crude mortality rate

\*\*\* Source: World Health Organization; crude mortality rate

Prepared by: Kevin Joseph Patrick Craib, M.Math (Statistics), Ph.D. (Epidemiology), P.Stat (Canada)  
& Jonathan Edward Joseph Craib, B.A. (Liberal Studies)

Date: December 31, 2020 at 6:00 AM PST North Vancouver, BC, Canada

**Question #3:** If a person is diagnosed with COVID19 (using current case detection and testing methodology), what is the current estimated probability they will die from COVID-19?

**Table 3: Infection Fatality Rate (IFR)**

Age stratified IFR according to CDC (USA) as of September 10, 2020.

0-19 years: P(death) = 0.00003

20-49 years: P(death) = 0.0002

50-69 years: P(death) = 0.005

70+ years: P(death) = 0.054

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Question #4: In Canada, in the USA and other countries, what is the current estimated probability a person (from the general population) has died from COVID-19?

**TABLE 4: This tabular summary shows: (1) Number of reported COVID-19 deaths, (2) estimated probability of COVID-19 related death in the general population, and (3) crude mortality rates for the general population (per million people) for selected locations. (Source: World Health Organization, 12/31/20)**

<b>Location</b>	<b>#Deaths</b>	<b>P(Death)*</b>	<b>#Deaths per million**</b>
World	1,814,649	0.000233	233
Belgium	19,441	0.001674	1,674
Slovenia	2,665	0.001282	1,282
Bosnia and Herzegovina	4,050	0.001238	1,238
Italy	73,604	0.001218	1,218
North Macedonia	2,488	0.001194	1,194
Peru	37,621	0.001133	1,133
Bulgaria	7,515	0.001086	1,086
Spain	50,689	0.001084	1,084
Montenegro	681	0.001084	1,084
Czechia	11,580	0.001080	1,080
UK	72,548	0.001066	1,066
USA	350,778	0.001057	1,057
Hungary	9,537	0.000988	988
France	64,381	0.000985	985
Mexico	124,897	0.000964	964
Armenia	2,823	0.000952	952
Argentina	43,163	0.000951	951
Croatia	3,860	0.000943	943
Panama	3,975	0.000914	914
Brazil	193,940	0.000909	909
Switzerland	7,594	0.000874	874
Sweden	8,727	0.000861	861
Chile	16,499	0.000859	859
Colombia	42,909	0.000839	839
Romania	15,596	0.000813	813
Ecuador	14,023	0.000789	789
Luxembourg	495	0.000784	784
Bolivia	9,149	0.000779	779
Poland	28,554	0.000755	755
Moldova	2,960	0.000735	735
Austria	6,222	0.000689	689
Portugal	6,830	0.000671	671

**Kevin & Jonathan Craib's Report on COVID-19 Mortality – December 31, 2020**

<b>Location</b>	<b>#Deaths</b>	<b>P(Death)*</b>	<b>#Deaths per million**</b>
Netherlands	11,324	0.000660	660
Iran	55,095	0.000652	652
Georgia	2,505	0.000629	629
Lithuania	1,458	0.000539	539
South Africa	28,033	0.000470	470
Greece	4,788	0.000460	460
Ireland	2,226	0.000448	448
Ukraine	18,533	0.000425	425
Costa Rica	2,171	0.000424	424
<b>Canada</b>	<b>15,498</b>	<b>0.000411</b>	<b>411</b>
Albania	1,174	0.000408	408
Germany	33,486	0.000399	399
Slovakia	2,138	0.000392	392
Russia	57,019	0.000391	391
Tunisia	4,620	0.000389	389
Jordan	3,815	0.000372	372
Serbia	3,163	0.000363	363
Israel	3,318	0.000361	361
Latvia	626	0.000334	334
Iraq	12,808	0.000315	315
Honduras	3,130	0.000314	314
Paraguay	2,242	0.000312	312
Oman	1,499	0.000290	290
Guatemala	4,803	0.000266	266
Palestine	1,371	0.000266	266
Azerbaijan	2,609	0.000256	256
Turkey	20,642	0.000243	243
Dominican Republic	2,409	0.000221	221
Kuwait	933	0.000217	217
Denmark	1,256	0.000216	216
Libya	1,478	0.000214	214
Lebanon	1,456	0.000214	214
Kyrgyzstan	1,355	0.000206	206
El Salvador	1,336	0.000205	205
Morocco	7,355	0.000198	198
Saudi Arabia	6,214	0.000177	177
Belarus	1,414	0.000150	150
Kazakhstan	2,262	0.000120	120
India	148,774	0.000107	107
Finland	556	0.000100	100
Philippines	9,244	0.000084	84
Indonesia	22,138	0.000081	81

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<b>Location</b>	<b>#Deaths</b>	<b>P(Death)*</b>	<b>#Deaths per million**</b>
Norway	436	0.000080	80
Egypt	7,576	0.000073	73
UAE	665	0.000067	67
Nepal	1,856	0.000063	63
Algeria	2,751	0.000062	62
Afghanistan	2,198	0.000056	56
Myanmar	2,664	0.000049	49
Bangladesh	7,559	0.000046	46
Pakistan	10,105	0.000045	45
Syria	704	0.000040	40
Venezuela	1,025	0.000036	36
Australia	909	0.000035	35
Sudan	1,468	0.000033	33
Kenya	1,667	0.000031	31
Japan	3,349	0.000027	27
Senegal	402	0.000024	24
Yemen	610	0.000020	20
S. Korea	900	0.000018	18
Uzbekistan	614	0.000018	18
Cameroon	448	0.000017	17
Ethiopia	1,918	0.000016	16
Malaysia	463	0.000014	14
Angola	405	0.000012	12
DRC	591	0.000007	7
Nigeria	1,278	0.000006	6
China	4,634	0.000003	3

\* Estimated probability of death from Covid-19

\*\*Estimated number of Covid-19 deaths for one million people from the general population in the selected location

Prepared by: Kevin Joseph Patrick Craib, M.Math (Statistics), Ph.D. (Epidemiology), P.Stat (Canada)

Jonathan Edward Joseph Craib, B.A. (Liberal Studies)

Date: December 31, 2020 at 6:00 AM PST North Vancouver, BC, Canada



**Question #5:** How does the current risk of COVID-19 mortality in Canada (for the general population) compare with other causes of death?

TABLE 5: Reported number of deaths (per million people from the general population) for the top 10 causes of death in Canada (in 2019). For comparison, the number of deaths related to Covid-19 (in 2020), have been included.

Cause of death	#deaths (2019)*	# deaths per million
Malignant neoplasms	80152	2132
Diseases of heart	52541	1398
<b>Covid-19 (as of 12/31/20)**</b>	<b>15498</b>	<b>411</b>
Accidents	13746	366
Cerebrovascular diseases	13660	363
Chronic lower respiratory disease	12823	341
Influenza and pneumonia	8511	226
Diabetes mellitus	6912	184
Alzheimer's disease	6166	164
Intentional self harm (suicide)	4012	107
Nephritis, nephrotic syndrome, nephrosis	3767	100

\* Source: Statistics Canada

\*\*Source: World Health Organization

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**Question #6:** In each of the states (in the USA) plus Puerto Rico, what is the current estimated probability a person (from the general population) has died from COVID-19?

**TABLE 6:** This tabular summary shows: (1) Number of reported COVID-19 deaths, (2) estimated probability of COVID-19 related death in the general population, and (3) crude mortality rate for the general population (per million people) for states in the USA (plus Puerto Rico). (Source: *Worldometer*, 12/31/20)

Location	#Deaths	P(Death)*	#Deaths per million**
New Jersey	19,109	0.002151	2,151
New York	37,868	0.001947	1,947
Massachusetts	12,338	0.001790	1,790
North Dakota	1,282	0.001682	1,682
Rhode Island	1,777	0.001677	1,677
Connecticut	5,964	0.001673	1,673
South Dakota	1,464	0.001655	1,655
Louisiana	7,448	0.001602	1,602
Mississippi	4,747	0.001595	1,595
Illinois	17,811	0.001406	1,406
Michigan	13,018	0.001304	1,304
Pennsylvania	15,780	0.001233	1,233
Indiana	8,160	0.001212	1,212
Iowa	3,822	0.001211	1,211
Arkansas	3,637	0.001205	1,205
Arizona	8,718	0.001198	1,198
New Mexico	2,436	0.001162	1,162
District Of Columbia	780	0.001105	1,105
Georgia	10,846	0.001022	1,022
South Carolina	5,249	0.001019	1,019
Florida	21,550	0.001003	1,003
Tennessee	6,810	0.000997	997
Nevada	3,066	0.000995	995
Missouri	6,010	0.000979	979
Alabama	4,774	0.000974	974
Maryland	5,848	0.000967	967
Texas	27,898	0.000962	962
Delaware	921	0.000946	946
Minnesota	5,321	0.000944	944
Kansas	2,741	0.000941	941
Montana	950	0.000889	889
Nebraska	1,611	0.000833	833
Wisconsin	4,818	0.000827	827
Colorado	4,750	0.000825	825
Idaho	1,403	0.000785	785

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Location	#Deaths	P(Death)*	#Deaths per million**
Ohio	8,855	0.000758	758
West Virginia	1,318	0.000735	735
Wyoming	405	0.000700	700
California	25,387	0.000643	643
North Carolina	6,729	0.000642	642
Oklahoma	2,453	0.000620	620
Kentucky	2,623	0.000587	587
Virginia	4,984	0.000584	584
New Hampshire	741	0.000545	545
Washington	3,540	0.000465	465
Puerto Rico	1,484	0.000438	438
Utah	1,256	0.000392	392
Oregon	1,468	0.000348	348
Alaska	202	0.000276	276
Maine	334	0.000248	248
Vermont	134	0.000215	215
Hawaii	285	0.000201	201

\* Estimated probability of death from Covid-19

\*\*Estimated number of Covid-19 deaths for one million people from the general population in the selected location

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**FOI HTH-2021-10472**  
**VSA Responsive Records**

Twelve leading causes of death in BC for the years 2019 and 2020.  
Statistics for YTD 2021 are not yet available as medical coding is not yet complete.

2019:

CAUSE	Number	Ranking
Malignant Neoplasms	10,626	1
Diseases of The Heart	6,354	2
Cerebrovascular Diseases	2,605	3
Chronic Lower Respiratory Diseases	1,779	4
Diabetes Mellitus	1,677	5
Accidents	1,159	6
Influenza and Pneumonia	1,112	7
Alzheimer's	1,021	8
Chronic Liver Disease and Cirrhosis	534	9
Suicide	473	10
Parkinson's	434	11
Nephritis, Nephrotic Syndrome, and Nephrosis	400	12
Other Causes	10,202	
Total	38,376	

2020:

CAUSE	Number	Ranking
Malignant Neoplasms	10,687	1
Diseases of The Heart	6,405	2
Cerebrovascular Diseases	2,558	3
Diabetes Mellitus	1,757	4
Chronic Lower Respiratory Diseases	1,601	5
Alzheimer's	1,002	6
Influenza and Pneumonia	928	7
Accidents	686	8
Chronic Liver Disease and Cirrhosis	603	9
Parkinson's	497	10
Nephritis, Nephrotic Syndrome, and Nephrosis	439	11
Essential Hypertension and Hypertensive Renal Disease	414	12
Covid*	901	
Other Causes	12,632	
Total	41,110	

\* The cumulative total for Covid deaths reported to the Ministry of Health is as at December 31, 2020. This data was provided to the Vital Statistics Agency (VSA) for inclusion in this summary by the Ministry's Covid Analysis and Reporting team. Deaths due to Covid are otherwise not separately identified in standard VSA reporting.