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This publication was developed by the Canadian Cancer Statistics Advisory Committee in collaboration with the Canadian Cancer Society, Statistics Canada and the Public Health Agency of Canada with data provided by the provincial and territorial cancer registries.

cancer.ca/statistics

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This publication is available in English and French on the Canadian Cancer Society's website at cancer.ca/statistics. Visit the website for the most up-to-date version of this publication and additional resources, such as individual figures from the chapters and past editions.

The development of this publication over the years has benefited considerably from the comments and suggestions of readers. The Canadian Cancer Statistics Advisory Committee appreciates and welcomes such comments. To offer ideas on how the publication can be improved or to be notified about next year's publications, complete the evaluation form or email stats@cancer.ca.

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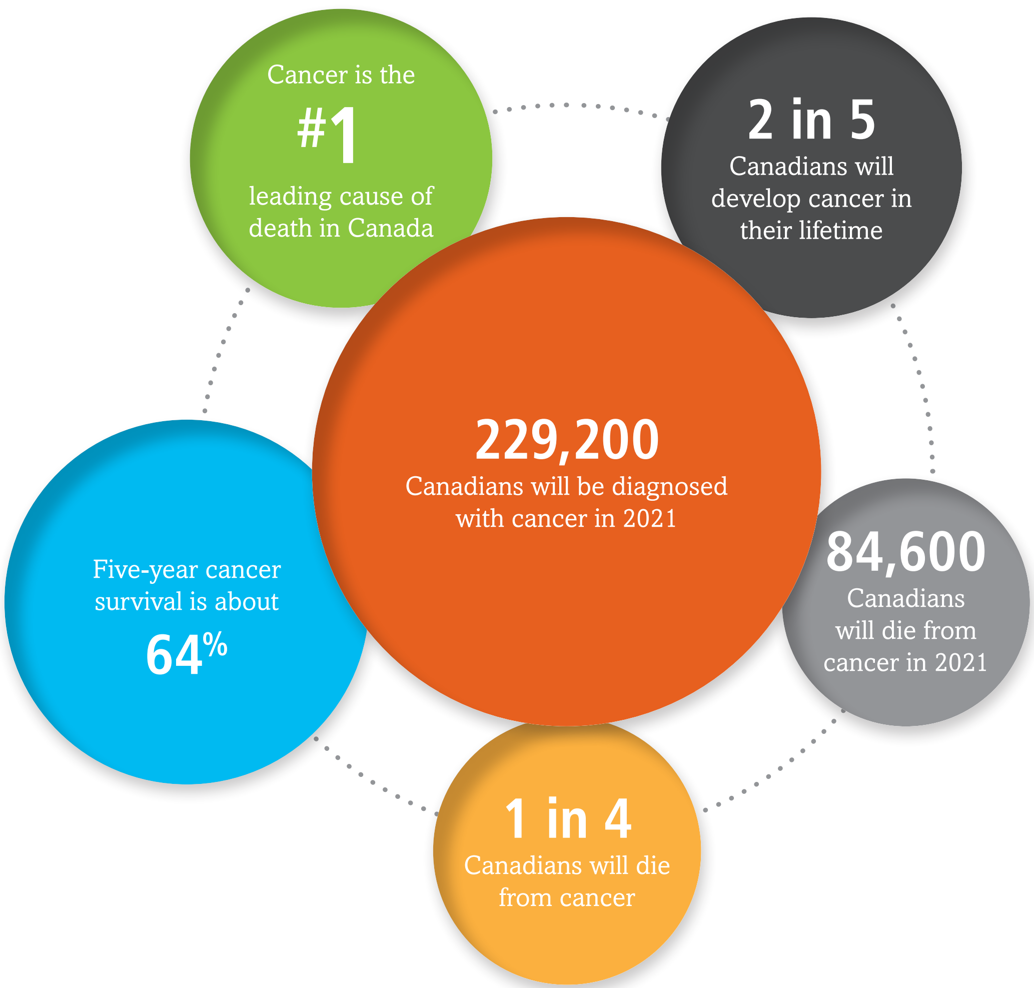
Executive summary

Canadian Cancer Statistics is a publication that provides comprehensive, up-to-date estimates of the impact of cancer in Canada.

It is estimated that about 2 in 5 Canadians will develop cancer in their lifetime, and about 1 in 4 Canadians will die from cancer. In 2021 alone, it is expected that 229,200 Canadians will be diagnosed with cancer and 84,600 will die from the disease. Cancer is by far the leading cause of death among Canadians.

Lung and bronchus (lung), breast, colorectal and prostate cancers account for almost half of all new cancer cases diagnosed. Lung cancer is the leading cause of cancer death, responsible for more cancer deaths among Canadians than the other three major cancer types (colorectal, breast and prostate) combined. Despite this large impact, there has been a substantial drop in the lung cancer death rate in males over the past 35 years, which has contributed to a decline in the death rate in males for all cancers combined. Lung cancer death rates in females have also recently started to decrease. As a result of the progress made with lung and other cancers, cancer death rates have decreased 37% in males and 22% in females since their peak in 1988.

Cancer survival has also increased. In the early 1990s, five-year net survival for all cancers combined was only 55%, but current estimates show that it has reached 64%. Survival varies widely by the type of cancer. Some cancers have very high five-year net survival, including



thyroid cancer and testicular cancer (both 97%). Other cancers have consistently low five-year net survival, such as esophageal cancer (16%) and pancreatic cancer (10%).

Cancer strikes males and females, young and old, and those in different regions across Canada on a decidedly uneven basis. For example:

- Males are more likely to be diagnosed with cancer than females, and females are more likely to survive cancer than males.
- About 90% of cancer diagnoses occur among Canadians who are at least 50 years of age, but its impact at a younger age can be particularly devastating. In 2019, cancer was the leading cause of disease-related death in children under the age of 15 years.[(1)]
- Across Canada, cancer incidence and death rates are generally higher in the east than in the west.

Measures of the cancer impact in Canada are vital for developing and evaluating health policy, helping decision-makers assess the type and amount of health resources needed and informing health research priorities. This information is also essential for informing and evaluating primary and secondary cancer prevention activities and assessing the impact of early detection and cancer treatment on cancer outcomes. Moreover, these statistics can be used to prioritize services to help Canadians and their families who have been affected by cancer and who may need support after their treatment has ended.

The goal in providing cancer incidence and mortality projections was to estimate the true underlying impact of cancer up to 2021. As such, the projections presented in this publication do not account for any changes in diagnosis or cancer control due to the COVID-19 pandemic. The effect of the pandemic on cancer diagnosis and control is an important issue that will need to be explored when data are available.

We hope that our readers think critically about what these numbers mean and how they can be used to reduce cancer incidence, improve survival and develop better overall care for those dealing with cancer in Canada.

Notable new statistics

Compared with the last full Canadian Cancer Statistics publication in 2019, several new patterns have emerged. Notably:

- Thyroid cancer incidence is decreasing, after the rates increased for many years.
- The magnitude of the declining mortality rate for lung cancer is now comparable between sexes for the first time since 1984.
- Death rates for colorectal cancer in both sexes are decreasing, with the rate in females decreasing more rapidly.

Reference

1. Statistics Canada [Internet]. Table 13-10-0394-01. Leading causes of death, total population, by age group. Available at: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310039401 (accessed April 2021).

About this publication

Canadian Cancer Statistics 2021 is the most recent in a series of publications that began in 1987 to describe the impact of cancer in Canada. It was developed through a collaboration between the Canadian Cancer Society, Statistics Canada and the Public Health Agency of Canada, who brought together expertise from across the cancer surveillance and epidemiology community in the form of the Canadian Cancer Statistics Advisory Committee.

Purpose and intended audience

This publication provides the most current summary of key cancer surveillance indicators in Canada. It includes detailed information on incidence, mortality, survival and other measures of the impact of cancer for selected types of cancer in Canada. This information is presented by sex, age group, geographic region and time period.

These statistics are produced using the Canadian Cancer Registry (CCR),[1] one of the highest quality national population-based cancer registry systems in the world,[2] as well as the national Vital Statistics—Death Database (CVSD),[3] a census of all deaths occurring in Canada each year. Such comprehensive and reliable surveillance information allows us to monitor cancer patterns and identify where progress has been made and where there is more to do. It is also important for cancer control planning, healthcare resource allocation and research. Box 1 describes some of the ways in which the specific types of statistics in this publication can be used.

Box 1 How these statistics can be used

Cancer cases (incidence): Useful for determining the amount of diagnosis, treatment and support services needed.

Age-standardized incidence rates (ASIR): Facilitate comparisons across populations and over time; can reflect changes in risk factors and screening and show where progress is being made (or not) in cancer prevention.

Cancer deaths (mortality): Useful for determining the amount of healthcare and support services needed, particularly for those who are at the end of life.

Age-standardized mortality rates (ASMR): Facilitate comparisons across populations and over time; can reflect changes in incidence rates, show where progress is being made in early detection, diagnosis and treatment and indicate where more progress is needed.

Annual percent change (APC): Useful for examining trends in age-standardized incidence and mortality rates over time.

Net survival: Facilitate comparisons across populations and over time; useful for monitoring the effects of early detection and diagnosis and treatment on cancer outcomes.

Notably, this publication is the only source of national estimates of cancer incidence and mortality projected to the current year (2021). While projected estimates must be interpreted with caution (Box 2), they provide a more up-to-date picture of the cancer burden in Canada than would otherwise be available, which is important for planning health services and allocating resources.

This publication is designed to help health professionals, policy-makers and researchers make decisions and identify priorities for action in their respective areas. However, the information contained in this publication is relevant to a much broader audience. As such, the media, educators and members of the public with an interest in cancer may also find this publication valuable.

Box 2 Projecting the cancer burden to 2021

This publication strives to provide the most up-to-date statistics. However, because time is required for reporting, collating, verifying, analyzing and publishing surveillance data, the most recent data available are several years behind the publication year. For this publication, actual cancer incidence data up to 2017 and cancer death data up to 2019 (2018 for projections) were used (except Quebec, where cancer incidence data were available to 2010). These historical data were used to project cancer incidence and cancer deaths to 2021.

Important: Projected estimates are not expected to be exact predictions. They are used to give an indication of what might be expected if the analytic assumptions were to hold true over the projected time frame based on the best available data.

The projections presented here are based on quality historical data and reflect the underlying cancer incidence and mortality trends in the population, not the likely changes in diagnosis patterns due to COVID-19. It is expected that COVID-19 has impacted cancer diagnosis and potentially cancer outcomes in Canada, which might impact actual incidence and mortality data for 2020 and 2021. This is discussed further in Chapter 4.

What is new or noteworthy?

Continuous efforts are made to ensure this publication best serves the needs of the cancer community and is based on the most up-to-date data and most appropriate methodology available. To that end, many updates were made this year. Two are particularly noteworthy:

1. New head and neck category

A head and neck cancer grouping has been added to this 2021 publication. This new grouping includes the combination of oral (oral cavity and pharynx) and laryngeal cancers, which were included as separate cancers in the 2019 publication, as well as the nasal cavity sinuses. The head and neck grouping excludes thyroid, which continues to be reported on separately.

2. Updated incidence, mortality and survival statistics

In the 2019 edition, estimates of cancer mortality were based on data to 2015. Statistics Canada recently released cancer mortality data up to 2019, which has provided the opportunity to examine more recent trends in cancer mortality in Canada. These updated mortality statistics are presented in detail in Chapter 2. The mortality projections to 2021 were based on mortality data to 2018. In addition, incidence and survival data up to 2015 and 2014, respectively, were used in the 2019 edition. These data are now updated to 2017 and are presented in detail in Chapters 1 and 3.

References

1. Statistics Canada [Internet]. Canadian Cancer Registry (CCR). Ottawa, ON: Statistics Canada; 2021. Available at: https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3207 (accessed April 2021).
2. International Agency for Research on Cancer [Internet]. Cancer Registries: Why, what and how? Geneva, Switzerland: Union for International Cancer Control. Available at: https://www.uicc.org/sites/main/files/atoms/files/UICC%20Cancer%20Registries-%20why%20what%20how.pdf (accessed April 2021).
3. Statistics Canada [Internet]. Vital Statistics—Death Database (CVSD). Ottawa, ON; 2021. Available at: http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3233 (accessed April 2021).

How many people get cancer in Canada?

Incidence by sex, age, geography and year

The number and rate of new cases of cancer diagnosed each year (incidence) and over time are important measures of the cancer burden on the Canadian population and healthcare system. This information is essential for ensuring that adequate screening, diagnosis, treatment and support services are available, as well as for directing future cancer prevention, control and research programs.

This chapter examines incidence by sex, age and geographic region, as well as over time, to better understand who is affected by cancer in Canada and what can be done about it.

Key findings

- It is estimated that 43% of Canadians will be diagnosed with cancer in their lifetime.
- 229,200 new cases of cancer are expected to be diagnosed in Canada in 2021. The number of cases expected in males (118,200) is slightly higher than in females (110,900).
- Together, the four most frequently diagnosed cancers (lung, breast, colorectal and prostate cancers) are expected to account for 46% of all cancers diagnosed in 2021.
- Overall, cancer rates have declined -1.5% annually since 2011 for males and -1.2% annually since 2013 for females.
- The number of cancer cases diagnosed each year has been increasing because of the growing and aging population. When the effect of age and population size are removed, the risk of cancer has been decreasing.
- The rate of new cancer cases increases substantially with age. It is expected that 93% of new cancer cases in males and 87% in females will be diagnosed in Canadians 50 years of age and older.
- The rate of melanoma skin cancer is still increasing although this is a largely preventable cancer.
- In general, cancer incidence rates are lower in the western provinces and the territories, and higher in the central and eastern provinces. Newfoundland and Labrador is expected to have the highest rate in Canada followed by Ontario and Nova Scotia.

Probability of developing cancer

The probability of developing a specific type of cancer depends on many factors, including age, sex, risk factors and life expectancy. This probability reflects the average experience of people in Canada and does not take into account individual behaviours and risk factors; therefore, it should not be interpreted as an individual's risk. The numbers presented in this section reflect the likelihood at birth that Canadians will develop cancer at some point during their lifetime.

- About 2 in 5 (43%) of Canadians are expected to be diagnosed with cancer in their lifetime (Figure 1.1).
- The probability of developing cancer remains slightly higher in males (44%) than females (43%).

As shown in Table 1.1, the probability of developing cancer varies by cancer type.

- Canadians are more likely to be diagnosed with lung cancer than any other cancer. An estimated 1 in 15 Canadians (7%) is expected to be diagnosed with lung cancer in their lifetime.
- 1 in 8 males (12%) is expected to be diagnosed with prostate cancer in their lifetime.
- 1 in 8 females (12%) is expected to be diagnosed with breast cancer in their lifetime.
- The lifetime probability of developing breast, prostate, colorectal or lung cancer remains high, but it is lower for other cancers.

FIGURE 1.1 Lifetime probability of developing cancer, Canada (excluding Quebec*), 2017

* Quebec is excluded because cases diagnosed in Quebec from 2011 onward had not been submitted to the Canadian Cancer Registry.
Note: The probability of developing cancer is calculated based on age- and sex-specific cancer incidence and mortality rates for Canada excluding Quebec in 2017. For further details, see *Appendix II: Data sources and methods*. The complete definition of the specific cancers included here can be found in Table A1.
Analysis by: Centre for Surveillance and Applied Research, Public Health Agency of Canada
Data sources: Canadian Cancer Registry and Canadian Vital Statistics Death database at Statistics Canada

Probability

The chance of developing cancer measured over a lifetime. The probability of developing cancer is expressed as a percentage or as a chance (e.g., 20% or 1 in 5 people over a lifetime)

Projected new cancer cases in 2021

The cancer incidence data used for this publication were from 1984 to 2017 (1984 to 2010 for Quebec). These were the most recent data available when the analyses began. Data from 1993 onward were used to project rates and counts to 2021.

An estimated 229,200 new cases of cancer are expected to be diagnosed in Canada in 2021 (Table 1.2).

- Lung cancer is expected to be the most commonly diagnosed cancer in Canada with an estimated 29,600 cases expected in 2021. It is followed by breast cancer (28,000), colorectal cancer (24,800) and prostate cancer (24,000).
- The four most commonly diagnosed cancers are expected to account for about half (46%) of all cancers diagnosed in 2021.

Every hour in 2021, 26 Canadians are expected to be diagnosed with cancer.

Incidence by sex

Cancer affects males and females differently. This may be the result of biological differences, or differences in risk factors or health behaviours. In general, cancer is more commonly diagnosed in males than females (Table 1.2).

- Slightly more males (118,200) than females (110,900) are expected to be diagnosed with cancer in 2021.
- The age-standardized incidence rate (ASIR) in males (556 per 100,000) is expected to be about 15% higher than in females (485 per 100,000).
- The same number (14,800) of lung cancers are expected to be diagnosed in males and females.
- The rate at which cancer is diagnosed is expected to be higher in males than in females for all cancer types except breast and thyroid cancers.

Figure 1.2 shows the expected distribution of cancer cases in males and females in 2021.

- In males, prostate cancer is expected to be the most commonly diagnosed cancer, accounting for about 1 in 5 (20%) of new cases. It is followed by lung cancer (13%), colorectal cancer (12%), bladder cancer (8%) and non-Hodgkin lymphoma (5%).
- In females, breast cancer is expected to be the most commonly diagnosed cancer, accounting for 1 in 4 (25%) of new cases. It is followed by lung cancer (13%), colorectal cancer (10%), uterine cancer (7%) and non-Hodgkin lymphoma (5%).
- The four most commonly diagnosed cancers are expected to account for 46% of all cancers in 2021, which is less than in the previous report, *Canadian Cancer Statistics 2019* (48%).

FIGURE 1.2 Percent distribution of projected new cancer cases, by sex, Canada,* 2021

Males 118,200 New cases		Females 110,900 New cases	
Prostate	20.3%	Breast	25.0%
Lung and bronchus	12.5%	Lung and bronchus	13.3%
Colorectal	11.6%	Colorectal	10.0%
Bladder	8.0%	Uterus (body, NOS)	7.2%
Non-Hodgkin lymphoma	5.2%	Non-Hodgkin lymphoma	4.5%
Head and neck	4.6%	Thyroid	4.4%
Kidney and renal pelvis	4.4%	Melanoma	3.6%
Melanoma	4.0%	Bladder	2.7%
Leukemia	3.4%	Pancreas	2.7%
Pancreas	3.1%	Ovary	2.7%
Stomach	2.2%	Leukemia	2.4%
Liver	2.2%	Kidney and renal pelvis	2.3%
Multiple myeloma	1.9%	Head and neck	1.8%
Esophagus	1.6%	Multiple myeloma	1.4%
Brain/CNS	1.5%	Cervix	1.3%
Thyroid	1.5%	Stomach	1.3%
Testis	1.0%	Brain/CNS	1.2%
Hodgkin lymphoma	0.5%	Liver	0.7%
Breast	0.2%	Esophagus	0.5%
All other cancers	10.3%	Hodgkin lymphoma	0.4%
		All other cancers	10.5%

CNS=central nervous system, NOS=not otherwise specified

* Quebec is included in the cases because of their importance in determining the national total projected number. `

Note: The complete definition of the specific cancers included here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Cancer Registry database at Statistics Canada

Incidence

The number of new cancer cases diagnosed in a given population during a specific period of time, often a year.

Age-standardized incidence rate (ASIR)

The number of new cases of cancer per 100,000 people, standardized to the age structure of the 2011 Canadian standard population. In this publication, ASIR is also referred to as “incidence rate.”

Projected incidence

Actual cancer incidence data were available to 2017 for all provinces and territories except Quebec, for which data were available to 2010. Data from 1993 onward were used to project cancer incidence to 2021.

The most commonly diagnosed cancer in males is prostate cancer and in females is breast cancer.

Incidence by age

Age is the most important risk factor for cancer. Figure 1.3 shows the dramatic increase in cancer rates by age.

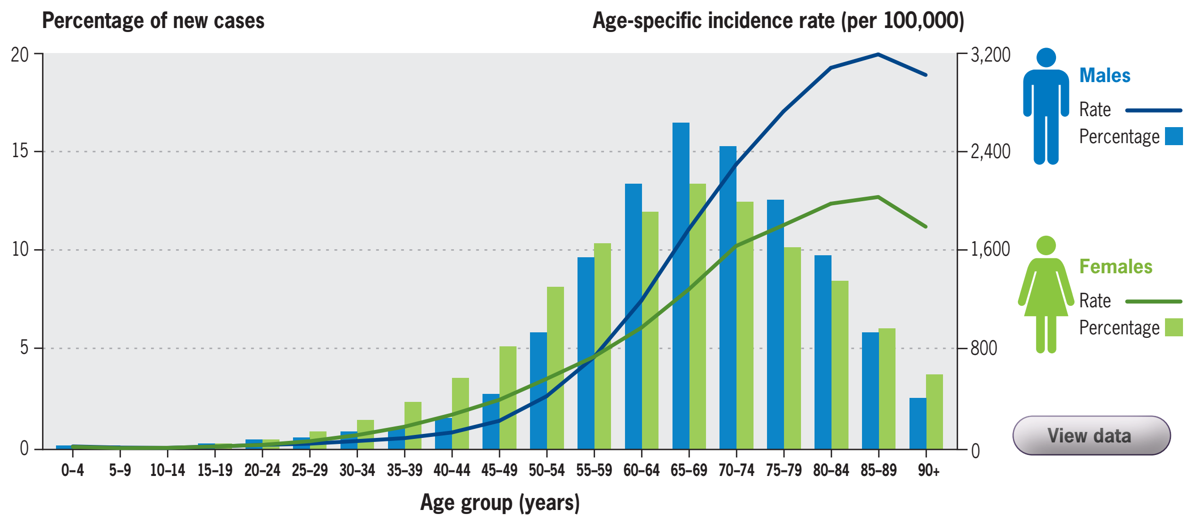
- Cancer rates peak in males and females aged 85 to 89 years.
- For both males and females, the highest number of new cancers is diagnosed between the ages of 65 and 69 years.
- Between the ages of 25 and 59 years, rates of cancer are higher in females than males. In all other age groups, rates are higher in males.

Table 1.3 shows the projected number of cases by age group in 2021.

- 9 in 10 cancers are expected to be diagnosed in Canadians aged 50 years and older.
- Of all cancers diagnosed, a projected 4,050 (almost 2%) will be diagnosed in children and young adults (0 to 29 years) and 143,900 (63%) will be diagnosed in seniors (65 years and older).
- Almost all lung and prostate cancers (98% and 99%, respectively) are expected to occur in people 50 years of age or older.
- Over half (56%) of colorectal cancer cases are expected to occur in Canadians who fall within the age covered by the screening guidelines (50 to 74 years).[1] It is expected that 8% of colorectal cancer cases will be diagnosed in people younger than 50 years of age.
- It is expected that 38% of breast cancer cases will be diagnosed in females aged 30 to 59 years, which helps explain why overall cancer rates are higher in females than males in that age group.

The distribution of cancer type varies by age. In general, embryonal and hematopoietic cancers are more common in children, while epithelial tumours are more common in adults. Cancers found in adolescents and young adults are a mix of childhood and adult tumours.

FIGURE 1.3 Percentage of new cases and age-specific incidence rates for all cancers, by age group and sex, Canada (excluding Quebec*), 2015–2017



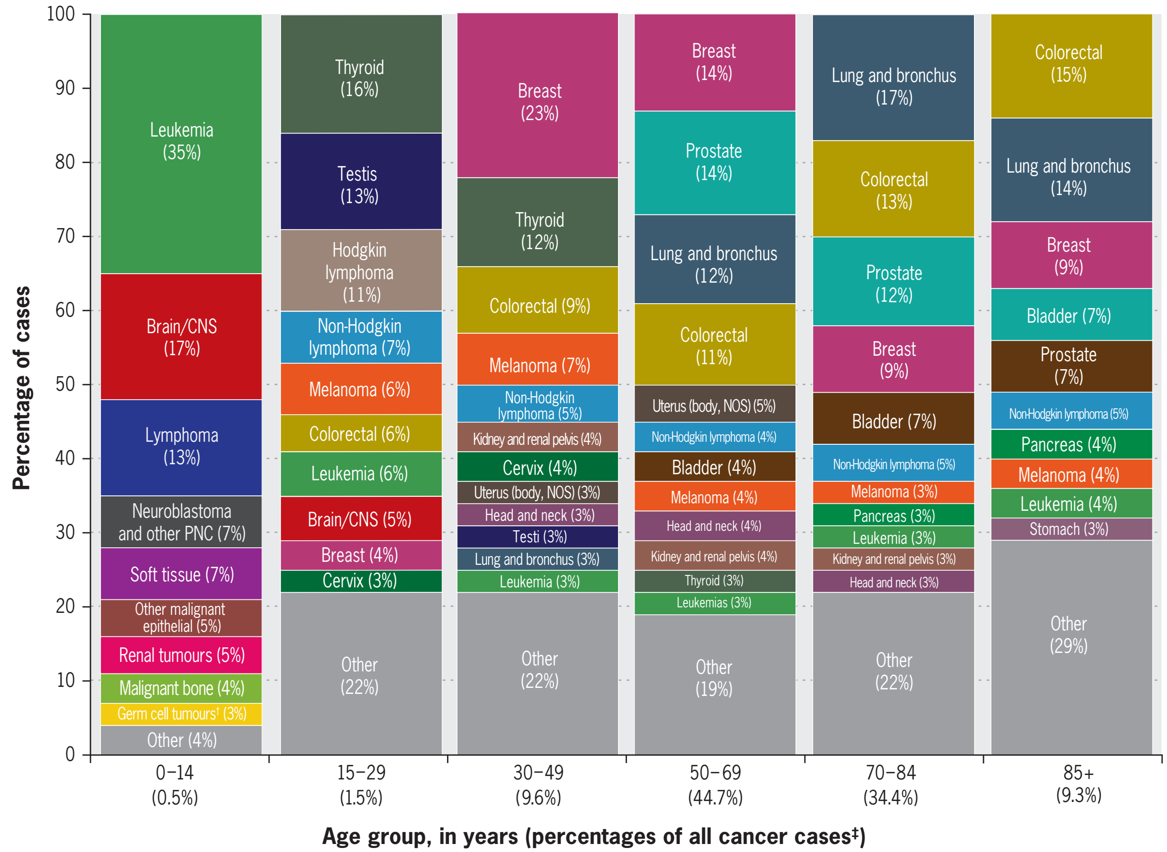
* Quebec is excluded because cases diagnosed in Quebec from 2011 onward had not been submitted to the Canadian Cancer Registry.
Analysis by: Centre for Surveillance and Applied Research, Public Health Agency of Canada
Data source: Canadian Cancer Registry database at Statistics Canada

The most commonly diagnosed cancers in each age group are shown in Figure 1.4:

- In children aged 0 to 14 years, the most commonly diagnosed cancers were leukemia (35%), followed by central nervous system cancers (17%), lymphoma (13%), neuroblastoma and other peripheral nervous cell tumours (7%) and soft tissue sarcoma (7%).
- Among youth and young adults (aged 15 to 29 years), the most commonly diagnosed cancers were thyroid (16%), testicular (13%), Hodgkin lymphoma (11%), non-Hodgkin lymphoma (7%), melanoma (6%), colorectal (6%) and leukemia (6%).
- In Canadians aged 30 to 49 years, the most commonly diagnosed cancers were breast (23%), thyroid (12%), colorectal (9%) and melanoma (7%).
- Between the ages of 50 and 84 years, lung, breast, colorectal and prostate cancers were the most commonly diagnosed cancers. In those aged 85 years and older, bladder cancer ties with prostate cancer as the fourth most commonly diagnosed cancers, after colorectal, lung and breast.

The most commonly diagnosed types of cancers vary between age groups.

FIGURE 1.4 Distribution of new cancer cases for selected cancers, by age group, Canada (excluding Quebec*), 2013–2017



CNS=central nervous system; PNC=peripheral nervous cell tumours; NOS=not otherwise specified

* Quebec is excluded because cases diagnosed in Quebec from 2011 onward had not been submitted to the Canadian Cancer Registry.

† Also includes trophoblastic tumours and neoplasms of gonads.

‡ The relative percentage is calculated based on the total number of cancer cases over five years (2013–2017) for each age group. Cases aged 0–14 years not mapping to a main childhood cancer diagnostic group were excluded.

Note: Cancers diagnosed in children (aged 0–14 years) were classified according to the Surveillance, Epidemiology and End Results Program (SEER) update to the International Classification of Childhood Cancer, Third Edition (ICCC-3).

Cancers diagnosed in older individuals were classified according to the International Classification of Diseases for Oncology, Third Edition (ICD-O-3). For further details, see *Appendix II: Data sources and methods*.The complete definition of the specific cancers included here can be found in Table A1.

Analysis by: Centre for Surveillance and Applied Research, Public Health Agency of Canada; Centre for Population Health Data, Statistics Canada
Data source: Canadian Cancer Registry database at Statistics Canada

Incidence by geographic region

Figure 1.5 shows the expected distribution of cancer across Canada in 2021. Estimates for Quebec were not included because a different projection approach was used for Quebec, meaning those rates are not comparable to the others.

- The number of expected cancer cases in each province and territory is largely a function of the expected population size. While the number of cases is important for healthcare planning within a region, age-standardized rates should be used when comparing across jurisdictions and populations.
- In general, it is expected that cancer incidence rates for 2021 will be highest in eastern and central Canada and lowest in western Canada and the territories. Nova Scotia is expected to have the highest ASIR in males (598.9 per 100,000) and Newfoundland and Labrador the highest rate for females (542.9 per 100,000).
- For both sexes combined, Newfoundland and Labrador is expected to have the highest ASIR in 2021, closely followed by Ontario and Nova Scotia.

Tables 1.4 and 1.5 show the projected number of new cases and projected ASIR by cancer type for each province and territory.

- Among males and females, the highest rates of colorectal cancer are expected in Newfoundland and Labrador (105.0 per 100,000 and 80.3 per 100,000, respectively), while the highest rates of lung cancer are expected in New Brunswick for males (90.6 per 100,000) and Nova Scotia for females (74.9 per 100,000).
- The rates of prostate cancer across the country are expected to range from a low of 101.7 per 100,000 in Manitoba to a high of 127.8 per 100,000 in Prince Edward Island.
- Rates of breast cancer in females are expected to be lowest in Manitoba (113.9 per 100,000) and Prince Edward Island (114.0 per 100,000) and highest in Newfoundland and Labrador (136.6 per 100,000).

Differences in cancer rates between provinces and territories could be the result of different risk factors (such as smoking and obesity), as well as differences in diagnostic practices and data

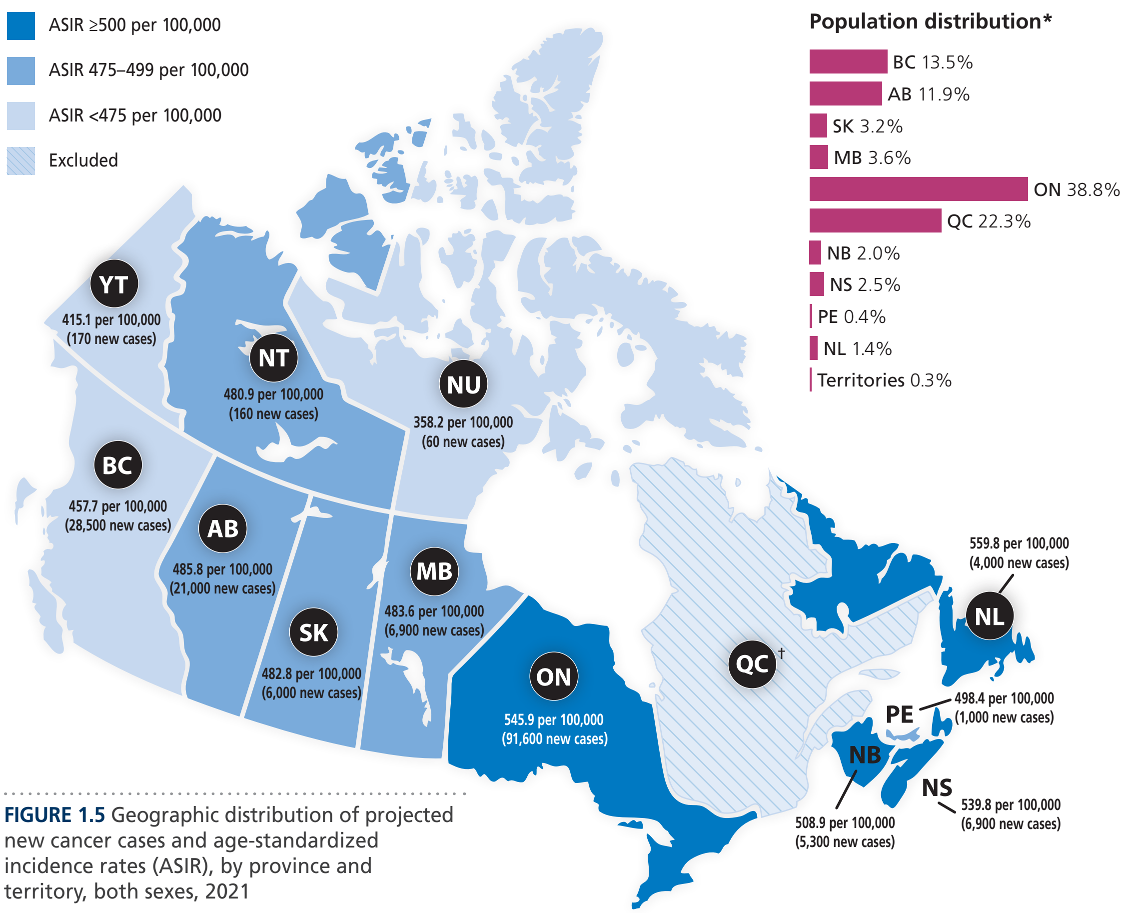


FIGURE 1.5 Geographic distribution of projected new cancer cases and age-standardized incidence rates (ASIR), by province and territory, both sexes, 2021

* Based on projected estimates of population size in 2021.

† Quebec is excluded because a different projection method was used for Quebec than the other regions, meaning the estimates are not comparable. For further details, see *Appendix II: Data source and methods*.

Note: Rates are age-standardized to the 2011 Canadian standard population.

Analysis by: Centre for Population Health Data, Statistics Canada

Data sources: Canadian Cancer Registry database and Population projections for Canada, Provinces and Territories at Statistics Canada collection. For example, the dramatic variation in prostate cancer incidence across the country is likely largely due to differences in the use of prostate-specific antigen (PSA) testing.

Importantly, these estimates do not include a measure of precision, such as confidence intervals or p-values, so we cannot determine whether the differences reported are statistically significant. Also, estimates from less populous provinces and the territories must be interpreted with caution as they can vary considerably from year to year.

Incidence over time

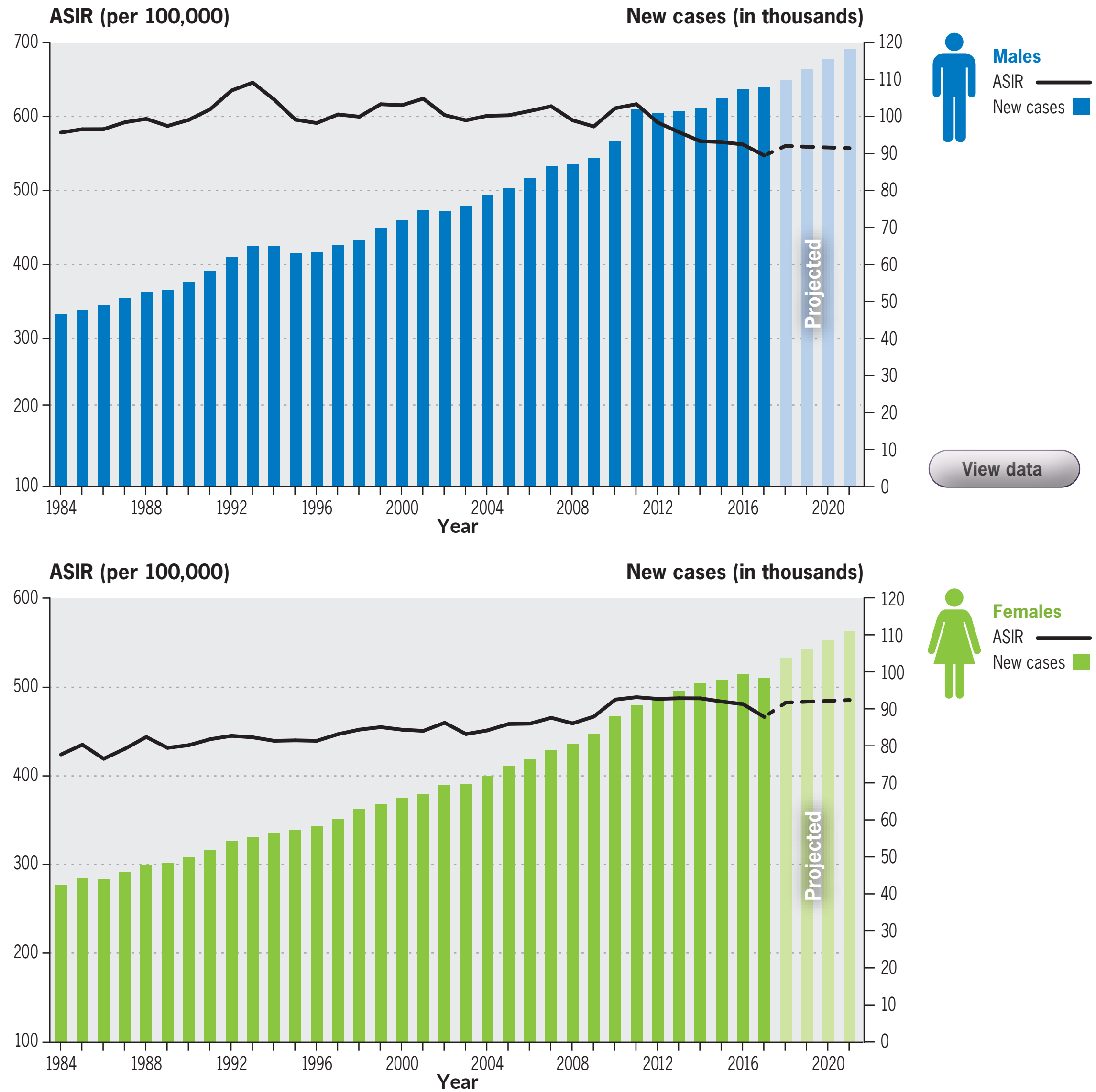
Monitoring trends in incidence over time can help identify emerging trends, where progress has been made and where more needs to be done.

Figure 1.6 shows the counts and rates for all cancers combined, by sex.

- In 1984, the age-standardized incidence rate (ASIR) for all cancers combined in males was 577.4 per 100,000 and is projected to be 556.3 per 100,000 in 2021 (-3.6% decrease). For females, it was 423.6 in 1984 and is projected to be 484.9 per 100,000 in 2021, which is an increase of 12.5%.
- The number of new cases diagnosed each year rose steadily, from 46,700 in 1984 to a projected 118,200 in males in 2021 (an increase of 153%), and from 42,500 to a projected 110,900 in females (an increase of 161%). The steady increase in the number of new cases diagnosed each year is primarily due to the growing and aging Canadian population.[2,3]

* Quebec is included in the cases because of their importance in determining the national total projected number. Quebec is excluded from the rates because a different projection method was used for this province than for other regions.

FIGURE 1.6 New cases and age-standardized incidence rates (ASIR) for all cancers, Canada,* 1984–2021



Note: Rates are age-standardized to the 2011 Canadian standard population. Actual data were available to 2017 for all provinces and territories except Quebec, for which actual data were available to 2010, and projected thereafter.
Analysis by: Centre for Population Health Data, Statistics Canada
Data source: Canadian Cancer Registry database at Statistics Canada

Annual percent change (APC)

The estimated change in the age-standardized incidence rate per year over a defined period of time in which there is no significant change in trend (i.e., no changepoint). It is reported as a percentage.

Reference year

The year corresponding to the first year of the APC segment.

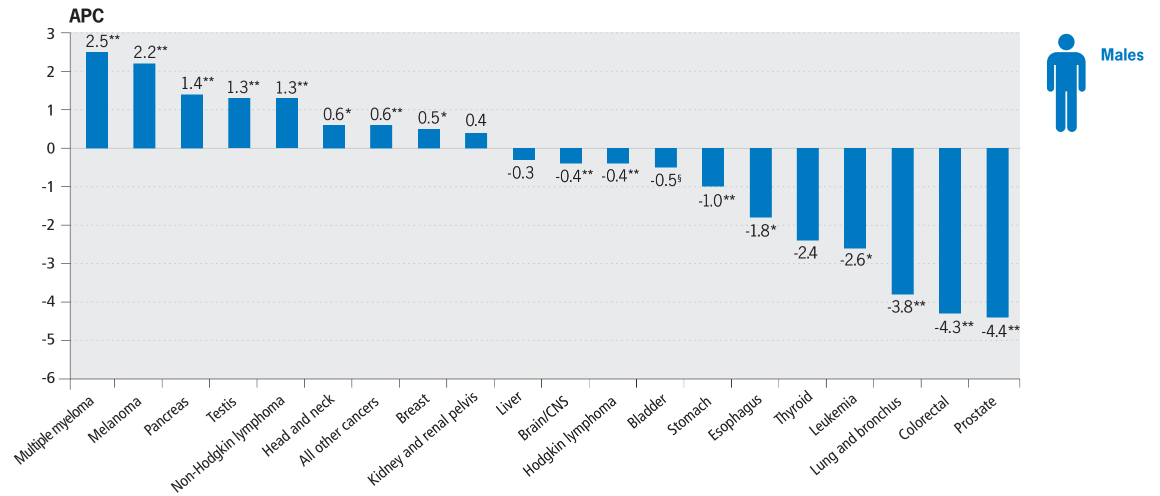
Statistical significance

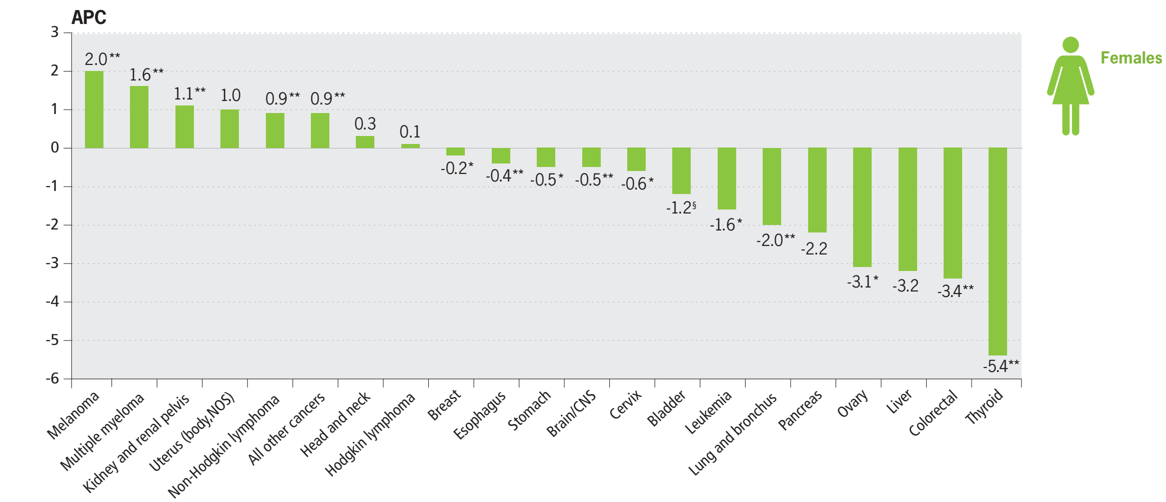
Refers to a result that is unlikely due to chance, assuming there were no other sources of bias, given a predetermined threshold (e.g., fewer than 1 out of 20 times, which is expressed as p<0.05).

Confidence limits (CL)

Upper and lower values of a range (confidence interval) that provide an indication of the precision of an estimate. Confidence intervals are usually 95%. This means that upon repeated sampling for a study, and assuming there were no other sources of bias, 95% of the resulting confidence intervals would contain the true value of the statistic being estimated.

FIGURE 1.7 Most recent annual percent change (APC)† in age-standardized incidence rates (ASIR), by sex, Canada (excluding Quebec‡), 1984–2017





CNS=central nervous system; NOS=not otherwise specified

* APC differs significantly from 0, p<0.05

** APC differs significantly from 0, p<0.001

† The APC was calculated using the Joinpoint Regression Program and rates age-standardized to the 2011 Canadian standard population. If one or more significant changes in the trend of rates was detected, the APC reflects the trend from the most recent significant change (reference year) to 2017. Otherwise, the APC reflects the trend in rates over the entire period (1984–2017). For further details, see *Appendix II: Data sources and methods*.

‡ Quebec is excluded because cases diagnosed in Quebec from 2011 onward had not been submitted to the Canadian Cancer Registry.

§ The trend analysis for bladder cancer was performed using the Jump Model of the JoinPoint Regression Program to account for the artificial change in cancer counts introduced in 2010 when Ontario started to include *in situ* carcinomas of the bladder in their data collection. For further details, see *Appendix II: Data sources and methods*.

Note: The reference year for each cancer is in Table 1.7. The range of scales differs widely between the figures. The complete definition of the specific cancers included here can be found in Table A1.

Analysis by: Centre for Surveillance and Applied Research, Public Health Agency of Canada

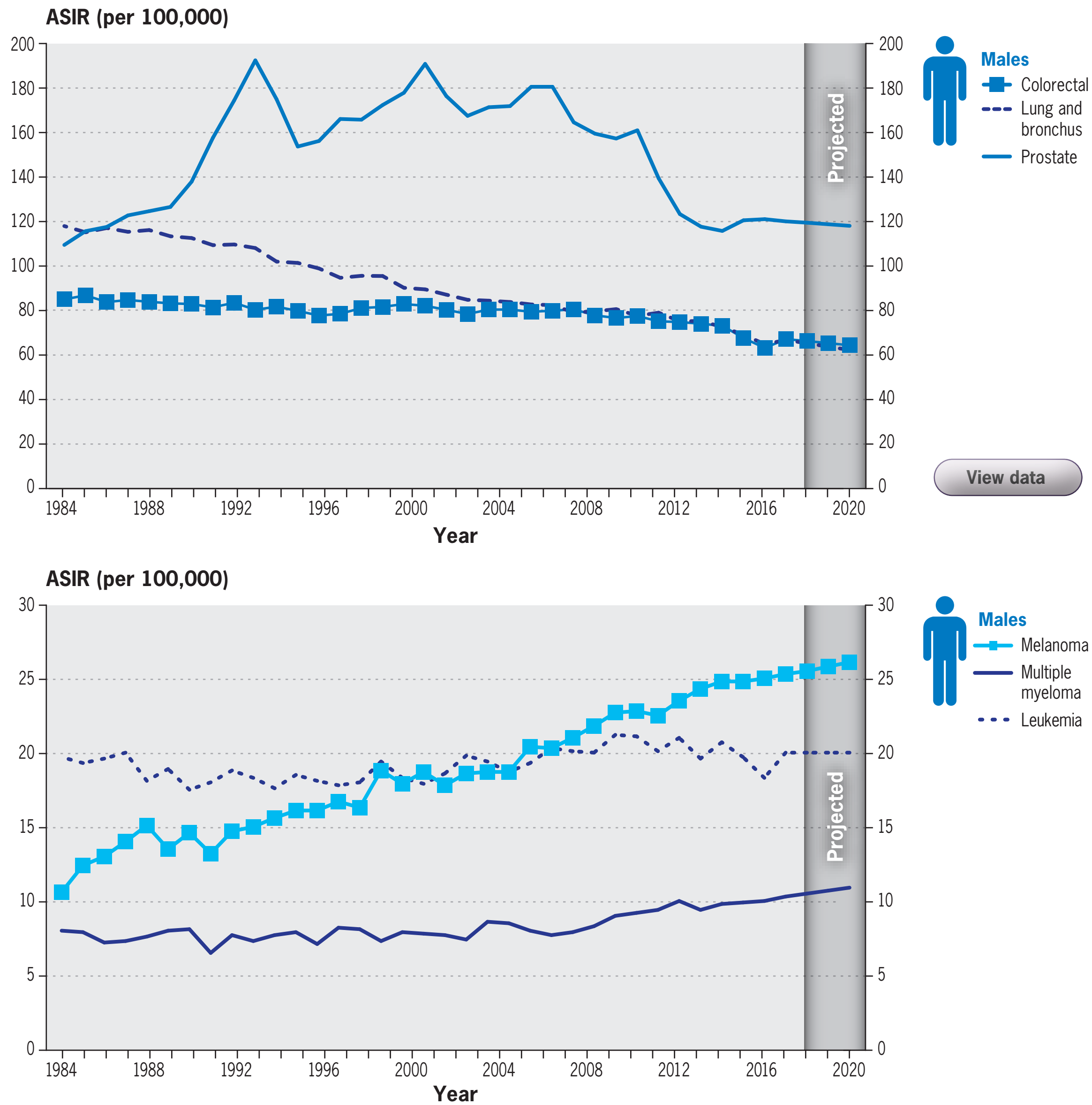
Data sources: Canadian Cancer Registry and National Cancer Incidence Reporting System databases at Statistics Canada

Recent trends

Table 1.6 provides details on trends between 1984 and 2017 for each cancer, by sex, as measured by annual percent change (APC).[4] Table 1.7 draws out the most recent trends for each cancer. These recent trends are depicted in Figure 1.7.

- In males, the most recent largest decreases were for prostate (-4.4% per year), colorectal (-4.3% per year) and lung (-3.8% per year) cancers.
- In females, the largest significant decreases were for thyroid (-5.4% per year), colorectal (-3.4% per year) and ovarian (-3.1% per year).
- The biggest increases in males were for multiple myeloma (2.5% per year) and melanoma (2.2% per year). In females, melanoma (2.0% per year) and multiple myeloma (1.6% per year) increased the most.
- Compared to the results presented in Canadian Cancer Statistics 2019,[5] prostate cancer shows a slower decline and colorectal cancer shows a more rapid decline in both males and females. Trends in thyroid cancer for females and leukemia for both sexes are now decreasing.
- Between 1984 and 2013, the rate of thyroid cancer in both sexes was steeply rising. However, there has been an annual decline of -4.7% since then.

FIGURE 1.8 Age-standardized incidence rates (ASIR) for selected* cancers, males, Canada (excluding Quebec†), 1984–2021



Analysis by: Centre for Population Health Data, Statistics Canada

Data sources: Canadian Cancer Registry and National Cancer Incidence Reporting System databases at Statistics Canada

* Three most frequently diagnosed cancers among males and cancers with a statistically significant change in incidence rate of at least 2% per year, as measured by the most recent annual percent change (see Table 1.7).

† Quebec is excluded because cases diagnosed in Quebec from 2011 onward had not been submitted to the Canadian Cancer Registry.

Note: Rates are age-standardized to the 2011 Canadian standard population. Actual incidence data were available to 2017 and projected thereafter. The range of scales differs widely between the figures. The complete definition of the specific cancers included here can be found in Table A1.

- Leukemia is now significantly declining for both sexes.

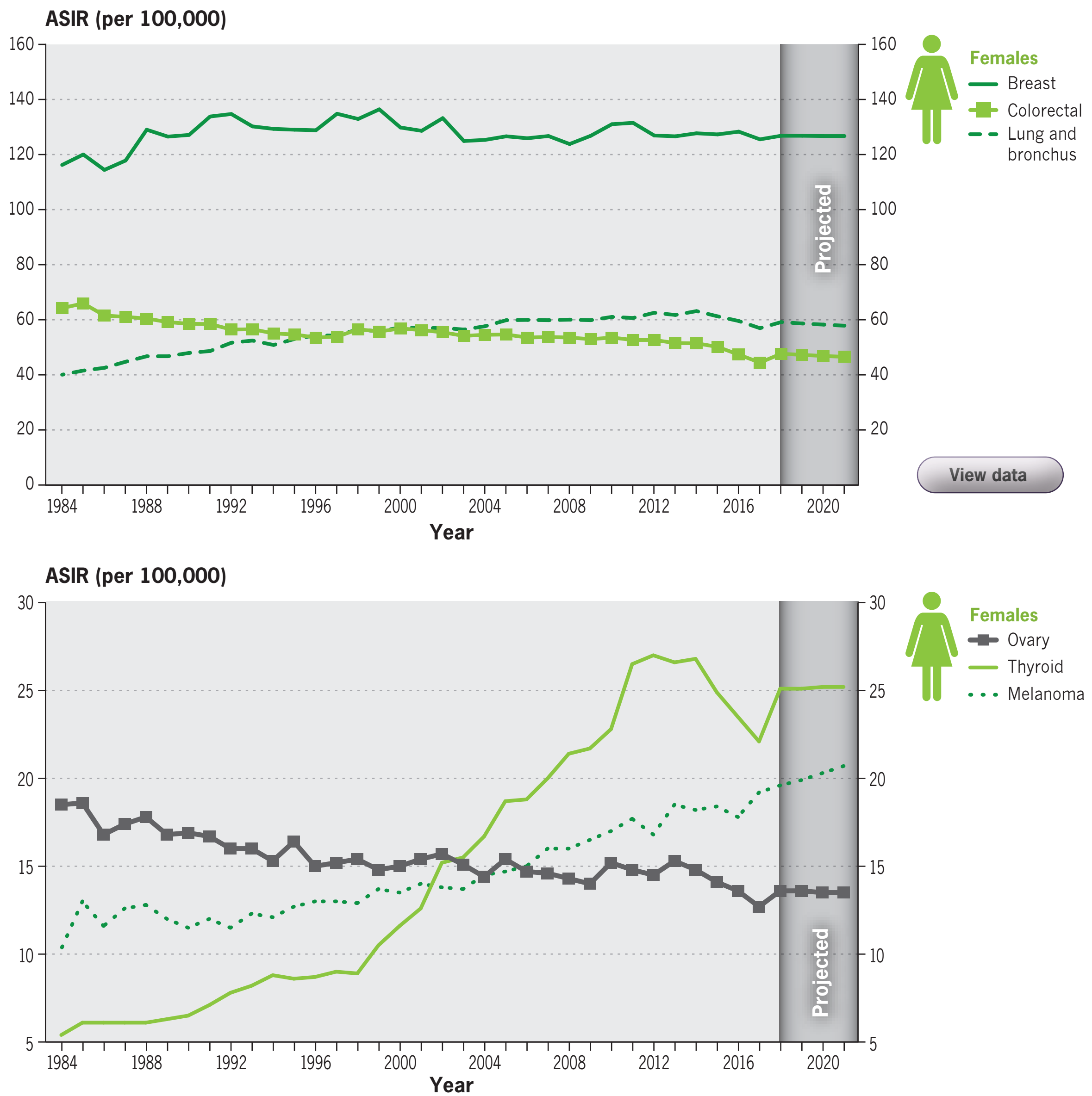
Long-term trends

Longer-term trends provide additional context for understanding the achievements and challenges in reducing cancer incidence. Table 1.6 shows trends in incidence rates between 1984 and 2017 by cancer type.

- The trend for all cancers combined in males increased slowly from 1984 to 1992 (0.9% per year), stabilized between 1992 and 2011 (-0.1% per year) and decreased after 2011 (-1.5% per year).
- The trend for all cancers combined in females increased slowly between 1984 and 2007 (0.3% per year), and then more steeply between 2007 and 2013 (1.2% per year). Since 2013, the rate has been decreasing in females (-1.2% per year).

Figures 1.8 and 1.9 show the ASIR over time (projected to 2021) for the most common cancers in Canada and cancers that had a statistically significant change in APC of at least 2% in the most recent trend: melanoma in both sexes, leukemia and multiple myeloma in males, and ovarian and thyroid cancers in females.

FIGURE 1.9 Age-standardized incidence rates (ASIR) for selected* cancers, females, Canada (excluding Quebec†), 1984–2021



Analysis by: Centre for Population Health Data, Statistics Canada

Data sources: Canadian Cancer Registry and National Cancer Incidence Reporting System databases at Statistics Canada

* Three most frequently diagnosed cancers among females and cancers with a statistically significant change in incidence rate of at least 2% per year, as measured by the most recent annual percent change (see Table 1.7).

† Quebec is excluded because cases diagnosed in Quebec from 2011 onward had not been submitted to the Canadian Cancer Registry.

Note: Rates are age-standardized to the 2011 Canadian standard population. Actual incidence data were available to 2017 and projected thereafter. The range of scales differs widely between the figures. The complete definition of the specific cancers included here can be found in Table A1.

A short discussion of trends (based on Table 1.6) for each of these notable cancers is presented below. The list does not include liver and pancreatic cancers in females and thyroid cancer in males (APC=-3.2%, -2.2% and -2.4%, respectively) because the trends were not statistically significant.

Lung and bronchus (lung) cancer

In males, the incidence rate for lung cancer was stable in the late 1980s and has been decreasing since 1990, though at different rates: steeply from 1990 to 2003 (-2.2% per year), then less steeply from 2003 to 2013 (-1.0% per year), and then more steeply after 2013 (-3.8% per year). In females, the lung cancer incidence rate increased significantly between 1984 and 1993 (2.9%). The increase continued, but more slowly, from 1993 to 2013 (0.9% per year). The lung cancer incidence rate in females started to decrease in 2013 (-2.0% per year).

The differences in trends in lung cancer rates in males and females reflect past differences in cigarette smoking, which is the main risk factor for this cancer. In males, a decrease in the prevalence of daily smokers began in the mid-1960s in Canada, preceding the decrease in lung cancer incidence by about 20 years.[6] In females, the drop in smoking was not until the mid-1980s, and lung cancer rates have only recently started to decrease. These results are similar to those found in the United States (US).[7]

Breast cancer (female)

In Canada, the breast cancer incidence rate in females rose between 1984 and 1991 by 2.0% per year. This is attributable in part to increased opportunistic mammography screening that was done before even the first organized screening programs were implemented. After 1991, incidence rates fluctuated with peaks around 1999 and 2011. However, overall, rates have shown a small but statistically significant decline between 1991 and 2017 of -0.2% per year. The reasons for these fluctuations are unclear. They are likely due to continued participation in mammography screening and to long-term changes in hormonal factors, such as early age at menarche, breastfeeding, late age at menopause, oral contraceptive use and late age at full-term pregnancy.[8] The slight decrease in incidence that occurred around 2002 may reflect the reduced use of hormone replacement therapy (HRT) among post-menopausal females at that time.[9,10] Recent data from the US show a moderate increase in female breast cancer rates over the last 10 years.[11]

Colorectal cancer

Overall, colorectal cancer incidence rates decreased between 1984 and 1995 (-1.1% per year), were stable between 1995 and 2001, and decreased slightly between 2001 and 2013 (-0.5% per year). Since 2013, colorectal cancer incidence rates have declined more steeply in males (-4.3% per year) and females (-3.4% per year).

The recent decline in colorectal cancer rates is likely due in part to increased screening for the disease, which can identify treatable precancerous polyps and reduce cancer incidence. Between 2007 and 2016, Yukon and every province in Canada (except Quebec) implemented organized colorectal cancer screening programs.[12,13] The decline in colorectal cancer incidence rates may be confined to older adults as rates are reportedly increasing among adults younger than 50 years of age in Canada and the US.[14,15]

Prostate cancer

The prostate cancer incidence rate for males increased rapidly from 1984 to 1993 (5.6% per year), then levelled off, and then declined steeply from 2007 to 2017 (-4.4% per year). The incidence rate peaked in 1993 and 2001, which mirrored intensified use of prostate-specific antigen (PSA) testing in Canada.[16] The US Preventive Services Task Force advised against PSA screening in men over 75 years of age in 2008, and then in asymptomatic men of all ages in 2011. Canada released similar guidelines in 2014.[17,18] The considerable decline in prostate cancer following changes in PSA testing guidelines has also been reported in the US.[7,11]

Leukemia

Trends in the incidence rate for leukemia have been variable over the period from 1984 to 2017. In males, the incidence rate for leukemia decreased -1.1% per year until 1994, increased 0.9% per year until 2013, and has since declined -2.6% annually. In females, the modest rate of decrease seen until 2001 (-0.3% per year) was followed by a 1.9% annual increase until 2010. More recently, the rate has declined -1.6% annually.

A similar trend in the incidence rate for leukemia has been reported globally between 1990 and 2017, though the rate of decline varies between countries and leukemia subtypes.[19,20] For example, the incidence of all types of leukemia decreased in Australia, whereas most countries have witnessed increases in chronic lymphocytic leukemia (CLL) and acute myeloid leukemia (AML). Factors driving these trends are not well understood, though some suggest that changes in environmental exposures (e.g., benzene), lifestyle (e.g., smoking) and parental behaviours (e.g., increased intake of folate during the preconception period and pregnancy) may be at play.[19,21]

Melanoma

Between 1984 and 2017, the incidence rate for melanoma increased an average of 2.2% per year in males and 1.4% per year in females. Exposure to ultraviolet (UV) radiation through sunlight, tanning beds and sun lamps is a well-established risk factor for melanoma.[22,23] Past increases in sun exposure without corresponding increases in sun safety behaviours likely accounts for the continued rise in melanoma rates.[24]

Multiple myeloma

In males, the incidence rate for multiple myeloma was stable until 2007, after which it began to increase at about 2.5% per year. Similarly, in females, the rate was stable until 2005 and has since been increasing at 1.6% per year. In the US, the incidence rate for multiple myeloma increased slowly (0.8% per year) until 2008, and has been increasing more rapidly (1.8% per year) since then.[4] Improved detection and case ascertainment has been reported to contribute to some of the increase in multiple myeloma cases in other countries.[25]

The increased prevalence of obesity, a known risk factor for multiple myeloma, could be contributing to the recent upward trend in the incidence rate.[26,27] Elevated risk of multiple myeloma has also been linked with pesticide use and proximity to contaminated bodies of water and rivers.[28,29] From 1981 to 2011, the relative risk of water contamination by pesticides across agricultural areas in Canada has increased 50%.[30]

Ovarian cancer

The incidence rate of ovarian cancer declined (-1.5% per year) between 1984 and 1997 and then levelled off until 2013. It has since been decreasing rapidly (-3.1% per year). In 2021, the rate is projected to be 27% lower than in 1984. A gradual decline in incidence rate has also been reported in most European countries and in the US.[31] Several factors could be contributing to the favourable trend, including increased use of oral contraceptives, changes in reproductive and protective risk factors (e.g., older age at childbirth), decreased prevalence of smoking and changes in disease classifications (i.e., since 2000, ovarian neoplasms with borderline or low malignant potential are no longer considered malignant tumours).[31–33]

Thyroid cancer

Incidence rates for thyroid cancer increased rapidly between 1984 and 2013. Between 2013 and 2017, incidence rates have decreased significantly in females (-5.4% per year) and non-significantly in males (-2.4% per year). The rate of thyroid cancer is decreasing in the US.[34]

It is suspected that a substantial portion of the increase in thyroid cancer incidence was due to the over-diagnosis as a result of increased use of improved diagnostic technologies such as ultrasound and fine needle aspiration.[35] A recent Canadian study found evidence to support the over-diagnosis hypothesis, including the confirmation of the central role played by papillary thyroid cancer in past trends. It also reported significant increases in medullary thyroid cancer.[36]

Many other reports have found increases primarily in small, indolent papillary cases with no concurrent increase in mortality.[37] However, recent studies also show an increase in late-stage papillary tumours, suggesting that the overall increase may not be entirely due to over-diagnosis.[38]

Average annual percent change (AAPC)

The weighted average of the APCs in effect during a period of time, where the weights equal the proportion of time accounted for by each APC in the interval. AAPC summarizes the change in age-standardized rates over a specified interval. It is reported as a percentage.

Average annual percent change (AAPC)

Table 1.6 also shows the average annual percent change (AAPC) in cancers between 1984 and 2017. By summarizing changes in trends, the AAPC enables the comparison of changes in incidence across cancers for the same defined time period. In both males and females, the greatest increases were observed for thyroid (4.0% and 4.3% per year, respectively) and liver (3.3% and 2.2% per year, respectively). The greatest decrease was in stomach cancer (-1.8% and -1.7% per year, respectively). Despite the current decrease in prostate cancer incidence, the dramatic increases and decreases since 1984 have averaged to indicate virtually no change over the three time periods (AAPC=0.2%). AAPCs should be interpreted with caution as they do not necessarily reflect the most recent trends; the APC should be used for the most recent trends.

What do these statistics mean?

Cancer strikes males and females, young and old, and those in different regions across Canada on an uneven basis. The statistics in this chapter can support informed decision-making to ensure that healthcare services meet the needs of specific populations. They can also help identify opportunities for further prevention and cancer control initiatives.

We estimate that approximately 43% of Canadians will be diagnosed with cancer in their lifetime. This high number is attributable to several factors, including that the Canadian population has a high life expectancy. It emphasizes the need for support services for those diagnosed with cancer and their caregivers.

In 2021 alone, a projected 229,200 people in Canada will be diagnosed with cancer. An increased focus on primary prevention efforts should be employed to minimize the risk of developing cancer. Prevention efforts include vaccination, sun exposure awareness, tobacco control and the promotion of healthy living such as physical activity, healthy eating and limiting alcohol consumption. In addition, a focus on screening and early detection should be maintained to diagnose and treat cancer at an earlier stage when treatments are more effective and more likely to be successful.

The biggest risk factor for cancer is age, and the Canadian population is aging.[39] Like many other developed countries, Canada now has a greater proportion of seniors (people who are 65 years of age or older) than at any time in the past, and seniors represent the fastest-growing age group in Canada.[40] As a result, the number of people diagnosed with cancer is increasing in Canada each year, a trend that is expected to continue until at least the early 2030s.[41] With the rising number of new cancer cases, there will be a corresponding increase in the need for primary prevention, screening, diagnosis, treatment and support services, including palliative care.

It is also important to recognize that the priorities of people with cancer and their needs for services can vary at different points in the age continuum. For example, females are more likely than males to be diagnosed with cancer in the prime of their lives (between the ages of 25 and 59 years), which reflects patterns for specific cancers, such as breast and thyroid. Also, approximately 2% of cancers are diagnosed in children and young adults (aged 0 to 29 years), but these cancers have a significant and lasting impact on both the individuals and their caregivers.

Cancer incidence rates vary across the country, with generally higher rates in the east and lower rates in the west. These data can help inform screening and support efforts. To better target prevention activities, these differences in rates can be correlated with the prevalence of risk factors, such as tobacco and alcohol consumption, physical inactivity and obesity rates.

The overall incidence rate for both sexes combined has not changed dramatically over the past 30 years, but trends in individual cancers tell a different story about the progress that has been made. For example, the recent decreases in thyroid and prostate cancers likely reflect the success of evolving screening policies and the decrease in lung cancer likely reflects success in tobacco control. Also, the decline in cervical cancer likely reflects the success of widespread screening programs, and similar signs of progress are emerging for colorectal cancer. In contrast, there are significant increases in some cancers, such as melanoma and multiple myeloma. Strategies to mitigate these increases must be developed promptly.

Supplementary resources

Cancer.ca/statistics houses supplementary resources for this chapter. This includes:

- Excel spreadsheets with the statistics used to create the figures
- Excel spreadsheets with supplementary statistics
- PowerPoint images of the figures throughout this chapter

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TABLE 1.1 Lifetime probability of developing cancer, Canada (excluding Quebec*), 2017

	Lifetime probability of developing cancer					
	%			One in:		
	Both sexes	Males	Females	Both sexes	Males	Females
All cancers†	**43.4**	**44.3**	**42.6**	**2.3**	**2.3**	**2.4**
Lung and bronchus	6.7	6.8	6.6	15	15	15
Breast	6.1	0.1	12.1	16	934	8
Colorectal	5.7	6.1	5.3	18	16	19
Prostate	—	11.9	—	—	8	—
Bladder	3.0	4.6	1.4	34	22	73
Non-Hodgkin lymphoma	2.5	2.7	2.2	40	37	45
Melanoma	2.2	2.4	1.9	46	41	51
Uterus (body, NOS)	—	—	3.2	—	—	31
Kidney and renal pelvis	1.5	2.0	1.1	65	51	92
Head and neck	2	2	0.9	66	46	114
Pancreas	1.5	1.5	1.4	68	67	69
Leukemia	1.5	1.8	1.3	65	55	80
Thyroid	1.2	0.6	1.7	85	158	58
Stomach	1.0	1.3	0.7	104	80	146
Multiple myeloma	0.9	1.0	0.8	111	95	131
Liver	0.6	0.9	0.3	159	109	299
Brain/CNS	1	1	0.6	155	137	178
Ovary	—	—	1.3	—	—	79
Esophagus	0.6	0.9	0.3	169	113	329
Cervix	—	—	0.6	—	—	161
Testis	—	0.4	—	—	237	—
Hodgkin lymphoma	0.2	0.3	0.2	448	392	525

— Not applicable; CNS=central nervous system; NOS=not otherwise specified

* Quebec is excluded because cases diagnosed in Quebec from 2011 onward had not been submitted to the Canadian Cancer Registry.

† "All cancers" includes *in situ* bladder cancer and excludes non-melanoma skin cancer (neoplasms, NOS; epithelial neoplasms, NOS; and basal and squamous).

Note: The probability of developing cancer is calculated based on age-, sex- and cancer-specific incidence and mortality rates for Canada excluding Quebec in 2017. For further details, see *Appendix II: Data sources and methods*. The complete definition of the specific cancers included here can be found in Table A1.

Analysis by: Centre for Surveillance and Applied Research, Public Health Agency of Canada

Data sources: Canadian Cancer Registry and Canadian Vital Statistics Death databases at Statistics Canada

TABLE 1.2 Projected new cases and age-standardized incidence rates (ASIR) for cancers, by sex, Canada,* 2021

	New cases (2021 estimates)			Cases per 100,000		
	Total†	Males	Females	Both sexes	Males	Females
All cancers‡	**229,200**	**118,200**	**110,900**	**515.2**	**556.3**	**484.9**
Lung and bronchus	29,600	14,800	14,800	59.5	62.0	57.9
Breast	28,000	260	27,700	66.5	1.2	126.8
Colorectal	24,800	13,700	11,100	54.9	64.1	46.6
Prostate	24,000	24,000	—	—	117.9	—
Bladder	12,500	9,500	3,000	25.0	41.4	11.3
Non-Hodgkin lymphoma	11,100	6,200	5,000	25.7	30.3	21.8
Melanoma	8,700	4,700	4,000	22.9	26.1	20.7
Uterus (body, NOS)	8,000	—	8,000	—	—	37.2
Kidney and renal pelvis	7,800	5,200	2,600	17.6	24.5	11.3
Head and neck	7,400	5,400	2,000	16.5	25.1	8.8
Pancreas	6,700	3,700	3,000	14.1	16.5	12.0
Leukemia	6,700	4,000	2,700	15.7	20.0	11.9
Thyroid	6,700	1,800	4,900	17.3	9.2	25.2
Stomach	4,000	2,600	1,400	8.7	12.3	5.7
Multiple myeloma	3,800	2,300	1,500	8.4	10.9	6.2
Liver	3,300	2,600	800	7.1	11.5	3.1
Brain/CNS	3,100	1,800	1,350	7.2	8.6	5.8
Ovary	3,000	—	3,000	—	—	13.5
Esophagus	2,400	1,900	560	5.6	9.2	2.4
Cervix	1,450	—	1,450	—	—	7.5
Testis	1,200	1,200	—	—	6.5	—
Hodgkin lymphoma	1,050	600	460	2.7	3.0	2.4
All other cancers	23,800	12,200	11,600	50.8	56.0	46.9

— Not applicable; CNS=central nervous system; NOS=not otherwise specified

* Quebec is included in the cases because of their importance in determining the national total projected number. Quebec is excluded from the rates because a different projection method was used for this province than for other regions.

† Column totals may not sum to row totals due to rounding. See *Rounding for reporting* in *Appendix II* for more information on rounding procedures.

‡ "All cancers" includes *in situ* bladder cancer and excludes non-melanoma skin cancer (neoplasms, NOS; epithelial neoplasms, NOS; and basal and squamous).

Note: Rates are age-standardized to the 2011 Canadian standard population. The complete definition of the specific cancers included here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Cancer Registry database at Statistics Canada

TABLE 1.3 Projected new cases for the most common cancers, by age group and sex, Canada,* 2021

Age	All cancers†			Lung and bronchus			Breast	Colorectal			Prostate
	Both sexes‡	Males	Females	Both sexes‡	Males	Females	Females	Both sexes‡	Males	Females	Males
All ages	**229,200**	**118,200**	**110,900**	**29,600**	**14,800**	**14,800**	**27,700**	**24,800**	**13,700**	**11,100**	**24,000**
0–14	1,050	600	470	—	—	—	—	5	—	5	—
15–29	3,000	1,450	1,500	20	10	10	140	210	100	110	—
30–39	6,200	2,100	4,100	95	30	65	1,150	490	240	250	5
40–49	13,200	4,500	8,700	540	220	320	3,400	1,200	630	590	290
50–59	32,800	15,100	17,700	2,800	1,300	1,450	5,900	3,400	1,950	1,450	3,300
60–69	63,000	34,700	28,300	8,300	4,100	4,200	7,500	6,400	3,900	2,600	9,500
70–79	64,900	36,300	28,600	10,700	5,500	5,200	6,200	7,300	4,200	3,100	7,500
80–89	36,000	19,400	16,600	5,900	3,100	2,900	2,700	4,600	2,300	2,300	2,900
90+	9,100	4,100	5,000	1,200	550	650	730	1,150	410	730	590
50–74	131,400	69,800	61,600	16,700	8,300	8,400	17,000	13,800	8,200	5,600	17,300
65+	143,900	78,900	65,000	22,500	11,500	11,000	13,500	16,500	9,000	7,500	16,200

— Fewer than 3 cases.

* Quebec is included in the cases because of their importance in determining the national total projected number. Quebec is excluded from the rates because a different projection method was used for this province than for other regions.

† "All cancers" includes *in situ* bladder cancer and excludes non-melanoma skin cancer (neoplasms, NOS; epithelial neoplasms, NOS; and basal and squamous).

‡ Counts for both sexes may not sum to row totals due to rounding. See *Rounding for reporting* in *Appendix II* for more information on rounding procedures.

Note: The complete definition of the specific cancers included here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Cancer Registry database at Statistics Canada

TABLE 1.4 Projected age-standardized incidence rates (ASIR) for selected cancers, by sex and province, Canada (excluding Quebec*), 2021

	Cases per 100,000										
	CA†	BC	AB	SK	MB	ON	QC*	NB	NS	PE	NL
Males											
All cancers‡	**556.3**	**501.8**	**519.4**	**517.7**	**509.4**	**587.6**		**560.5**	**598.9**	**559.2**	**580.1**
Prostate	117.9	115.7	116.7	108.8	101.7	120.7		116.4	122.1	127.8	105.2
Lung and bronchus	62.0	55.2	62.9	63.6	61.2	59.9		90.6	84.0	68.4	77.9
Colorectal	64.1	61.1	59.6	82.9	64.3	61.5		66.7	76.5	84.9	105.0
Bladder	41.4	41.7	41.8	39.0	36.1	41.5		43.7	44.1	39.4	39.4
Non-Hodgkin lymphoma	30.3	23.2	25.9	22.1	25.7	35.5		27.3	29.3	23.8	31.1
Head and neck	25.1	24.2	20.9	20.4	23.1	27.1		23.0	23.6	29.9	27.6
Kidney and renal pelvis	24.5	20.8	22.8	24.5	25.4	25.1		26.3	31.3	22.7	35.0
Melanoma	26.1	22.1	21.7	17.4	28.4	28.5		22.3	37.5	42.8	24.3
Leukemia	20.0	16.9	18.9	23.1	16.7	22.2		22.2	18.1	15.8	11.5
Pancreas	16.5	15.4	15.6	16.1	15.4	17.5		17.3	16.1	16.7	11.0
Stomach	12.3	9.6	9.7	12.0	12.7	14.0		13.3	9.1	12.9	16.0
Liver	11.5	13.6	11.2	9.2	8.9	11.8		6.0	10.0	8.4	6.1
Multiple myeloma	10.9	8.1	9.6	9.7	9.1	13.0		8.8	9.6	10.7	8.3
Esophagus	9.2	9.7	9.1	8.2	8.6	8.9		8.2	12.6	9.9	11.1
Brain/CNS	8.6	8.7	8.2	7.9	7.4	8.9		8.5	9.5	9.7	9.6
Thyroid	9.2	5.0	8.9	5.6	8.2	11.4		8.3	7.4	5.0	14.3
Testis	6.5	6.7	6.5	5.8	6.6	6.7		7.1	6.8	4.4	4.8
Hodgkin lymphoma	3.0	2.7	3.0	2.6	2.8	3.1		3.4	3.0	3.2	2.5
Breast	1.2	1.1	1.0	1.2	1.0	1.3		1.4	1.7	—	1.4
Females											
All cancers‡	**484.9**	**421.5**	**459.6**	**456.6**	**467.7**	**517.2**		**468.3**	**493.1**	**448.9**	**542.9**
Breast	126.8	116.4	131.5	119.7	113.9	131.3		119.2	124.4	114.0	136.6
Lung and bronchus	57.9	54.3	58.1	66.6	56.3	56.2		68.0	74.9	69.8	68.3
Colorectal	46.6	46.7	44.6	48.2	46.2	45.0		46.5	48.8	53.2	80.3
Uterus (body, NOS)	37.2	29.8	34.0	34.9	53.3	40.2		33.0	34.3	30.0	41.9
Non-Hodgkin lymphoma	21.8	16.6	17.1	18.7	18.8	25.7		20.5	18.9	16.6	22.8
Thyroid	25.2	12.8	19.4	13.1	21.5	33.4		19.5	18.3	8.9	32.0
Melanoma	20.7	17.3	18.4	23.7	19.3	21.8		22.0	29.1	35.3	18.3
Bladder	11.3	9.8	10.1	10.6	10.1	12.2		11.8	12.4	11.6	13.8
Pancreas	12.0	12.0	12.4	11.7	13.2	11.9		12.3	12.0	11.3	9.9
Ovary	13.5	11.8	10.9	12.5	11.8	15.6		9.9	11.0	12.5	13.6
Leukemia	11.9	10.3	12.5	13.2	9.6	12.6		16.3	10.4	9.3	8.9
Kidney and renal pelvis	11.3	9.3	11.7	15.1	11.8	10.7		14.9	17.8	12.2	16.1
Head and neck	8.8	7.7	7.2	7.6	9.5	9.7		8.0	8.8	10.4	7.8
Multiple myeloma	6.2	5.0	5.4	5.5	5.1	7.2		5.8	5.3	6.5	5.8
Cervix	7.5	6.5	8.4	8.2	7.2	7.6		7.5	5.9	8.9	10.4
Stomach	5.7	4.1	4.2	4.5	5.0	6.9		5.5	4.5	4.8	8.1
Brain/CNS	5.8	5.7	5.4	5.6	5.2	6.0		5.9	6.2	4.6	6.4
Liver	3.1	3.7	2.8	2.2	2.9	3.4		1.6	1.9	2.8	2.2
Esophagus	2.4	2.8	2.3	2.0	2.1	2.4		1.6	3.5	2.6	2.1
Hodgkin lymphoma	2.4	2.0	2.0	2.1	2.3	2.7		2.5	2.5	—	2.5

— Projected incidence rate based on fewer than 3 cases; CNS=central nervous system; NOS=not otherwise specified

* Quebec is excluded because a different projection method was used for Quebec than the other regions, meaning the estimates are not comparable. For further details, see *Appendix II: Data source and methods*.

† Canada totals include provincial and territorial estimates, except Quebec. Territories are not listed due to small numbers.

‡ "All cancers" includes *in situ* bladder and excludes non-melanoma skin cancer (neoplasms, NOS; epithelial neoplasms, NOS; and basal and squamous).

Note: Rates are age-standardized to the 2011 Canadian standard population. The complete definition of the specific cancers included here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Cancer Registry database at Statistics Canada

TABLE 1.5 Projected new cases for selected cancers, by sex and province, Canada,* 2021

	CA†	BC	AB	SK	MB	ON	QC‡	NB	NS	PE	NL
Males											
All cancers§	**118,200**	**15,100**	**10,700**	**3,100**	**3,500**	**46,600**	**30,100**	**2,800**	**3,600**	**540**	**2,000**
Prostate	24,000	3,600	2,500	680	710	9,900	4,600	620	780	130	400
Lung and bronchus	14,800	1,700	1,250	380	420	4,800	4,800	470	520	70	280
Colorectal	13,700	1,800	1,250	500	430	4,800	3,600	340	470	85	370
Bladder	9,500	1,250	830	230	240	3,300	2,900	220	280	40	140
Non-Hodgkin lymphoma	6,200	680	530	130	170	2,800	1,450	130	170	20	100
Head and neck	5,400	710	440	120	160	2,100	1,500	110	150	25	95
Kidney and renal pelvis	5,200	610	480	150	170	1,950	1,350	130	190	20	120
Melanoma	4,700	650	440	100	190	2,200	640	110	220	40	85
Leukemia	4,000	490	390	140	110	1,700	900	110	110	15	40
Pancreas	3,700	460	310	95	110	1,400	1,050	85	100	15	40
Stomach	2,600	290	190	70	85	1,100	680	65	55	10	55
Liver	2,600	420	230	55	60	950	700	30	65	10	20
Multiple myeloma	2,300	240	200	55	65	1,050	610	45	60	10	30
Esophagus	1,900	290	190	50	60	710	420	40	75	10	40
Brain/CNS	1,800	240	180	50	50	680	470	40	55	10	30
Thyroid	1,800	140	200	35	55	850	400	35	40	5	45
Testis	1,200	170	150	35	45	490	240	25	30	5	10
Hodgkin lymphoma	600	70	65	15	20	230	160	15	15	5	5
Breast	260	30	20	10	5	100	65	5	10	—	5
Females											
All cancers§	**110,900**	**13,500**	**10,300**	**2,900**	**3,400**	**45,100**	**27,400**	**2,500**	**3,300**	**480**	**1,950**
Breast	27,700	3,600	2,900	730	820	11,000	6,700	610	780	120	490
Lung and bronchus	14,800	1,900	1,300	450	440	5,300	4,100	390	540	80	270
Colorectal	11,100	1,550	1,000	320	340	4,100	2,800	260	340	60	300
Uterus (body, NOS)	8,000	930	750	210	380	3,400	1,750	180	220	30	150
Non-Hodgkin lymphoma	5,000	540	380	120	140	2,300	1,100	110	130	15	85
Thyroid	4,900	350	430	75	140	2,500	1,100	85	95	10	95
Melanoma	4,000	540	410	140	140	1,850	530	100	170	35	60
Bladder	3,000	340	230	70	80	1,150	960	65	90	15	55
Pancreas	3,000	410	280	80	100	1,150	820	75	85	15	40
Ovary	3,000	370	240	75	80	1,300	720	50	75	15	45
Leukemia	2,700	330	280	85	75	1,100	580	85	65	10	30
Kidney and renal pelvis	2,600	300	260	95	85	940	650	80	120	15	60
Head and neck	2,000	250	160	50	70	850	500	45	60	10	25
Multiple myeloma	1,500	170	120	35	40	670	360	35	40	5	25
Cervix	1,450	180	190	50	45	580	290	30	30	10	30
Stomach	1,400	140	95	30	40	630	380	30	30	5	30
Brain/CNS	1,350	170	120	35	35	510	360	30	40	5	20
Liver	800	120	65	15	25	310	230	10	15	5	10
Esophagus	560	95	55	15	15	230	120	10	25	5	10
Hodgkin lymphoma	460	55	45	10	15	210	110	10	10	—	5

— Fewer than 3 cases; CNS=central nervous system; NOS=not otherwise specified

* Canada totals include provincial and territorial estimates. Territories are not listed due to small numbers.

† Canadian counts may not sum to row totals due to rounding. See *Rounding for reporting* in Appendix II for more information on rounding procedures.

‡ Quebec projections are calculated differently from the other provinces and territories because actual data were only available to 2010 for Quebec, whereas they were available to 2017 for the other regions. For further details, see *Appendix II: Data source and methods*.

§ "All cancers" includes *in situ* bladder cancer and excludes non-melanoma skin cancer (neoplasms, NOS; epithelial neoplasms, NOS; and basal and squamous).

Note: The complete definition of the specific cancers included here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Cancer Registry database at Statistics Canada

TABLE 1.6 Annual percent change (APC) and average annual percent change (AAPC) in age-standardized incidence rates (ASIR) for selected cancers, by sex, Canada (excluding Quebec*), 1984–2017

	Both sexes			Males			Females		
	Period	APC† (95% CL)	AAPC† (95% CL), 1984–2017	Period	APC† (95% CL)	AAPC† (95% CL), 1984–2017	Period	APC† (95% CL)	AAPC† (95% CL), 1984–2017
All cancers	**1984–2012**	**0.3 (0.2, 0.4)**	**0.1 (-0.1, 0.2)**	**1984–1992**	**0.9 (0.2, 1.6)**	**-0.1 (-0.4, 0.1)**	**1984–2007**	**0.3 (0.2, 0.4)**	**0.3 (0.1, 0.4)**
	2012–2017	**-1.1 (-1.9, -0.2)**		**1992–2011**	**-0.1 (-0.3, 0.0)**		**2007–2013**	**1.2 (0.5, 1.8)**	
				2011–2017	**-1.5 (-2.2, -0.8)**		**2013–2017**	**-1.2 (-2.1, -0.3)**	
Lung and bronchus	1984–1990	0.6 (-0.0, 1.3)	-0.6 (-0.8, -0.4)	1984–1990	-0.7 (-1.4, 0.1)	-1.7 (-2.0, -1.5)	1984–1993	2.9 (2.4, 3.5)	1.1 (0.9, 1.3)
	1990–2003	-0.8 (-1.0, -0.6)		1990–2003	-2.2 (-2.4, -1.9)		1993–2013	0.9 (0.8, 1.0)	
	2003–2013	-0.1 (-0.4, 0.2)		2003–2013	-1.0 (-1.4, -0.6)		2013–2017	-2.0 (-3.1, -1.0)	
	2013–2017	-2.8 (-3.7, -1.9)		2013–2017	-3.8 (-4.9, -2.7)				
Breast	1984–1991	1.9 (0.8, 3.1)	0.2 (-0.1, 0.4)	1984–2017	0.5 (0.1, 0.9)	0.5 (0.1, 0.9)	1984–1991	2.0 (0.9, 3.1)	0.3 (0.0, 0.5)
	1991–2017	-0.3 (-0.4, -0.2)					1991–2017	-0.2 (-0.3, -0.0)	
Colorectal	1984–1995	-1.1 (-1.4, -0.8)	-0.9 (-1.1, -0.7)	1984–2013	-0.3 (-0.4, -0.2)	-0.8 (-1.0, -0.6)	1984–1994	-1.7 (-2.0, -1.4)	-1.1 (-1.3, -0.8)
	1995–2001	0.5 (-0.3, 1.3)		2013–2017	-4.3 (-5.8, -2.8)		1994–2000	0.4 (-0.5, 1.3)	
	2001–2013	-0.5 (-0.7, -0.3)					2000–2013	-0.5 (-0.7, -0.3)	
	2013–2017	-3.6 (-4.5, -2.7)					2013–2017	-3.4 (-4.5, -2.4)	
Prostate				1984–1993	5.6 (3.4, 7.8)	0.2 (-0.5, 0.9)			
				1993–2007	0.2 (-0.6, 1.1)				
				2007–2017	-4.4 (-5.5, -3.3)				
Bladder‡	1984–2007	-1.1 (-1.3, -0.8)	0.1 (-0.5, 0.7)	1984–2007	-1.2 (-1.4, -0.9)	-0.0 (-0.7, 0.7)	1984–2008	-0.9 (-1.2, -0.5)	0.0 (-0.9, 1.0)
	2007–2011	7.8 (2.9, 12.9)		2007–2011	7.8 (2.5, 13.3)		2008–2012	7.2 (-0.1, 15.0)	
	2011–2017	-0.2 (-1.5, 1.2)		2011–2017	-0.5 (-1.9, 1.0)		2012–2017	-1.2 (-3.9, 1.6)	
Non-Hodgkin lymphoma	1984–1997	1.8 (1.4, 2.3)	1.3 (0.9, 1.6)	1984–2017	1.3 (1.2, 1.4)	1.3 (1.2, 1.4)	1984–1993	2.1 (1.2, 3.1)	1.2 (1.0, 1.5)
	1997–2007	0.5 (-0.1, 1.1)					1993–2017	0.9 (0.8, 1.1)	
	2007–2013	2.2 (1.0, 3.5)							
	2013–2017	-0.0 (-1.6, 1.6)							
Melanoma	1984–2017	2.0 (1.8, 2.1)	2.0 (1.8, 2.1)	1984–2017	2.2 (2.1, 2.4)	2.2 (2.1, 2.4)	1984–1994	0.2 (-0.9, 1.3)	1.4 (1.1, 1.8)
							1994–2017	2.0 (1.8, 2.2)	

Continued on next page

TABLE 1.6 Annual percent change (APC) and average annual percent change (AAPC) in age-standardized incidence rates (ASIR) for selected cancers, by sex, Canada (excluding Quebec*), 1984–2017

	Both sexes			Males			Females		
	Period	APC (95% CL)	AAPC (95% CL), 1984–2017	Period	APC (95% CL)	AAPC (95% CL), 1984–2017	Period	APC (95% CL)	AAPC (95% CL), 1984–2017
Uterus (body, NOS)							1984–1990	-1.5 (-3.1, 0.2)	0.7 (0.2, 1.1)
							1990–2005	0.4 (-0.0, 0.8)	
							2005–2011	3.1 (1.5, 4.8)	
							2011–2017	1.0 (-0.0, 2.1)	
Kidney and renal pelvis	1984–1989	4.1 (1.6, 6.6)	1.4 (0.9, 1.9)	1984–1989	4.0 (1.3, 6.7)	1.4 (0.9, 2.0)	1984–2017	1.1 (0.9, 1.2)	1.1 (0.9, 1.2)
	1989–1998	-0.4 (-1.4, 0.7)		1989–2003	0.1 (-0.4, 0.6)				
	1998–2012	1.9 (1.5, 2.3)		2003–2012	2.7 (1.8, 3.6)				
	2012–2017	0.3 (-1.1, 1.7)		2012–2017	0.4 (-1.1, 1.8)				
Head and neck	1984–2004	-2.0 (-2.2, -1.8)	-1.0 (-1.1, -0.8)	1984–2004	-2.4 (-2.7, -2.2)	-1.2 (-1.4, -1.0)	1984–2004	-1.1 (-1.4, -0.9)	-0.5 (-0.8, -0.3)
	2004–2017	0.7 (0.3, 1.0)		2004–2017	0.6 (0.2, 1.0)		2004–2017	0.3 (-0.1, 0.8)	
Pancreas	1984–2006	-0.7 (-0.9, -0.5)	-0.1 (-0.4, 0.3)	1984–2002	-1.4 (-1.8, -1.0)	-0.1 (-0.4, 0.2)	1984–2006	-0.3 (-0.5, -0.0)	0.0 (-0.4, 0.4)
	2006–2013	2.7 (1.4, 3.9)		2002–2017	1.4 (1.0, 1.9)		2006–2013	2.2 (0.8, 3.7)	
	2013–2017	-1.6 (-3.6, 0.4)					2013–2017	-2.2 (-4.6, 0.2)	
Leukemia	1984–1996	-0.7 (-1.2, -0.1)	-0.0 (-0.4, 0.3)	1984–1994	-1.1 (-2.0, -0.2)	-0.1 (-0.6, 0.3)	1984–2001	-0.3 (-0.6, 0.1)	0.0 (-0.3, 0.4)
	1996–2013	1.1 (0.8, 1.4)		1994–2013	0.9 (0.6, 1.2)		2001–2010	1.9 (1.0, 2.9)	
	2013–2017	-2.8 (-4.9, -0.7)		2013–2017	-2.6 (-5.0, -0.2)		2010–2017	-1.6 (-2.6, -0.5)	
Thyroid	1984–1998	3.7 (2.8, 4.5)	4.2 (3.6, 4.9)	1984–1998	2.8 (1.5, 4.0)	4.0 (3.3, 4.8)	1984–1998	4.0 (3.2, 4.8)	4.3 (3.6, 5.0)
	1998–2004	9.4 (6.6, 12.3)		1998–2013	7.0 (6.3, 7.8)		1998–2004	10.4 (7.6, 13.2)	
	2004–2013	5.9 (5.0, 6.9)		2013–2017	-2.4 (-5.8, 1.1)		2004–2013	5.5 (4.6, 6.4)	
	2013–2017	-4.7 (-6.9, -2.4)					2013–2017	-5.4 (-7.6, -3.2)	
Stomach	1984–2002	-2.6 (-2.8, -2.4)	-1.7 (-1.9, -1.5)	1984–2002	-2.6 (-2.8, -2.3)	-1.8 (-2.0, -1.6)	1984–2001	-2.8 (-3.2, -2.4)	-1.7 (-2.0, -1.5)
	2002–2017	-0.7 (-0.9, -0.4)		2002–2017	-1.0 (-1.3, -0.6)		2001–2017	-0.5 (-0.9, -0.1)	
Multiple myeloma	1984–2006	0.3 (0.0, 0.7)	0.9 (0.6, 1.2)	1984–2007	0.3 (-0.0, 0.7)	1.0 (0.6, 1.4)	1984–2005	0.2 (-0.2, 0.6)	0.7 (0.4, 1.1)
	2006–2017	2.1 (1.4, 2.8)		2007–2017	2.5 (1.5, 3.4)		2005–2017	1.6 (0.9, 2.3)	
Liver	1984–2004	3.0 (2.6, 3.5)	3.0 (2.5, 3.5)	1984–2013	3.8 (3.5, 4.1)	3.3 (2.8, 3.8)	1984–2005	1.9 (1.2, 2.6)	2.2 (1.3, 3.1)
	2004–2013	4.9 (3.8, 6.1)		2013–2017	-0.3 (-3.5, 3.1)		2005–2013	5.8 (3.5, 8.2)	
	2013–2017	-1.7 (-4.3, 1.0)					2013–2017	-3.2 (-7.6, 1.4)	
Brain/CNS	1984–2017	-0.4 (-0.5, -0.3)	-0.4 (-0.5, -0.3)	1984–2017	-0.4 (-0.5, -0.2)	-0.4 (-0.5, -0.2)	1984–2017	-0.5 (-0.6, -0.3)	-0.5 (-0.6, -0.3)
Ovary							1984–1997	-1.5 (-1.9, -1.0)	-1.0 (-1.4, -0.7)
							1997–2013	-0.1 (-0.5, 0.2)	
							2013–2017	-3.1 (-5.3, -0.8)	

Continued on next page

TABLE 1.6 Annual percent change (APC) and average annual percent change (AAPC) in age-standardized incidence rates (ASIR) for selected cancers, by sex, Canada (excluding Quebec*), 1984–2017

Cancer	Both sexes			Males			Females		
	Period	APC (95% CL)	AAPC (95% CL), 1984–2017	Period	APC (95% CL)	AAPC (95% CL), 1984–2017	Period	APC (95% CL)	AAPC (95% CL), 1984–2017
Esophagus	1984–2005	0.1 (-0.2, 0.4)	0.2 (-0.2, 0.7)	1984–2005	0.3 (0.0, 0.6)	0.4 (-0.1, 0.8)	1984–2017	-0.4 (-0.6, -0.2)	-0.4 (-0.6, -0.2)
	2005–2011	2.2 (0.3, 4.2)		2005–2011	2.8 (0.8, 4.8)				
	2011–2017	-1.4 (-2.7, -0.1)		2011–2017	-1.8 (-3.0, -0.5)				
Cervix							1984–2005	-2.0 (-2.2, -1.8)	-1.5 (-1.7, -1.3)
							2005–2017	-0.6 (-1.1, -0.1)	
Testis				1984–2017	1.3 (1.1, 1.5)	1.3 (1.1, 1.5)			
Hodgkin lymphoma	1984–2017	-0.2 (-0.3, -0.0)	-0.2 (-0.3, -0.0)	1984–2017	-0.4 (-0.5, -0.2)	-0.4 (-0.5, -0.2)	1984–2017	0.1 (-0.1, 0.3)	0.1 (-0.1, 0.3)
All other cancers	1984–2017	0.7 (0.6, 0.9)	0.7 (0.6, 0.9)	1984–2017	0.6 (0.5, 0.8)	0.6 (0.5, 0.8)	1984–2017	0.9 (0.8, 1.0)	0.9 (0.8, 1.0)

CL=confidence limits; CNS=central nervous system; NOS=not otherwise specified

* Quebec is excluded because cases diagnosed in Quebec from 2011 onward had not been submitted to the Canadian Cancer Registry.

† The APC and AAPC are calculated using the Joinpoint Regression Program and rates age-standardized to the 2011 Canadian standard population.

‡ The trend analysis for bladder cancer was performed using the Jump Model of the Joinpoint Regression Program to account for the artificial change in cancer counts introduced in 2010 when Ontario started to include *in situ* carcinomas of the bladder in their data collection. For further details, see *Appendix II: Data sources and methods*.

Note: The complete definition of the specific cancers included here can be found in Table A1.

Analysis by: Centre for Surveillance and Applied Research, Public Health Agency of Canada

Data sources: Canadian Cancer Registry and National Cancer Incidence Reporting System databases at Statistics Canada

TABLE 1.7 Most recent annual percent change (APC) in age-standardized incidence rates (ASIR), by sex, Canada (excluding Quebec*), 1984–2017

	Both sexes		Males		Females	
	Reference year	APC† (95% CL)	Reference year	APC† (95% CL)	Reference year	APC† (95% CL)
All cancers‡	**2012**	**-1.1 (-1.9, -0.2)**	**2011**	**-1.5 (-2.2, -0.8)**	**2013**	**-1.2 (-2.1, -0.3)**
Lung and bronchus	2013	-2.8 (-3.7, -1.9)	2013	-3.8 (-4.9, -2.7)	2013	-2.0 (-3.1, -1.0)
Breast	1991	-0.3 (-0.4, -0.2)	1984	0.5 (0.1, 0.9)	1991	-0.2 (-0.3, -0.0)
Colorectal	2013	-3.6 (-4.5, -2.7)	2013	-4.3 (-5.8, -2.8)	2013	-3.4 (-4.5, -2.4)
Prostate	—	—	2007	-4.4 (-5.5, -3.3)	—	—
Bladder§	2011	-0.2 (-1.5, 1.2)	2011	-0.5 (-1.9, 1.0)	2012	-1.2 (-3.9, 1.6)
Non-Hodgkin lymphoma	2013	-0.0 (-1.6, 1.6)	1984	1.3 (1.2, 1.4)	1993	0.9 (0.8, 1.1)
Melanoma	1984	2.0 (1.8, 2.1)	1984	2.2 (2.1, 2.4)	1994	2.0 (1.8, 2.2)
Uterus (body, NOS)	—	—	—	—	2011	1.0 (-0.0, 2.1)
Kidney and renal pelvis	2012	0.3 (-1.1, 1.7)	2012	0.4 (-1.1, 1.8)	1984	1.1 (0.9, 1.2)
Head and neck	2004	0.7 (0.3, 1.0)	2004	0.6 (0.2, 1.0)	2004	0.3 (-0.1, 0.8)
Pancreas	2013	-1.6 (-3.6, 0.4)	2002	1.4 (1.0, 1.9)	2013	-2.2 (-4.6, 0.2)
Leukemia	2013	-2.8 (-4.9, -0.7)	2013	-2.6 (-5.0, -0.2)	2010	-1.6 (-2.6, -0.5)
Thyroid	2013	-4.7 (-6.9, -2.4)	2013	-2.4 (-5.8, 1.1)	2013	-5.4 (-7.6, -3.2)
Stomach	2002	-0.7 (-0.9, -0.4)	2002	-1.0 (-1.3, -0.6)	2001	-0.5 (-0.9, -0.1)
Multiple myeloma	2006	2.1 (1.4, 2.8)	2007	2.5 (1.5, 3.4)	2005	1.6 (0.9, 2.3)
Liver	2013	-1.7 (-4.3, 1.0)	2013	-0.3 (-3.5, 3.1)	2013	-3.2 (-7.6, 1.4)
Brain/CNS	1984	-0.4 (-0.5, -0.3)	1984	-0.4 (-0.5, -0.2)	1984	-0.5 (-0.6, -0.3)
Ovary	—	—	—	—	2013	-3.1 (-5.3, -0.8)
Esophagus	2011	-1.4 (-2.7, -0.1)	2011	-1.8 (-3.0, -0.5)	1984	-0.4 (-0.6, -0.2)
Cervix	—	—	—	—	2005	-0.6 (-1.1, -0.1)
Testis	—	—	1984	1.3 (1.1, 1.5)	—	—
Hodgkin lymphoma	1984	-0.2 (-0.3, -0.0)	1984	-0.4 (-0.5, -0.2)	1984	0.1 (-0.1, 0.3)
All other cancers	1984	0.7 (0.6, 0.9)	1984	0.6 (0.5, 0.8)	1984	0.9 (0.8, 1.0)

— Not applicable; CL=confidence limits; CNS=central nervous system; NOS=not otherwise specified

* Quebec is excluded because cases diagnosed in Quebec from 2011 onward had not been submitted to the Canadian Cancer Registry.

† The APC was calculated using the Joinpoint Regression Program and rates age-standardized to the 2011 Canadian standard population. If one or more significant changes in the trend of rates from was detected, the APC reflects the trend from the most recent significant change (reference year) to 2017. Otherwise, the APC reflects the trend in rates over the entire period (1984–2017). For further details, see *Appendix II: Data sources and methods*.

‡ "All cancers" includes *in situ* bladder cancer and excludes non-melanoma skin cancer (neoplasms, NOS; epithelial neoplasms, NOS; and basal and squamous).

§ The trend analysis for bladder cancer was performed using the Jump Model of the Joinpoint Regression Program to account for the artificial change in cancer counts introduced in 2010 when Ontario started to include *in situ* carcinomas of the bladder in their data collection. For further details, see *Appendix II: Data sources and methods*.

Note: The complete definition of the specific cancers included here can be found in Table A1.

Analysis by: Centre for Surveillance and Applied Research, Public Health Agency of Canada

Data sources: Canadian Cancer Registry and National Cancer Incidence Reporting System databases at Statistics Canada

Chapter 2

How many people die from cancer in Canada?

Mortality by sex, age, geography and year

The number and rate of cancer deaths that occur each year (mortality) and over time provide the ultimate measure of progress in cancer control: reduction in cancer-related deaths. Mortality is affected by the things that drive cancer incidence, such as risk factors and aging. It also reflects improvements in finding cancers early and treating them successfully.

This chapter examines mortality by sex, age, geography and over time to better understand who is dying from cancer so cancer control services that address the needs of specific populations can be better directed.

Key findings

- It is estimated that 1 in 4 Canadians will die from cancer. The lifetime probability of dying from cancer is slightly higher for males than females.
- An estimated 84,600 Canadians are expected to die from cancer in 2021. 1 in 4 of these deaths is expected to be caused by lung cancer.
- Pancreatic cancer is expected to be the third leading cause of cancer death in 2021 in Canada for both sexes combined.
- Almost all (96%) cancer deaths in Canada are expected to occur in people 50 years of age and older.
- In general, cancer mortality rates are lower in the western provinces and Ontario, and higher in Quebec and the eastern provinces.
- The mortality rates for all cancers combined peaked in 1988 and have been decreasing ever since. However, the number of cancer deaths continues to increase each year due to the growing and aging population.
- The expected prostate cancer mortality rate in 2021 represents a 50% decline since the rate peaked in 1995.

Probability of dying from cancer

The probability of dying from a specific type of cancer depends on many factors, including the probability of developing that cancer, the treatments available and how the cancer responds to treatment. The estimated probabilities are for the general Canadian population and should not be interpreted as an individual's risk.

- Approximately 1 in 4 Canadians is expected to die from cancer (Figure 2.1).
- The probability of dying from cancer is slightly higher for males (26%) than females (22%).

As shown in Table 2.1, the probability of dying from cancer varies by type of cancer.

- Canadians are more likely to die from lung and bronchus (lung) cancer than any other type of cancer. An estimated 1 in 19 (5%) of all Canadians will die from lung cancer, followed by colorectal cancer (1 in 37; almost 3%) and pancreas (1 in 66; 1.5%).
- 1 in 29 (4%) males is expected to die from prostate cancer.
- 1 in 34 (3%) females is expected to die from breast cancer.

Projected cancer deaths in 2021

The cancer mortality data used for projections in this publication were from 1994 to 2018. These were the most recent data available when the analyses began. The data were used to project rates and deaths to 2021.

An estimated 84,600 Canadians are expected to die from cancer in 2021 (Table 2.2).

- It is expected that lung cancer will continue to be the leading cause of cancer death for both sexes, accounting for approximately 25% of all cancer deaths in Canada.
- Lung cancer is followed by colorectal cancer, which will account for 11% of all cancer deaths in Canada, and pancreatic cancer, which will account for 7%.
- The five leading causes of cancer death (lung, colorectal, pancreatic, breast and prostate cancers) account for about 55% of all cancer deaths in Canada.

Lung cancer is responsible for 1 in 4 cancer deaths in Canada.

FIGURE 2.1 Lifetime probability of dying from cancer, Canada (excluding Quebec), 2019

Analysis by: Centre for Surveillance and Applied Research, Public Health Agency of Canada
Data source: Canadian Vital Statistics Death database at Statistics Canada

Note: The probability of dying from cancer is calculated based on age-, sex- and cause-specific mortality rates for Canada excluding Quebec in 2019. For further details, see *Appendix II: Data sources and methods*. The complete definition of the specific cancers included here can be found in Table A1.

Mortality by sex

Table 2.2 shows the number and rate of cancer deaths projected for males and females in 2021.

- For each cancer type except breast and thyroid, a higher number of deaths is expected among males than females.
- 53% of all cancer deaths are expected to occur among males.
- More males (44,600) than females (40,000) are expected to die from cancer in 2021.
- The age-standardized mortality rate (ASMR) in males (217 per 100,000) is expected to be 33% higher than in females (163 per 100,000).

Figure 2.2 shows the expected distribution of cancer deaths in males and females in 2021.

- For males, lung cancer is expected to be the most common cause of cancer death, accounting for 24% of all cancer deaths, followed by colorectal cancer (12%) and prostate cancer (10%).
- For females, lung cancer is expected to be the leading cause of cancer death, accounting for 26% of all cancer deaths, followed by breast cancer (14%) and colorectal cancer (11%).
- Pancreatic cancer is expected to be the fourth most common cause of cancer death for each sex, accounting for almost 7% of all cancer deaths in both males and females.

FIGURE 2.2 Percent distribution of projected cancer deaths, by sex, Canada, 2021

Males
44,600
Deaths

Lung and bronchus	24.2%
Colorectal	11.9%
Prostate	10.1%
Pancreas	6.5%
Bladder	4.3%
Leukemia	4.0%
Esophagus	3.9%
Non-Hodgkin lymphoma	3.7%
Head and neck	3.4%
Brain/CNS	3.1%
Liver*	2.9%
Kidney and renal pelvis	2.8%
Stomach	2.8%
Multiple myeloma	2.1%
Melanoma	1.8%
Thyroid	0.2%
Hodgkin lymphoma	0.1%
Breast	0.1%
Testis	0.1%
All other cancers	12.1%

Females
40,000
Deaths

Lung and bronchus	25.8%
Breast	13.5%
Colorectal	10.8%
Pancreas	6.8%
Ovary	4.9%
Uterus (body, NOS)	3.5%
Leukemia	3.3%
Non-Hodgkin lymphoma	3.1%
Brain/CNS	2.6%
Stomach	1.9%
Bladder	1.8%
Multiple myeloma	1.7%
Kidney and renal pelvis	1.7%
Head and neck	1.4%
Esophagus	1.3%
Melanoma	1.1%
Cervix	1.0%
Liver*	0.8%
Thyroid	0.3%
Hodgkin lymphoma	0.1%
All other cancers	12.8%

CNS=central nervous system; NOS=not otherwise specified

* Liver cancer mortality was underestimated because deaths from liver cancer, unspecified (ICD-10 code C22.9), were excluded. For further details, see *Appendix II: Data sources and methods*.

Note: The complete definition of the specific cancers included here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Vital Statistics Death database at Statistics Canada

Probability

The chance of dying from cancer measured over a lifetime. The probability of dying from cancer is expressed as a percentage or as a chance (e.g., 20% or 1 in 5 people over a lifetime).

Deaths

The number of cancer deaths in a given population during a specific period of time, often a year.

Age-standardized mortality rate (ASMR)

The number of cancer deaths per 100,000 people, standardized to the age structure of the 2011 Canadian standard population. In this publication, ASMR is also referred to as “mortality rate” or “death rate.”

Projected mortality

Actual death data were available to 2019 for all provinces and territories except Yukon, for which data were imputed for 2017 through 2019. Data were used to project cancer mortality to 2021.

Mortality by age

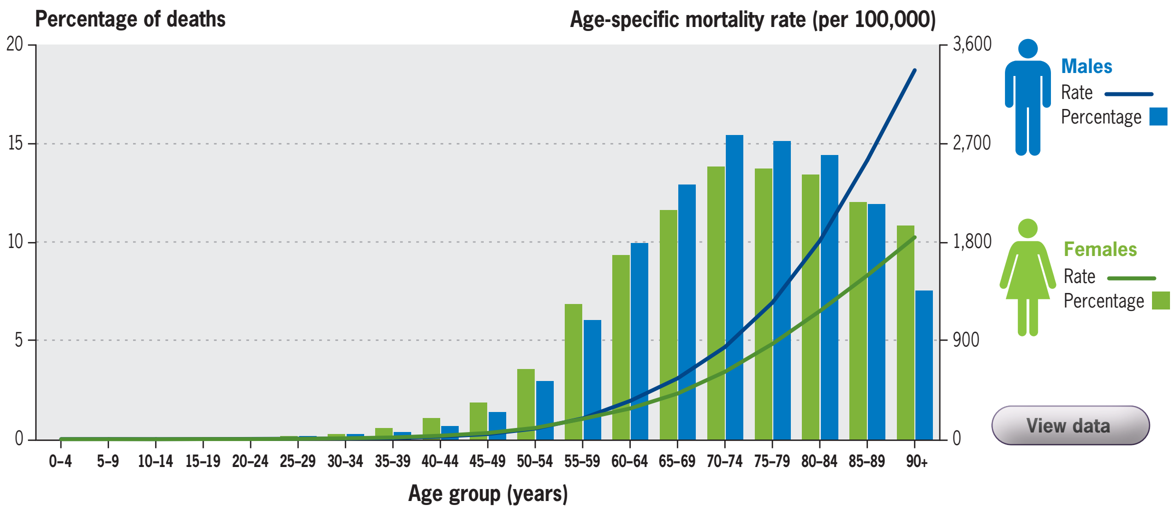
The number of cancer deaths increases dramatically with age (Table 2.3).

- 96% of cancer deaths are expected to occur in people 50 years of age and older.
- The majority of deaths (78%) occur in Canadians aged 65 years and older. However, almost half (46%) of all cancer deaths occur in people aged 50 to 74 years. This is one reason why cancer screening (which aims to reduce cancer mortality) is frequently focused on people in these older age groups.
- 42% of colorectal cancer deaths are expected to occur among Canadians who fall within the age covered by the screening guidelines (aged 50 to 74 years),(1) while 4% are expected to occur among Canadians who are younger than 50 years of age.
- Almost half (48%) of breast cancer deaths are expected to occur among females who fall within the age covered by the screening guidelines (aged 50 to 74 years),(2) while 9% are expected to occur among Canadians who are younger than 50 years of age.
- 88% of cancer deaths are expected to occur in people 60 years of age and older.
- 91% of lung cancer deaths are expected to occur among Canadians 60 years of age and older. Almost half of all lung cancer deaths are in the age range proposed for lung cancer screening in Canada (aged 55 to 74 years with a 30 pack-year smoking history).(3)
- 86% of prostate cancer deaths are expected to occur among Canadians 70 years of age and older.
- 89% of pancreatic cancer deaths are expected to occur among Canadians 60 years of age and older.

Patterns in cancer mortality by age differ for males and females (Figure 2.3).

- Between the ages of 30 and 54, the rate of cancer deaths is higher in females than males.
- From age 55 onward, the cancer death rate is higher in males than females.
- The rate of cancer deaths is highest among Canadians aged 90 years and older. In that age group, the number of cancer deaths is higher in females than males (Table 2.3), despite a lower age-specific rate.

FIGURE 2.3 Percentage of cancer deaths and age-specific mortality rates for all cancers, by age group and sex, Canada, 2017–2019

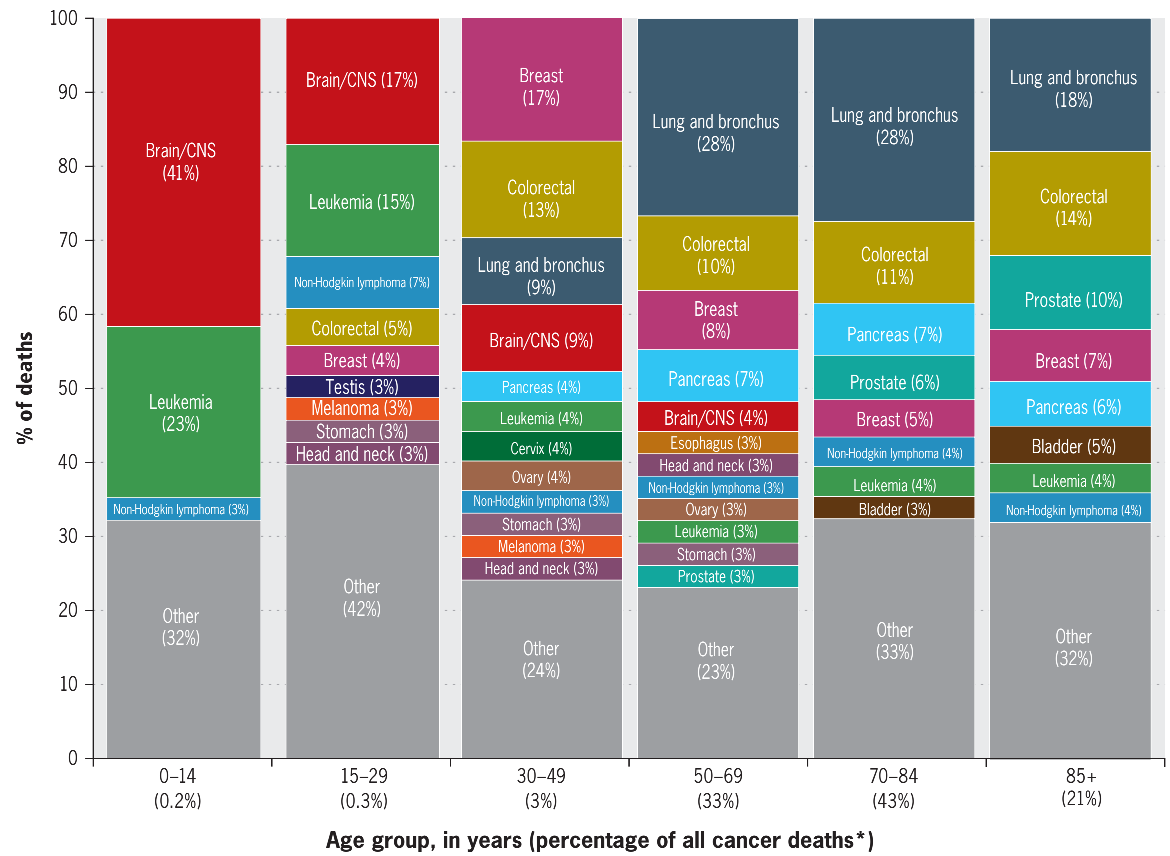


Analysis by: Centre for Population Health Data, Statistics Canada
Data source: Canadian Vital Statistics Death Database at Statistics Canada

Figure 2.4 shows the most common causes of cancer death by age group.

- In the youngest age groups (0 to 14 years and 15 to 29 years), brain cancer, leukemia and non-Hodgkin lymphoma are the most common causes of cancer death. In the 0 to 14 years age group, these cancers make up 67% of all cancer deaths, yet they comprise only 39% of all cancer deaths in the 15 to 29 years age group. This older group had more deaths from "adult" cancers (e.g., colorectal, breast and melanoma) and cancers of the reproductive system (e.g., testis).
- In the 30 to 49 years age group, breast cancer is the leading cause of cancer death and accounts for 17% of all cancer deaths. Colorectal, lung and brain cancers are the next most common, accounting for another 31% of cancer deaths in this age group.
- In all older age groups (50 years of age and older), the most common causes of cancer death are those associated with lung cancer, followed by the other overall common cancer deaths (colorectal, breast, pancreatic and, in the oldest age groups, prostate cancer).

FIGURE 2.4 Distribution of cancer deaths for selected cancers by age group, Canada, 2015–2019



CNS=central nervous system; NOS=not otherwise specified

* The relative percentage is calculated based on the total number of cancer deaths over five years (2015–2019) for each age group.

Note: The complete definition of the specific cancers included here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Vital Statistics Death database at Statistics Canada

Mortality by geographic region

Figure 2.5 shows the expected distribution of cancer deaths across Canada in 2021. These estimates are based on the individual's province or territory of residence at the time of death rather than the place where the death occurred.

- Similar to incidence, the mortality rates for all cancers combined are generally higher in the east and lower in the west.

Projected 2021 rates (Table 2.4) and numbers of deaths (Table 2.5) for selected cancer types by sex and province show that there are several geographic differences by cancer type.

- Lung cancer mortality rates for males are generally highest in Quebec and the Atlantic provinces.
- Colorectal cancer mortality rates are highest in Newfoundland and Labrador for both males and females. Newfoundland and Labrador also has a high incidence rate of colorectal cancer (Table 1.4).
- Mortality rates for stomach cancer are also projected to be highest in Newfoundland and Labrador.
- Prostate cancer mortality rates vary from about 20 per 100,000 to 30 per 100,000 across regions.

Differences in cancer mortality rates may correlate with differences in incidence due to regional variations in modifiable risk factors (*Chapter 1*), as well as differences in access to cancer services, such as screening, diagnosis, treatment and follow-up.[4,5]

Importantly, these estimates do not include a measure of significance, such as confidence intervals or p-values, so we cannot conclude if the differences reported are statistically significant. Also, estimates from less populous provinces and the territories must be interpreted with caution as they can vary considerably from year to year.

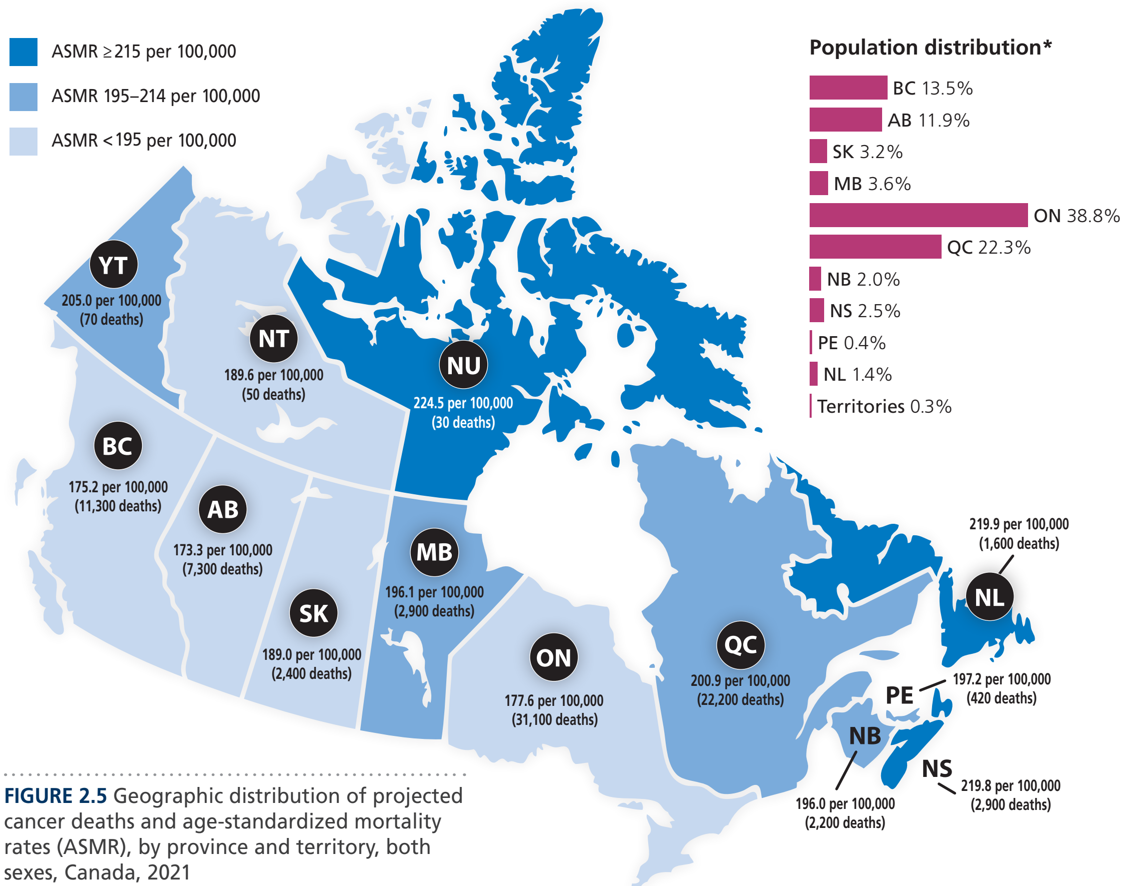


FIGURE 2.5 Geographic distribution of projected cancer deaths and age-standardized mortality rates (ASMR), by province and territory, both sexes, Canada, 2021

Cancer mortality rates are generally higher in eastern Canada and lower in the western Canada.

* Based on projected estimates of population size in 2021.

Note: Rates are age-standardized to the 2011 Canadian standard population.

Analysis by: Centre for Population Health Data, Statistics Canada

Data sources: Canadian Vital Statistics Death database and Population projections for Canada, Provinces and Territories at Statistics Canada

Mortality over time

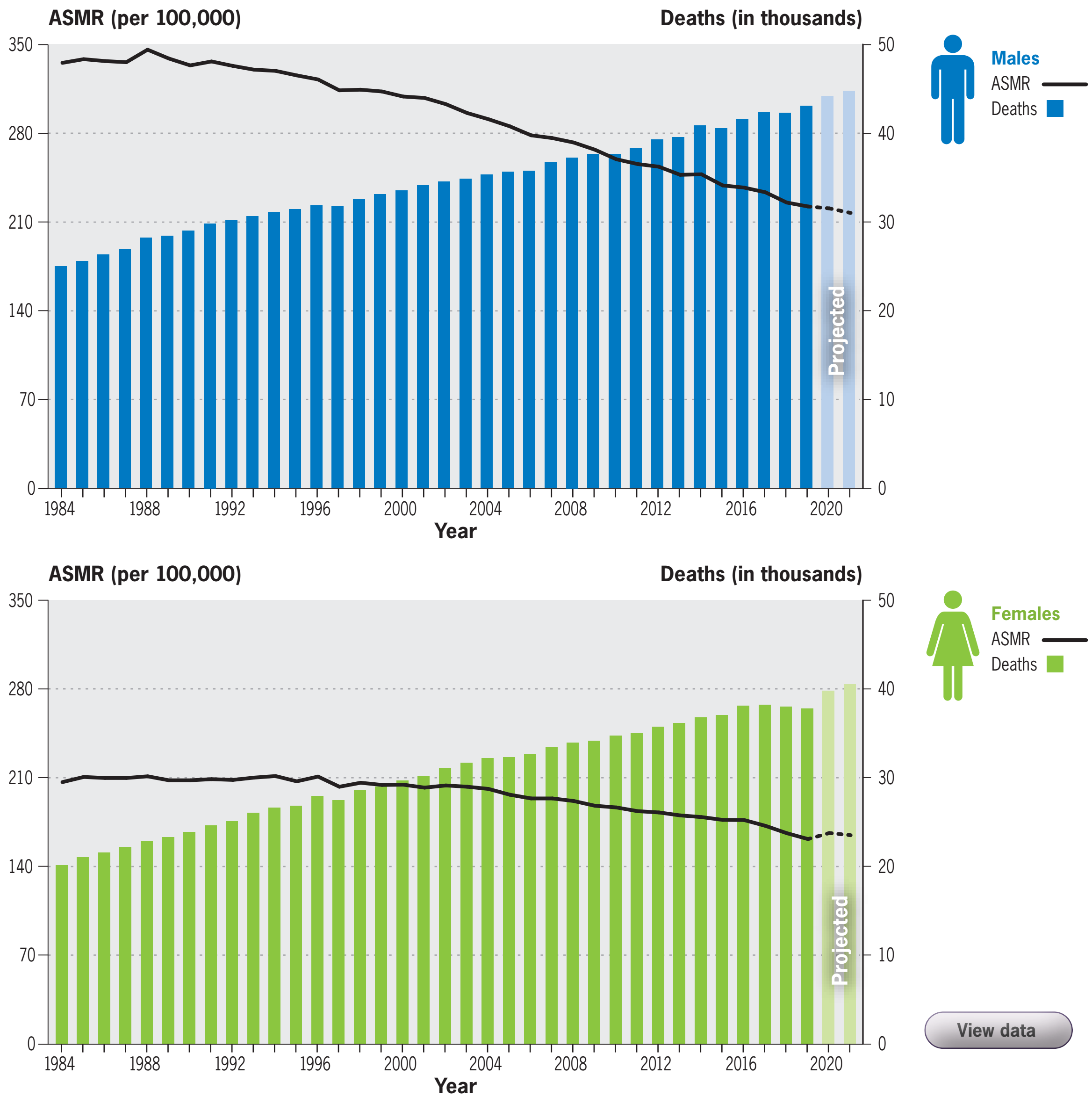
Monitoring mortality over time can help identify emerging trends, where progress has been made and where more needs to be done.

Figure 2.6 provides a high-level view of patterns in mortality over time for all cancers combined.

- From 1984 to 2021, mortality rates for all cancers combined decreased from 335.4 to an estimated 216.9 per 100,000 in males, and from 203.9 to an estimated 162.6 per 100,000 in females. Cancer death rates peaked in 1988 and have since decreased 37% in males and 22% in females.
- Over the same period, the number of cancer deaths has increased from 24,900 to an expected 44,600 in males, and from 19,900 to an expected 40,000 in females. This increase is due primarily to the growing and aging population.[6,7]

The number of cancer deaths in Canada continues to increase each year.

FIGURE 2.6 Deaths and age-standardized mortality rates (ASMR) for all cancers, Canada, 1984–2021



Note: Rates are age-standardized to the 2011 Canadian standard population. Actual mortality data were available to 2019; estimates for 2020–2021 were projected based on data up to 2018.

Analysis by: Centre for Population Health Data, Statistics Canada
Data source: Canadian Vital Statistics Death database at Statistics Canada

Recent trends

Table 2.6 provides the complete picture of trends in cancer mortality rates between 1984 and 2019 for males and females, as measured by an annual percent change (APC).[8] Table 2.7 draws out the most recent trends for each cancer. These recent trends are depicted in Figure 2.7.

Annual percent change (APC)

The estimated change in the age-standardized mortality rate per year over a defined period of time in which there is no significant change in trend (i.e., no changepoint). It is reported as a percentage.

Reference year

The year corresponding to the start year of the APC.

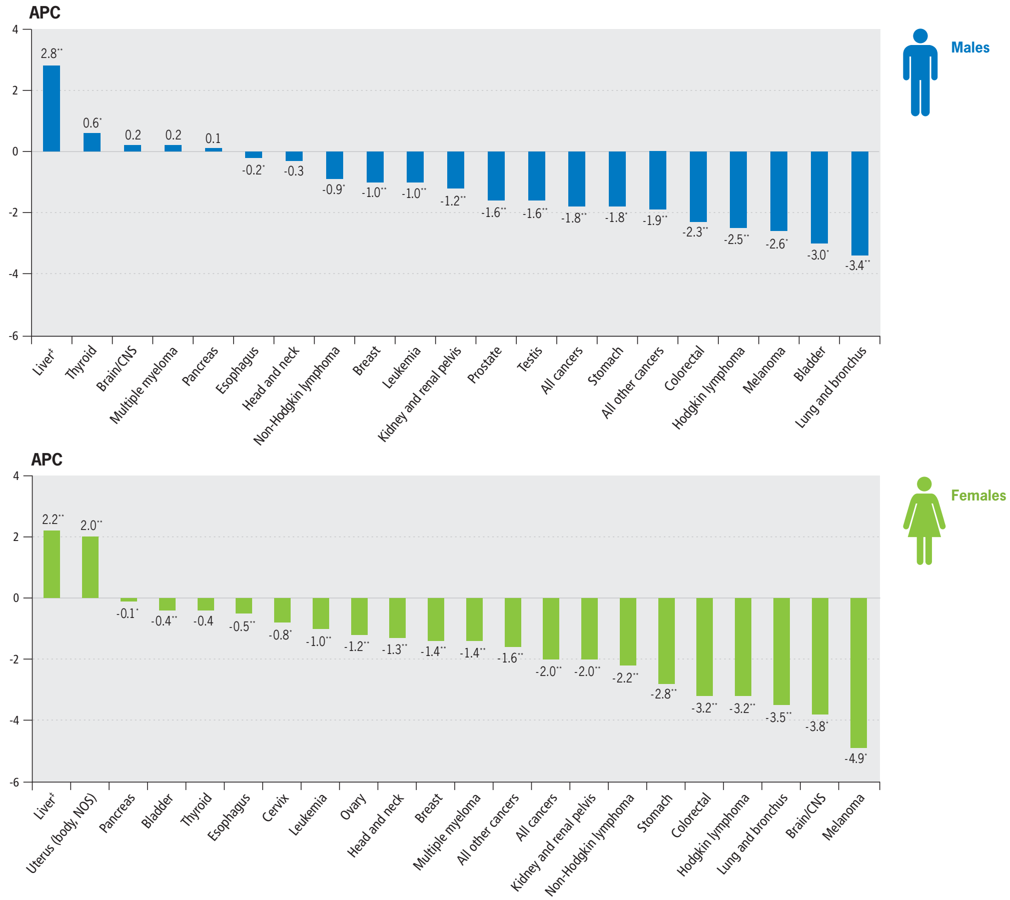
Statistical significance

Refers to a result that is unlikely due to chance, assuming there were no other sources of bias, given a predetermined threshold (e.g., fewer than 1 out of 20 times, which is expressed as $p<0.05$).

Confidence limits (CL)

Upper and lower values of a range (confidence interval) that provide an indication of the precision of an estimate. Confidence intervals are usually 95%. This means that upon repeated sampling for a study, and assuming there were no other sources of bias, 95% of the resulting confidence intervals would contain the true value of the statistic being estimated.

FIGURE 2.7 Most recent annual percent change (APC)† in age-standardized mortality rates (ASMR) for selected cancers, by sex, Canada, 1984–2019



CNS=central nervous system; NOS=not otherwise specified

* APC differs significantly from 0, $p<0.05$

** APC differs significantly from 0, $p<0.001$

† The APC was calculated using the Joinpoint Regression Program and rates age-standardized to the 2011 Canadian standard population. If one or more significant changes in the trend of rates was detected, the APC reflects the trend from the most recent significant change (reference year) to 2019. Otherwise, the APC reflects the trend in rates over the entire period (1984–2019). For further details, see *Appendix II: Data sources and methods*.

‡ Liver cancer mortality was underestimated because deaths from liver cancer, unspecified (ICD-10 code C22.9), were excluded. For further details, see *Appendix II: Data sources and methods*.

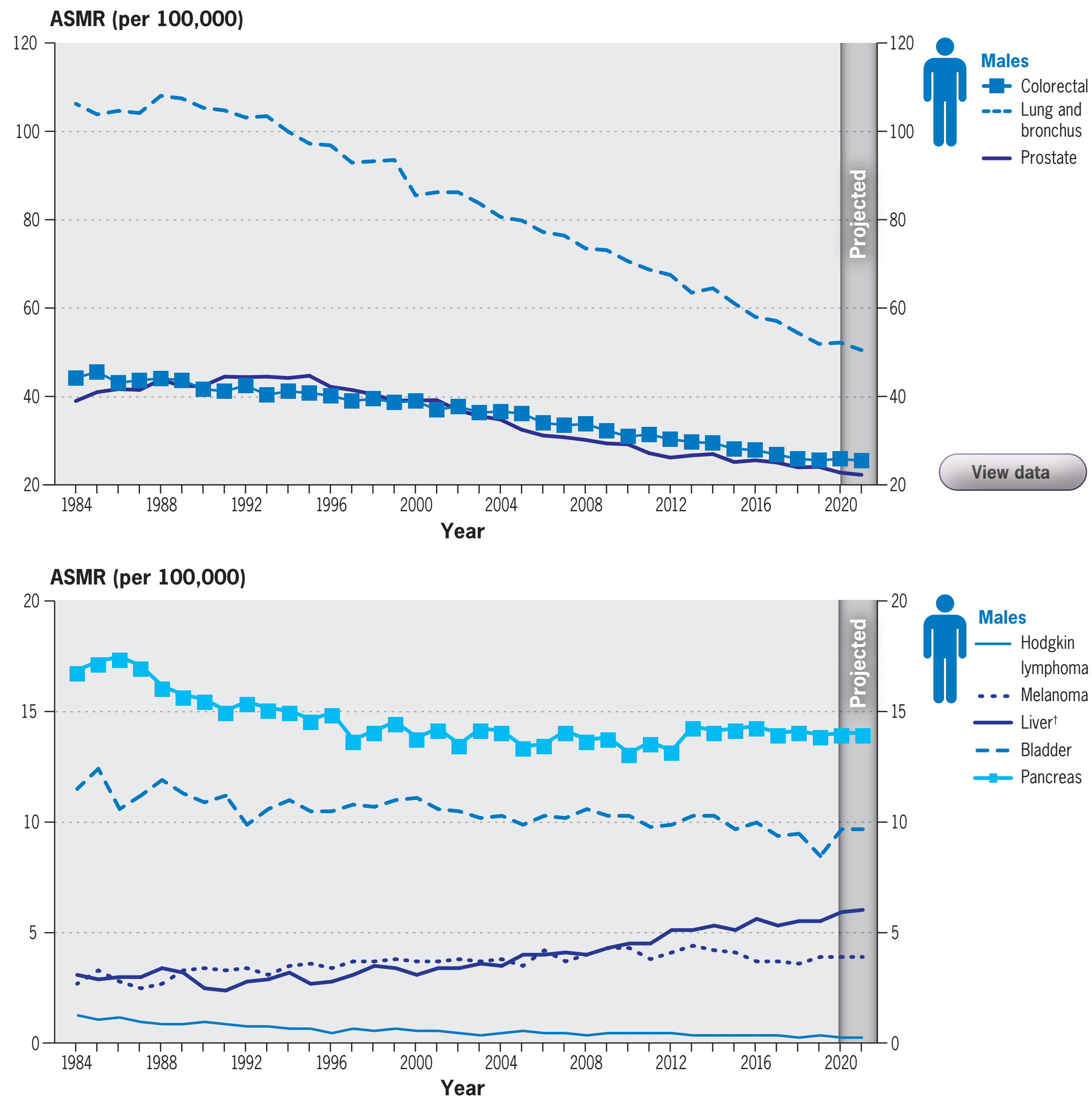
Note: The reference year for each cancer is in Table 2.7. The range of scales differs between the figures. The complete definition of the specific cancers listed here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Vital Statistics Death database at Statistics Canada

- Mortality rates have declined for nearly all cancers in recent years.
- For both sexes and all cancers combined, mortality decreased at a rate of -1.9% per year since 2015.
- In males, this decrease in mortality is largely driven by decreases in lung (-3.4%), and colorectal (-2.3%) cancers, along with bladder (-3.0%), melanoma (-2.6%) and Hodgkin lymphoma (-2.5%).
- In females, the decrease in mortality is largely driven by decreases in lung (-3.5%) and colorectal (-3.2%) cancers, along with melanoma (-4.9%), brain/CNS (-3.8%), Hodgkin lymphoma (-3.2), stomach (-2.8%), non-Hodgkin lymphoma (-2.2%) and kidney and renal pelvis (-2.0%).
- The largest increases in mortality rates are for liver cancer in both males (2.8%) and females (2.2%), as well as for uterine cancer (2.0%).

FIGURE 2.8 Age-standardized mortality rates (ASMR) for selected* cancers, males, Canada, 1984–2021



Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Vital Statistics Death database at Statistics Canada

* Four most frequent causes of cancer death among males and cancers with a statistically significant change in mortality rate of at least 2% per year, as measured by the most recent annual percent change (see Table 2.7).

† Liver cancer mortality was underestimated because deaths from liver cancer, unspecified (ICD-10 code C22.9), were excluded. For further details, see *Appendix II: Data sources and methods*.

Note: Rates are age-standardized to the 2011 Canadian standard population. Actual mortality data were available to 2019; estimates for 2020–2021 were projected based on data up to 2018. The range of scales differs widely between the figures. The complete definition of the specific cancers included here can be found in Table A1.

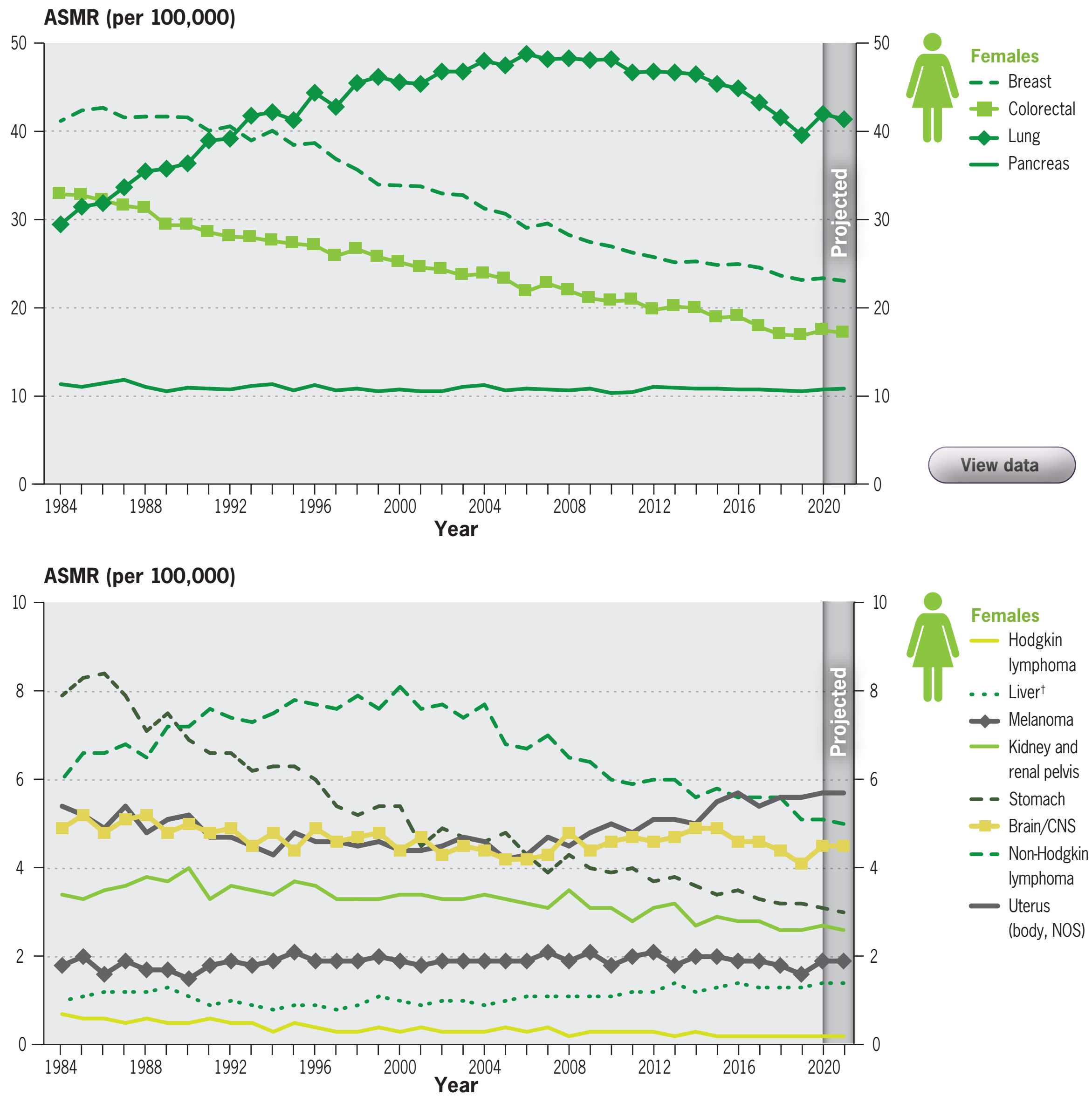
Long-term trends

Longer-term trends provide additional context for understanding the success and challenges in reducing cancer mortality. Table 2.6 shows trends in mortality rates between 1984 and 2019 by cancer type.

- In males, the overall cancer mortality rate increased slightly (0.6% per year) from 1984 to 1988, after which it started to decrease -0.9% per year until 2001. Since 2001, the rate of decline has doubled, with mortality decreasing -1.8% annually.
- In females, the overall cancer mortality has been decreasing at varying rates since 1984: -0.2 % per year between 1984 and 2002; -1.1% per year between 2002 and 2015; and -2.0 % per year since 2015.

Figures 2.8 and 2.9 show the ASMR over time (projected to 2021) for the leading causes of cancer death. They also show cancers that had a statistically significant change of at least 2% in the most recent APC: Hodgkin lymphoma, liver cancer and melanoma for both sexes; bladder cancer in males; and brain/CNS, kidney and renal pelvis, stomach and uterine cancers, as well as non-Hodgkin lymphoma, in females.

FIGURE 2.9 Age-standardized mortality rates (ASMR) for selected* cancers, females, Canada, 1984–2021



Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Vital Statistics Death Database at Statistics Canada

CNS=central nervous system; NOS=not otherwise specified

* Four most frequent causes of cancer death among females and cancers with a statistically significant change in mortality rate of at least 2% per year, as measured by the most recent annual percent change (see Table 2.7).

† Liver cancer mortality was underestimated because deaths from liver cancer, unspecified (ICD-10 code C22.9), were excluded. For further details, see *Appendix II: Data sources and methods*.

Note: Rates are age-standardized to the 2011 Canadian standard population. Actual mortality data were available to 2019; estimates for 2020–2021 were projected based on data up to 2018. The range of scales differs widely between the figures. The complete definition of the specific cancers included here can be found in Table A1.

Lung and bronchus (lung) cancer

In males, the mortality rate for lung cancer was stable throughout the 1980s and has been declining since 1992. In females, the mortality rate continued to increase until 2006. While the initial decline in females was slow (-0.7% between 2006 and 2015), the rate of decline for lung cancer mortality is now comparable between sexes for the first time since 1984 (-3.4% between 2011 and 2019 for males and -3.5% between 2015 and 2019 for females).

The pattern in lung cancer mortality largely mirrors that of lung cancer incidence, which reflects past tobacco smoking. Despite the observed downward trends, lung cancer continues to be the most commonly diagnosed cancer in Canada and remains the leading cause of cancer death. Efforts to control tobacco use are still needed to further reduce the burden of lung cancer[9,10] as approximately 15% of Canadians continue to smoke on a daily basis.[11] Pilot studies are currently underway to investigate the feasibility of implementing lung cancer screening programs for high-risk populations.[12] In 2020, British Columbia announced the funding of the first province-wide organized lung screening program in Canada, and in April 2021 Ontario transitioned their four screening sites from their pilot study into the Ontario Lung Screening Program. Quebec launched a three-year lung cancer screening demonstration project that began on June 1, 2021. The aim of these programs is to detect disease at an earlier stage when it may respond better to treatment. Currently, about 70% of lung cancers are diagnosed at a late stage (stage III or IV),[13–15] so these programs may help further reduce lung cancer mortality rates in the future.

Colorectal cancer

The mortality rates for colorectal cancer have declined significantly for both sexes between 1984 and 2019. In males, the rate declined -1.0% per year until 2004 and -2.3% afterwards. In females, the rate initially declined -1.7% per year, but since 2014 the rate of decline has nearly doubled, lowering mortality -3.4% per year. Part of this decline may be driven by the decrease in incidence and improvements in treatment.[16,17] Given the strong connection between stage at diagnosis and survival for colorectal cancer,[18,19] participation in colorectal cancer screening programs may be an additional factor contributing to the more rapid rate of decline observed in colorectal cancer mortality in recent years.[20]

Pancreatic cancer

Although it is not one of the most commonly diagnosed cancers, pancreatic cancer is expected to be the third leading cause of cancer death in 2021. This is in part because the mortality rate for pancreatic cancer has stayed largely the same over the past 35 years, whereas that of more common cancers, including lung, breast, prostate and colorectal, has declined considerably. For both sexes combined, there was a marginal decrease in pancreatic cancer mortality rates between 1984 and 2000 (-0.8% per year) and no significant change since 2000 (0.1%). The mortality rates for pancreatic cancer are almost as high as the incidence rates for this cancer due to the low survival.[21–23] Between countries, trends in pancreatic cancer mortality rates varied in the past decade but have typically increased over time.[24]

For more discussion about the burden of pancreatic cancer, see *Canadian Cancer Statistics 2017* *(Chapter 6: Pancreatic cancer)*.[22]

Breast cancer (female)

The breast cancer mortality rate in females has been declining since the 1980s. After its peak in 1986, the ASMR has fallen 46%, from 42.7 deaths per 100,000 in 1986 to a projected rate of 23.1 deaths per 100,000 in 2021. The downward trend was estimated at -2.4% per year between 1994 and 2011 and -1.4% per year between 2011 and 2019. The decline in breast cancer mortality has been largely attributed to a combination of increased mammography screening[25] and the use of more effective and multidisciplinary therapies following breast cancer diagnosis.[26,27] A similar decline has been observed in the US where the breast cancer death rate decreased by -1.3% per year between 2011 and 2017.[28] However, breast cancer continues to be an important health concern internationally. Many countries report increases in both prevalence and mortality rates[29] and there continues to be high incidence and mortality rates in Canada.

Prostate cancer

The mortality rate for prostate cancer has been decreasing since 1994. Initially, the rate declined -2.8% per year, and in 2012 the decline slowed to -1.6% per year. The decline likely reflects improved treatment following the introduction of hormonal therapy for early and advanced stage disease[30,31] and advances in radiation therapy.[32] The role of screening with the prostate-specific antigen (PSA) test in reducing mortality rate remains unclear. In 2009, two large randomized trials in the US and Europe reported conflicting results on the use of PSA testing in males older than 55 years of age.[33,34] The Canadian Task Force on Preventive Health Care does not recommend the use of the PSA test for screening based on the current evidence.[35] A recent study from the Public Health Agency of Canada reported no increase in mortality or diagnosis of late-stage tumours in the five years following the adoption of revised PSA screening guidelines.

Bladder

In males, the bladder cancer mortality rate had historically decreased marginally (-0.4%). However, since 2015, the rate of decline has been rapid at -3.0% per year. In females, the decrease in the mortality rate has been stable at -0.4% per year since 1984. Similar patterns of decline have been reported in the United Kingdom (UK)[36] where males have also shown a faster reduction in mortality rates than females in recent years. Globally, bladder cancer mortality has decreased in most countries, except in those undergoing rapid economic transition. As tobacco smoking is the main risk factor for bladder cancer, accounting for about half of all bladder cancer cases in some populations, it is not surprising to see trends in bladder cancer incidence (see Chapter 1) and mortality partially mirroring smoking histories in Canada and elsewhere.[37]

Brain and central nervous system (CNS)

In males, the mortality rate associated with cancer of the brain and CNS decreased -0.5% per year between 1984 and 2003; it has since stabilized. In females, the mortality rate declined -0.7% until 2006, increased 1.3% per year until 2015 and has since decreased rapidly at -3.8 per year. Decreases in brain and CNS cancer mortality rates have been reported in several countries, though the magnitude of decline varies considerably between countries, sexes and sociodemographic index.[38,39] Sex differences in cancer risk and mortality are likely linked to differences in fundamental mechanisms of tumour initiation, tumour promotion and therapeutic response. Currently, optimal treatment for primary CNS cancers consist of multidisciplinary approaches that combine biopsy or aggressive surgical resection with post-operative radiation and chemotherapy, when appropriate.[40]

Hodgkin lymphoma

Hodgkin lymphoma mortality rates have been declining rapidly in both males and females since 1984. For both sexes combined, the rate declined -4.6% per year until 1997 and has since declined -2.5% per year. Based on these rates of decline, mortality rates in 2021 are expected to be 77% and 71% lower than in 1984 for males and females, respectively. The latest study of global mortality for Hodgkin lymphoma reported similar downward trends[41] though the magnitude of decline in mortality varies by age group and a region's sociodemographic index. The reduction in mortality has been largely attributed to improvements in treatment.[42,43]

Kidney and renal pelvis

Kidney and renal pelvis cancer mortality rates have been declining since 1984 in both males and females. Recent trends show a -1.2% annual decline in male mortality rate since 2004 and a -2.0% annual decline in female mortality since 2008. Similar magnitude declines in kidney cancer mortality have been reported in the US[44] and globally, in high sociodemographic regions.[45] The interpretation of these trends remains open to discussion. However, some researchers have suggested that a greater understanding of the molecular biology of the disease and improvements in diagnosis and treatment, as well as downward trends in tobacco smoking, may have played a role.[44–47]

Liver cancer

Trends in liver cancer mortality fluctuated considerably between 1984 and 2019, with recent patterns showing significant increases in mortality for both sexes. In males, the rate increased 2.8% per year since 1991. In females, it has increased 2.2% per year since 1994. If these rates continue to increase, mortality rates for 2021 are expected to be 150% higher in males and 75% higher in females compared to what they were in 1991 and 1994, respectively. Similar trends have been reported in several countries, including the US and UK.[48] Typically, trends in mortality mirror those of incidence because prognosis for liver cancer remains poor. However, the decline in liver cancer incidence rates noted in Chapter 1 has yet to translate into a downward shift in mortality. Hepatitis C infection and alcohol use are the main risk factors for liver cancer in the high-income countries.[49–51]

Melanoma

In males, the melanoma mortality rate increased 1.3% per year between 1984 and 2013. Since then, it has decreased -2.6% annually. In females, the mortality rate increased marginally (0.4% per year) until 2015 and has since declined at a rapid rate of -4.9% per year. This represents the fastest decline in mortality amongst all cancer types. Similar patterns have also been reported in the US[8] and Europe.[52] These decreases have largely been attributed to the introduction of improved therapies and early diagnosis, as well as the implementation of awareness programs.

Non-Hodgkin lymphoma

Non-Hodgkin lymphoma mortality rates increased prior to 2000 but have declined subsequently since then. In males, the rate decreased -2.4% per year between 2000 and 2010, and -0.9% per year thereafter. In females, the rate of decline has been constant since 1999 at -2.2% per year. As incidence rates continue to increase in both sexes combined (Table 1.6) declining mortality likely reflect recent improvements in treatment, such as immunotherapy (e.g., rituximab). In addition, the introduction of highly active antiretroviral therapy (HAART) in the late 1990s[53] for the human immunodeficiency virus (HIV) resulted in a decline of the aggressive forms of non-Hodgkin lymphoma attributable to HIV infection.

Stomach cancer

Between 1984 and 2019, mortality rates for stomach cancer declined for both sexes. In males, the rate declined rapidly at -3.3% per year until 2012, and then -1.8% afterwards. In females, the rate of decline has been constant since 1984 at -2.8% per year. In 2021, the mortality rate for females is expected to be less than half of what it was in 1984. The trends in mortality rates have largely mirrored those in incidence. This pattern was reported in several regions of the world.[54] Research suggests that diet modification and changes in the prevalence of common risk factors, including *Helicobacter pylori* infections and tobacco smoking, have contributed to the reported trends.[54,55]

Average annual percent change (AAPC)

The weighted average of the APCs in effect during a period of time, where the weights equal the proportion of time accounted for by each APC in the interval. AAPC summarizes the change in age-standardized rates over a specified interval. It is reported as a percentage.

Uterine cancer (body, not otherwise specified [NOS])

The mortality rate for uterine cancer increased 2.0% per year between 2005 and 2019, which represents an increase of 35% over the entire 14-year period. Comparatively, the incidence rate for uterine cancer increased rapidly through the mid-2000s, but it has slowed to a 1.0% increase per year since 2011. Similar trends have been reported in the US[56] and UK.[57] The past increase in uterine cancer incidence (and therefore mortality) has been attributed, at least in part, to increases in the prevalence of obesity, an important risk factor for the disease.[58–60] Currently, uterine cancer is one of the few cancer types for which both the mortality and incidence rates continue to increase in Canada.

Average annual percent change (AAPC)

Table 2.6 also shows the average annual percent change (AAPC) in cancers between 1984 and 2019. By summarizing changes in trends, the AAPC enables the comparison of changes in mortality across cancers for the same defined time period. Since 1984, the biggest improvements for both sexes combined were for Hodgkin lymphoma and stomach cancer, while the biggest increase was for liver cancer.

The AAPC also provides a measure of the overall change in a cancer over a period of time. For example, despite the increase in prostate cancer mortality rate between 1984 and 1994 (APC=1.3%), the mortality rate for this cancer has decreased overall since 1984 (AAPC=-1.4%). AAPCs should be interpreted with caution because they do not necessarily reflect the most recent trends; the APC should be used for the most recent trends. For example, while the mortality rate for lung cancer in females increased marginally (AAPC=0.8%) between 1984 and 2019, it has decreased rapidly since 2015 (APC=-3.5%). In Canada, the mortality rate for all cancers combined has decreased by an average of -0.9% per year since 1984.

What do these statistics mean?

Encouragingly, the mortality rate for all cancers combined has been decreasing since the late 1980s. This is despite the fact that the incidence rate for all cancers combined has only been declining in Canada since 2011.

A decrease in the mortality rate for a specific cancer can result from a decrease in the incidence rate. As a result, it is not surprising that the patterns in mortality rates by sex, age and geographic region largely mirror the patterns for incidence reported in Chapter 1. For example, cancer mortality rates are generally higher among males than females, most cancer deaths occur at older ages and cancer mortality rates are generally higher in eastern Canada than in western Canada.

However, incidence is not the only factor that determines mortality. A decrease in the mortality rate for a specific cancer can also result from an improvement in early detection. This is because cancer stage at diagnosis has a significant impact on cancer survival.[13] Improvements in treatments that increase the chances of survival also have an impact on mortality rates. As such, factors like access to cancer control interventions (e.g., screening) or variations in clinical practice patterns by province, age or sex also contribute to variations in mortality rates. There are likely also age and sex differences in the response to cancer treatment[61] that further contribute to variations in mortality rates.

Although the overall mortality rate continues to decline in Canada, the actual number of cancer deaths continues to increase due to the growth and aging of the population. This has implications for health policy and resource planning. Moreover, the mortality rate of some cancers, like liver cancer, continues to increase. Improving early detection and treatment for people diagnosed with cancer and improving supports for people living with and beyond cancer continues to be of the utmost importance.

Supplementary resources

Cancer.ca/statistics houses supplementary resources for this chapter. This includes:

- Excel spreadsheets with the statistics used to create the figures
- Excel spreadsheets with supplementary statistics
- PowerPoint images of the figures used throughout this chapter

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TABLE 2.1 Lifetime probability of dying from cancer, Canada (excluding Quebec), 2019

	Lifetime probability of dying from cancer					
	%			One in:		
	Both sexes	Males	Females	Both sexes	Males	Females
All cancers	**23.4**	**25.6**	**21.5**	**4.3**	**3.9**	**4.7**
Lung and bronchus	5.2	5.4	5.0	19	18	20
Colorectal	2.7	3.0	2.5	37	34	40
Pancreas	1.5	1.5	1.5	66	65	68
Breast	1.5	0.0	2.9	66	3,344	34
Prostate	—	3.5	—	—	29	—
Leukemia	0.8	1.0	0.7	118	102	140
Non-Hodgkin lymphoma	0.9	1.0	0.7	115	97	140
Bladder	0.8	1.1	0.4	131	90	225
Brain/CNS	0.6	0.7	0.4	181	149	227
Esophagus	0.6	1.0	0.3	156	101	329
Head and neck	0.5	0.7	0.3	194	133	337
Stomach	0.6	0.7	0.4	178	140	229
Kidney and renal pelvis	0.5	0.7	0.4	190	145	273
Ovary	—	—	1.0	—	—	103
Multiple myeloma	0.5	0.6	0.4	213	181	263
Liver*	0.4	0.6	0.2	271	174	602
Melanoma	0.3	0.5	0.2	292	211	479
Uterus (body, NOS)	—	—	0.7	—	—	137
Cervix	—	—	0.2	—	—	486
Thyroid	0.1	0.1	0.1	1,258	1,580	995
Hodgkin lymphoma	0.0	0.0	0.0	2,825	2,500	7,463
Testis	—	0.0	—	—	6,667	—

— Not applicable; CNS=central nervous system; NOS=not otherwise specified; 0.0 indicates that value is less than 0.05

* Liver cancer mortality was underestimated because deaths from liver cancer, unspecified (ICD-10 code C22.9), were excluded. For further details, see *Appendix II: Data sources and methods*.

Note: The probability of dying from cancer is calculated based on age-, sex- and cause-specific mortality rates for Canada excluding Quebec in 2019. For further details, see *Appendix II: Data sources and methods*. The complete definition of the specific cancers included here can be found in Table A1.

Analysis by: Centre for Surveillance and Applied Research, Public Health Agency of Canada

Data source: Canadian Vital Statistics Death Database at Statistics Canada

TABLE 2.2 Projected deaths and age-standardized mortality rates (ASMR) for cancers, by sex, Canada, 2021

	Deaths (2021 estimates)			Deaths per 100,000		
	Total*	Males	Females	Both sexes	Males	Females
All cancers	**84,600**	**44,600**	**40,000**	**185.9**	**216.9**	**162.6**
Lung and bronchus	21,000	10,800	10,300	45.5	50.9	41.4
Colorectal	9,600	5,300	4,300	21.2	25.9	17.2
Pancreas	5,600	2,900	2,700	12.3	13.9	10.9
Breast	5,500	55	5,400	12.5	0.3	23.1
Prostate	4,500	4,500	—	—	22.7	—
Leukemia	3,100	1,800	1,300	6.8	8.8	5.2
Non-Hodgkin lymphoma	2,900	1,650	1,250	6.5	8.2	5.0
Bladder	2,600	1,900	720	5.7	9.6	2.8
Brain/CNS	2,400	1,400	1,050	5.7	6.9	4.5
Esophagus	2,300	1,750	530	5.1	8.4	2.2
Head and neck	2,100	1,500	560	4.6	7.3	2.3
Stomach	1,950	1,250	740	4.4	6.0	3.0
Kidney and renal pelvis	1,950	1,250	660	4.3	6.2	2.6
Ovary	1,950	—	1,950	—	—	8.1
Multiple myeloma	1,600	930	690	3.5	4.5	2.7
Liver†	1,600	1,300	330	3.6	6.0	1.4
Uterus (body, NOS)	1,400	—	1,400	—	—	5.7
Melanoma	1,250	790	450	2.8	3.9	1.9
Cervix	380	—	380	—	—	1.8
Thyroid	240	110	130	0.5	0.5	0.5
Hodgkin lymphoma	110	65	40	0.2	0.3	0.2
Testis	35	35	—	—	0.2	—
All other cancers	10,500	5,400	5,100	23.0	26.6	20.1

— Not applicable; CNS=central nervous system; NOS=not otherwise specified

* Column totals may not sum to row totals due to rounding. See *Rounding for reporting* in *Appendix II* for more information on rounding procedures.

† Liver cancer mortality was underestimated because deaths from liver cancer, unspecified (ICD-10 code C22.9), were excluded. For further details, see *Appendix II: Data sources and methods*.

Note: Rates are age-standardized to the 2011 Canadian standard population. The complete definition of the specific cancers included here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Vital Statistics Death Database at Statistics Canada

TABLE 2.3 Projected deaths for the most common causes of cancer death, by age group and sex, Canada, 2021

Age	All cancers			Lung and bronchus			Colorectal		
	Both sexes*	Males	Females	Both sexes*	Males	Females	Both sexes*	Males	Females
All ages	**84,600**	**44,600**	**40,000**	**21,000**	**10,800**	**10,300**	**9,600**	**5,300**	**4,300**
0–14	110	60	45	—	—	—	—	—	—
15–29	230	130	100	5	—	—	10	5	5
30–39	680	270	410	35	10	25	90	50	40
40–49	2,000	880	1,150	240	100	140	280	150	120
50–59	7,300	3,600	3,600	1,550	750	780	860	510	350
60–69	18,800	10,200	8,600	5,500	2,800	2,700	1,850	1,150	720
70–79	26,200	14,400	11,800	7,600	4,000	3,600	2,700	1,600	1,050
80–89	21,500	11,600	9,900	4,900	2,600	2,300	2,600	1,350	1,250
90+	7,800	3,600	4,300	1,200	540	650	1,200	450	770
50–74	39,200	21,000	18,200	11,000	5,600	5,300	4,000	2,400	1,600
65+	66,100	35,300	30,800	16,900	8,700	8,100	7,600	4,100	3,500

Age	Pancreas			Breast	Prostate
	Both sexes*	Males	Females	Females	Males
All ages	**5,600**	**2,900**	**2,700**	**5,400**	**4,500**
0–14	—	—	—	—	—
15–29	—	—	—	10	—
30–39	20	10	10	140	—
40–49	110	65	45	350	5
50–59	530	320	220	750	100
60–69	1,400	780	600	1,150	540
70–79	1,850	970	870	1,300	1,250
80–89	1,350	630	710	1,100	1,750
90+	400	140	260	610	820
50–74	2,900	1,600	1,250	2,600	1,200
65+	4,400	2,200	2,200	3,600	4,200

— Fewer than 3 deaths.

* Counts for both sexes may not sum to row totals due to rounding. See Rounding for reporting in *Appendix II* for more information on rounding procedures.

Note: The complete definition of the specific cancers included here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Vital Statistics Death Database at Statistics Canada

TABLE 2.4 Projected age-standardized mortality rates (ASMR) for selected cancers, by sex and province, Canada,* 2021

	CA	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL
Males											
All cancers	**216.9**	**201.7**	**200.5**	**217.2**	**231.0**	**209.7**	**231.3**	**235.8**	**264.9**	**237.6**	**256.8**
Lung and bronchus	50.9	42.0	44.1	49.2	48.3	45.0	64.7	65.2	60.4	58.0	65.7
Colorectal	25.9	24.6	23.3	27.8	29.1	23.0	28.7	26.9	35.9	33.7	42.8
Prostate	22.7	22.1	25.3	29.5	29.2	22.0	20.3	22.1	28.8	24.6	27.8
Pancreas	13.9	13.6	13.4	13.8	14.0	14.2	13.8	15.1	14.5	12.6	12.5
Bladder	9.6	9.8	6.6	9.6	10.5	9.2	10.7	10.3	10.8	9.5	10.2
Leukemia	8.8	8.1	8.1	10.8	10.3	8.5	9.6	10.1	10.5	7.2	7.6
Esophagus	8.4	9.5	8.1	10.5	9.1	8.3	7.1	9.7	11.9	9.7	8.6
Non-Hodgkin lymphoma	8.2	7.8	7.7	8.1	7.6	8.3	8.4	9.1	9.8	9.2	8.9
Head and neck	7.3	6.6	6.4	5.5	5.7	7.5	7.9	6.3	8.3	6.0	7.5
Brain/CNS	6.9	6.9	6.7	5.2	5.2	6.9	7.5	6.7	7.5	5.8	7.1
Liver†	6.0	7.7	5.6	3.1	5.0	6.5	5.4	4.1	6.4	6.0	3.4
Kidney and renal pelvis	6.2	5.7	5.3	7.3	8.9	5.6	6.6	8.3	8.9	7.7	9.1
Stomach	6.0	4.9	5.0	4.4	5.5	6.4	6.6	6.1	5.9	5.3	10.1
Multiple myeloma	4.5	4.6	4.3	4.4	5.3	4.4	4.8	4.3	4.5	6.7	4.7
Melanoma	3.9	3.4	3.2	2.9	3.2	4.9	3.1	3.3	5.9	5.2	3.1
Thyroid	0.5	0.7	0.5	0.5	0.6	0.6	0.5	—	0.7	—	0.7
Hodgkin lymphoma	0.3	0.3	0.4	—	0.4	0.4	0.4	—	—	—	—
Breast	0.3	0.3	0.3	—	0.4	0.3	0.3	0.7	0.5	—	—
Testis	0.2	0.2	0.1	—	—	0.2	0.2	—	—	—	—
Females											
All cancers	**162.6**	**154.3**	**153.3**	**167.9**	**170.1**	**153.7**	**178.7**	**165.8**	**185.9**	**164.4**	**190.7**
Lung and bronchus	41.4	39.8	38.5	43.9	43.1	35.4	50.7	44.6	51.3	48.3	44.4
Breast	23.1	20.2	22.7	25.3	23.5	22.9	24.9	20.9	24.7	20.0	25.3
Colorectal	17.2	16.8	15.4	18.9	18.8	15.1	19.6	18.0	22.7	20.4	27.9
Pancreas	10.9	11.1	11.0	10.2	11.0	10.5	11.5	10.9	10.3	9.1	9.7
Ovary	8.1	9.4	7.3	8.9	9.0	7.8	7.9	7.8	9.1	9.6	9.3
Uterus (body, NOS)	5.7	5.1	5.4	4.9	6.5	6.0	5.8	5.1	6.8	4.3	5.8
Leukemia	5.2	5.3	4.4	5.2	5.5	5.1	5.7	5.7	5.2	4.4	5.9
Non-Hodgkin lymphoma	5.0	4.9	4.5	4.8	5.6	5.0	5.0	6.3	6.3	5.1	6.5
Brain/CNS	4.5	4.4	4.1	4.3	4.0	4.4	5.3	4.3	4.2	4.5	6.2
Stomach	3.0	2.4	2.8	2.6	2.9	3.2	3.3	3.3	2.4	2.4	4.4
Bladder	2.8	2.8	2.4	2.5	2.6	2.7	3.2	2.7	2.7	2.7	2.8
Multiple myeloma	2.7	2.7	2.3	3.0	3.2	2.6	3.0	3.4	3.1	3.3	3.5
Kidney and renal pelvis	2.6	2.2	2.2	3.5	3.5	2.4	3.0	3.4	3.8	2.9	4.6
Head and neck	2.3	2.5	2.0	1.9	2.1	2.2	2.7	2.0	2.3	2.9	2.0
Esophagus	2.2	2.7	2.0	2.2	2.2	2.2	1.8	2.5	2.7	2.7	2.0
Melanoma	1.9	1.6	1.7	1.7	1.5	2.1	1.9	2.4	2.3	3.3	1.7
Cervix	1.8	1.6	1.9	2.8	2.0	1.8	1.7	1.7	1.8	2.9	3.1
Liver†	1.4	1.8	1.5	0.7	1.4	1.4	1.3	1.0	1.1	—	1.2
Thyroid	0.5	0.6	0.6	0.5	0.6	0.5	0.5	0.5	0.6	—	0.7
Hodgkin lymphoma	0.2	0.2	0.2	—	—	0.2	0.3	—	—	—	—

— ASMR based on fewer than 3 deaths; CNS=central nervous system; NOS=not otherwise specified

* Canada totals include provincial and territorial estimates. Territories are not listed due to small numbers.

† Liver cancer mortality was underestimated because deaths from liver cancer, unspecified (ICD-10 code C22.9), were excluded. For further details, see *Appendix II: Data sources and methods*.

Note: Rates are age-standardized to the 2011 Canadian standard population. The complete definition of the specific cancers listed here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Vital Statistics Death Database at Statistics Canada

TABLE 2.5 Projected deaths for selected cancers by sex and province, Canada,* 2021

	CA†	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL
Males											
All cancers	**44,600**	**6,000**	**3,800**	**1,300**	**1,550**	**16,400**	**11,600**	**1,200**	**1,600**	**230**	**860**
Lung and bronchus	10,800	1,300	870	300	330	3,600	3,400	330	380	60	230
Colorectal	5,300	720	450	160	190	1,800	1,400	140	210	30	140
Prostate	4,500	640	440	170	180	1,700	980	100	160	20	85
Pancreas	2,900	410	260	80	95	1,150	710	75	90	10	45
Bladder	1,900	290	120	55	65	700	530	50	65	10	30
Leukemia	1,800	240	150	65	70	660	480	50	60	5	25
Esophagus	1,750	290	170	60	60	670	360	50	70	10	30
Non-Hodgkin lymphoma	1,650	230	140	45	50	650	420	45	55	10	30
Head and neck	1,500	200	130	35	40	600	400	30	50	5	25
Brain/CNS	1,400	200	140	30	35	530	370	30	45	5	25
Liver‡	1,300	240	120	20	35	520	280	25	40	5	10
Kidney and renal pelvis	1,250	170	100	45	60	440	330	45	55	10	30
Stomach	1,250	140	95	25	35	500	330	30	35	5	35
Multiple myeloma	930	140	80	25	35	350	240	20	25	5	15
Melanoma	790	100	60	20	20	380	150	15	35	5	10
Thyroid	110	20	10	5	5	50	25	—	5	—	5
Hodgkin lymphoma	65	10	10	—	5	30	20	—	—	—	—
Breast	55	10	5	—	5	25	15	5	5	—	—
Testis	35	5	5	—	—	15	10	—	—	—	—
Females											
All cancers	**40,000**	**5,300**	**3,500**	**1,150**	**1,350**	**14,700**	**10,600**	**980**	**1,350**	**190**	**730**
Lung and bronchus	10,300	1,400	880	300	350	3,400	3,000	270	380	60	170
Breast	5,400	680	510	170	180	2,100	1,400	120	170	20	90
Colorectal	4,300	590	350	140	160	1,500	1,200	110	170	25	110
Pancreas	2,700	390	250	70	90	1,050	690	65	75	10	40
Ovary	1,950	320	160	60	70	720	450	45	65	10	35
Uterus (body, NOS)	1,400	180	120	35	50	570	340	30	50	5	25
Leukemia	1,300	180	100	35	45	490	340	35	40	5	20
Non-Hodgkin lymphoma	1,250	170	100	35	45	490	310	35	45	5	25
Brain/CNS	1,050	140	95	25	30	390	280	20	30	5	20
Stomach	740	80	60	20	25	300	200	20	15	5	15
Bladder	720	100	55	20	20	270	200	15	20	5	10
Multiple myeloma	690	95	55	20	25	250	190	20	25	5	15
Kidney and renal pelvis	660	75	50	25	30	240	180	20	30	5	20
Head and neck	560	85	45	15	15	210	160	10	15	5	5
Esophagus	530	95	45	15	20	210	110	15	20	5	5
Melanoma	450	50	40	10	10	200	100	15	15	5	5
Cervix	380	50	40	15	15	150	80	10	10	5	10
Liver‡	330	60	35	5	10	140	80	5	5	—	5
Thyroid	130	20	15	5	5	50	30	5	5	—	5
Hodgkin lymphoma	40	5	5	—	—	15	15	—	—	—	—

— Fewer than 3 deaths; CNS=central nervous system; NOS=not otherwise specified

* Canada totals include provincial and territorial estimates. Territories are not listed due to small numbers.

† Canadian counts may not sum to row totals due to rounding. See *Rounding for reporting* in Appendix II for more information on rounding procedures.

‡ Liver cancer mortality was underestimated because deaths from liver cancer, unspecified (ICD-10 code C22.9), were excluded. For further details, see *Appendix II: Data sources and methods*.

Note: The complete definition of the specific cancers listed here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Vital Statistics Death Database at Statistics Canada

TABLE 2.6 Annual percentage change (APC) and average annual percent change (AAPC) in age-standardized mortality rates (ASMR) for selected cancers, by sex, Canada, 1984–2019

	Both sexes			Males			Females		
	Period	APC* (95% CL)	AAPC* (95% CL), 1984–2019	Period	APC* (95% CL)	AAPC* (95% CL), 1984–2019	Period	APC* (95% CL)	AAPC* (95% CL), 1984–2019
All cancers	**1984–1992**	**-0.1 (-0.3, 0.2)**	**-0.9 (-1.0, -0.8)**	**1984–1988**	**0.6 (-0.1, 1.4)**	**-1.1 (-1.3, -1.0)**	**1984–2002**	**-0.2 (-0.3, -0.1)**	**-0.7 (-0.8, -0.6)**
	1992–2002	**-0.7 (-0.9, -0.5)**		**1988–2001**	**-0.9 (-1.0, -0.7)**		**2002–2015**	**-1.1 (-1.2, -0.9)**	
	2002–2015	**-1.3 (-1.4, -1.2)**		**2001–2019**	**-1.8 (-1.8, -1.7)**		**2015–2019**	**-2.0 (-2.7, -1.4)**	
	2015–2019	**-1.9 (-2.4, -1.4)**							
Lung and bronchus	1984–1992	1.0 (0.5, 1.5)	-0.9 (-1.1, -0.7)	1984–1992	-0.1 (-0.6, 0.5)	-2.0 (-2.1, -1.8)	1984–1993	3.8 (3.2, 4.3)	0.8 (0.6, 1.1)
	1992–2007	-0.8 (-0.9, -0.6)		1992–2011	-2.1 (-2.3, -2.0)		1993–2006	1.2 (1.0, 1.5)	
	2007–2015	-1.7 (-2.1, -1.2)		2011–2019	-3.4 (-3.9, -3.0)		2006–2015	-0.7 (-1.1, -0.2)	
	2015–2019	-3.6 (-4.7, -2.6)					2015–2019	-3.5 (-4.6, -2.3)	
Colorectal	1984–2005	-1.3 (-1.4, -1.2)	-1.7 (-1.7, -1.6)	1984–2004	-1.0 (-1.2, -0.9)	-1.6 (-1.7, -1.5)	1984–2014	-1.7 (-1.8, -1.6)	-1.9 (-2.1, -1.7)
	2005–2019	-2.2 (-2.3, -2.0)		2004–2019	-2.3 (-2.5, -2.1)		2014–2019	-3.2 (-4.2, -2.1)	
Pancreas	1984–2000	-0.8 (-1.1, -0.6)	-0.3 (-0.5, -0.2)	1984–2000	-1.4 (-1.7, -1.1)	-0.6 (-0.8, -0.4)	1984–2019	-0.1 (-0.2, 0.0)	-0.1 (-0.2, 0.0)
	2000–2019	0.1 (-0.1, 0.2)		2000–2019	0.1 (-0.1, 0.3)				
Breast	1984–1994	-0.6 (-0.9, -0.2)	-1.7 (-1.9, -1.6)	1984–2019	-1.0 (-1.5, -0.5)	-1.0 (-1.5, -0.5)	1984–1994	-0.7 (-1.1, -0.3)	-1.7 (-1.8, -1.5)
	1994–2012	-2.5 (-2.6, -2.3)					1994–2011	-2.4 (-2.6, -2.2)	
	2012–2019	-1.5 (-2.1, -0.9)					2011–2019	-1.4 (-1.9, -0.9)	
Prostate				1984–1994	1.3 (0.7, 1.8)	-1.4 (-1.6, -1.2)			
				1994–2012	-2.8 (-3.0, -2.6)				
				2012–2019	-1.6 (-2.3, -0.9)				
Leukemia	1984–2019	-0.9 (-1.0, -0.8)	-0.9 (-1.0, -0.8)	1984–2019	-1.0 (-1.1, -0.9)	-1.0 (-1.1, -0.9)	1984–2019	-1.0 (-1.1, -0.9)	-1.0 (-1.1, -0.9)
Non-Hodgkin lymphoma	1984–2000	1.6 (1.3, 1.9)	-0.3 (-0.6, -0.1)	1984–2000	1.8 (1.5, 2.2)	-0.1 (-0.4, 0.2)	1984–1999	1.5 (1.0, 2.0)	-0.6 (-0.9, -0.4)
	2000–2010	-2.5 (-3.1, -1.9)		2000–2010	-2.4 (-3.0, -1.7)		1999–2019	-2.2 (-2.4, -1.9)	
	2010–2019	-1.2 (-1.8, -0.7)		2010–2019	-0.9 (-1.6, -0.3)				
Bladder	1984–2015	-0.3 (-0.4, -0.2)	-0.5 (-0.8, -0.2)	1984–2015	-0.4 (-0.6, -0.3)	-0.7 (-1.0, -0.4)	1984–2019	-0.4 (-0.6, -0.3)	-0.4 (-0.6, -0.3)
	2015–2019	-2.0 (-4.5, 0.6)		2015–2019	-3.0 (-5.4, -0.4)				
Brain/CNS	1984–2005	-0.6 (-0.8, -0.4)	-0.4 (-0.7, -0.1)	1984–2003	-0.5 (-0.8, -0.2)	-0.2 (-0.4, 0.0)	1984–2006	-0.7 (-1.0, -0.5)	-0.6 (-1.0, -0.2)
	2005–2015	0.8 (0.2, 1.4)		2003–2019	0.2 (-0.1, 0.5)		2006–2015	1.3 (0.3, 2.3)	
	2015–2019	-2.1 (-3.9, -0.3)					2015–2019	-3.8 (-6.4, -1.1)	
Esophagus	1984–1999	0.7 (0.4, 1.1)	0.2 (0.0, 0.4)	1984–2000	0.9 (0.5, 1.3)	0.3 (0.1, 0.5)	1984–2019	-0.5 (-0.7, -0.3)	-0.5 (-0.7, -0.3)
	1999–2019	-0.2 (-0.4, 0.0)		2000–2019	-0.2 (-0.4, 0.0)				
Head and neck	1984–2010	-2.1 (-2.3, -1.9)	-1.6 (-1.9, -1.3)	1984–1991	-0.6 (-2.0, 0.8)	-1.7 (-2.0, -1.3)	1984–2019	-1.3 (-1.5, -1.0)	-1.3 (-1.5, -1.0)
	2010–2019	-0.3 (-1.2, 0.7)		1991–2009	-2.8 (-3.1, -2.4)				
				2009–2019	-0.3 (-1.1, 0.4)				
Stomach	1984–2010	-3.1 (-3.2, -3.0)	-2.8 (-3.0, -2.6)	1984–2012	-3.3 (-3.4, -3.2)	-3.0 (-3.2, -2.8)	1984–2019	-2.8 (-2.9, -2.6)	-2.8 (-2.9, -2.6)
	2010–2019	-2.0 (-2.6, -1.3)		2012–2019	-1.8 (-2.8, -0.7)				
Kidney and renal pelvis	1984–2008	-0.3 (-0.5, -0.1)	-0.7 (-0.9, -0.4)	1984–2004	-0.1 (-0.4, 0.3)	-0.6 (-0.8, -0.3)	1984–2008	-0.5 (-0.8, -0.1)	-0.9 (-1.3, -0.6)
	2008–2019	-1.5 (-2.1, -0.9)		2004–2019	-1.2 (-1.6, -0.8)		2008–2019	-2.0 (-2.9, -1.1)	

Continued on next page

TABLE 2.6 Annual percentage change (APC) and average annual percent change (AAPC) in age-standardized mortality rates (ASMR) for selected cancers, by sex, Canada, 1984–2019

	Both sexes			Males			Females		
	Period	APC (95% CL)	AAPC (95% CL), 1984–2015	Period	APC (95% CL)	AAPC (95% CL), 1984–2015	Period	APC (95% CL)	AAPC (95% CL), 1984–2015
Ovary							1984–2003	-0.6 (-0.9, -0.2)	-0.9 (-1.1, -0.6)
							2003–2019	-1.2 (-1.6, -0.9)	
Multiple myeloma	1984–1994	0.7 (-0.3, 1.6)	-0.4 (-0.7, -0.2)	1984–1995	1.0 (0.0, 2.1)	-0.2 (-0.7, 0.2)	1984–2002	-0.1 (-0.6, 0.5)	-0.8 (-1.1, -0.4)
	1994–2019	-0.9 (-1.1, -0.7)		1995–2008	-1.6 (-2.4, -0.9)		2002–2019	-1.4 (-1.9, -1.0)	
				2008–2019	0.2 (-0.5, 1.0)				
Liver†	1984–1996	-1.1 (-2.3, 0.1)	1.4 (0.8, 2.0)	1984–1991	-2.7 (-5.8, 0.4)	1.7 (1.0, 2.3)	1984–1989	3.1 (-2.3, 8.8)	0.8 (-0.5, 2.1)
	1996–2015	3.2 (2.7, 3.7)		1991–2019	2.8 (2.5, 3.1)		1989–1994	-8.0 (-14.6, -0.8)	
	2015–2019	0.6 (-2.7, 4.0)					1994–2019	2.2 (1.8, 2.5)	
Uterus (body, NOS)							1984–2005	-0.8 (-1.1, -0.5)	0.3 (0.1, 0.6)
							2005–2019	2.0 (1.5, 2.4)	
Melanoma	1984–2013	0.9 (0.7, 1.2)	0.3 (0.0, 0.6)	1984–2013	1.3 (1.0, 1.6)	0.6 (0.1, 1.1)	1984–2015	0.4 (0.1, 0.6)	-0.2 (-0.8, 0.3)
	2013–2019	-2.7 (-4.3, -0.9)		2013–2019	-2.6 (-5.0, -0.2)		2015–2019	-4.9 (-9.2, -0.4)	
Cervix							1984–2006	-2.8 (-3.2, -2.5)	-2.1 (-2.4, -1.7)
							2006–2019	-0.8 (-1.6, 0.0)	
Thyroid	1984–2019	0.0 (-0.4, 0.3)	0.0 (-0.4, 0.3)	1984–2019	0.6 (0.0, 1.1)	0.6 (0.0, 1.1)	1984–2019	-0.4 (-0.8, 0.1)	-0.4 (-0.8, 0.1)
Hodgkin lymphoma	1984–1997	-4.6 (-5.8, -3.4)	-3.3 (-3.9, -2.8)	1984–1996	-5.2 (-6.6, -3.8)	-3.4 (-4.0, -2.8)	1984–2019	-3.2 (-3.6, -2.9)	-3.2 (-3.6, -2.9)
	1997–2019	-2.5 (-3.2, -1.9)		1996–2019	-2.5 (-3.1, -1.9)				
Testis				1984–2019	-1.6 (-2.1, -1.0)	-1.6 (-2.1, -1.0)			
All other cancers	1984–2002	1.6 (1.2, 2.0)	0.0 (-0.2, 0.3)	1984–2003	1.7 (1.3, 2.2)	0.0 (-0.3, 0.3)	1984–2002	1.4 (1.0, 1.8)	-0.1 (-0.3, 0.2)
	2002–2019	-1.6 (-2.0, -1.3)		2003–2019	-1.9 (-2.4, -1.5)		2002–2019	-1.6 (-1.9, -1.3)	

CL=confidence limits; CNS=central nervous system; NOS=not otherwise specified

* The APC and the AAPC are calculated using the Joinpoint Regression Program and rates age-standardized to the 2011 Canadian standard population.

† Liver cancer mortality was underestimated because deaths from liver cancer, unspecified (ICD-10 code C22.9), were excluded. For further details, see *Appendix II: Data sources and methods*.

Note: The complete definition of the specific cancers listed here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Vital Statistics Death Database at Statistics Canada

TABLE 2.7 Most recent annual percent change (APC) in age-standardized mortality rates (ASMR) for selected cancers, by sex, Canada, 1984–2019

	Both sexes		Males		Females	
	Reference year	APC* (95% CL)	Reference year	APC* (95% CL)	Reference year	APC* (95% CL)
All cancers	**2015**	**-1.9 (-2.4, -1.4)**	**2001**	**-1.8 (-1.8, -1.7)**	**2015**	**-2.0 (-2.7, -1.4)**
Lung and bronchus	2015	-3.6 (-4.7, -2.6)	2011	-3.4 (-3.9, -3.0)	2015	-3.5 (-4.6, -2.3)
Colorectal	2005	-2.2 (-2.3, -2.0)	2004	-2.3 (-2.5, -2.1)	2014	-3.2 (-4.2, -2.1)
Pancreas	2000	0.1 (-0.1, 0.2)	2000	0.1 (-0.1, 0.3)	1984	-0.1 (-0.2, 0.0)
Breast	2012	-1.5 (-2.1, -0.9)	1984	-1.0 (-1.5, -0.5)	2011	-1.4 (-1.9, -0.9)
Prostate	—	—	2012	-1.6 (-2.3, -0.9)	—	—
Leukemia	1984	-0.9 (-1.0, -0.8)	1984	-1.0 (-1.1, -0.9)	1984	-1.0 (-1.1, -0.9)
Non-Hodgkin lymphoma	2010	-1.2 (-1.8, -0.7)	2010	-0.9 (-1.6, -0.3)	1999	-2.2 (-2.4, -1.9)
Bladder	2015	-2.0 (-4.5, 0.6)	2015	-3.0 (-5.4, -0.4)	1984	-0.4 (-0.6, -0.3)
Brain/CNS	2015	-2.1 (-3.9, -0.3)	2003	0.2 (-0.1, 0.5)	2015	-3.8 (-6.4, -1.1)
Esophagus	1999	-0.2 (-0.4, 0.0)	2000	-0.2 (-0.4, 0.0)	1984	-0.5 (-0.7, -0.3)
Head and neck	2010	-0.3 (-1.2, 0.7)	2009	-0.3 (-1.1, 0.4)	1984	-1.3 (-1.5, -1.0)
Stomach	2010	-2.0 (-2.6, -1.3)	2012	-1.8 (-2.8, -0.7)	1984	-2.8 (-2.9, -2.6)
Kidney and renal pelvis	2008	-1.5 (-2.1, -0.9)	2004	-1.2 (-1.6, -0.8)	2008	-2.0 (-2.9, -1.1)
Ovary	—	—	—	—	2003	-1.2 (-1.6, -0.9)
Multiple myeloma	1994	-0.9 (-1.1, -0.7)	2008	0.2 (-0.5, 1.0)	2002	-1.4 (-1.9, -1.0)
Liver†	2015	0.6 (-2.7, 4.0)	1991	2.8 (2.5, 3.1)	1994	2.2 (1.8, 2.5)
Uterus (body, NOS)	—	—	—	—	2005	2.0 (1.5, 2.4)
Melanoma	2013	-2.7 (-4.3, -0.9)	2013	-2.6 (-5.0, -0.2)	2015	-4.9 (-9.2, -0.4)
Cervix	—	—	—	—	2006	-0.8 (-1.6, 0.0)
Thyroid	1984	0.0 (-0.4, 0.3)	1984	0.6 (0.0, 1.1)	1984	-0.4 (-0.8, 0.1)
Hodgkin lymphoma	1997	-2.5 (-3.2, -1.9)	1996	-2.5 (-3.1, -1.9)	1984	-3.2 (-3.6, -2.9)
Testis	—	—	1984	-1.6 (-2.1, -1.0)	—	—
All other cancers	2002	-1.6 (-2.0, -1.3)	2003	-1.9 (-2.4, -1.5)	2002	-1.6 (-1.9, -1.3)

— Not applicable; CL=confidence limits; CNS=central nervous system; NOS=not otherwise specified

* The APC was calculated using the Joinpoint Regression Program and rates age-standardized to the 2011 Canadian standard population. If one or more significant changes in the trend of rates was detected, the APC reflects the trend from the most recent significant change (reference year) to 2019. Otherwise, the APC reflects the trend in rates over the entire period (1984–2019). For further details, see *Appendix II: Data sources and methods*.

† Liver cancer mortality was underestimated because deaths from liver cancer, unspecified (ICD-10 code C22.9), were excluded. For further details, see *Appendix II: Data sources and methods*.

Note: The complete definition of the specific cancers listed here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Vital Statistics Death Database at Statistics Canada

Chapter 3

What is the probability of surviving cancer in Canada?

Net survival by sex, age, geography and over time

Population-based cancer survival includes all people diagnosed with cancer in a defined geographic area (such as a province) regardless of their age, health status or access to health insurance and medical care. It provides useful "average" estimates of survival and does not reflect any individual's prognosis. Along with incidence and mortality data, population-based cancer survival is a key metric by which to evaluate cancer care and screening initiatives in the population.[1,2]

Predicted five-year net survival is 64%.

Key findings

- For 2015 to 2017, the predicted five-year net survival for all cancers combined was 64%. This was up from 55% in the early 1990s.
- The highest five-year net survival was for cancers of the thyroid (97%) and testis (97%). It was lowest for cancers of the pancreas (10%) and esophagus (16%).
- Net survival is generally higher among females (66%) than among males (62%).
- Net survival generally decreased with advancing age.
- 84% of children diagnosed with cancer survived at least five years.
- Some of the biggest increases in net survival have been for blood-related cancers. There has been no improvement in survival for uterine cancer since the early 1990's.

Net survival

The percentage of people diagnosed with a cancer who survive a given period of time past their diagnosis, assuming that the cancer of interest is the only possible cause of death. Net survival is the preferred method for comparing cancer survival in population-based cancer studies because it adjusts for the fact that different populations may have different levels of background risk of death. It can be measured over various timeframes but, as is standard in other reports, five years has been chosen as the primary duration of analysis for this publication.

Predicted survival

Predicted (period) survival provides a more up-to-date estimate of survival by exclusively using the survival experienced by cancer cases during a recent period (e.g., 2015–2017). When there is an increasing trend in survival, predicted estimates provide a more up-to-date, though typically conservative, measure of recent survival.[3,4]

Five- and 10-year net survival

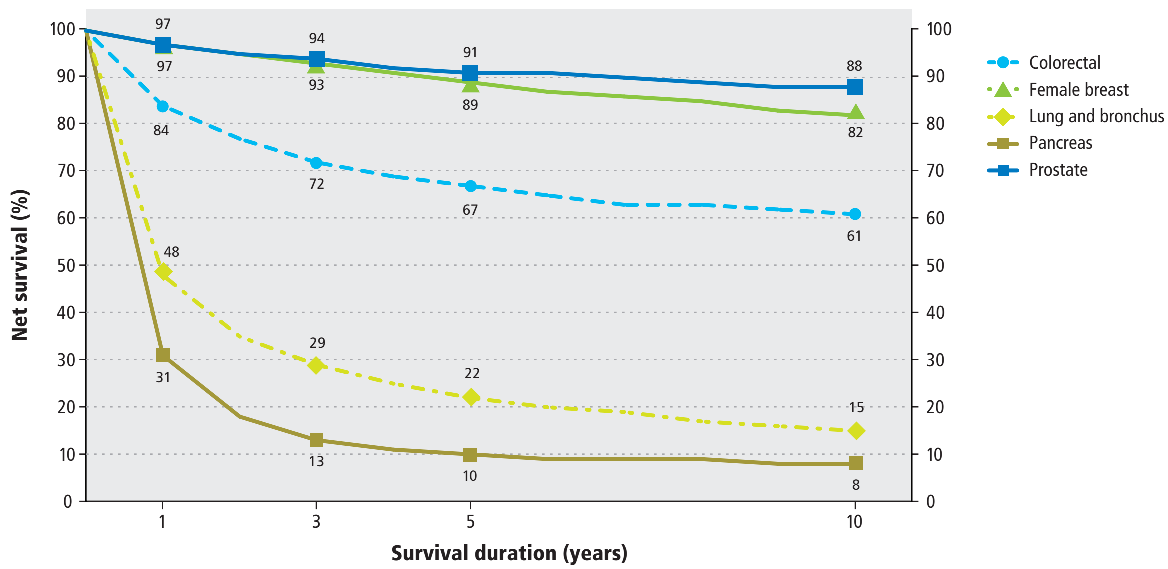
Population-based net cancer survival provides a measure of the prognosis for a cancer. Table 3.1 shows the predicted five- and 10-year net survival by sex for people diagnosed with cancer at ages 15–99 years.

- For all cancers combined, adjusted net survival is 64% at five years and 58% at 10 years.
- Five- and 10-year net survival were highest for cancers of the thyroid (97%, 97%) and testis (97%, 96%).
- Five- and 10-year net survival is lowest for pancreatic (10%, 8%) and esophageal (16%, 13%) cancers. Although not presented in this publication, five-year survival is also low for mesothelioma (9%).[5,6]
- Where feasible, estimates of survival were also provided for individual cancers (e.g., colon cancer and rectum cancer) within a group of cancers (e.g., colorectal cancer). This was done because survival can vary considerably within a group. For example, five-year survival is significantly lower for acute myeloid leukemia (23%) than for chronic lymphocytic leukemia (86%), while survival for all leukemias combined is 61%.

Cancer survival generally decreases with time, particularly in the first few years following a diagnosis. Figure 3.1 shows the predicted net survival up to 10 years after diagnosis for selected cancers.

- For prostate cancer and female breast cancer, net survival declined relatively gradually over the first 10 years, though less gradually for breast cancer.
- For colorectal cancer, net survival declined from 84% to 72% between one and three years after diagnosis, and then more gradually three to 10 years after diagnosis, at which point survival was 61%.
- For lung cancer and pancreatic cancer, net survival declined sharply during the first three years after diagnosis (to 29% and 13%, respectively) and more gradually thereafter.
- There appears to be a plateau in the long-term survival curve for prostate, colorectal and pancreatic cancer, but not for female breast and lung cancer.

FIGURE 3.1 Predicted net survival for leading causes of cancer death by survival duration, ages 15–99, Canada (excluding Quebec*), 2015–2017



*Quebec is excluded because cases diagnosed in Quebec from 2011 onward had not been submitted to the Canadian Cancer Registry.

Note: The complete definition of the specific cancers listed here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data sources: Canadian Cancer Registry death linked file (1992–2017) and life tables at Statistics Canada

Survival by sex

Cancer survival can vary between sexes. In addition to results for both sexes combined, Table 3.1 also presents estimates for males and females separately. The following points pertain to five-year net survival.

- For all cancers combined, females had higher adjusted survival (66%) than males (62%).
- In terms of percentage point differences, the largest advantages for females relative to males were observed for breast cancer, chronic myeloid leukemia, lung cancer and melanoma.
- Five-year net survival was lower in females than males for acute lymphocytic leukemia (42% vs. 51%), bladder cancer (75% vs. 77%), cancers of the central nervous system (59% vs. 61%) and pancreatic cancer (9% vs. 10%), but these differences were not statistically significant.
- For bladder cancer, the 10-year prognosis favoured females (69% vs. 65%). A previous study using Canadian Cancer Registry data found that the survival advantage for males was significant for only the first 12 to 18 months post diagnosis.[8] One partial explanation is that bladder cancer diagnoses among females may be more delayed due to the rarity of this cancer in females relative to males.[9]

The higher net survival among females is mirrored by the observation that females have a significantly lower excess risk of dying from their cancer than males, particularly for people younger than 55 years of age.[8]

Survival by age

For most cancers diagnosed in adults, net survival decreases with advancing age at diagnosis.[5,6] Table 3.2 shows predicted five-year net survival by age group.

- Survival for prostate cancer is consistently high (≥94%) among males diagnosed before 75 years of age and lowest (52%) among males aged 85 years and older.
- Survival for breast cancer is relatively high (≥85%) among females diagnosed before 85 years of age, after which survival drops to about 73%.
- For both sexes combined, survival for lung cancer is twice as high (43%) among Canadians diagnosed between 15 and 44 years of age than it is among those diagnosed between 75 and 84 years of age (19%) and between 85 and 99 years of age (11%).

Survival is typically lower among males than females.

Observed survival

The proportion of people with cancer who are alive after a given period of time (e.g., five years) following diagnosis. In this publication, observed survival is only used to describe cancer in children (aged 0–14 years).

Age-standardized net survival

The net survival that would have occurred if the age distribution at diagnosis of the group of people with the cancer under study had been the same as that of the standard population. For each cancer, the standard population was based on persons diagnosed with that cancer in Canada (excluding Quebec) from 2010 to 2014. This facilitates the comparison of net survival between geographic areas and over time.

Confidence interval (CI)

A range of values that provides an indication of the precision of an estimate. Confidence intervals are usually 95%. This means that upon repeated sampling for a study, and assuming there were no other sources of bias, 95% of the resulting confidence intervals would contain the true value of the statistic being estimated.

All cancers combined

Non-age-standardized survival estimates for all cancers combined (Table 3.1) were calculated as a weighted average of estimates for individual cancer and sex combinations. For childhood cancer (Table 3.3), main diagnostic groups were used in place of individual cancers. To facilitate comparison of net survival for all cancers combined over time (Figure 3.2), a net cancer survival index was constructed by additionally adjusting for age group at diagnosis.[7] The index is unaffected by changes in the age, sex or cancer type (case-mix) distribution of cancer cases over time. In this case, the index represents the net survival from cancer that would have occurred if the age, sex and cancer type distribution of cancers under study had been the same as the distribution of cancers in Canada (excluding Quebec) from 2010 to 2014.

- There is a considerable difference in survival among those diagnosed with pancreatic cancer between 15 and 44 years of age (43%) and those diagnosed between 75 and 84 years of age (6%) or older (2%).

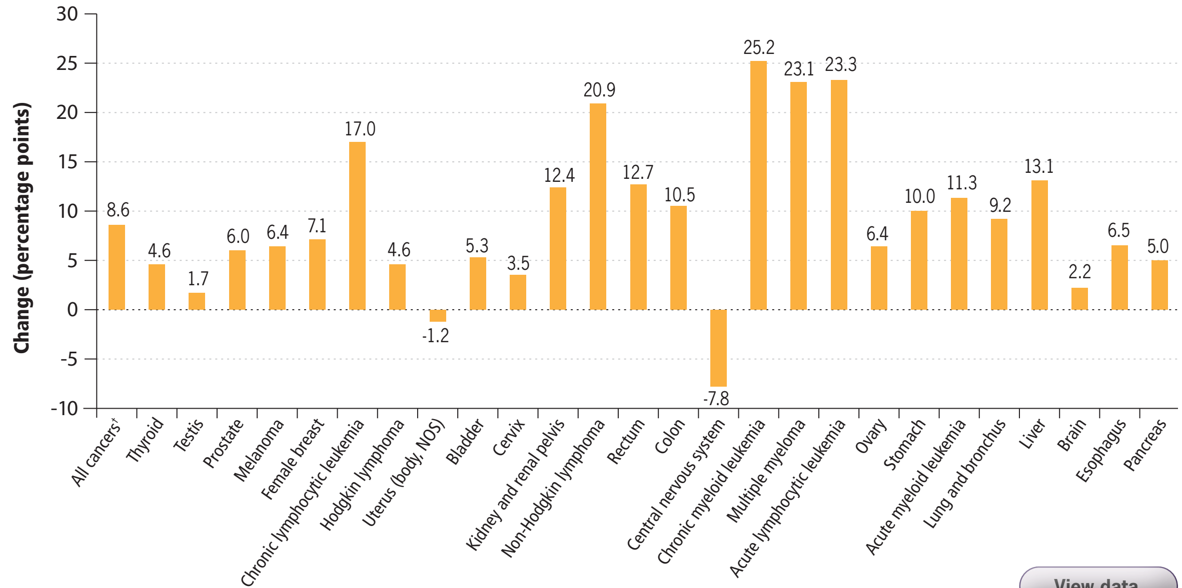
Childhood cancer survival

Cancer in children (under the age of 15 years) is uncommon (Table 1.3), and deaths due to cancer are even more uncommon (Table 2.3). In general, cancer survival is relatively high for many of the most commonly diagnosed cancers in this age group. Table 3.3 shows one- and five-year predicted observed survival for children by childhood cancer diagnostic group and selected subgroups.[10,11]

- For all childhood cancers combined, one-year survival is 93% and five-year survival is 84%.
- Five-year survival exceeds 95% among children diagnosed with Hodgkin lymphoma, nephroblastoma and other non-epithelial renal tumours, and malignant gonadal germ cell tumours.
- Five-year survival is lowest for acute myeloid leukemia (65%), rhabdomyosarcomas (69%), intracranial and intraspinal embryonal tumours (71%), malignant bone tumours (72%) and hepatic tumours (72%).
- One-year survival was 80% or higher for all childhood cancers considered and was 95% or higher for seven of the 12 diagnostic groups.

A recently published study reported statistically significant increases in both one- and five-year survival (2.7 and 7.5 percentage points, respectively) for all childhood cancers combined from 1992–1996 to 2013–2017.[12] Most of this improvement occurred in the first half of this time span and increases since the 2003–2007 period were not found to be statistically significant.

FIGURE 3.2 Predicted five-year age-standardized net survival for selected cancers by time period, ages 15–99, Canada (excluding Quebec*), 2015–2017 versus 1992–1994



View data

NOS=not otherwise specified

* Quebec is excluded because cases diagnosed in Quebec from 2011 onward have not been submitted to the Canadian Cancer Registry.
† Estimates for all cancers combined were calculated as a weighted average of sex-specific, age-standardized estimates. For further details, see *Appendix II: Data sources and methods*.

Note: Estimates were age-standardized using the Canadian Cancer Survival Standard weights. For further details, see *Appendix II: Data sources and methods*. The complete definition of the specific cancers listed here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data sources: Canadian Cancer Registry death linked file (1992–2017) and life tables at Statistics Canada.

Survival by geographic region

Table 3.4 shows age-standardized five-year net survival for selected cancers by province (except Quebec).

- Five-year net survival is fairly uniform among the provinces for female breast cancer and thyroid cancer. There is also little provincial variation in five-year survival for prostate cancer with the exception of a relatively low predicted estimate for Saskatchewan (86%).
- There is more variation in survival estimates for certain cancers. Colorectal cancer estimates range from 62% (Nova Scotia) to 68% (Newfoundland and Labrador). Lung cancer estimates range from 18% (Saskatchewan) to 24% (Ontario). Pancreatic cancer estimates range from 7% (British Columbia) to 12% (Ontario).
- Some of this variation may reflect variations in the stage at which cancers are typically diagnosed in different provinces.[13]

Survival over time

Examining trends in net survival alongside trends in incidence and mortality can give important information about progress in cancer treatment and control. Figure 3.2 shows the predicted change in five-year age-standardized net survival since the 1992–1994 period.

- Survival for all cancers combined rose by 9 percentage points, from 55% in 1992–1994 to 64% in 2015–2017.
- Survival has increased for most cancers but has remained virtually unchanged for uterine cancer.
- Very modest improvements were observed for testicular and brain cancer. While survival for testicular cancer has been at or above 95% for some time, the prognosis for individuals diagnosed with brain cancer remains relatively very poor.
- The largest increases between the two time periods were for chronic myeloid leukemia (25 percentage points), acute lymphocytic leukemia (23 percentage points) and multiple myeloma (23 percentage points), followed by non-Hodgkin lymphoma (21 percentage points) and chronic lymphocytic leukemia (17 percentage points).

Conditional net survival

Conditional survival is often more meaningful for clinical management and prognosis than the five-year survival measured from the date of diagnosis.[14] Since the risk of death due to cancer is often greatest in the first few years after diagnosis (Figure 3.1), prognosis can substantially improve among people surviving one or more years. For these people, the five-year net survival measured at diagnosis (Table 3.1) no longer applies. Table 3.5 shows the five-year predicted conditional net survival, which is calculated from the date of cancer diagnosis among people who have survived the first year after their cancer diagnosis. It also presents one-year predicted net survival.

- Typically, the largest differences between five-year net survival and five-year conditional net survival were for cancers with a relatively low one-year survival. The largest difference was observed for acute myeloid leukemia, for which the five-year conditional survival was 51%, 28 percentage points higher than the five-year survival. Stomach and lung cancers were associated with the next largest differences at 26 and 24 percentage points, respectively.
- In contrast, since the potential for improvement is limited for cancers that have a good prognosis at diagnosis, there was little difference between five-year net survival and five-year conditional net survival for these cancers. For example, given the high one-year net survival for breast cancer (97%), there was only a 2-point difference between the five-year net survival (88%) and the five-year conditional net survival (91%) for this cancer.

Conditional net survival

A measure that reflects improvements in prognosis for people who have already survived a given number of years (e.g., one year) since diagnosis. This is measured in the hypothetical situation where the cancer of interest is the only possible cause of death.

What do these statistics mean?

Survival statistics are important indicators of the effectiveness of cancer detection and treatment. A number of factors influence survival, including sex (females have better survival than males), age (survival typically decreases with age) and access to quality care (which can vary between regions).

Fortunately, we are making progress. Cancer survival has improved for most cancers over the last 20 to 25 years in Canada. The most notable improvements have been for blood-related cancers, including leukemia and non-Hodgkin lymphoma, which can be largely attributed to improvements in treatment.[15,16]

While colorectal cancer survival has also improved, its five-year survival is still only 67%. This likely reflects that fact that almost 50% of colorectal cancers are diagnosed at stage III or IV.[13] However, population-based colorectal cancer screening programs exist across the country. With increased participation in these programs, it is expected that more cancers will be diagnosed early and colorectal cancer survival will increase. This is based on cancers such as female breast, where most cases are diagnosed early[13] and survival is high, which likely reflects the success of well-established screening programs.

Despite these notable successes, there remains a lot of room for improvement because some cancers continue to have low net survival. These include lung cancer — the most commonly diagnosed cancer and leading cause of cancer death in Canada — and pancreatic cancer, which is a less commonly diagnosed cancer but is projected to be the third leading cause of cancer death in Canada in 2021. The low survival probabilities for these cancers are largely reflected in the late stage at which they are diagnosed.[13]

Nonetheless, lung cancer survival has improved in recent years[7] with advances in treatment, including the increasing use of targeted therapy drugs, playing a role.[17] This improvement has been identified as a key factor in the recent improvement in survival for all cancers combined.[7] The anticipated introduction of lung cancer screening programs in Canada in the near future may increase early detection of the disease, potentially leading to further improvements in survival. With pancreatic cancer, research in improving early detection and treatment is key to improving survival.

Continuing to monitor cancer survival by sex, age, geography and time helps point to areas where greater efforts are required to detect, diagnose and treat cancer, or where more research is needed to develop better treatments.

Supplementary resources

Cancer.ca/statistics houses supplementary resources for this chapter. This includes:

- Excel spreadsheets with the statistics used to create the figures
- Excel spreadsheets with supplementary statistics. For example, in order to help facilitate international comparison of survival estimates with Canada, online Table S3.1 presents sex-specific survival estimates for selected cancers that were age-standardized using both the Canadian Standard Weights and the International Cancer Survival Standard (ICSS) weights.[18]
- PowerPoint images of the figures used throughout this chapter

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TABLE 3.1 Predicted five- and 10-year net survival for selected cancers by sex, ages 15–99, Canada (excluding Quebec*), 2015–2017

	5-year net survival (%) (95% CI)			10-year net survival (%) (95% CI)		
	Both sexes	Males	Females	Both sexes	Males	Females
All cancers†	**64 (64–64)**	**62 (62–62)**	**66 (66–66)**	**58 (57–58)**	**55 (55–56)**	**60 (59–60)**
Thyroid	97 (97–98)	95 (93–96)	98 (98–99)	97 (96–98)	93 (91–95)	99 (98–99)
Testis	—	97 (96–98)	—	—	96 (95–97)	—
Prostate	—	91 (91–92)	—	—	88 (87–88)	—
Melanoma	89 (88–90)	86 (85–88)	92 (91–93)	85 (84–87)	82 (79–84)	90 (87–92)
Breast	89 (88–89)	76 (70–81)	89 (88–89)	82 (81–83)	60 (50–69)	82 (82–83)
Hodgkin lymphoma	85 (83–87)	84 (81–86)	86 (84–89)	81 (79–83)	80 (76–82)	82 (79–85)
Uterus (body, NOS)	—	—	82 (82–83)	—	—	80 (79–81)
Bladder‡	77 (76–77)	77 (76–78)	75 (73–77)	66 (64–68)	65 (63–67)	69 (66–72)
Cervix	—	—	74 (72–75)	—	—	68 (67–70)
Kidney and renal pelvis	73 (72–74)	73 (71–74)	73 (71–74)	64 (63–66)	64 (62–66)	64 (62–66)
Non–Hodgkin lymphoma	69 (69–70)	68 (67–69)	71 (70–73)	61 (60–62)	59 (57–60)	64 (62–65)
Colorectal	67 (66–67)	66 (66–67)	67 (66–68)	61 (60–61)	60 (59–61)	61 (60–62)
Rectum	67 (67–68)	67 (66–68)	69 (67–70)	60 (59–62)	59 (57–60)	64 (61–66)
Colon	66 (66–67)	66 (65–67)	66 (65–67)	61 (60–62)	62 (60–63)	60 (59–62)
Head and neck	64 (63–65)	64 (63–65)	65 (63–67)	56 (55–57)	56 (54–57)	57 (54–60)
Leukemia	61 (60–62)	60 (59–62)	61 (60–63)	52 (50–53)	51 (49–53)	53 (50–56)
Chronic lymphocytic leukemia	86 (85–88)	84 (82–86)	89 (86–91)	73 (70–76)	70 (67–74)	77 (72–82)
Chronic myeloid leukemia	58 (56–61)	55 (52–59)	63 (59–67)	49 (46–53)	46 (42–51)	54 (49–59)
Acute lymphocytic leukemia	47 (42–51)	51 (44–57)	42 (35–48)	41 (36–46)	44 (38–51)	37 (29–45)
Acute myeloid leukemia	23 (22–25)	22 (19–24)	26 (23–29)	20 (19–22)	19 (17–21)	23 (20–25)
Ovary	—	—	44 (43–45)	—	—	35 (33–36)
Multiple myeloma	50 (49–52)	50 (48–52)	51 (48–53)	30 (28–32)	28 (26–31)	32 (29–35)
Stomach	29 (28–30)	27 (26–29)	32 (30–34)	25 (24–27)	23 (21–25)	29 (26–32)
Lung and bronchus	22 (22–23)	19 (18–19)	26 (25–26)	15 (15–16)	13 (12–13)	18 (17–19)
Liver	22 (21–23)	22 (21–23)	22 (20–25)	16 (15–18)	16 (14–18)	18 (15–21)
Brain/CNS	22 (21–23)	21 (20–22)	23 (21–24)	17 (16–18)	16 (15–17)	18 (16–20)
CNS	61 (54–67)	61 (51–70)	59 (49–67)	51 (44–58)	*50 (40–60)*	51 (41–60)
Brain	20 (19–21)	19 (18–21)	20 (19–22)	15 (14–16)	14 (13–16)	16 (14–17)
Esophagus	16 (15–18)	16 (15–18)	17 (15–20)	13 (11–14)	12 (11–14)	14 (12–17)
Pancreas	10 (9–10)	10 (9–11)	9 (9–10)	8 (7– 9)	8 (7– 9)	8 (7– 9)

— Not applicable; CI=confidence interval; CNS=central nervous system; NOS=not otherwise specified

* Quebec is excluded because cases diagnosed in Quebec from 2011 onward had not been submitted to the Canadian Cancer Registry.

† Estimates for all cancers combined were calculated as a weighted average of sex–specific estimates for individual cancers. For further details, see *Appendix II: Data sources and methods*.

‡ Ten year net survival for bladder cancer does not include *in situ* cases for Ontario diagnosed prior to 2010 because they were not submitted to the Canadian Cancer Registry.

Note: Estimates associated with a standard error >0.05 and ≤0.10 are italicized. The complete definition of the specific cancers listed here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data sources: Canadian Cancer Registry death linked file (1992–2017) and life tables at Statistics Canada

TABLE 3.2 Predicted five-year net survival for selected cancers by age group, Canada (excluding Quebec*), 2015–2017

Age group (years)	Net survival (%) (95% CI)					
	Prostate	Breast (female)	Colorectal	Lung and bronchus	Thyroid	Melanoma
15–44	94 (88–97)	88 (87–89)	74 (73–76)	43 (38–47)	100 (99–100)	95 (94–96)
45–54	96 (95–97)	91 (91–92)	73 (72–74)	29 (28–31)	99 (98–99)	94 (92–95)
55–64	97 (96–97)	91 (90–91)	71 (70–72)	26 (25–27)	98 (97–98)	91 (89–92)
65–74	95 (95–96)	91 (90–92)	70 (69–71)	24 (24–25)	95 (93–96)	90 (89–92)
75–84	85 (84–86)	85 (83–86)	62 (61–63)	19 (18–20)	92 (86–95)	83 (81–86)
85–99	52 (49–56)	73 (70–77)	50 (47–52)	11 (9–12)	57 (41–70)	75 (68–80)

Age group (years)	Net survival (%) (95% CI)				
	Uterus (body, NOS)	Bladder	Kidney and renal pelvis	Non–Hodgkin lymphoma	Pancreas
15–44	91 (88–93)	91 (87–93)	92 (90–94)	86 (84–87)	43 (37–49)
45–54	88 (87–90)	86 (84–88)	85 (84–87)	83 (82–85)	21 (18–23)
55–64	88 (87–89)	83 (82–85)	77 (76–79)	78 (77–80)	12 (10–13)
65–74	81 (79–82)	81 (79–82)	73 (71–75)	72 (70–73)	9 (8–10)
75–84	69 (67–72)	74 (72–75)	59 (57–62)	56 (55–58)	6 (5–7)
85–99	56 (49–63)	58 (54–62)	33 (27–38)	42 (38–46)	2 (1–4)

CI=confidence interval; NOS=not otherwise specified

* Quebec is excluded because cases diagnosed in Quebec from 2011 onward had not been submitted to the Canadian Cancer Registry.

Note: Estimates associated with a standard error >0.05 and ≤0.10 are italicized. The complete definition of the specific cancers listed here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data sources: Canadian Cancer Registry death linked file (1992–2017) and life tables at Statistics Canada

TABLE 3.3 Predicted one- and five-year observed survival proportions by diagnostic group and selected subgroups, ages 0–14 at diagnosis, Canada (excluding Quebec*), 2013–2017

Diagnostic group†	OSP (%) (95% CI)	
	1-year	5-year
All groups‡	**93 (92–93)**	**84 (83–85)**
I. Leukemias, myeloproliferative diseases, and myelodysplastic diseases	95 (93–96)	88 (87–90)
a. Lymphoid leukemias	97 (96–98)	93 (92–95)
b. Acute myeloid leukemias	81 (74–86)	65 (57–71)
II. Lymphomas and reticuloendothelial neoplasms	96 (94–97)	92 (89–94)
a. Hodgkin lymphomas	99 (95–100)	99 (95–100)
b. Non-Hodgkin lymphomas (except Burkitt lymphoma)	93 (89–96)	84 (78–89)
c. Burkitt lymphoma	97 (89–99)	94 (84–98)
III. CNS and miscellaneous intracranial and intraspinal neoplasms	84 (81–87)	72 (69–75)
b. Astrocytomas	88 (84–91)	82 (78–86)
c. Intracranial and intraspinal embryonal tumours	85 (79–90)	71 (64–78)
IV. Neuroblastoma and other peripheral nervous cell tumours	96 (92–97)	84 (79–88)
V. Retinoblastoma	100 (..– ..)	94 (85–98)
VI. Renal tumours	98 (95–99)	96 (91–98)
a. Nephroblastoma and other non-epithelial renal tumours	98 (95–99)	96 (92–98)
VII. Hepatic tumours	*84 (71–92)*	*72 (58–82)*
VIII. Malignant bone tumours	97 (92–99)	72 (64–78)
IX. Soft tissue and other extraosseous sarcomas	90 (85–93)	70 (64–76)
a. Rhabdomyosarcomas	92 (85–96)	69 (60–77)
X. Germ cell tumours, trophoblastic tumours, and neoplasms of gonads	92 (86–96)	91 (85–95)
b. Malignant extracranial and extragonadal germ cell tumours	91 (75–97)	91 (75–97)
c. Malignant gonadal germ cell tumours	97 (83–100)	97 (83–100)
XI. Other malignant epithelial neoplasms and malignant melanomas	96 (92–98)	92 (86–95)
XII. Other and unspecified malignant neoplasms	*80 (55–92)*	*80 (55–92)*

.. estimate cannot be calculated; OSP=observed survival proportion; CI=confidence interval; CNS=central nervous system

* Quebec is excluded because cases diagnosed in Quebec from 2011 onward had not been submitted to the Canadian Cancer Registry.

† Cancers were classified according to the Surveillance, Epidemiology, and End Results Program (SEER) update of the *International Classification of Childhood Cancer, Third Edition* (ICCC-3).[11] Only selected subgroups within each diagnostic group are listed.

‡ Estimates for all childhood cancers combined were calculated as a weighted average of sex- and diagnostic group–specific estimates. For further details, see *Appendix II: Data sources and methods*.

Note: Estimates associated with a standard error >0.05 and ≤0.10 are italicized.

Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Cancer Registry death linked file (1992–2017). Adapted from Table 2 in Ellison LF, Xie L, Sung L. Trends in paediatric cancer survival in Canada, 1992 to 2017. Health Reports 2021; Feb 17; 32(2):3–15.

TABLE 3.4 Predicted five-year age-standardized net survival for selected cancers by province, ages 15–99, Canada (excluding Quebec*), 2015–2017

Province	Net survival (%) (95% CI)						
	Prostate	Breast (female)	Colorectal	Lung and bronchus	Thyroid	Melanoma	Uterus (body, NOS)
Canada*	**91 (91–92)**	**89 (88–89)**	**66 (66–67)**	**22 (22–23)**	**98 (97–98)**	**89 (88–90)**	**83 (82–83)**
British Columbia (BC)	91 (90–92)	88 (87–89)	67 (66–68)	21 (20–21)	95 (93–96)	90 (88–91)	83 (81–85)
Alberta (AB)	91 (90–92)	89 (88–90)	67 (65–68)	22 (20–23)	97 (95–98)	88 (85–90)	83 (81–85)
Saskatchewan (SK)	86 (84–88)	88 (86–89)	64 (62–67)	18 (17–20)	95 (91–97)	87 (82–91)	87 (83–91)
Manitoba (MB)	91 (89–93)	88 (86–89)	64 (61–67)	22 (20–24)	97 (93–99)	90 (84–94)	85 (82–88)
Ontario (ON)	92 (92–93)	89 (88–89)	67 (66–67)	24 (23–24)	98 (98–99)	89 (88–90)	82 (81–83)
New Brunswick (NB)	91 (88–93)	88 (86–91)	63 (60–65)	21 (20–23)	98 (93–99)	93 (87–96)	83 (78–87)
Nova Scotia (NS)	90 (88–92)	89 (86–90)	62 (60–64)	20 (18–22)	95 (91–97)	91 (86–94)	77 (73–81)
Prince Edward Island (PE)	88 (82–93)	90 (84–94)	67 (60–73)	..	91 (62–98)	82 (72–88)	*79 (67–87)*
Newfoundland and Labrador (NL)	91 (87–93)	89 (85–91)	68 (65–71)	23 (20–26)	97 (93–98)	87 (78–92)	88 (82–92)

Province	Net survival (%) (95% CI)			
	Bladder	Kidney and renal pelvis	Non-Hodgkin lymphoma	Pancreas
Canada*	**77 (76–77)**	**72 (72–73)**	**69 (69–70)**	**10 (9–10)**
British Columbia (BC)	75 (73–77)	69 (67–72)	69 (67–71)	7 (6– 8)
Alberta (AB)	77 (74–80)	71 (68–74)	70 (67–72)	9 (8–11)
Saskatchewan (SK)	73 (68–77)	65 (60–69)	70 (65–74)	9 (7–12)
Manitoba (MB)	72 (67–77)	66 (62–70)	69 (65–73)	11 (9–15)
Ontario (ON)	77 (76–78)	76 (75–77)	70 (69–71)	12 (11–13)
New Brunswick (NB)	75 (70–80)	71 (66–75)	70 (65–74)	..
Nova Scotia (NS)	77 (72–82)	69 (65–73)	66 (62–70)	9 (7–12)
Prince Edward Island (PE)	68 (55–78)	..	*67 (52–78)*	..
Newfoundland and Labrador (NL)	82 (73–88)	70 (64–75)	69 (63–75)	..

.. estimate can not be calculated as one or more of the age-specific estimates are undefined; CI=confidence interval; NOS=not otherwise specified

* Quebec is excluded because cases diagnosed in Quebec from 2011 onward have not been submitted to the Canadian Cancer Registry.

Note: Estimates were age-standardized using the Canadian Cancer Survival Standard weights. For further details, see *Appendix II: Data sources and methods*. The complete definition of the specific cancers listed here can be found in Table A1. Estimates associated with a standard error > 0.05 and ≤ 0.10 are italicized.

Analysis by: Centre for Population Health Data, Statistics Canada

Data sources: Canadian Cancer Registry death linked file (1992–2017) and life tables at Statistics Canada

TABLE 3.5 Predicted net survival for one year and for five years from diagnosis (conditional on having survived one year), for selected cancers, by sex, ages 15–99, Canada (excluding Quebec*), 2015–2017

	1-year net survival (%) (95% CI)			5-year conditional net survival (%) (95%CI)		
	Both Sexes	Males	Females	Both sexes	Males	Females
Thyroid	98 (98–98)	96 (96–97)	99 (98–99)	99 (99–100)	98 (97–99)	100 (99–100)
Testis	—	98 (98–99)	—	—	98 (97–99)	—
Prostate	—	97 (97–98)	—	—	94 (93–94)	—
Breast	97 (97–97)	96 (92–98)	97 (97–97)	91 (91–92)	79 (73–84)	91 (91–92)
Melanoma	97 (96–97)	96 (95–96)	98 (97–98)	92 (91–93)	90 (89–91)	94 (93–95)
Uterus (body, NOS)	—	—	93 (92–93)	—	—	89 (88–90)
Hodgkin lymphoma	91 (90–92)	90 (88–91)	93 (91–94)	93 (92–95)	93 (91–95)	93 (91–95)
Bladder	89 (89–90)	91 (90–91)	85 (84–86)	86 (85–87)	85 (84–86)	88 (87–90)
Cervix	—	—	89 (88–90)	—	—	82 (81–84)
Kidney and renal pelvis	85 (85–86)	86 (85–87)	85 (83–86)	85 (84–86)	85 (83–86)	86 (85–88)
Colorectal	84 (83–84)	84 (84–85)	83 (82–83)	80 (79–80)	79 (78–79)	81 (80–82)
Rectum	87 (87–88)	88 (87–88)	87 (86–88)	77 (76–78)	76 (75–77)	79 (78–81)
Colon	82 (81–82)	83 (82–83)	81 (81–82)	81 (80–82)	80 (79–81)	82 (81–83)
Head and neck	83 (83–84)	84 (83–85)	82 (81–84)	77 (76–78)	76 (75–78)	79 (77–81)
Non–Hodgkin lymphoma	81 (81–82)	81 (80–82)	82 (81–83)	85 (84–86)	84 (83–85)	87 (86–88)
Multiple myeloma	80 (78–81)	79 (78–81)	80 (78–81)	63 (62–65)	63 (61–66)	64 (61–66)
Ovary	—	—	76 (75–77)	—	—	57 (56–59)
Leukemia	75 (74–76)	76 (75–77)	74 (73–75)	81 (80–82)	80 (78–81)	83 (81–84)
Chronic lymphocytic leukemia	94 (94–95)	94 (93–95)	95 (93–96)	91 (90–93)	90 (87–91)	94 (91–96)
Chronic myeloid leukemia	81 (79–83)	79 (76–82)	83 (80–86)	72 (69–75)	70 (66–74)	76 (71–80)
Acute lymphocytic leukemia	67 (63–71)	69 (64–74)	64 (58–70)	70 (64–75)	73 (65–79)	65 (56–72)
Acute myeloid leukemia	46 (44–48)	45 (43–48)	46 (44–49)	51 (48–54)	48 (43–52)	56 (51–60)
Stomach	53 (52–54)	53 (51–54)	53 (51–55)	55 (53–57)	52 (50–54)	61 (57–64)
Liver	50 (48–51)	51 (49–52)	47 (44–49)	45 (42–47)	44 (41–46)	48 (43–52)
Brain/CNS	49 (48–50)	49 (47–50)	50 (47–52)	44 (42–46)	43 (40–46)	45 (42–48)
CNS	79 (73–84)	81 (73–87)	76 (67–83)	77 (70–82)	76 (65–84)	77 (67–84)
Brain	48 (46–49)	47 (46–49)	48 (46–50)	41 (39–43)	41 (38–43)	42 (39–45)
Lung and bronchus	48 (48–49)	44 (43–44)	53 (52–53)	46 (45–47)	43 (42–44)	49 (48–50)
Esophagus	45 (44–47)	46 (44–47)	43 (40–46)	37 (34–39)	36 (33–38)	40 (35–45)
Pancreas	31 (30–32)	32 (31–33)	30 (29–32)	32 (30–33)	32 (29–35)	31 (29–34)

—not applicable; CI=confidence interval; CNS=central nervous system; NOS=not otherwise specified

* Quebec is excluded because cases diagnosed in Quebec from 2011 onward have not been submitted to the Canadian Cancer Registry.

Note: The complete definition of the specific cancers listed here can be found in Table A1.

Analysis by: Centre for Population Health Data, Statistics Canada

Data sources: Canadian Cancer Registry death linked file (1992–2017) and life tables at Statistics Canada

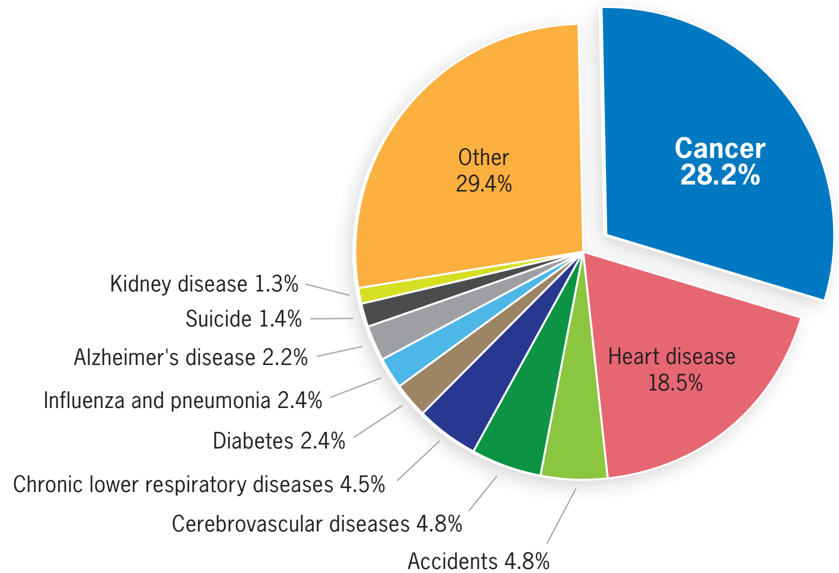
Chapter 4

Cancer in context: The cancer burden in Canada

Cancer is the leading cause of death in Canada

Cancer poses an enormous burden on both the health of Canadians and the Canadian healthcare system. This publication shows that 43% of Canadians are expected to be diagnosed with cancer in their lifetime and about one-quarter are expected to die from the disease. In recent years, the proportion of Canadians that die from cancer has gone up compared to other causes of death. In fact, a significantly higher proportion of Canadians die from cancer (28.2%) than any of the other leading causes of death, including heart disease (18.5%), cerebrovascular diseases and accidents (4.8% each) (Figure 4.1).

FIGURE 4.1 Proportion of deaths due to cancer and other causes, Canada, 2019

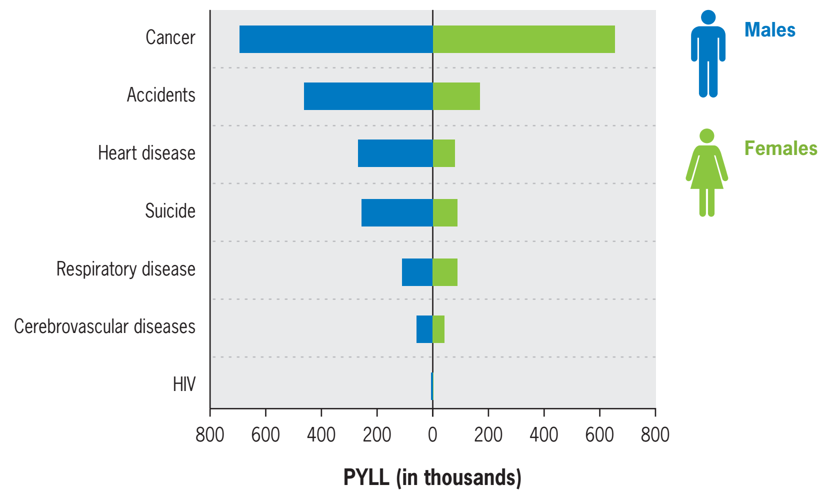


Note: The total of all deaths in 2019 in Canada was 284,082

Data source: Statistics Canada. Table 13-10-0394-01 Leading causes of death, total population, by age group (accessed November 26, 2020)

Cancer is also the leading cause of premature death in Canada, which means that people are dying from cancer at younger ages than the average age of death from other causes. Premature mortality is often reported in terms of potential years of life lost (PYLL). PYLL is an estimate of the additional number of years a person would have lived if they had not died prematurely (e.g., before the age of 75). For example, if a person dies from cancer at 60 years of age, they have lost 15 potential years of life, while dying at 70 years of age results in 5 years of life lost. During the period from 2017 to 2019, the PYLL for all cancers combined was about 1,347,600 (Figure 4.2), which was considerably higher than any of the other leading causes of premature death in Canada.

FIGURE 4.2 Selected causes of death* and their associated potential years of life lost (PYLL), Canada, 2017–2019



* See *Appendix II: Data sources and methods* for definitions of causes of death.

Note: Causes are displayed in decreasing order of total PYLL for males and females combined.

Analysis by: Centre for Population Health Data, Statistics Canada

Data sources: Canadian Vital Statistics Death Database at Statistics Canada

Cancer is a complex disease

Cancer is a complex disease that is influenced by many factors, including the environment, lifestyle and genetics. Cancer is not just one disease, but a group of more than 100 different diseases characterized by uncontrolled growth of abnormal cells that have the propensity to invade nearby tissues. This abnormal cell growth can begin almost anywhere in the body, and it can behave differently depending on the origin.

How cancers are categorized

Cancers are categorized based on the organ, tissue or body system in which they originate (primary site) and their cellular characteristics (histology). Some cancer cells tend to grow and spread more slowly and look like normal cells (low-grade cancer cells). Others look very different from normal cells and tend to grow and spread quickly (high-grade cancer cells). A different grading system is used for each cancer type and they are used to help determine prognosis and plan treatment. The detailed categorization of cancer and the related cell types is essential for effective clinical management of different types of cancers. Some types of cells have a greater tendency to become cancerous than others, leading to higher incidence rates for those cancers. This is one reason cancer in the breast, for example, is much more common than cancer in the liver.

How cancer spreads

Any type of cancer can spread (metastasize) from the organ it originated in to another site in the body. Whether or not and to what extent a cancer spreads will depend on several factors, such as the type of cancer, the aggressiveness of the cancer cells, the location of the primary tumour, how long it has been in the body, and the type and effectiveness of available treatments. Once a cancer has spread, it is more difficult to treat. This can lead to lower survival rates for certain cancers. For example, almost half of all lung cancer cases diagnosed in Canada are stage IV (cancer has spread)[1] and, as a result, its survival rate is very low.

How cancer is detected

Detecting cancer at an early stage can improve outcomes. Our ability to detect a cancer early depends on the availability and effectiveness of screening and early detection tools, or on the location and depth of the tumour and when symptoms become noticeable. This helps explain why cancer of the pancreas, which resides deep in the body and is generally asymptomatic in early stages, is detected so much later than cancer of the testes.[1] Cancers that are more likely to be detected early, such as breast cancer, have a much higher chance of survival than cancers that tend to be detected late, as is the case with lung cancer.

Cancer outcomes in Canada are among the best in the world

Comparable measures of cancer burden for different countries can be found through various international resources, such as those provided in Appendix I.[2–6] These resources generally indicate that Canada compares favourably to other countries on several measures, including survival rates. For example, the recent International Cancer Benchmarking Partnership (ICBP) study showed that Canada's cancer survival rate ranks among the highest in the world.[7] Ongoing exploratory research through the ICBP is focused on understanding why cancer outcomes vary between countries. Areas of investigation include differences in access to diagnostics, optimal treatments and healthcare system structures.[6]

Cancer outcomes are not evenly distributed among Canadians

Despite comparatively positive population-level cancer outcomes in Canada, incidence, mortality and survival vary across socio-economic status, racial, ethnic and under-represented population groups. The comprehensive national estimates included in this publication would require systematically collected and complete data to provide the same detail of estimates by these and other important groups. At this time, the data needed to rigorously estimate population subgroup rates and meaningfully compare the differences within the population are limited or lacking. The collaborators involved in this publication and other members of the cancer control community are investing in efforts to increase data collection and availability to address these crucial gaps. For example, the Canadian Cancer Society is currently co-leading a pan-Canadian cancer data strategy with the Canadian Partnership Against Cancer (CPAC) that focuses on enhancing data collection, integration and use to improve cancer control and outcomes for all people in Canada. The 2019–2029 Canadian Strategy for Cancer Control includes several key investments in building capacity for data collection by partners, including partners that have a focus on First Nation, Inuit and Métis populations. The Public Health Agency of Canada and Statistics Canada are focused on better integrating socio-economic and ethno-cultural data with cancer and outcome data in addition to recently launching important data collection initiatives. The Canadian Institute for Health Information (CIHI) endorsed the collection of race-based and ethnicity data in a publication from 2020 that outlines proposed standards of data collection to facilitate better reporting of population groups that typically experience disparate access and outcomes. Together the cancer control community is working to address these important gaps in data so that we can better identify disparities in outcomes for increased attention and investment.[8]

Cancer has a substantial economic burden on Canadians and Canadian society

Cancer is a costly illness, which means that it has major implications for people diagnosed with cancer, their families and Canadian society as a whole. It is difficult to obtain reliable measures of the true economic cost of cancer, and different approaches can produce a wide range of estimates. A report in 2012 noted that the costs of cancer care in Canada rose steadily over the period studied, from $2.9 billion in 2005 to $7.5 billion in 2012.[9] Similarly, a study in the US estimated that the cost of cancer care would increase by 27% between 2010 and 2020.[10] Given the increasing number of cancer cases diagnosed each year in Canada,[11] the cost of cancer care is also likely to continue to rise for the foreseeable future.

The financial hardship of cancer in Canada goes beyond the physical and emotional challenges related to the disease because people with cancer also face significant financial pressures following the cancer diagnosis.[12–15] New research in Canada has shed light on the financial burden faced by many people with cancer and their families.[16] The national survey, administered in 20 cancer centres across Canada, found that one-third of survey respondents noted "somewhat, large, or worst possible" financial burden. They also reported spending an average of 34% of their monthly income on cancer-related costs. This was particularly experienced by those with lower incomes. These challenges can result from a loss of income after diagnosis and an increase in day-to-day costs caused by unforeseen expenses, such as medical equipment, childcare, homecare and transportation fees.

Progress has been made but the challenge continues

There is no doubt that a lot of progress has been made in the fight against cancer, despite the high burden of the disease. Today, more is known about what causes cancer, how it develops and how best to prevent and treat it. This progress is reflected by decreases in incidence rates over time and even more so in trends in mortality rates, which have decreased more than 35% in males and 20% in females since the cancer death rate peaked in 1988 (Figure 4.3).

However, in addition to the continued high burden of cancer, new challenges continue to arise. For example, colorectal cancer rates among younger people are rising.[17] The reasons for this remain unclear and research is needed to understand how we can mitigate this increase.

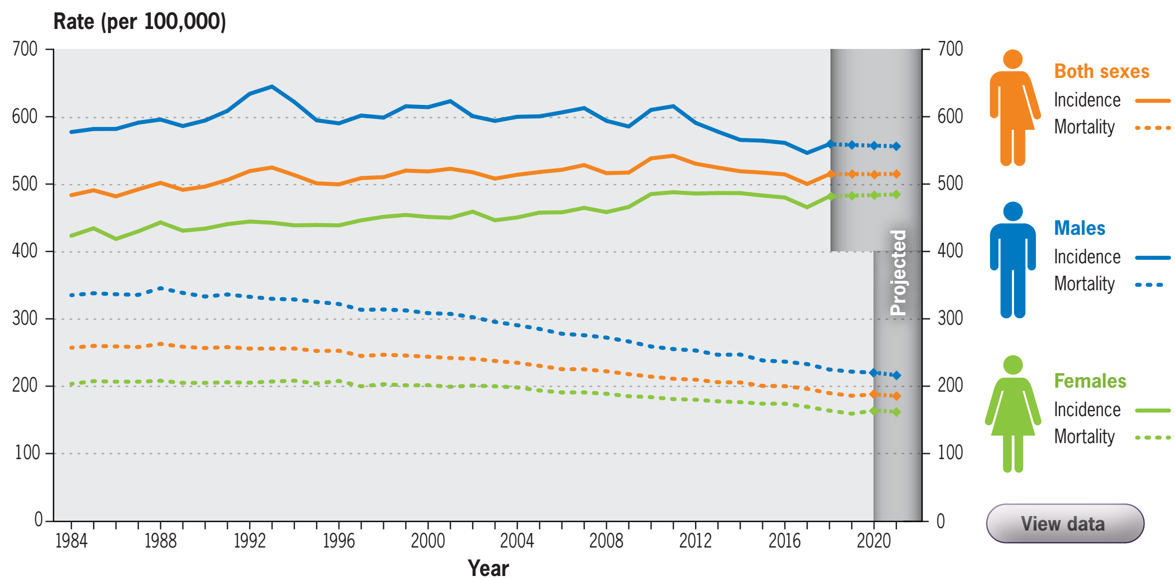
Addressing gaps in cancer control

Inequities in terms of access to care and outcomes are also a challenge in Canada. For example, people in Canada with a lower income are more likely to be diagnosed with lung cancer, more likely to be diagnosed with advanced stage (stage III or IV) disease and less likely to survive lung cancer.[18] Inequities in cancer outcomes can be further exacerbated by the increasing costs of emerging cancer treatments, some of which are paid out of pocket. Limited data have shown that some racialized groups face additional barriers to accessing cancer care and experience worse outcomes.[19,20] As noted above, systematically collected racial and ethnicity-specific surveillance data are lacking in Canada, creating a challenge to comprehensively quantify the cancer outcomes experienced in under-served communities. However, data from targeted provincial analyses or research studies do provide some insights.

For example, research shows that new and long-term immigrant Canadians of racialized groups have lower screening uptake and adherence to recommendations even in the presence of funded, population-based screening programs.[21] These screening disparities also follow socio-economic and racial divisions within cities and towns, with lower uptake in neighbourhoods with lower socio-economic status and higher numbers of Black people and other racialized groups.[22] Structural barriers that lower screening rates and access to appropriate care have also been noted for LGBTQ2S+ populations, which can potentially lead to differential outcomes.[23,24]

Research data also highlight some of the disparities in cancer survival for First Nations, Inuit and Métis people. First Nations had poorer survival than the general population in Canada for 14 of the 15 most common cancers, and this disparity could not be explained by income and rurality.[18,20,25] Data from the territories can also shed some light on the experience of people who live in northern Canada, many of whom are First Nations, Inuit and Métis often at a great distance to cancer care. Delivering healthcare services in remote areas like Nunavut can be challenging for several reasons, including the size of the territory, dispersion of the small population, weather and

FIGURE 4.3 Age-standardized incidence and mortality rates for all cancers combined, by sex, Canada,* 1984–2021



* Age-standardized incidence rates exclude data from Quebec.

Note: Rates are age-standardized to the 2011 Canadian standard population. Projected rates are based on long-term historic data and may not always reflect recent changes in trends. Incidence excludes non-melanoma skin cancer (neoplasms, NOS; epithelial neoplasms, NOS; and basal and squamous). Actual incidence data were available to 2017 and projected thereafter. Actual mortality data were available to 2019; estimates for 2020–2021 were projected based on data up to 2018. For further details, see *Appendix II: Data sources and methods*.

Analyses by: Centre for Population Health Data, Statistics Canada

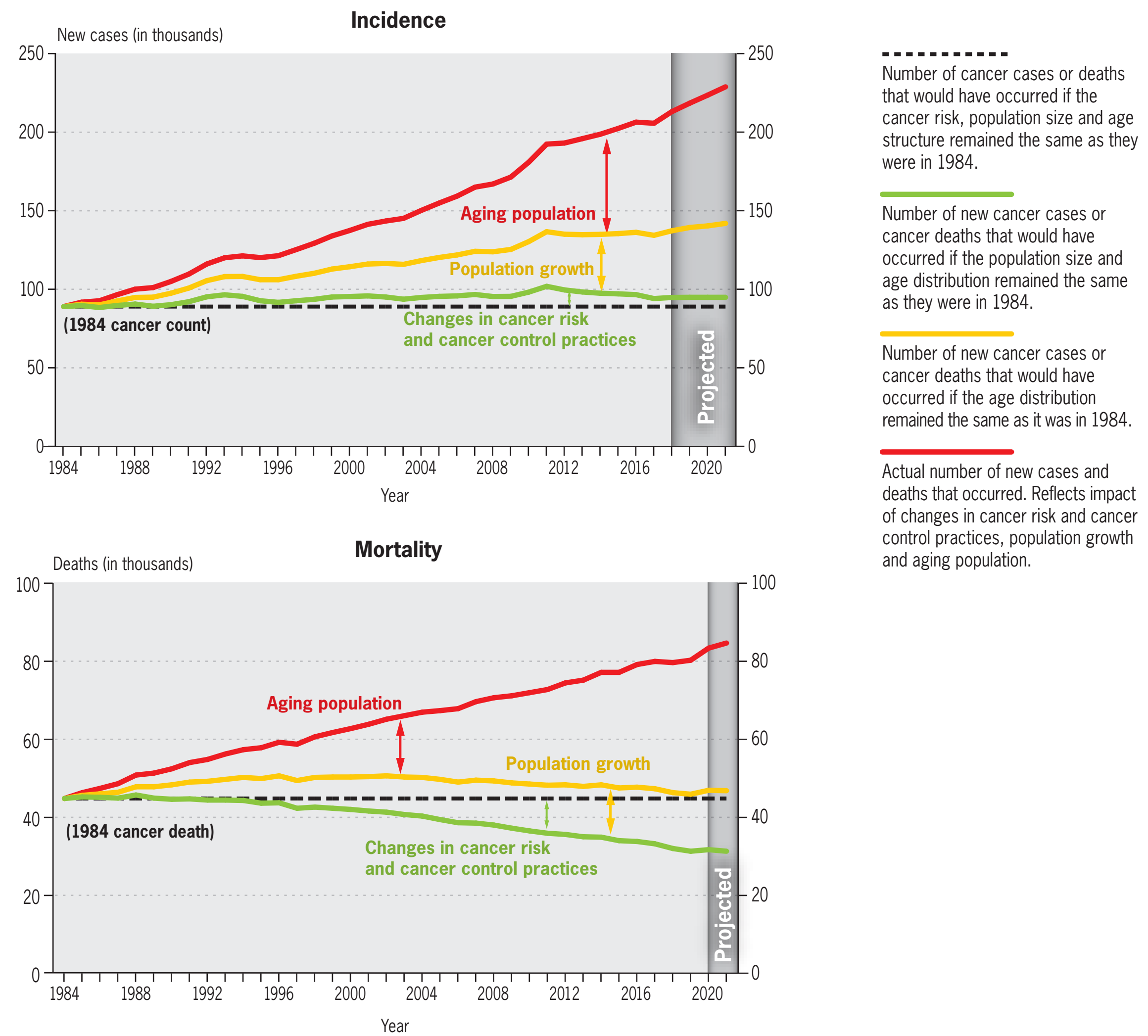
Data sources: Canadian Cancer Registry, National Cancer Incidence Reporting System and Canada Vital Statistics Death Database at Statistics Canada reliance on air transportation. The territory's 25 communities are isolated and spread across the largest territory or province in Canada.[26,27] People living in Inuit Nunangat (Inuvialuit Settlement Region, Nunavut, Nunavik and Nunatsiavut) are more than twice as likely to be diagnosed with lung cancer than people living in the rest of Canada.[27] Furthermore, individuals in these communities must travel extensive distances to access treatment not available locally. To help drive needed changes in outcomes and experiences for all First Nations, Inuit and Métis, the Canadian Strategy for Cancer Control includes three Peoples-specific self-identified priorities: culturally appropriate care closer to home; peoples-specific, self-determined cancer care; First Nations- Inuit- or Métis-governed research and data systems.

The challenge of a growing and aging population

As presented in this publication, the total number of new cases of cancer and the number of cancer deaths continues to increase each year in Canada, a phenomenon that can largely be explained by the aging and growing population.

Figure 4.4 illustrates how the number of new cases of cancer and deaths from cancer each year are affected by changes in cancer risk factors and cancer control practices, the aging population and population growth. Since 1984, changes in cancer risks and cancer control practices have had a small influence on reducing the overall number of cancer cases diagnosed. But they have had a more meaningful influence on reducing the number of Canadians who die from cancer. Unfortunately, this progress has been outweighed by the impact of population aging, followed by population growth, both of which have contributed to a dramatic increase in the number

FIGURE 4.4 Trends in new cases and deaths (in thousands) for all cancers and ages, attributed to changes in cancer risk and cancer control practices, population growth and aging population, Canada, 1984–2021



Note: New cases exclude non-melanoma skin cancer (neoplasms, NOS; epithelial neoplasms, NOS; and basal and squamous). Actual incidence data was available to 2017 for all provinces and territories except Quebec and mortality data to 2019 for all provinces and territories except Yukon. For further details, see *Appendix II: Data sources and methods*. The range of scales differs between the graphs.

Analyses by: Centre for Surveillance and Applied Research, Public Health Agency of Canada

Data sources: Canadian Cancer Registry, National Cancer Incidence Reporting System and Canadian Vital Statistics Death Database at Statistics Canada of cancer cases and cancer deaths each year.

Because the Canadian population is continuing to grow and age,[28] the average annual number of cancer cases is projected to be 79% higher in 2028–2032 than it was in 2003–2007.[11,29] As a result, the Canadian healthcare system is expected to continue to face increasing demand for cancer services, including diagnostics, treatment and palliative care.

In addition, an increasing percentage of Canadians are surviving their cancer diagnosis, meaning there is an increasing number of cancer survivors in the population. Individuals who survive a cancer diagnosis often go on to live productive and rewarding lives, but the cancer experience presents many physical, emotional, spiritual and financial challenges that can persist long after the disease is treated.[30] This growing population of survivors will require continued support and services.

How statistics can help guide cancer control

The wide variation we observe in incidence, mortality and survival across cancers reflects the complexity of the disease. But additional factors must also be taken into account when assessing how to address the ongoing burden of cancer in Canada. For example, prevention, screening and early detection, treatment and survivorship all play an important role in the fight against cancer.

Figure 4.5 presents a simplified approach to categorizing cancers based on their relative burden in Canada and the extent to which they can be prevented and detected early. The figure displays a relative rating for the most commonly diagnosed cancer types in relation

FIGURE 4.5 Summary of key cancer control and outcome characteristics by cancer type

	Preventability	Detectability	Incidence	Survival	Mortality
Lung and bronchus	Green	Yellow	Red	Red	Red
Breast	Yellow	Green	Red	Green	Red
Colorectal	Green	Green	Red	Yellow	Red
Prostate	Red	Yellow	Red	Green	Red
Bladder	Green	Red	Yellow	Yellow	Yellow
Non-Hodgkin lymphoma	Red	Red	Yellow	Yellow	Yellow
Melanoma	Green	Yellow	Yellow	Green	Yellow
Uterus (body, NOS)	Yellow	Red	Yellow	Green	Yellow
Kidney and renal pelvis	Yellow	Red	Yellow	Yellow	Yellow
Head and neck	Green	Yellow	Yellow	Yellow	Yellow
Pancreas	Yellow	Red	Yellow	Red	Red
Leukemia	Red	Red	Yellow	Yellow	Yellow
Thyroid	Red	Yellow	Yellow	Green	Green
Stomach	Green	Red	Green	Red	Yellow
Multiple myeloma	Red	Red	Green	Red	Yellow
Liver	Green	Red	Green	Red	Yellow
Brain/CNS	Red	Red	Green	Red	Yellow
Ovary	Red	Red	Green	Red	Yellow
Esophagus	Green	Red	Green	Red	Yellow
Cervix	Green	Green	Green	Yellow	Green
Testis	Red	Yellow	Green	Green	Green
Hodgkin lymphoma	Yellow	Red	Green	Green	Green

CNS=central nervous system; NOS=not otherwise specified

Preventability — Relative ratings are assigned to each cancer site based primarily on the population attributable risk reported by Canadian Population Attributable Risk of Cancer (ComPARe) study. Green represents cancers for which it is estimated that at least 50% of cancers are preventable or for which screening programs can detect treatable precancerous lesions, yellow where 25%–49% are preventable and red where less than 25% are preventable. Where information was not available through ComPARe, Cancer Research UK was used.

Detectability — Relative ratings were assigned as green if organized screening programs are available in Canada, yellow if opportunistic early detection is available and red if no organized screening and limited early detection procedures are available.

Incidence — Relative ratings were assigned as green if there were less than 5,000 cases, yellow if there were less than 15,000 cases and red if there at least 15,000 cases in 2021 (Table 1.2).

Survival — Relative ratings are assigned based on predicted five-year net survival probabilities listed in Table 3.1. Red represents a survival of less than 50%, yellow represents 50%–79% and green represents 80% or more.

Mortality — Relative ratings were assigned as green if there were less than 1,000 deaths, yellow if there were 1,000–4,000 deaths and red if there were more than 4,000 deaths in 2021 (Table 2.2).

to their preventability, detectability, incidence, survival and mortality using the statistics in this publication and information about modifiable risk factors and early detection programs.

It is recognized that other measures, such as the PYLL and economic impacts described earlier, must be considered when assessing the cancer burden. Also, this approach does not take into account the fact that less common cancers and pediatric cancers can still have a devastating impact on people with cancer and their families. Despite these limitations, Figure 4.5 aims to illustrate that, when assessed together, the statistics reported in this publication can be used to highlight gaps and opportunities in population-based cancer control strategies and identify priority areas for clinical and health services research.

Preventability

The World Health Organization suggests that prevention offers the most cost-effective, long-term strategy for controlling cancer and other non-communicable diseases.[31] Research suggests that a large number of cancers can be prevented through reductions in exposure to adverse environmental, behavioural and infectious factors.[32] Efforts to reduce cancer risk through the implementation of prevention programs targeted at both the individual and the population level can have a substantial impact on the future cancer burden in Canada. For example, the Canadian Cancer Society and Cancer Partnership Against Cancer have collaborated on a national smoking cessation initiative targeting First Nations, Inuit and Metis communities, which have significantly higher rates of smoking than non-Indigenous populations.[33–35]

Cervical cancer is almost entirely preventable through human papillomavirus (HPV) vaccination. The World Health Organization's goal to eliminate cervical cancer this century has been widely adopted globally. Canada has set an ambitious target to eliminate cervical cancer by 2040 through coordinated efforts to improve HPV vaccination rates and replace traditional Pap testing with HPV primary screening.[36] The Action Plan to Eliminate Cervical Cancer in Canada, 2020–2030, describes how a broad group of partners, experts and stakeholders, including the Public Health Agency of Canada, as well as First Nations, Inuit and Métis organizations and people with cancer, plan to close the gaps in equitable access to immunization, screening and follow-up of abnormal screening results.

Detectability

Detecting cancer early (e.g., through screening tests) and being treated for precancerous conditions can significantly reduce the burden of some cancers. Organized screening programs exist in most provinces and territories for breast, cervical and colorectal cancers, which is reducing the burden of these diseases. Lung cancer screening for high-risk populations has been explored in several provinces through pilots and research trials demonstrating that it is feasible, scalable and cost-effective in reducing lung cancer mortality. It is expected that provinces will begin to roll out these programs over the coming years. The widespread adoption of population-based screening has had a meaningful impact on the incidence and mortality of several common cancers in Canada. For example, cervical cancer once had high incidence and mortality rates.[37] But due to the success of widespread cervical cancer screening, it now has a moderate incidence rate and relatively low mortality rate.

Because of additional prevention opportunities that currently exist through HPV vaccination and further improvements in screening, many believe this cancer could be virtually eradicated in some countries.[38]

Incidence, survival and mortality

There are many cancers with low to medium incidence rates that are considered medium to high burden because they do not have definitively preventable risk factors, are not easily detected through current diagnostic modalities and do not have noticeable early symptoms. As a result, these cancers tend to be diagnosed at a later stage, have limited treatment options and have low survival. Examples include brain and pancreatic cancers. It is important to note that the development and progression of these cancers are not as well understood as other cancers because the short survival time makes it difficult to conduct meaningful clinical research. Nevertheless, there is a need to intensify efforts to better understand the etiology of these diseases and identify more effective diagnostic and treatment strategies to reduce the burden.

On the other side of the spectrum are thyroid and prostate cancers, which have high incidence rates but good survival. However, both of these cancers have come under scrutiny for over-diagnosis.[39,40] Given the significant toll each diagnosis takes on individuals and the healthcare system, when and how cancers are diagnosed and treated must always be taken into careful consideration.

The impact of COVID-19 on cancer statistics

Throughout the COVID-19 pandemic, cancer control efforts across the spectrum have been impacted. Given the disproportionate impact of the pandemic on Black people and people of colour,[41,42] it is likely they have also experienced greater access challenges and adverse outcomes. The projections in this publication do not account for any changes in diagnosis or cancer control due to COVID-19 as they are based on data up to 2017 for incidence and 2018 for mortality. Several initiatives are underway at the provincial and national levels to understand the impacts.

International efforts suggest that the diagnoses of cancers were reduced by 40% between March 9 and May 17, 2020, compared to diagnoses averaged over the same time period in 2018 and 2019.[43] In terms of screening, we expect that interruptions to programs will have an impact in future cancer survival. These impacts will be picked up in future analyses. Early reports from provincial analyses suggest that biopsies, surgical referrals and even emergency department visits were lower for a number of months. Data from CIHI show a 25% reduction in diagnostic imaging and a 20% reduction in the number of cancer surgeries in the first six months of the pandemic.[44] Importantly, COVID-19 has impacted some populations more than others, exacerbating the inequities faced by many, including Indigenous peoples, people of colour, LGBTQ2S+ and others.

Summary

Despite the limitations of the approach taken in generating Figure 4.5, it is an example of an exercise that can help focus cancer control efforts. It also helps reinforce that measures of cancer burden must be assessed in a variety of ways and alongside each other. They also need to be examined in relation to the extent to which we are currently able to reduce the burden through improved primary prevention, timely and effective early detection and screening, and evidence-based and person-centred diagnosis and treatment. Such comprehensive assessments can help take the statistics reported in this publication to the next level by highlighting gaps and opportunities in population-based cancer control strategies and identifying priority areas for clinical and health services research.

Supplementary resources

Cancer.ca/statistics houses supplementary resources for this chapter. This includes:

- Excel spreadsheets with the statistics used to create the figures
- PowerPoint images of the figures used throughout this chapter

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APPENDIX I

Related resources

Additional cancer surveillance statistics

Statistics Canada offers a series of online tables of aggregate statistics that can be manipulated to the user's specifications. The tables were previously referred to as CANSIM.

Statistics Canada also offers a series of online data tables that provide the public with fast and easy access to the latest statistics available in Canada relating to demography, health, trade, education and other key topics. This includes a number of tables related to cancer. These tables can be accessed from the Statistics Canada website at https://www150.statcan.gc.ca/n1/en/type/data.

Users can browse available data tables by topic or search by keywords or a table number. Users can generate customized statistical summaries of tables using some of the data functions (e.g., "Add/Remove data"). Final summaries can be exported using the download function.

Table number	Title and description
13-10-0111-01	**Number and rates of new cases of primary cancer, by cancer type, age group and sex** Provides counts of new cancer cases and crude incidence rates (and 95% confidence intervals) for Canada and provinces and territories by cancer type, age group, sex and year
13-10-0747-01	**Number of new cases and age-standardized rates of primary cancer, by cancer type and sex** Provides counts of new cancer cases and age-standardized incidence rates (and 95% confidence intervals) for Canada and provinces and territories by cancer type, sex and year
13-10-0761-01	**Number and rates of new primary cancer cases, by stage at diagnosis, selected cancer type and sex** Provides counts of new cancer cases and crude incidence rates (and 95% confidence intervals) by stage at diagnosis for Canada, the provinces and the territories, by selected cancer type, age group, sex and year
13-10-0762-01	**Number of new cases and age-standardized rates of primary cancer, by stage at diagnosis, selected cancer type and sex** Provides counts of new cancer cases and age-standardized incidence rates (and 95% confidence intervals) by stage at diagnosis for Canada, the provinces and the territories, by selected cancer type, sex and year
13-10-0109-01	**Cancer incidence, by selected sites of cancer and sex, three-year average, Canada, provinces, territories and health regions (2015 boundaries)** Provides counts of new cancer cases and crude age-standardized incidence rates (and 95% confidence intervals) for Canada, the provinces and the territories by cancer type, sex, geography and year
13-10-0112-01	**Cancer incidence, by selected sites of cancer and sex, three-year average, census metropolitan areas** Provides cancer cases and crude and age-standardized cancer rates (and confidence intervals) for metropolitan areas, by sex and cancer site for 2001/2003 to 2013/2015
13-10-0142-01	**Deaths, by cause, Chapter II: Neoplasms (C00 to D48)** Provides the annual number of cancer deaths for Canada by cancer cause of death, age group, sex and year
13-10-0392-01	**Deaths and age-specific mortality rates, by selected grouped causes** Provides the annual number of deaths and crude mortality rates for Canada by cause of death, age group, sex and year
13-10-0800-01	**Deaths and mortality rate (age-standardization using 2011 population), by selected grouped causes** Provides the annual number of deaths and the crude and age-standardized mortality rates for Canada, the provinces or the territories by sex, year and cause of death
17-10-0005-01	**Population estimates on July 1st, by age and sex** Provides population counts for Canada, the provinces and the territories by age, year and sex
13-10-0158-01	**Age-specific five-year net survival estimates for primary sites of cancer, by sex, three years combined** Provides estimates of age-specific five-year net survival (and 95% confidence intervals) for Canada (with and without Quebec) by cancer type, sex and overlapping three-year time periods
13-10-0159-01	**Age-specific five-year net survival estimates for selected cancers with age distributions of cases skewed to older ages, by sex, three years combined** Provides estimates of age-specific five-year net survival (and 95% confidence intervals) for Canada (with and without Quebec) by selected cancers with age distributions of cases skewed to older ages, by sex and overlapping three-year time periods

Which tables are relevant and how do I use them?

The table on the right contains a list of tables most relevant to this publication. Many have been referenced in this publication. This is not a complete list of all tables available. Additional tables can be found by browsing the Statistics Canada website.

A detailed description of how to access, modify and download these data tables is provided online.

What if I need statistics that are not available in the tables?

Custom tabulations are available on a cost-recovery basis upon request from Statistics Canada. Analytical articles appear regularly in Health Reports, Statistics Canada, Catalogue no. 82-003.

Other information about the data Statistics Canada offers is available through their website (statcan.gc.ca).

Why do some statistics in this publication differ from the statistics in these tables?

Users of Statistics Canada's data tables should be aware that there are some differences between the data compiled for this publication and those used in Statistics Canada's tables. For additional details on those data, users should review the footnotes provided under each table on the Statistics Canada website. The information in those footnotes can be compared to the details provided in *Appendix II* of this publication.

Table number	Title and description
13-10-0160-01	**Age-standardized five-year net survival estimates for primary sites of cancer, by sex, three years combined** Provides estimates of age-standardized five-year net survival (and 95% confidence intervals) for Canada (with and without Quebec) by cancer type, sex and overlapping three-year time periods
13-10-0161-01	**Age-standardized and all-ages five-year net survival estimates for selected primary sites of cancer, by sex, three years combined, by province** Provides estimates of all-ages and age-standardized five-year net survival (and 95% confidence intervals) for provinces by selected cancers, sex and overlapping three-year time periods
13-10-0790-01	**Predicted age-standardized and all ages five-year net survival estimates for selected primary types of cancer, by sex, three years combined** Provides estimates of age-standardized and all ages five-year net survival (and 95% confidence intervals) for Canada (excluding Quebec) for selected cancers by sex for the 2015 to 2017 time period
13-10-0791-01	**Predicted age-specific five-year net survival estimates for selected primary types of cancer, by sex, three years of cases** Provides estimates of age-specific five-year net survival (and 95% confidence intervals) for Canada (excluding Quebec) for selected cancers by sex for the 2015 to 2017 time period
13-10-0751-01	**Number of prevalent cases and prevalence proportions of primary cancer, by prevalence duration, cancer type, attained age group and sex** Provides prevalence counts and proportions (and 95% confidence intervals) by prevalence duration for Canada, the provinces and the territories, by cancer type, sex, attained age group and index date

Chronic disease surveillance

The Public Health Agency of Canada hosts a series of online interactive tools, including data tools, indicator frameworks and data blogs, on their Public Health Infobase, which allows users to access and view public health data. This includes the Canadian Cancer Data Tool (CCDT), which provides data on the incidence and mortality of cancer in Canada over time by age and sex for 22 different cancer types and all cancers combined. Other resources in the Public Health Infobase include the Canadian Chronic Disease Surveillance System (CCDSS) data tool, which is a comprehensive pan-Canadian resource on the burden of chronic diseases and associated determinants, as well as the Canadian Chronic Disease Indicators (CCDI). Among other indicators, the CCDI provides the rate of cancer incidence, mortality, prevalence and screening practices over time and by sex, age and province or territory. The Public Health Agency of Canada also regularly publishes fact sheets and infographics on cancer in Canada (https://www.canada.ca/en/public-health/services/chronic-diseases/cancer.html).

Childhood cancer surveillance

The Public Health Agency of Canada funds and manages the Cancer in Young People in Canada (CYP-C) program, which is a national, population-based surveillance system studying all children and youth with cancer in Canada. This program is a partnership with the C17 Council, the network of all 17 children's cancer hospitals across Canada. CYP-C products include the Cancer in Young People in Canada (CYP-C) Data Tool, a full report[1] and fact sheets. The CYP-C Data Tool, located on the Public Health Infobase, provides pan-Canadian surveillance data on children and youth with cancer to inform research and planning for cancer control efforts.

Cancer system performance

The Canadian Partnership Against Cancer is an independent organization funded by the federal government to accelerate action on cancer control for all Canadians. As part of that work, they produce cancer system performance data to see how jurisdictions compare and to identify gaps in care. This includes information related to prevention, screening, diagnosis, treatment, the person-centred perspective and research. Online tools and reports are available at partnershipagainstcancer.ca/performance-reports.

Cancer prevention

The Canadian Cancer Society maintains up-to-date, accurate information on cancer prevention. This includes It's My Life, which is an online, interactive tool designed to teach the public how different risk factors affect the risk of getting cancer and what can be done to reduce the risk.

In 2019, the Canadian Population Attributable Risk of Cancer (ComPARe) study was released. It quantified the number and percentage of cancers in Canada, now and in the future, attributable to modifiable risk factors. All results from that study are available through a data dashboard at prevent.cancer.ca. Using the dashboard, users can select the cancer and risk factor of interest and investigate the data by age, sex and year.

International cancer surveillance

Comparable cancer indicators for different countries can be found through various international resources. Those listed below represent reputable resources for that information.

- The Global Cancer Observatory (GCO) is an interactive web-based platform that focuses on the visualization of cancer statistics to show the changing scale, epidemiologic profile and impact of the disease worldwide.
- The Cancer Incidence in Five Continents series provides comparable data on cancer incidence from a range of geographical locations.
- The Cancer in North America (CiNA) publications are produced annually to provide the most current incidence and mortality statistics for the US and Canada.
- The International Cancer Benchmarking Partnership (ICBP) quantifies international differences in cancer survival and identifies factors that might influence observed variations.
- CONCORD is a program for worldwide surveillance of cancer survival. The most recent CONCORD publication is CONCORD-3.[2]

References

1. Public Health Agency of Canada [Internet]. Cancer in Young People in Canada: A Report from the Enhanced Childhood Cancer Surveillance System. Ottawa, ON: Public Health Agency of Canada; 2017. Available at: https://www.Canada.ca/content/dam/hc-sc/documents/services/publications/science-research-data/cancer-young-people-Canada-surveillance-2017-eng.pdf (accessed April 2021).
2. Allemani C, Matsuda T, Di Carlo V, Harewood R, Matz M, Niksic M, et al. [Internet]. Global surveillance of trends in cancer survival 2000–14 (CONCORD-3): Analysis of individual records for 37 513 025 patients diagnosed with one of 18 cancers from 322 population-based registries in 71 countries. 2018 [updated Jan 30]. Available at: http://www.ncbi.nlm.nih.gov/pubmed/29395269. (accessed April 2021).

APPENDIX II

Data sources and methods

Summary

Who was involved?

The Centre for Population Health Data at Statistics Canada and the Centre for Surveillance and Applied Research at the Public Health Agency of Canada conducted the analyses that are presented in this publication. The provincial and territorial cancer registries were consulted in the preparation of the cancer incidence and mortality projections for their jurisdictions. The Canadian Cancer Statistics Advisory Committee advised on the methodology and interpretation of results and wrote the accompanying text. The Canadian Cancer Society coordinated the production of this publication and the work of the committee.

What data were used?

- Actual cancer incidence data used for this publication were for the period 1984 to 2017 (except for Quebec, for which data were available to 2010).
- Actual cancer mortality data covered the period from 1984 to 2019.
- Cancer incidence and mortality projections up to 2021 were generally based on the most recent 25 years of data available. However, the mortality projections were based on data from 1994 to 2018 as the projection analysis commenced prior to the release of the 2019 mortality data by Statistics Canada.
- Survival analyses were based on a Canadian Cancer Registry death-linked analytic file that covered the period from 1992 to 2017.
- Additional sources of data included population life tables, population estimates and forecasts on population growth.

Which analytic approaches were used?

- Estimates of the lifetime probability of developing and dying from cancer were estimated using DevCan.[1]
- Cancer incidence and mortality projections were estimated using CANPROJ.[2]
- Joinpoint analysis was applied to estimate trends in incidence[3] and mortality[4] over time.
- Net survival was calculated using the Pohar Perme estimator.[5]

Data sources

Incidence data: The Canadian Cancer Registry (CCR)

Actual cancer incidence data used in this publication cover the period of 1984 to 2017 (except Quebec, for which data from 1984 to 2010 were used). Data for 1992 to 2017 were obtained from the CCR Tabulation Master File,[6] released January 29, 2020 (see *Data methods and issues)*. Data for years that precede the CCR (before 1992) were retrieved from its predecessor, the National Cancer Incidence Reporting System (NCIRS). The NCIRS is a fixed, tumour-oriented database containing cases diagnosed between 1969 and 1991.

- Incidence data originate with the provincial and territorial cancer registries (PTCR), which provide data annually to Statistics Canada for inclusion in the CCR.
- The CCR is a person-oriented database that includes clinical and demographic information about residents of Canada diagnosed with new primary cases of cancer.
- Incidence estimates are based on the individuals' province or territory of residence at the time of diagnosis, which may differ from the jurisdiction in which the diagnosis occurred.
- The Centre for Population Health Data at Statistics Canada maintains the CCR. An annual process is in place to identify and remove

duplicate person and tumour records. Records from Quebec have not been de-duplicated within or between provinces since the last provincial process, which was completed for cases diagnosed to December 31, 2008.

- Cancer diagnoses are classified according to the *International Classification of Diseases for Oncology, 3rd Edition* (ICD-O-3) from 1992 onward.[7] Cancer diagnoses in the NCIRS (i.e., prior to 1992) were classified according to the *International Statistical Classification of Diseases and Related Health Problems, Ninth Revision* (ICD-9).[8]
- The International Agency for Research on Cancer (IARC) rules[9] for multiple primaries were used for cases from the CCR (see *Data and methods issues*) from 1992 onward for all provinces except Ontario which had slightly more conservative IARC rules until the 2010 diagnosis year. During the period covered by the NCIRS, registries other than Quebec and Ontario used multiple primary rules that allowed a small percentage of additional cases.

Mortality data: The Canadian Vital Statistics—Death database (CVSD)

The actual mortality data used in this publication cover the period of 1984 to 2019 and were obtained from the Canadian Vital Statistics—Death Database (CVSD).[10]

- Death records originate with the provincial and territorial registrars of vital statistics and are provided regularly to Statistics Canada for inclusion in the CVSD.
- The Centre for Population Health Data at Statistics Canada maintains the CVSD.
- The CVSD includes information on demographics and cause of death for all deaths in Canada. Prior to the 2010 reference year, some data were also collected on Canadian residents who died in American states within the US. Deaths of non-residents of Canada are not included in the calculation of mortality statistics in this publication.
- Mortality estimates are based on the individuals' province or territory of residence at the time of death rather than the place where the death occurred.
- Cause of death is classified according to the ninth and 10th revisions of *the International Statistical Classification of Diseases and Related Health Problems* (ICD): ICD-9[8] from 1979 to 1999 and ICD-10 from 2000 onward.[11]
- Cancer deaths are those for which some form of cancer, as certified by a physician, is the primary underlying cause of death.

Population data: Census of the population

- Population estimates for 1984 to 2019 were obtained from Statistics Canada.[12] These estimates are final intercensal up to 2015, final postcensal for 2016, updated postcensal for 2017 to 2018 and preliminary postcensal for 2019.
- Projected population estimates are used for 2020 and 2021, as prepared by Statistics Canada under assumptions of medium growth (scenario M1).[13] Scenario M1 incorporates medium growth and historical trends (1991/1992 to 2016/2017) of interprovincial migration.
- All population estimates include non-permanent residents and are adjusted for net census undercoverage and Canadians returning from abroad.

Survival data

- Survival analyses were conducted using the CCR death-linked analytic file created by Statistics Canada in their Social Data Linkage Environment.[14] Specifically, the CCR tabulation file released January 29, 2020, was linked to mortality information complete through December 31, 2017.
- In addition to pre-existing mortality information on the CCR itself, mortality information were also obtained from the CVSD[10] and from the T1 Personal Master Files (as reported on tax returns). The use of death information appearing on tax returns permitted the identification of additional deaths events that may not have been included in the CVSD (e.g., deaths occurring outside Canada).[15]
- The analytic file follows the multiple primary coding rules of IARC.[9]
- Survival time was measured in days from the date of diagnosis to the date of death, where applicable; otherwise to the end of 2017.
- For more precise matching of obtained age and obtained calendar year to expected survival probabilities in the follow-up experience of individual people with cancer, the CCR death-linked analytic file includes variables for age at diagnosis and diagnosis year measured to three decimal places.

- More information on the linkage process and on the resulting death-linked analytic file is supplied in the User Guide to this file, which is available upon request.

Expected survival

- Expected survival probabilities necessary for the calculation of net survival were mostly obtained from sex-specific, complete, annual national or provincial life tables.[16]
- As complete life tables were not available for Prince Edward Island or the territories, expected survival for these jurisdictions were derived, up to the age of 99 years, from abridged life tables for Canada and the affected jurisdictions[17] and from complete Canadian life tables[16] using a method suggested by Dickman et al.[18] For ages 100 to 109, where this was not possible for these jurisdictions, complete Canadian life values were directly used.

Cancer definitions

- Cancer cases were defined according to ICD-9[8] prior to 1992 and ICD-O-3[7] thereafter. Cancer deaths were defined according to ICD-9[8] prior to 2000 and ICD-10[11] thereafter. Table A1 outlines the ICD-9, ICD-O-3 and ICD-10 codes used to identify cancer cases and deaths by cancer type for this publication.
- Some definitions have changed slightly over time. Changes occurring since the 2004 edition of this publication are outlined in Tables A2-1 and A2-2.
- A new cancer grouping — head and neck cancers — has been included with this edition of the publication. This group subsumes the previously reported categories of oral (i.e., lip, oral cavity and pharynx) and laryngeal cancer. It additionally includes cancers of the nasal cavity, middle ear and accessory sinuses, which were previously included in the "all other cancers" category. The head and neck cancers group does not include thyroid cancer, which remains as its own independent category.
- For Figure 1.4 and Table 3.3, new cancers for children (aged 0–14 years) were classified and reported according to the Surveillance, Epidemiology and End Results Program (SEER) update[19] of the *International Classification of Childhood Cancer, Third Edition* (ICCC-3).[20] The update was in response to new morphology codes introduced by the World Health Organization.[21] The classification system is more appropriate for reporting childhood cancers because it acknowledges the major differences between cancers that develop during childhood and those that occur later in life. Non-malignant tumours were excluded.

Methods

Incidence and mortality rates

- Records from each province or territory were extracted from the relevant incidence or mortality files and then classified by year of diagnosis or death and by sex, five-year age group (e.g., 0–4, 5–9, …, 85–89, 90+ years) and cancer type.
- Rates for each category were calculated by dividing the number of cases or deaths in each category (i.e., sex, age group, year, cancer type and province or territory) by the corresponding population figure. These formed the basis for calculations of age-standardized rates and for projections beyond the most recent year of actual data.
- Age-standardized rates were calculated using the direct method, which involves weighting the age-specific rates for each five-year age group according to the age distribution of the 2011 Canadian standard population (see table above). Unlike previous editions of this publication prior to 2020, all age-standardized rates were based on 19 age groups.

2011 Canadian standard population

Age group	Population	Standard weight
0–4	1,899,064	0.055297
5–9	1,810,433	0.052717
10–14	1,918,164	0.055853
15–19	2,238,952	0.065194
20–24	2,354,354	0.068555
25–29	2,369,841	0.069006
30–34	2,327,955	0.067786
35–39	2,273,087	0.066188
40–44	2,385,918	0.069474
45–49	2,719,909	0.079199
50–54	2,691,260	0.078365
55–59	2,353,090	0.068518
60–64	2,050,443	0.059705
65–69	1,532,940	0.044636
70–74	1,153,822	0.033597
75–79	919,338	0.026769
80–84	701,140	0.020416
85–89	426,739	0.012426
90+	216,331	0.006299
Total	34,342,780	1.000000

Note: The Canadian population distribution is based on the final postcensal estimates of the July 1, 2011, Canadian population, adjusted for census undercoverage.

Data source: Census and Demographics Branch, Statistics Canada

Figure 4.4 (in *Chapter 4: Cancer in context*) shows the relative number of new cases and deaths that can be attributed to changes in cancer risk and cancer control practices, population size and aging of the population.

The series shown in Figure 4.4 were calculated as follows:

- Uppermost series (red) — The actual and projected annual number of Canadian cancer cases or deaths for both sexes combined
- Next-to-uppermost series (orange) — Annual total population multiplied by the annual age-standardized rate, using the 1984 population distribution for males and females as the standard weights
- Next-to-baseline series (green) — The 1984 total population multiplied by the annual age-standardized rate, using the 1984 population distribution for males and females as the standard weights
- Baseline (dotted line) — The observed number of Canadian cancer cases or deaths during 1984 for both sexes combined.

Projection of incidence and mortality rates and counts for 2021

The CANPROJ R-package was used to produce annual incidence and mortality projections of rates and counts. Six options are available in CANPROJ, including four regression models and two average methods. All regression models are based on a Power5 linked function (although this option can be changed), and a negative binomial distribution is used instead of a Poisson distribution when there is overdispersion. The projection options available are: the age-drift-period-cohort (AdPC) model, also known as the Nordpred model when the Poisson distribution is used; the age-cohort model; the hybrid models that incorporate age and period effects (age-specific or one common trend for all ages); the hybrid model that incorporates only age (equivalent to a long-term average); and the five-year average method.

CANPROJ is equipped with a decision tree that determines which of these options is the most suitable for projecting the data based on the significance of the variables that are included in the AdPC model (age, drift, period and cohort).

Age was included in all models as a factor. The number of age groups used has been increased from 18 to 19 this year with the disaggregation of the 85+ plus age group into 85 to 89 and 90+ age groups. Trends in age-specific incidence and mortality rates were extrapolated to 2021. The projected numbers of cancer cases and deaths in 2021 were calculated by multiplying these extrapolated rates by the sex-, age- and province-specific projected population figures for 2021.

Selection of "best" projections

The process for selecting the "best" projected counts and rates by sex, cancer type and geography went as follows:

- The CANPROJ package decision tree was used to select the model that best suited the actual data, according to the statistical tests performed within CANPROJ. When counts were small, the five-year average projection was used. This happened more often in the territories and Prince Edward Island, as well as in rare cancer types.
- Figures created with the CANPROJ-selected models were visually inspected for face validity by a review committee. In instances where the CANPROJ-selected model looked problematic (e.g., the estimates were at least 10% different than what would be expected), an alternate model was selected and approved through group consensus.
- The proposed estimates (counts and age-standardized rates) were sent to the provincial and territorial cancer registries for approval.
- In instances where the province or territory disagreed with an estimate based on in-house projections, knowledge of local trends or access to more recent data, they had the opportunity to provide this information to the committee for consideration.
- If the committee approved the rationale, they recommended an alternate model to the registry.

Through this consultation process, the "best" model was selected. All cancer-specific provincial and territorial projections reported in this publication were approved by a representative from the respective cancer registry as well as by the Canadian Cancer Statistics Advisory Committee.

Quebec incidence projections

Because cancer incidence data were only available for Quebec to 2010, an alternative projection method was used to estimate Quebec-specific cases and rates for 2011–2021. Specifically:

- Sex-, age- and cancer-specific correction factors were calculated as the ratio of sex-, age- and cancer-specific rate estimates for Quebec relative to Canada (excluding Quebec) for the 2006–2010 years.

- Actual (2011–2017) and projected (2018–2021) Canada rates that excluded Quebec by year, sex and five-year age group were applied to the 2011 to 2021 Quebec population to estimate preliminary Quebec-specific counts.
- The correction factors were applied to the preliminary Quebec-specific counts to produce the counts and rates used for this publication.

This method assumes the ratio of rates between Quebec and the rest of Canada remained constant over time, which may not be the case. Given the assumptions made for this analysis, extra caution should be taken when interpreting Quebec projected data. Limitations involving the under-reporting of melanoma and prostate cancer in Quebec[22] noted in previous editions of this publication were addressed in a simple manner for the 2021 projections. The magnitude of the under-reporting for these cancers was estimated using the preliminary Quebec counts for 2011 (available from: http://publications.msss.gouv.qc.ca/msss/fichiers/2017/17-902-36W.pdf). The methodology described above was applied and the resulting counts were multiplied by an additional correction factor corresponding to the 2011 Quebec Cancer Registry to 2010 CCR count ratio for all imputed years (2011 to 2021).

In this publication, cases were reported for Quebec because of their importance in determining the national total projected number of cancer cases. However, age-standardized rates were not reported for Quebec since they were estimated differently than other regions and therefore should not be compared.

Combined projections

For each province or territory, the "all cancers" projection was calculated as the sum of the cancer-specific projections, and "both sexes" was calculated as the sum of male and female counts. Projections for Canada as a whole were computed as sums of the projections for the individual provinces and territories.

Rounding for reporting

Projected estimates of incidence and mortality presented in this publication have been rounded as follows:

- Numbers between 0 and 99 were rounded to the nearest 5.
- Numbers between 100 and 999 were rounded to the nearest 10.
- Numbers between 1,000 and 1,999 were rounded to the nearest 50.
- Numbers greater than or equal to 2,000 were rounded to the nearest 100.

Age-specific and sex-specific numbers were combined before rounding, so it is possible that totals in the tables do not add exactly. However, any such discrepancies are within the precision of the rounding units described above.

Throughout the publication, actual incidence and mortality frequencies are randomly rounded up or down to a multiple of 5.

Precision of 2021 projections

The precision of a projection depends primarily on the number of observed cases and the population size for each combination of cancer type, age, sex and province or territory. Therefore, caution must be taken when interpreting differences in counts or rates, particularly for the smaller provinces and territories, as these differences may not be statistically significant.

Annual percent change (APC) and average annual percent change (AAPC) in cancer incidence and mortality rates

- Using Joinpoint,[4] the APC was calculated for each cancer type by fitting a piecewise linear regression model, assuming a constant rate of change in the logarithm of the annual age-standardized rates in each segment. The models incorporated estimated standard errors of the age-standardized rates. The tests of significance used a Monte Carlo Permutation method. The estimated slope from this model was then transformed back to represent an annual percentage change in the rate.
- Joinpoint analysis was applied to annual age-standardized rates (1984 to 2017 for incidence, and 1984 to 2019 for mortality) to determine years in which the APC changed significantly. Such years are referred to as changepoints.
- After consultation, 1984 was chosen as the start year because the quality of the data is considered good for all the provinces and territories from that year onward.
- Data from Quebec were excluded from the analysis of incidence trends because cases diagnosed from 2011 onward had not been submitted to the CCR. Imputed cancer incidence rates for Quebec for 2011 to 2017 were not used as a replacement for the missing data.
- The minimum time span on which to report a trend was set at five years. Thus, the most recent possible trend period in this study was 2013 to 2017 for incidence, and 2015 to 2019 for

mortality. A maximum of five joinpoints was allowed. An uncorrelated error model was selected for the autocorrelated errors options and the permutation test was used for the model selection.

- The year corresponding to the most recent changepoint detected (reference year) and the APC for the years beyond the changepoint are reported in Tables 1.6 and 2.6, as well as Figures 1.7 and 2.7. In the absence of a changepoint, the reference year is 1984.
- For each sex, cancers that demonstrated a statistically significant APC of at least 2% since the reference year, as well as the four most commonly diagnosed cancers (for incidence) and the five leading causes of cancer death (for mortality), are highlighted in the text. The trends for these notable cancers are depicted in Figures 1.8 and 1.9 for incidence and Figures 2.8 and 2.9 for mortality.
- To summarize the trend(s) over specified periods, the average annual percent change (AAPC) was calculated for the entire time period (1984 to 2017 or 1984 to 2019) and the most recent 10 years (2008 to 2017 or 2010 to 2019). The AAPC is computed as a weighted average of the APCs in effect during the specified period with the weights equal to the proportion of the period accounted for by each APC.
- Bladder cancer incidence included *in situ* carcinomas, which are considered invasive for the purpose of incidence reporting for all provinces and territories. At the time of analysis, data on *in situ* carcinomas of the bladder for Ontario were limited to 2010 to 2017. Because a large proportion of Canadians live in Ontario and since a significant proportion of bladder cancers are *in situ* carcinomas, the trend analysis for bladder cancer incidence was performed using the "jump" model to account for the artificial increase in rates that occurred between 2009 and 2010. Specifically, the "jump" model has an additional parameter that allows direct estimation of trends in situations where there is a "jump" in rates caused by systematic scaled change, but it is assumed that the "jump" does not affect the underlying trend.[23]

Probability of developing or dying from cancer

Crude probabilities of developing or dying from cancer were calculated using the software application DevCan.[1] Using cross-sectional data on cancer diagnoses, cancer deaths, all deaths and population estimates, DevCan employs statistical modelling to compute the probability of developing a first-time cancer during an age interval, conditioned on being alive and cancer free at the beginning of the age interval, as well as the probability of dying from cancer.[1]

Estimates of the probability of developing or dying from cancer are based on a hypothetical cohort of 10,000,000 live births and the assumption that the current incidence and mortality rates at each age stay constant throughout each age interval. Since this assumption may not be true, the probabilities may only regarded as approximations. Further, the estimated probabilities are for the general Canadian population and should not be interpreted as an individual's risk.

Probability of developing cancer

Age-, sex- and cancer-specific case and death counts, age- and sex-specific all-cause death counts and population estimates for Canada (excluding Quebec) in 2017 were calculated using 20 age groups (0 to <1, 1–4, 5–9, 10–14,…, 85–89 and 90+ years). Quebec could not be included because incidence data were only available to 2010. Input death counts were rounded to a base 5 for both the probability of developing cancer and of dying from cancer (below) to fulfill the data sharing agreement between Statistics Canada and PHAC.

- The lifetime probability of developing cancer was calculated by dividing the total number of cancers occurring over the complete life (age 0–90+) by the hypothetical cohort of 10,000,000 live births. This calculation does not assume that an individual lives to any particular age.
- Probabilities were calculated for all cancers combined and by cancer type, by sex.

Probability of dying from cancer

Age, sex- and cancer-specific death counts, age- and sex-specific all-cause death counts and population estimates for Canada in 2019 (excluding Quebec) were calculated using 20 age groups (0 to <1, 1–4, 5–9, 10–14,…, 85–89 and 90+ years).

- The lifetime probability of dying from cancer is the total number of cancer deaths occurring over the complete life (age 0–90+) divided by the hypothetical cohort of 10,000,000 live births. This calculation does not assume that an individual lives to any particular age.
- Probabilities were calculated for all cancers combined and by cancer type, by sex.

Potential Years of Life Lost (PYLL)

PYLL was calculated by taking the exact age of each person dying before the age of 75 years and subtracting that from 75 to calculate individual years lost. The sum of all these values represents the total PYLL.

Figure 4.2 presents the total PYLL for people aged 0–74 for the years 2017 to 2019 combined using data from the CVSD.

The following ICD-10 codes were used to create the categories presented in Figure 4.2.

Category	ICD-10 cause of death terminology	ICD-10 Codes
Cancer	All malignant neoplasms	C00-C97
Accidents	Unintentional injuries	V01-X59, Y85-Y86
Heart disease	Ischaemic heart diseases	I20-I25
Suicide	Suicides and self-inflicted injuries	X60-X84, Y87.0
Respiratory disease	Respiratory diseases	J00-J99
Cerebrovascular diseases	Cerebrovascular diseases	I60-I69
HIV	Human immunodeficiency virus (HIV) disease	B20-B24

Survival

Inclusions and exclusions

- New primary cancers diagnosed in individuals aged 15 to 99 years at diagnosis were initially included. Cases were defined based on the *International Classification of Diseases for Oncology, Third Edition*[7] and classified using Surveillance, Epidemiology, and End Results (SEER) Program grouping definitions.[24]
- Cases from the province of Quebec were excluded because cancer incidence data from this province had not been submitted to the CCR since the 2010 data year. Next, cases for which the diagnosis had been established through autopsy only or death certificate only, or for which a death had been established but the year of death was unknown, were excluded.
- The data set was then further restricted to first primary cancers per person per individual cancer, or per cancer group when individual cancers are grouped for reporting purposes (e.g., colorectal cancers, head and neck cancers, leukemias, and brain and other nervous systems cancers), diagnosed from 1992 to 2017.[25–28]
- Childhood cancer survival analyses were conducted separately on new malignant primary cancers in children aged 0 to 14 years at diagnosis. Cases were classified according to the Surveillance, Epidemiology and End Results Program (SEER) update[19] of the *International Classification of Childhood Cancer, Third Edition* (ICCC-3).[20] The update was in response to new morphology codes introduced by the World Health Organization.[21] For 19 cases with a histology code of 8963 (malignant rhabdoid tumour) and a topography code of C71 (brain) that would otherwise not have been mapped to a diagnostic group, the histology code was edited to 9508 (atypical teratoid rhabdoid tumour) and the cases included in diagnostic subgroup IIIc. The same exclusions noted above apply. In addition, 15 remaining malignant cancer cases that did not map to a diagnostic group were excluded.

Observed and net survival

- Observed survival proportions were reported for the analysis of childhood cancers. Otherwise, net survival probabilities were reported. Both statistics were expressed as percentages.
- Unstandardized (crude) survival analysis estimates were derived using an algorithm[29] that has been augmented by Ron Dewar of the Nova Scotia Cancer Care Program (Dewar R, 2020, email communication, 22nd June) to include the Pohar Perme estimator of net survival[5] using the hazard transformation approach.
- Cases with the same date of diagnosis and death (not including those previously excluded because they were diagnosed through autopsy only or death certificate only) were assigned one day of survival because the program automatically excludes cases with zero days of survival. Exclusion of these cases would have biased estimates of survival upward.
- For five-year survival, three-month subintervals were used for the first year of follow-up, then six-month subintervals for the remaining four years, for a total of 12 subintervals. Where the analysis was extended to 10 years, one-year subintervals were used for the sixth through 10th years.

- Estimating net survival in a relative survival framework requires that the non-cancer mortality rate in a group of people diagnosed with cancer is the same as that in the population-based life table.[30] To better satisfy this assumption, expected survival data used in the calculation of net survival for colorectal, prostate and female breast cancer were adjusted for cancer-specific mortality rates in the general population.[31–33] In each case, the proportion of deaths among Canadian residents due to the specific cancer, by sex, five-year age group and year of death, was used for the adjustment. Provincial-specific mortality estimates were used for those aged 55 to 59 and older age groups. Otherwise, national estimates were used.[34]
- Conditional five-year net survival[35,36] was calculated as per five-year net survival using only the data of people who had survived at least one year after diagnosis. That is, the survival estimates for an additional four years among people who had already survived one year.
- Survival estimates associated with standard errors greater than 0.10 were omitted. Estimates associated with standard errors greater than 0.05, but less than or equal to 0.10, were italicized.

Predicted survival

- Predicted survival estimates for the most recent period — typically 2015–2017, but 2013–2017 for childhood cancer — were derived using period analysis.[37] The period approach to survival analysis provides up-to-date predictions of cancer survival[38] because actual long-term survival estimates for those diagnosed in the most recent period derived using the cohort method will not be known for some time.
- The underlying methodology between the cohort and period approaches is essentially the same. The exception is that the follow-up information used in the period method necessarily does not relate to a fixed cohort of people. Rather, estimates of period survival are based on the assumption that persons diagnosed in the period of interest will experience the most recently observed conditional survival probabilities.
- Empirical evaluations of period analysis have shown that this method provides estimates that closely predict the survival that is eventually observed for people diagnosed in the period of interest, particularly when survival is fairly constant.[38–40] When survival is generally increasing (or decreasing), a period estimate tends to be a conservative prediction of the survival that is eventually observed.[39,41]
- The cohort method was used to derive non-predictive (actual) estimates of survival for 1992–1994.

Age-standardization

- Age-standardized estimates for each cancer group were calculated using the direct method as a weighted average of age-specific estimates for that particular cancer. For individual cancers, the Canadian Cancer Survival Standard (CCSS) weights were used.[34] For the five cancer groups appearing in this publication, the weights were derived in the same manner as for the CCSS weights and are provided as online-only supplementary data (Table S3.2).
- A comparison of five-year net survival estimates age-standardized using the CCSS weights described above and, alternatively, weights developed from data collected for the EUROCARE-2 study[42] is provided as online-only supplementary data (Table S3.1).
- Standard errors for age-standardized estimates were estimated by taking the square root of the sum of the squared, weighted, age-specific standard errors.

All cancers combined

- In the analysis of cancer survival for all cancers combined, age-standardized net survival estimates for both sexes combined were calculated as the weighted sum of the unrounded sex- and cancer-specific age-standardized net survival estimates. These estimates are referred to as net cancer survival index (CSI) estimates.[43]
- Sex-specific net CSI estimates were calculated separately as the weighted sum of the unrounded cancer-specific age-standardized net survival estimates for each sex.
- The weights used in the calculation of net CSIs are provided elsewhere.[43]
- For this publication, 55 cancers were considered — the cancers traditionally reported on for cancer incidence, survival and prevalence by Statistics Canada with the exception that the categories corresponding to the corpus uteri and uterus not otherwise specified were combined.
- The CSI is superior to age-standardization alone in measuring progress in survival for all cancers combined because it additionally adjusts for

changes in the sex and cancer type distribution of cancer cases over time.

- Non–age-standardized net survival estimates for all cancers combined (Table 3.1) were similarly calculated as the weighted sum of the unrounded sex- and cancer-specific net survival estimates (both sexes) or as the weighted sum of the unrounded cancer-specific net survival estimates for each sex (sex-specific).
- Observed survival estimates for all childhood cancers combined were calculated as a weighted average of sex and diagnostic group-specific estimates. The weights used were based on the sex and diagnostic group case-mix distribution of people aged 0 to 14 diagnosed with cancer in Canada, excluding Quebec, from 2010 to 2014.[15]
- Case-mix standard weights are applicable to both crude and age-standardized estimates for all cancers combined.

Data and methods issues

Incidence

Although the Canadian Council of Cancer Registries and its standing Data Quality and Management Committee make every effort to achieve uniformity in defining and classifying new cancer cases, reporting procedures and completeness still vary across the country. The standardization of case-finding procedures, including linkage to provincial or territorial mortality files, has improved the registration of cancer cases and comparability of data across the country. Some specific issues remain:

- The analytic file used for cancer incidence analyses does not include cases diagnosed in the province of Quebec from 2011 onward as these cases had not been submitted to the Canadian Cancer Registry.
- Benign and borderline tumours and carcinomas *in situ* are not routinely captured or reported except for *in situ* carcinomas of the bladder, which are considered invasive for the purpose of incidence reporting for all provinces and territories. At the time of analysis, data on *in situ* carcinomas of the bladder for Ontario were limited to 2010 to 2017.
- In previous editions of this publication, it was noted that data from Newfoundland and Labrador (NL) were potentially affected by under-reporting of cases due to incomplete linkage of cancer and vital statistics information. The NL Cancer Registry has implemented death clearance processes to improve case ascertainment and have also improved the reporting of cases from subprovincial regions that previously under-reported cases. As a result of the enhancements to the NL Cancer Registry, case ascertainment is improved in the 2006 data onward. However, under-reporting persists in this province in years prior to 2006. For example, the total number of cases reported to the CCR by NL for 2005 is 21% lower than the corresponding count for 2006.
- Because the Quebec registry relied primarily on hospital data for the period included in the present publication, the numbers of cases of some cancers are underestimated, particularly for those where pathology reports represent the main source of diagnostic information. Prostate cancer, melanoma and bladder cancer are affected in particular.[44] The 2021 projections for these cancer types may be an underestimate because an increase in cases in the registry is expected with the inclusion of pathology reports starting with 2011 data (these data are not yet available).
- At the time of publication, no death certificate only (DCO) cases had been reported to the CCR from Ontario for 2017, from Manitoba for 2013 to 2017 and from Quebec for 2010. DCO cases for Ontario were imputed by randomly assigning DCO cases diagnosed in 2014 to 2016 to the time period 2017 to 2019 and keeping only 2017. DCO cases in Manitoba were estimated by using the DCO cases diagnosed in 2008 to 2012 and randomly assigning them to the time period 2013 to 2017. DCOs for Quebec were imputed by randomly assigning DCO cases diagnosed in 2007 to 2009 to the time period 2010 to 2012 and keeping only 2010. These DCO cases were all assumed to be first cancer diagnoses when calculating the probability of developing cancer.
- In October 2014, Ontario implemented a new cancer reporting system. The new system has several enhancements that permit the identification of cancer cases that previously went unrecorded. These include the use of more liberal rules for counting multiple primary sites, the use of additional source records and the inclusion of records that were previously not included. The new system has applied these changes retrospectively to the 2010 diagnosis year onward. The relative number of cases of certain types of cancer — including bladder, non-Hodgkin lymphoma, leukemia, multiple myeloma, melanoma and stomach — reported to the CCR from Ontario increased considerably following this implementation, while for many other cancers studied in this publication there was little change.

- Non-melanoma skin cancers (neoplasms, NOS; epithelial neoplasms, NOS; basal and squamous) are not included since most PTCRs do not collect incidence data on this type of cancer. These cancers are difficult to register because they may be diagnosed and/or treated in a variety of settings that do not report to the PTCRs, including dermatologist offices.
- Some PTCRs experience delays in submitting all cases for a reference period to Statistics Canada due to timing of collection and/or reporting within their own registry systems.[6] Cases delayed for one data submission are often reported in the next submission year and the missing cases are added to their appropriate diagnosis year. Generally, the reporting delay for the most recent year ranges between 2% and 3% nationally, which may impact the estimates in this publication.

Multiple primaries

- There are two common systems of rules used to determine when a second or subsequent cancer should be considered a new primary cancer, as opposed to a relapse or duplicate of a previously registered cancer: one from the International Agency for Cancer Research (referred to as the "IARC rules") and one from the Surveillance, Epidemiology, and End Results Program (referred to as "SEER rules"). IARC rules tend to yield lower total case counts than the SEER rules because IARC rules generally do not permit multiple cancers to be diagnosed at the same site within a single individual.
- Although all provinces and territories now register cancers according to the SEER rules for multiple primaries, historically, some did not. Since this publication uses historical data, data were collapsed into the IARC rules for all regions. Consequently, cancer counts for some provinces may appear lower in this publication than cancer counts in provincial cancer reports. The magnitude of difference between the two systems varies by province, cancer, sex and diagnosis year. For example, analyses performed by the Public Health Agency of Canada using CCR data showed British Columbia would report approximately 6% more female breast cancer cases under the SEER rules compared with the IARC rules for diagnosis year 2010.[45] For melanoma among males in British Columbia, the number of new cases in 2010 under the SEER rules would be about 8% higher than under the IARC rules. A recent paper from the US based on data from the SEER program reported similar differences between statistics based on SEER and IARC rules[46] and also examined the impact of the rules on reported trends.

Mortality

Although procedures for registering and allocating cause of death have been standardized both nationally and internationally, some lack of specificity and uniformity is inevitable. The description of cancer type provided on the death certificate is usually less accurate than that obtained by the cancer registries from hospital and pathology records. Although there have been numerous small changes in definitions over the years (see Tables A2-1 and A2-2), there are a few of note:

- Liver cancer mortality statistics in this publication exclude liver, unspecified (C22.9). This decision was based on unpublished analyses performed by the Public Health Agency of Canada indicating a consequential number of CCR decedents without a registered primary liver cancer had C22.9 as their underlying cause of death. In other words, C22.9 likely includes a substantial number of deaths from cancers that metastasized to the liver. Nevertheless, given C22.9 also contains primary liver cancer deaths, its exclusion from the liver cancer mortality definition used in this publication results in underestimated liver cancer deaths. The impact of adding liver, unspecified (C22.9) to the current liver cancer mortality definition would be substantial, increasing the number of liver cancer deaths in Canada in 2012 by about 45.9% (from 1,059 to 1,545 deaths). Therefore, the method of defining liver cancer mortality should be acknowledged when comparing estimates across sources. For example, code C22.9 is included in the presentation of liver and intrahepatic bile duct cancer mortality statistics in the annual SEER Cancer Statistics in Review publication.[24] It is also included in the presentation of liver cancer mortality statistics in the annual Cancer in North America (CINA) publication.[47] The Canadian Cancer Statistics Advisory Committee will continue to examine this issue when deciding on the definition to use for future publications.

- The analytic file used for the mortality analysis did not include deaths from Yukon for the 2017 to 2019 period as this data had yet to be reported to the CVSD at the time of file release. This necessitated the imputation of cancer deaths in Yukon for these three data years. This was accomplished by randomly assigning cancer deaths in this jurisdiction from the 2012 to 2016 period to the 2017 to 2021 period and then retaining only the data for 2017 to 2019.

Survival

Survival analyses do not include data from Quebec because cases diagnosed in this province from 2011 onward have not been submitted to the Canadian Cancer Registry.

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TABLE A1 Cancer definitions

Cancer	ICD-O-3 Site/type Incidence (1992–2017)	ICD-9 Incidence (1984–1991)	ICD-10 Mortality (2000–2019)	ICD-9 Mortality (1984–1999)
Head and neck	C00–C14, C30-C32.9	140-149, 160, 161	C00–C14, C30–C32	140-149, 160, 161
Esophagus	C15	150	C15	150
Stomach	C16	151	C16	151
Colorectal	C18–C20, C26.0	153, 159.0, 154.0, 154.1	C18–C20, C26.0	153, 159.0, 154.0, 154.1
Liver	C22.0	155.0	C22.0, C22.2–C22.4, C22.7	155.0
Pancreas	C25	157	C25	157
Lung and bronchus	C34	162.2–162.5 162.8, 162.9	C34	162.2, 162.3, 162.4, 162.5, 162.8, 162.9
Melanoma	C44 (Type 8720–8790)	172	C43	172
Breast	C50	174, 175	C50	174, 175
Cervix	C53	180	C53	180
Uterus (body, NOS)	C54–C55	179, 182	C54–C55	179, 182
Ovary	C56.9	183.0	C56	183.0
Prostate	C61.9	185	C61	185
Testis	C62	186	C62	186
Bladder (including *in situ* for incidence)	C67	188, 233.7	C67	188
Kidney and renal pelvis	C64.9, C65.9	189.0, 189.1	C64–C65	189.0, 189.1
Brain/CNS	C70–C72	191, 192	C70–C72	191, 192
Thyroid	C73.9	193	C73	193
Hodgkin lymphoma*	Type 9650–9667	201	C81	201
Non-Hodgkin lymphoma*	Type 9590–9597, 9670–9719, 9724–9729, 9735, 9737, 9738	200, 202.0–202.2, 202.8, 202.9	C82–C86	200, 202.0–202.2, 202.8, 202.9
	Type 9811-9818, 9823, 9827, 9837 all sites except C42.0, C42.1, C42.4			
Multiple myeloma*	Type 9731, 9732, 9734	203.0, 238.6	C90.0, C90.2, C90.3	203.0, 238.6
Leukemia*	Type 9733, 9742, 9800–9801, 9805-9809, 9820, 9826, 9831–9836, 9840, 9860–9861, 9863, 9865–9867, 9869–9876, 9891, 9895–9898, 9910, 9911, 9920, 9930–9931, 9940, 9945–9946, 9948, 9963–9964	204.0, 204.1, 205.0, 207.0, 207.2, 205.1, 202.4, 204.2, 204.8, 204.9, 205.2, 205.3, 205.8, 205.9, 206.0, 206.1, 206.2, 206.8, 206.9, 203.1, 207.1, 207.8, 208.0, 208.1, 208.2, 208.8, 208.9	C91–C95, C90.1	204.0, 204.1, 205.0, 207.0, 207.2, 205.1, 202.4, 204.2, 204.8, 204.9, 205.2, 205.3, 205.8, 205.9, 206.0, 206.1, 206.2, 206.8, 206.9, 203.1, 207.1, 207.8, 208.0, 208.1, 208.2, 208.8, 208.9
	Type 9811-9818, 9823, 9827, 9837 sites C42.0, C42.1, C42.4			
All other cancers	All sites C00–C80 not listed above	All sites 140-209 not listed above	All sites C00–C80 not listed above, C97	All sites 140-209 not listed above
All cancers	All invasive sites	All invasive sites	All invasive sites	All invasive sites

CNS=central nervous system; NOS=not otherwise specified

* For incidence, histology types 9590–9992 (leukemia, lymphoma and multiple myeloma), 9050–9055 (mesothelioma) and 9140 (Kaposi sarcoma) are excluded from other specific organ sites.

Note: ICD-O-3 refers to the *International Classification of Diseases for Oncology, Third Edition*.[7] ICD-10 refers to the *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision*.[11] ICD-9 refers to the *International Statistical Classification of Diseases and Related Health Problems, Ninth Revision*.[8]

TABLE A2-1 Recent cancer definition changes in incidence

	New definition	Year changed	Old definition
Bladder	ICD-O-3 C67 (including *in situ* cancers, except for Ontario which did not report *in situ* bladder cancer cases prior to 2010)	2006	ICD-O-3, C67 (not including *in situ* cancers)
Colorectal	ICD-O-3 C18–C20, C26.0	2011	ICD-O-3 C18–C21, C26.0
Kidney and renal pelvis	ICD-O-3 C64–C65	2008	ICD-O-3 C64–C66, C68
Lung and bronchus	ICD-O-3 C34	2008	ICD-O-3 C33–C34 (before 2006)
			ICD-O-3 C34 (in 2006)
			ICD-O-3 C33–C34 (in 2007)
Ovary	ICD-O-3 C56	2006	ICD-O-3 C56, C57.0–C57.4

Note: Bladder, colorectal, kidney, lung and ovary cancers exclude histology types 9590–9992 (leukemia, lymphoma and multiple myeloma), 9050–9055 (mesothelioma) and 9140 (Kaposi sarcoma). ICD-O-3 refers to the *International Classification of Diseases for Oncology, Third Edition*.[7]

Note: As of 2021, this publication reports on a new cancer category: head and neck cancers include cancers of the lip, oral cavity and pharynx previously associated with the "oral cancers" category, those of the larynx (which previously had their own category), as well as cancers of the nasal cavity and middle ear, and cancers of the accessory sinuses (which were previously part of the "all other cancers" category).

TABLE A2-2 Recent cancer definition changes in mortality

	New definition	Year changed	Old definition
Colorectal	ICD-10 C18–C20, C26.0	2012	ICD-10 C18–C21, C26.0
Kidney and renal pelvis	ICD-10 C64–C65	2008	ICD-10 C64–C66, C68
Leukemia	ICD-10 C91–C95, C90.1	2008	ICD-10 C91–C95
Liver	ICD-10 C22.0, C22.2–C22.7	2007	ICD-10 C22 (before 2006)
			ICD-10 C22.0, C22.2–C22.9 (in 2006)
Lung and bronchus	ICD-10 C34	2008	ICD-10 C33–C34 (before 2006)
			ICD-10 C34 (in 2006)
			ICD-10 C33–C34 (in 2007)
Multiple myeloma	ICD-10 C90.0, C90.2	2008	ICD-10 C88, C90 (before 2007)
			ICD-10 C90 (in 2007)
Ovary	ICD-10 C56	2006	ICD-10 C56, C57.0–C57.4
All other and unspecified cancers	ICD-10 C44, C46, C76–C80, C88,C96.0–C96.2, C96.7–C96.9, C97	2007	ICD-10 C44, C46, C76–C80,C96.0–C96.2, C96.7–C96.9, C97

Note: ICD-10 refers to the *International Statistical Classification of Disease and Related Health Problems, Tenth Revision*.[11]

Note: As of 2021, this publication reports on a new cancer category: head and neck cancers include cancers of the lip, oral cavity and pharynx previously associated with the "oral cancers" category, those of the larynx (which previously had their own category), as well as cancers of the nasal cavity and middle ear, and cancers of the accessory sinuses (which were previously part of the "all other cancers" category).

Index of tables and figures

Tables

Appendix tables

Figures

Contact us

Collaborators

Canadian Cancer Society

For general information about cancer (such as cancer prevention, screening, diagnosis, treatment or care), contact the Canadian Cancer Society's Cancer Information Helpline at 1-888-939-3333 or visit cancer.ca. For questions about this publication, email: stats@cancer.ca.

Public Health Agency of Canada (PHAC)

For information on chronic diseases including cancer, their determinants, and their risk and protective factors in Canada, please refer to https://www.canada.ca/en/public-health.html (select "Chronic Diseases") or email: phac.chronic.publications-chronique.aspc@canada.ca.

Statistics Canada

More detailed information on the methodology used in this publication is available from the Centre for Population Health Data at Statistics Canada, National Enquiries Line (1-800-263-1136) or through Client Services at the Centre for Population Health Data (statcan.hd-ds.statcan@canada.ca or 613-951-1746).

Canadian Council of Cancer Registries

Cancer incidence data are supplied to Statistics Canada by provincial and territorial cancer registries to form the Canadian Cancer Registry (CCR). The CCR is governed by the Canadian Council of Cancer Registries (CCCR), a collaboration between the 13 provincial and territorial cancer registries and the Centre for Population Health Data Statistics Canada. Information about the CCR and CCCR can be found on Statistics Canada's Canadian Cancer Registry (CCR) website. Detailed information regarding the statistics for each province or territory is available from the relevant registry:

Newfoundland and Labrador
Prince Edward Island
Nova Scotia
New Brunswick
Quebec
Ontario
Manitoba
Saskatchewan
Alberta
British Columbia
Nunavut
Northwest Territories
Yukon
Statistics Canada

Vital Statistics Council for Canada

Mortality data are supplied to Statistics Canada by the provincial and territorial Vital Statistics Registrars to form the Canadian Vital Statistics—Death Database (CVSD). The Canadian Vital Statistics System is governed by the Vital Statistics Council for Canada (VSCC) since 1945. The VSCC is a collaboration between the 13 provincial and territorial Vital Statistics Registrars and the federal government represented by the Centre for Population Health Data of Statistics Canada. Detailed information on the VSCC and the CVSD can be found on Statistics Canada's Vital Statistics—Death Database (CVSD).

Questions about cancer?

When you want to know more about cancer, call the Canadian Cancer Society's Cancer Information Helpline.

1-888-939-3333 Monday to Friday

cancer.ca

Canadian Cancer Society