Canadian Cancer Statistics

2023

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Canadian Cancer Society

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 cancer data provided by the provincial and territorial cancer registries through the Canadian Cancer Registry.
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 supplementary data and an archive of 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

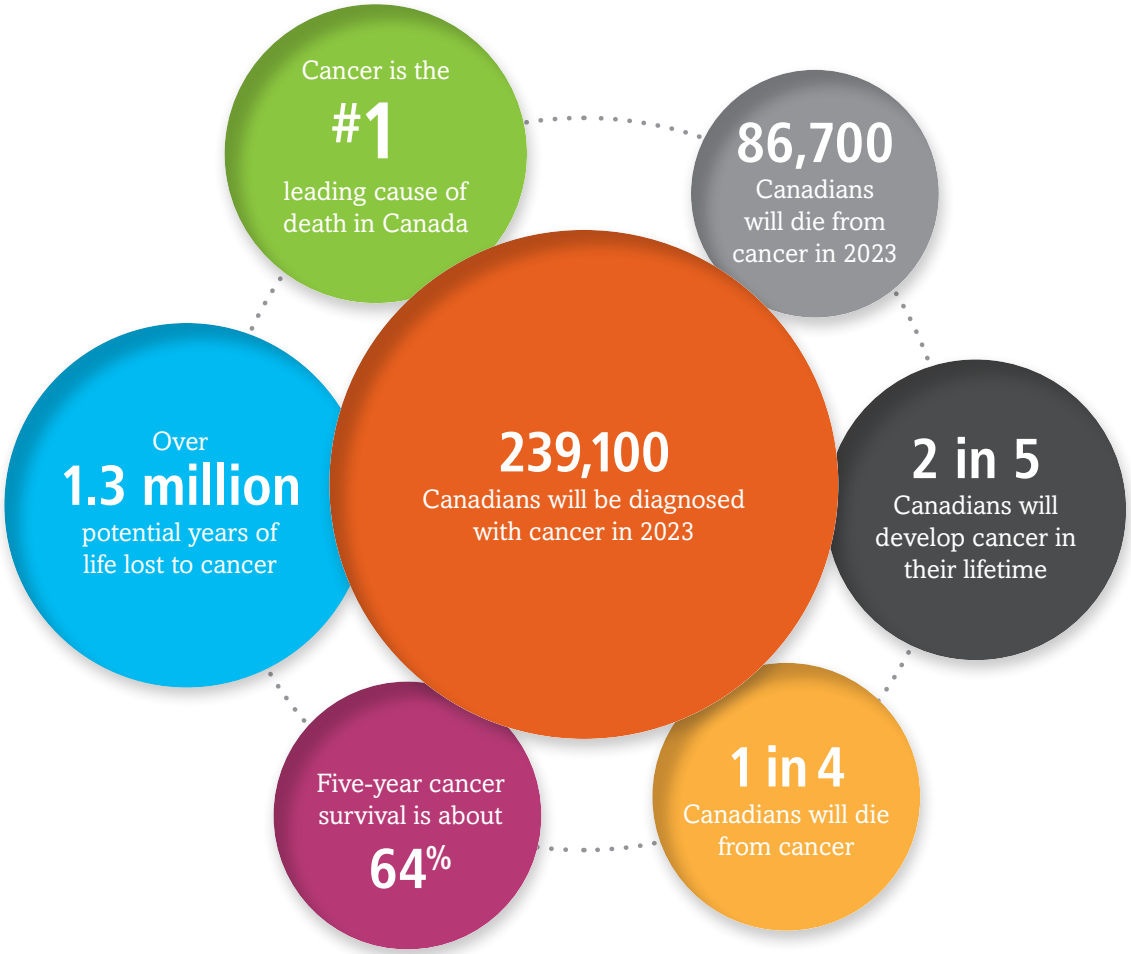
Canadian Cancer Statistics is a publication that provides comprehensive, up-to-date estimates of the impact of cancer in Canada.

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 2023 alone, it is expected that 239,100 Canadians will be diagnosed with cancer and 86,700 will die from the disease.
- Lung and bronchus (lung), breast, prostate and colorectal cancers account for almost half of all new cancer cases diagnosed.
- Cancer remains by far the leading cause of death in Canada, with an estimated 1.3 million potential years life lost from premature death due to cancer between 2018 and 2020.

In recent years, there have been significant decreases in incidence and deaths rates for lung and colorectal cancers.

- Lung cancer is the leading cause of cancer death, responsible for about 1 in 4 cancer deaths among Canadians. Despite this large impact, over the last decade there has been a substantial drop in both the lung cancer incidence and death rates for people assigned male at birth (referred to as males) and people assigned female at birth (referred to as females).



- Similarly, the colorectal cancer incidence and death rates have been declining for both males and females, particularly in recent years. In fact, the incidence rate for colorectal cancer is now declining faster than the rate for any other cancer type.
- As a result of the progress made with lung, colorectal and other cancers, cancer death rates have decreased 39% in males and 26% in females since their peak in 1988.

Cancer survival has increased, but it varies widely by type of cancer and stage at diagnosis.

- In the early 1990s, five-year net survival for all cancers combined was only 55%, but recent estimates show that it has reached 64%.
- Survival has also increased for most cancer types with the largest increases observed for hematologic cancers.
- However, survival varies widely by the type of cancer and stage at diagnosis. Recently released findings from Statistics Canada[1] revealed decreasing survival with increasing stage at diagnosis. For example, the estimated five-year net survival for female breast was almost 100% for those diagnosed at stage I, 92% for stage II, 74% for stage III and 23% for stage IV. For lung cancer, the survival estimates were 62% for those diagnosed at stage I, 39% for stage II, 16% for stage III and only about 3% for stage IV.

While several cancer types have seen notable advances, there is considerable area for improvement in others.

- Little progress has been made in reducing the death rate for pancreatic cancer over the last 20 years, and pancreatic cancer is the third leading cause of cancer death.
- Liver and intrahepatic bile duct cancers have low survival. In particular, only 6% of people diagnosed with intrahepatic bile duct cancer are expected to live five years past their diagnosis.
- Recent increases in the cervical cancer incidence rate also remind us that continued efforts are needed to ensure access to and uptake of available prevention strategies, such as cervical screening and human papillomavirus (HPV) vaccination.
- In general, the survival outcomes by stage remind us that early detection and effective treatment are critical for better outcomes for all people affected by cancer.

Measures of the cancer impact in Canada are vital for a wide audience of stakeholders. They guide the development and evaluation of health policy, help decision-makers assess the type and amount of health resources needed and inform 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 effect of the COVID-19 pandemic on cancer diagnosis and control is an important issue that will be explored when incidence data are available for 2020 and 2021. This publication, however, is one of the first to include mortality data up to the end of 2020. The first 10 months of the COVID-19 pandemic had limited impact on cancer-specific mortality. However, the impacts of the COVID-19 pandemic on cancer control efforts are expected to have longer-term effects on outcomes like mortality. This is discussed further in Chapter 4 and will be evaluated in the years to come.

We hope that our readers consider what these numbers mean and how they can be used to reduce cancer incidence, increase survival and improve the care and experiences for those dealing with cancer in Canada.

Notable new statistics

Compared with the last full Canadian Cancer Statistics publication in 2021, several new patterns have emerged. Notably:

- Of all cancer types reported, the colorectal cancer incidence rate is now declining the fastest. However, 24,100 people are still expected to be diagnosed with colorectal cancer in 2023.
- In recent years, the rate of cervical cancer incidence has increased. This is the first significant increase since 1984.
- Slightly more females (15,800) than males (15,300) are expected to be diagnosed with lung cancer in 2023.
- The lung cancer mortality rate is declining at the fastest rate reported to date and is declining faster than any other cancer type. The magnitude of the decline is comparable between the sexes. However, 20,600 people are still expected to die from lung cancer in 2023.

Reference

1. Ellison LF, Saint-Jacques N. Five-year cancer survival by stage at diagnosis in Canada. Health Rep. 2023;34(1):3–15.

About this publication

Canadian Cancer Statistics 2023 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 assigned at birth (referred to as 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 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: Facilitates comparisons across populations and over time; useful for monitoring the effects of early detection and diagnosis and treatment on cancer outcomes.

Box 1 describes some of the ways in which the specific types of statistics in this publication can be used.

Notably, this publication is the only source of national estimates of cancer incidence and mortality projected to the current year (2023). The goal of providing cancer incidence and mortality projections is to estimate the expected underlying impact of cancer up to 2023. As such, the incidence projections presented in this publication do not account for any changes in diagnosis or cancer control due to the COVID-19 pandemic. While projected estimates must be interpreted with caution (Box 2), they provide a more up-to-date picture of the cancer impact 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.

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. Three changes are particularly noteworthy:

1. Updated incidence, mortality and survival statistics

In the 2021 edition, incidence estimates were based on data to 2017. At the time of this publication, Statistics Canada has released cancer incidence data up to 2019. As a result, incidence projections in this publication are based on data up to 2019. (The exceptions are Quebec, for which cancer incidence data submitted to the Canadian Cancer Registry were up to 2010 at the time of this publication, and Nova Scotia, for which cancer incidence data were up to 2018). These data provide the opportunity to examine more recent trends in cancer incidence in Canada, which are presented in Chapter 1.

Similarly, estimates of cancer mortality in the 2021 publication were based on data up to 2018. Statistics Canada recently released cancer mortality data up to 2020, 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 2023 were based on mortality data to 2020.

Survival data in Chapter 3 are based on the same years of data as in the 2021 publication (up to 2017). Estimates of survival have been included for a newly added cancer type: soft tissue (including heart). The definition for liver cancer has also been updated to include cancer of the intrahepatic bile duct. To further enhance this chapter for this year's publication, we have included findings from recently published Canadian literature on cancer survival,[4–6] including the cancer survival index and survival by stage.

2. Change in liver cancer category

Intrahepatic bile duct cancer – previously listed as part of "all other cancers" – is now included with liver cancer for both incidence and mortality. Our definition of liver cancer (including intrahepatic bile duct) is now comparable to the definition used by other international agencies, countries and most Canadian provincial and territorial cancer registries.

3. New category: soft tissue (including heart)

After a review of the most recent actual incidence data (number of cases), we have included soft tissue (including heart) as a cancer type in this publication. Therefore, all tables and figures now include soft tissue. As a result, soft tissue (including heart) was removed from the "all other cancers" category.

Box 2 Projecting the cancer burden to 2023

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, we used actual cancer incidence data up to 2019 (except Quebec and Nova Scotia, for which cancer incidence data were available to 2010 and 2018, respectively) and cancer death data up to 2020. These historical data were used to project cancer incidence and cancer deaths to 2023.

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 incidence projections presented here are based on validated historical data (up to 2019) and reflect the underlying cancer incidence trends in the population, not the likely changes in diagnosis patterns due to COVID-19. The mortality projections presented here are also based on quality historical data and include data up to 2020. The first year of the COVID-19 pandemic had limited impact on cancer mortality. It is expected that COVID-19 has impacted cancer diagnosis and potentially cancer outcomes in Canada, which might in turn impact actual incidence for 2020 and 2021 and mortality over time. These impacts are discussed further in Chapter 4 and will be evaluated in future analyses.

References

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6. Ellison LF. The cancer survival index: Measuring progress in cancer survival to help evaluate cancer control efforts in Canada. Health Rep. 2021; Sept 15(31 (9)).

Chapter 1

How many people get cancer in Canada?

Incidence by sex, age, geographic region and year

The number and rate of new cases of cancer diagnosed each year (incidence) and over time are important measures of the cancer impact 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 45% of Canadians will be diagnosed with cancer in their lifetime.
- 239,100 new cases of cancer are expected to be diagnosed in Canada in 2023. The number of cases expected in males (124,200) is higher than in females (114,900).
- Together, the four most frequently diagnosed cancers (lung, breast, prostate and colorectal cancers) are expected to account for about 46% of all cancers diagnosed in 2023.
- The number of cancer cases diagnosed each year has been increasing largely due to the growing and aging population. When the effect of age and population size are removed, the risk of cancer has been decreasing.
- Overall, cancer rates have declined -1.2% annually since 2011 for males and -0.4% annually since 2012 for females.
- 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 recent years, the rate of cervical cancer has been increasing although this is also a preventable cancer.
- In general, cancer incidence rates are lower in the western provinces and the territories, and higher in the central and eastern provinces. Nova Scotia is expected to have the highest incidence rate in Canada, followed by Newfoundland and Labrador and Ontario.

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. The estimated probability of developing cancer presented here reflects the average experience of people in Canada and does not take into account individual differences 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. These estimates are based on only the last year of available data (i.e., 2019 for this publication, excluding Nova Scotia and Quebec) and therefore may vary from year-to-year and between publications.

- 45% of Canadians are expected to be diagnosed with cancer in their lifetime (Figure 1.1).
- The probability of developing cancer is similar for males (45%) and females (44%).

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

- Considering males and females together, Canadians are more likely to be diagnosed with lung and bronchus (lung) cancer than any other cancer. An estimated 1 in 14 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 (13%) is expected to be diagnosed with breast cancer in their lifetime.
- The lifetime probability of developing breast, prostate, colorectal or lung cancer remains high.

FIGURE 1.1 Lifetime probability of developing cancer, Canada (excluding Quebec and Nova Scotia*), 2019

* Quebec and Nova Scotia are excluded because cases diagnosed in Quebec from 2011 onward and cases diagnosed in Nova Scotia in 2019 had not been submitted to the Canadian Cancer Registry at the time of analysis.

Note: The probability of developing cancer is calculated based on age- and sex-specific cancer incidence and mortality rates for Canada excluding Quebec and Nova Scotia 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 Population Health Data, Statistics Canada

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

Probability of developing cancer

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).

Every hour in 2023, 27 Canadians are expected to be diagnosed with cancer.

Projected new cancer cases in 2023

The cancer incidence data used for this publication were from 1984 to 2019 (1984 to 2018 for Nova Scotia and 1984 to 2010 for Quebec). These were the most recent data available when the analyses began. Data from 1995 onward were used to project rates and counts to 2023 (except Nova Scotia, for which data from 1994 onward were used).

An estimated 239,100 new cases of cancer are expected to be diagnosed in Canada in 2023 (Table 1.2).

- Lung cancer is expected to be the most commonly diagnosed cancer in Canada with an estimated 31,000 cases expected in 2023. It is followed by breast cancer (29,700), prostate cancer (25,900) and colorectal cancer (24,100).
- The four most commonly diagnosed cancers are expected to account for about half (46%) of all cancers diagnosed in 2023.

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).

- More males (124,200) than females (114,900) are expected to be diagnosed with cancer in 2023.
- The age-standardized incidence rate (ASIR) in males (555.3 per 100,000) is expected to be about 15% higher than in females (481.2 per 100,000).
- A slightly greater number of females (15,800) than males (15,300) are expected to be diagnosed with lung cancer.
- 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.

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

FIGURE 1.2 Percent distribution of projected new cancer cases, by sex, Canada,* 2023

Males
124,200
new cases

Prostate	20.8%
Lung and bronchus	12.3%
Colorectal	10.9%
Bladder	8.2%
Non-Hodgkin lymphoma	4.9%
Head and neck	4.7%
Kidney and renal pelvis	4.5%
Melanoma	4.5%
Pancreas	3.2%
Leukemia	3.2%
Liver and intrahepatic bile duct	2.6%
Stomach	2.2%
Multiple myeloma	1.9%
Esophagus	1.6%
Thyroid	1.5%
Brain/CNS	1.5%
Testis	1.0%
Soft tissue (including heart)	0.8%
Hodgkin lymphoma	0.5%
Breast	0.2%
All other cancers	9.1%

Females
114,900
new cases

Breast	25.6%
Lung and bronchus	13.7%
Colorectal	9.2%
Uterus (body, NOS)	7.4%
Non-Hodgkin lymphoma	4.1%
Thyroid	3.8%
Melanoma	3.6%
Pancreas	2.8%
Bladder	2.8%
Ovary	2.7%
Kidney and renal pelvis	2.6%
Leukemia	2.1%
Head and neck	1.8%
Multiple myeloma	1.4%
Cervix	1.4%
Liver and intrahepatic bile duct	1.3%
Stomach	1.3%
Brain/CNS	1.2%
Soft tissue (including heart)	0.6%
Esophagus	0.5%
Hodgkin lymphoma	0.4%
All other cancers	9.9%

CNS=central nervous system, NOS=not otherwise specified

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

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 cancer cases 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 2019 for all provinces and territories except Quebec (data were available to 2010) and Nova Scotia (data were available to 2018). Data from 1995 onward were used to project cancer incidence to 2023, except for Nova Scotia where data from 1994 onward were used.

Figure 1.2 shows the expected distribution of cancer cases in males and females in 2023.

- In males, prostate cancer is expected to be the most commonly diagnosed cancer, accounting for about 1 in 5 (21%) new cases. It is followed by lung cancer (12%), colorectal cancer (11%), bladder cancer (8%) and non-Hodgkin lymphoma (5%).
- In females, breast cancer is expected to be the most commonly diagnosed cancer, accounting for about 1 in 4 (26%) new cases. It is followed by lung cancer (14%), colorectal cancer (9%), uterine cancer (7%) and non-Hodgkin lymphoma (4%).

- The four most commonly diagnosed cancers are expected to account for about 46% of all cancers in 2023, which is the same as in *Canadian Cancer Statistics 2021*.

Incidence by age

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

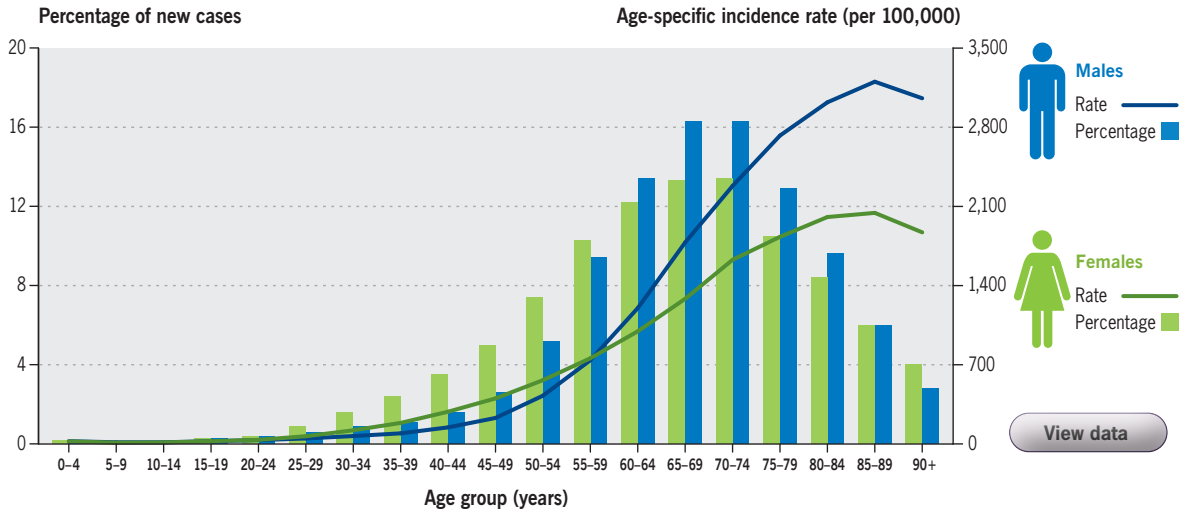
- Cancer rates peak in males and females aged 85 to 89 years.
- For both males and females, the highest percentage of new cancer cases is diagnosed between the ages of 65 and 74 years.
- Between the ages of 15 and 59 years, rates of cancer are higher in females than males. In all other age groups, rates are higher in males.

Table 1.3 shows the projected number of cases by age group in 2023.

- 9 in 10 cancers are expected to be diagnosed in Canadians aged 50 years and older.
- Of all cancers diagnosed, a projected 3,950 (almost 2%) will be diagnosed in children and young adults (0 to 29 years) and 154,700 (65%) will be diagnosed in seniors (65 years and older).
- Almost all lung and prostate cancer cases (98% for both cancer types) are expected to occur in people 50 years of age or older.
- Over half (54%) 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 36% 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 hematologic 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*), 2017–2019



* Quebec is excluded from 2017–2019 and Nova Scotia is excluded from 2019 because cases diagnosed in Quebec from 2011 onward and cases diagnosed in Nova Scotia in 2019 had not been submitted to the Canadian Cancer Registry at the time of analysis.

Analysis by: Centre for Population Health Data, Statistics 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:

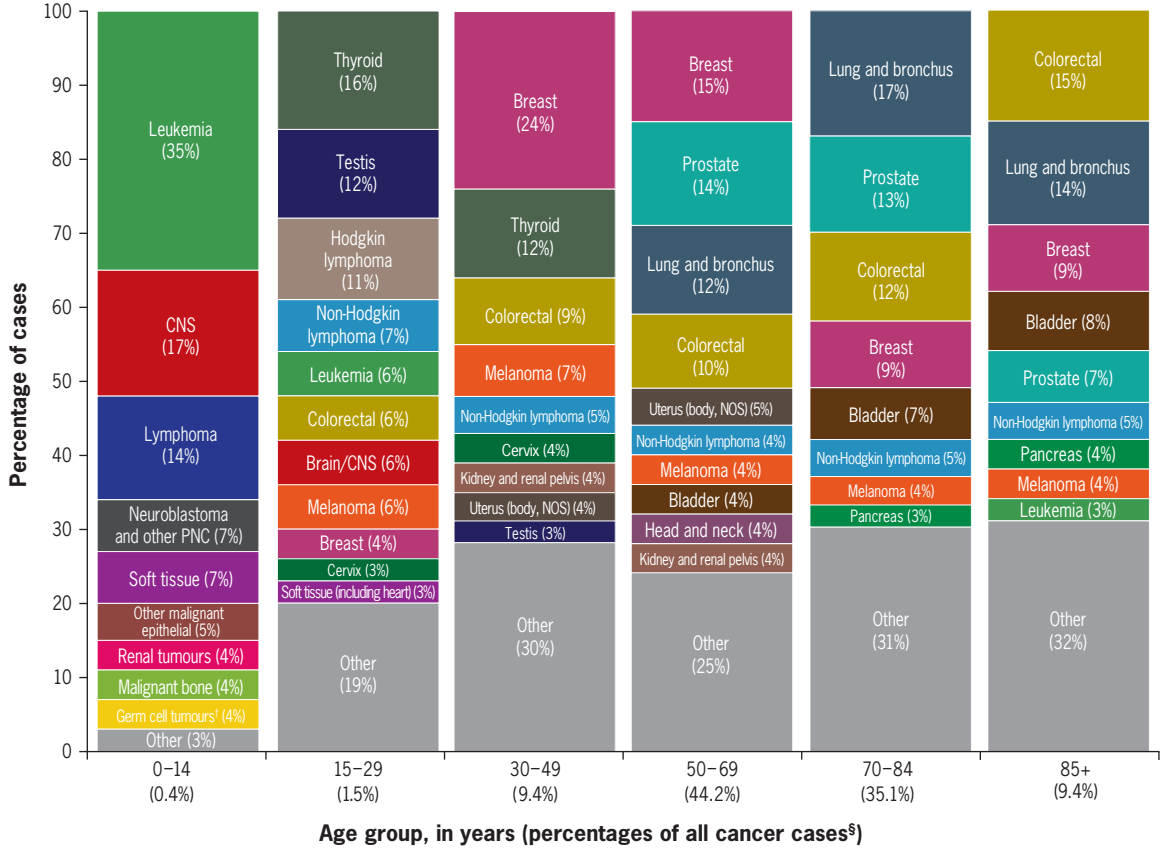
- In children aged 0 to 14 years, the most commonly diagnosed cancers were leukemia (35%), followed by central nervous system (CNS) cancers (17%), lymphoma (14%), neuroblastoma and other peripheral nervous cell tumours (7%) and soft tissue (7%).
- Among youth and young adults (aged 15 to 29 years), the most commonly diagnosed cancers were thyroid (16%), testicular (12%), Hodgkin lymphoma (11%) and non-Hodgkin lymphoma (7%).
- In Canadians aged 30 to 49 years, the most commonly diagnosed cancers were breast (24%), thyroid (12%), colorectal (9%) and melanoma (7%).
- Between the ages of 50 and 84 years, lung, breast, prostate and colorectal cancers were the most commonly diagnosed. In those aged 85 years and older, bladder cancer surpasses prostate cancer as the fourth most commonly diagnosed cancer.

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

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

*Selected cancers in each group are based on unrounded values of at least 3%. As a result of subsequent rounding of these percentages, the sum of percentages for each age group may not sum to 100. In previous publications, the effective threshold for inclusion was 2.5% due to rounding prior to selection.

FIGURE 1.4 Distribution of new cancer cases for selected cancers,* by age group, Canada (excluding Quebec†), 2015–2019



† Quebec is excluded from 2015–2019 and Nova Scotia is excluded from 2019 because cases diagnosed in Quebec from 2011 onward and cases diagnosed in Nova Scotia in 2019 had not been submitted to the Canadian Cancer Registry at the time of analysis.

‡ Also includes trophoblastic tumours and neoplasms of gonads.

§ The relative percentage is calculated based on the total number of cancer cases over five years (2015–2019) 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 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 2023. 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 2023 will be highest in eastern and central Canada. For both sexes combined, Nova Scotia is expected to have the highest ASIR in 2023, closely followed by Newfoundland and Labrador.

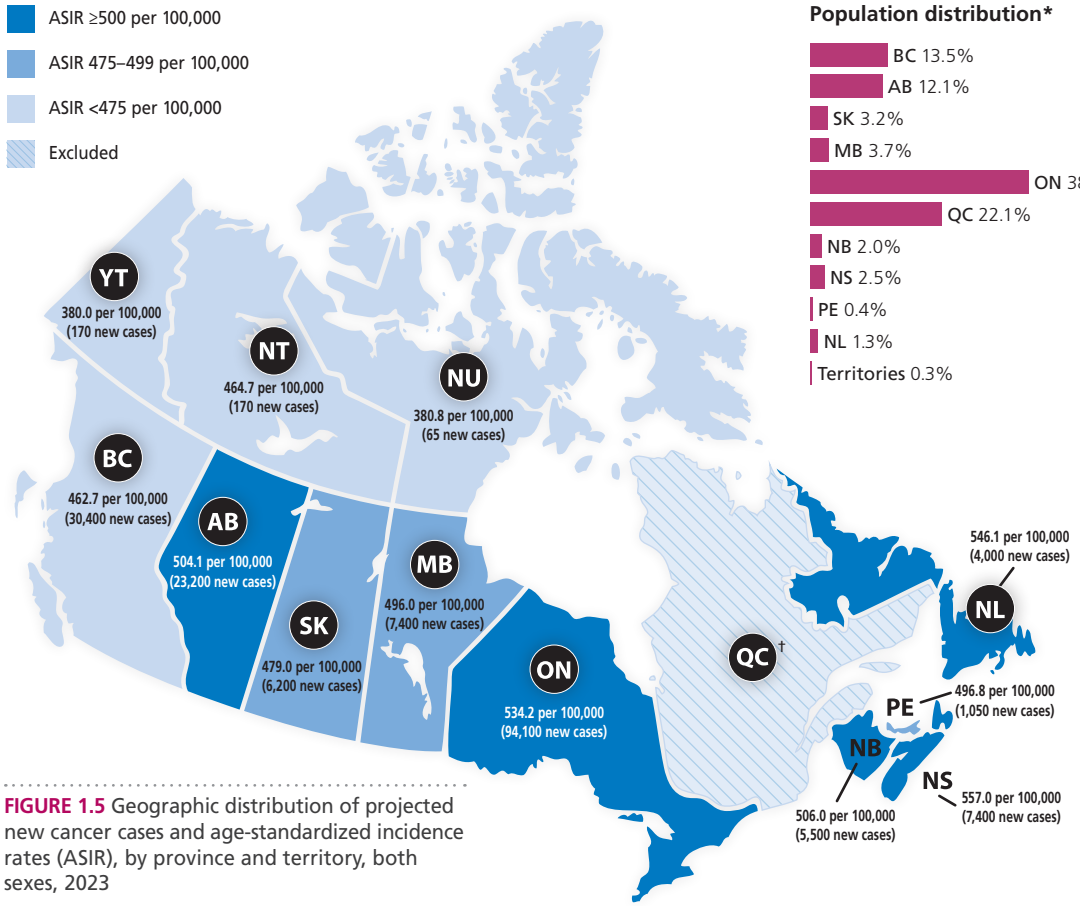


FIGURE 1.5 Geographic distribution of projected new cancer cases and age-standardized incidence rates (ASIR), by province and territory, both sexes, 2023

The projected ASIR (Table 1.4) and the projected number of new cases (Table 1.5) by cancer type for each province and territory show that there are differences in incidence across Canada.

- Nova Scotia is expected to have the highest ASIR in males (616.3 per 100,000) and Newfoundland and Labrador the highest rate for females (536.7 per 100,000).
- For males and females, the highest rates of colorectal cancer are expected in Newfoundland and Labrador (100.8 per 100,000 and 66.3 per 100,000, respectively), while the highest rates of lung cancer for males and females are expected in Nova Scotia (81.7 per 100,000 and 75.4 per 100,000, respectively).
- The rates of prostate cancer across the country are expected to range from a low of 106.4 per 100,000 in Newfoundland and Labrador to a high of 138.2 per 100,000 in Alberta.
- Rates of breast cancer in females are expected to be lowest in New Brunswick (116.8 per 100,000) and highest in Alberta (141.0 per 100,000).

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

* Based on projected estimates of population size in 2023.

† 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

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

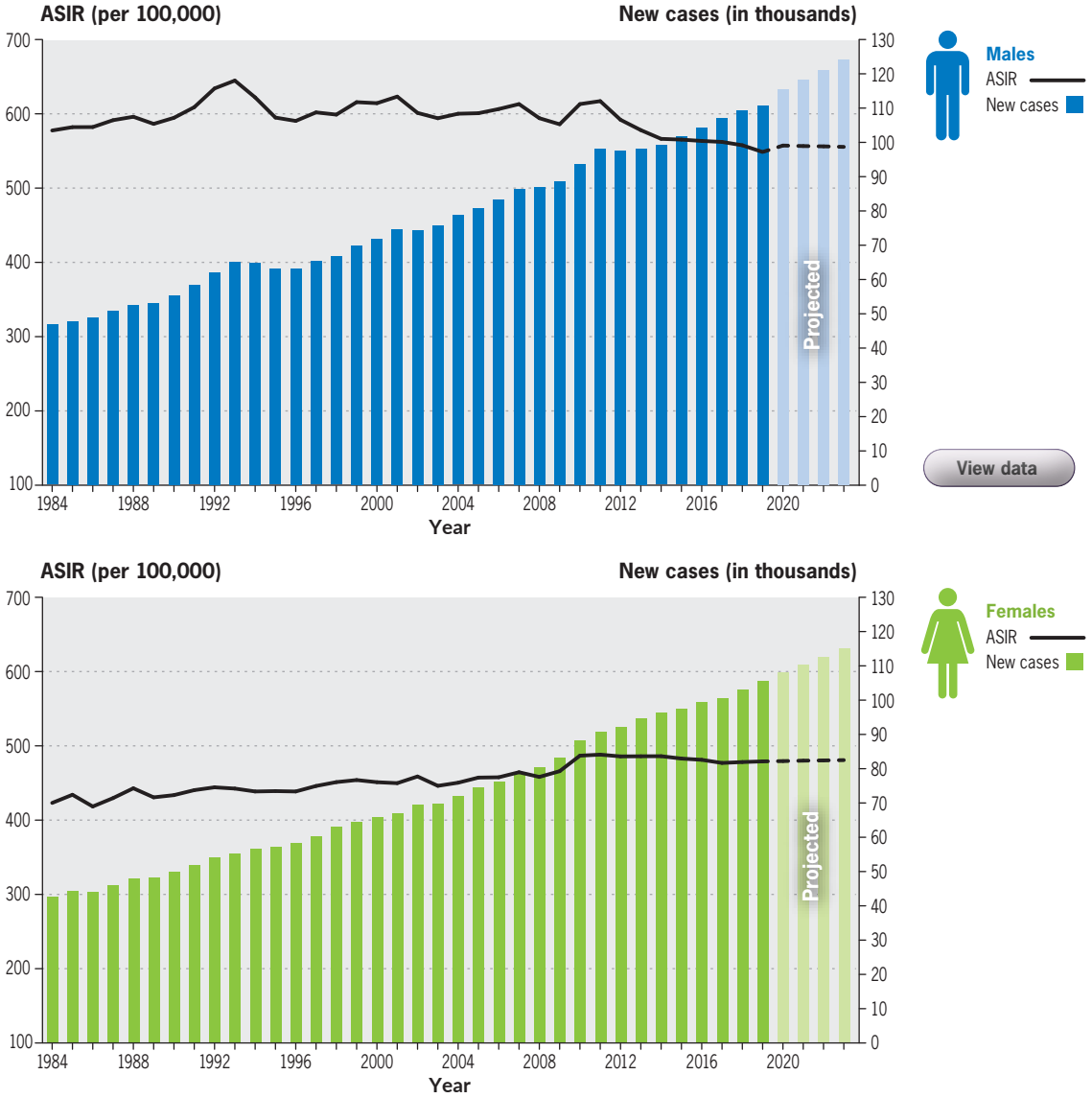
Monitoring trends in incidence over time can help identify emerging trends, where progress has been made and where more needs to be done.

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

- In 1984, the ASIR for all cancers combined in males was 577.4 per 100,000 and is projected to be 555.3 per 100,000 in 2023, which is a decrease of 3.8%. For females, it was 423.6 in 1984 and is projected to be 481.2 per 100,000 in 2023, which is an increase of 13.6%.
- The number of new cases diagnosed each year rose steadily, from 46,700 in 1984 to a projected 124,200 in males in 2023 (an increase of 164%), and from 42,500 to a projected 114,900 in females (an increase of 170%). The steady increase in the number of new cases diagnosed each year is primarily due to the growing and aging population in Canada.[2–4]

* 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. Similarly, data from Nova Scotia are included in case totals for 2019 but not in the calculation of the rate in 2019.

FIGURE 1.6 New cases and age-standardized incidence rates (ASIR) for all cancers, Canada,* 1984–2023



Note: Rates are age-standardized to the 2011 Canadian standard population. Actual data were available to 2019 for all provinces and territories except Nova Scotia (latest year 2018) and Quebec (latest year 2010) because this data had not yet been submitted to the Canadian Cancer Registry at the time of analysis. Estimates for 2020–2023 are projected. For further details, see *Appendix II: Data source and methods*.

Analysis by: Centre for Population Health Data, Statistics Canada

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

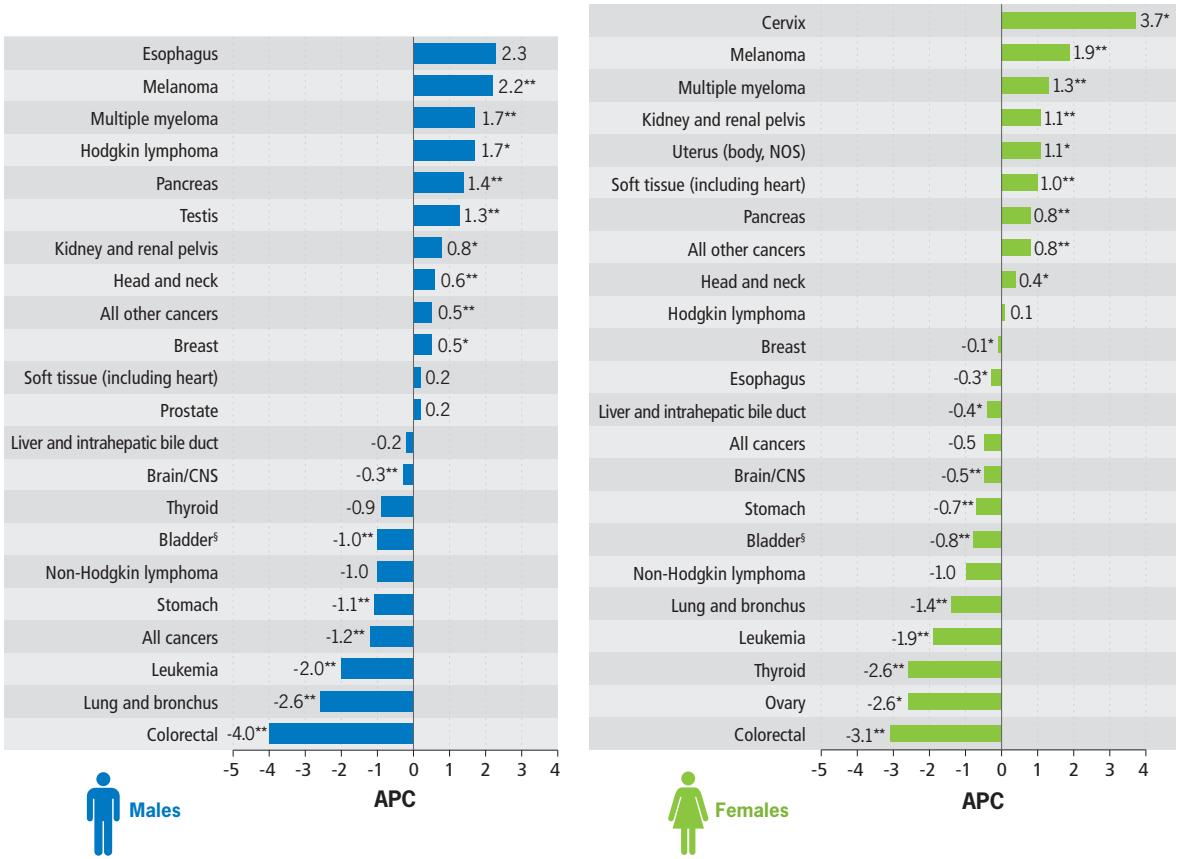
Statistical significance

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‡), 1984–2019



‡ Quebec is excluded because cases diagnosed in Quebec from 2011 onward had not been submitted to the Canadian Cancer Registry. Data for 2019 additionally excludes cases diagnosed in Nova Scotia as these cases also had not been submitted to the Canadian Cancer Registry at the time of analysis.

§ 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 Population Health Data, Statistics Canada

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

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*.

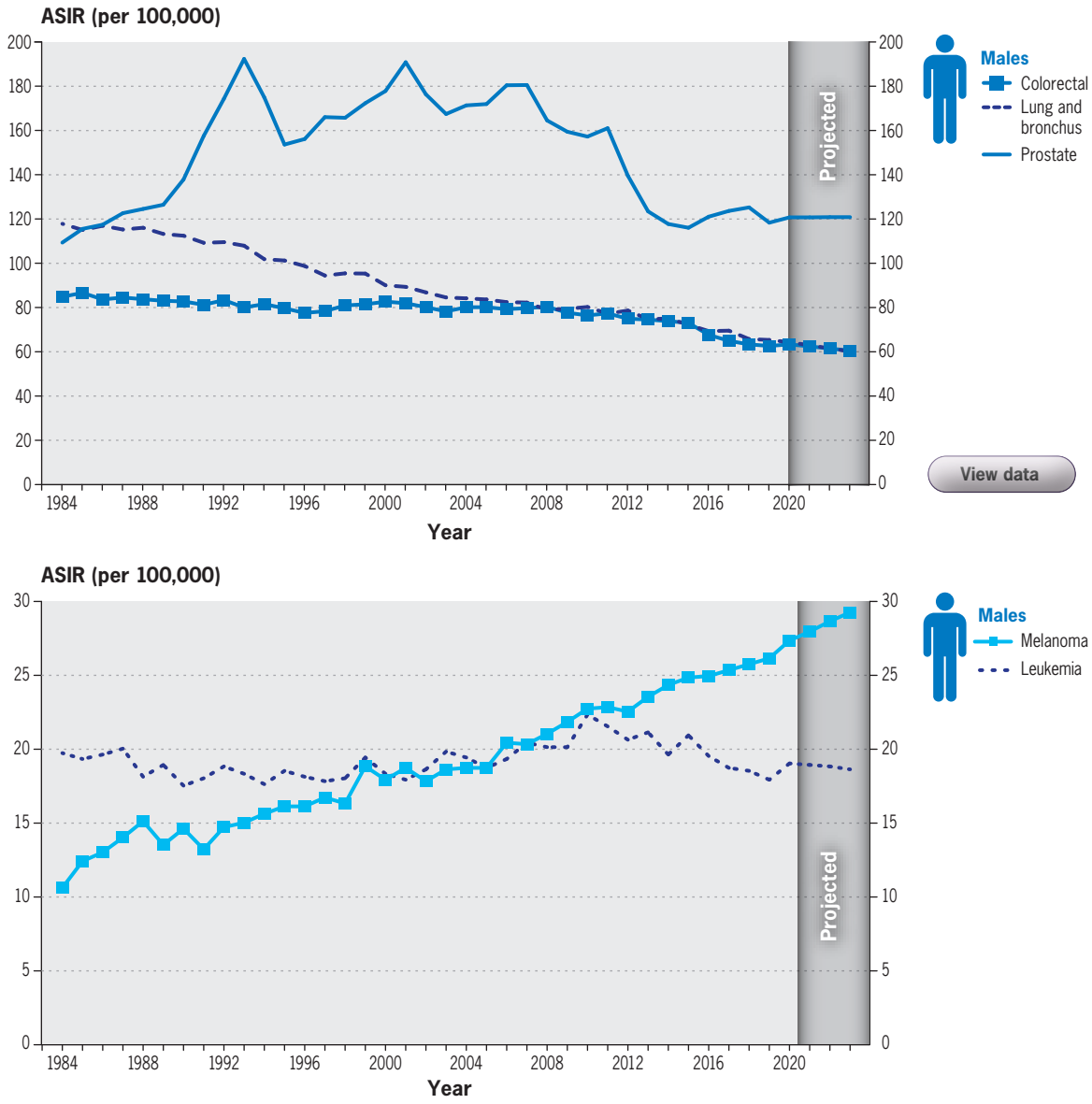
- The difference in cancer rates between males and females has been narrowing, particularly since 2010. This is due in part to the decreasing rates of some cancers in males, including lung and prostate cancers, and increasing rates of some cancers in females, including lung cancer.

Recent trends

Table 1.6 provides details on trends between 1984 and 2019 for each cancer type, by sex, as measured by annual percent change (APC). Table 1.7 draws out the most recent trends for each cancer. These recent trends are depicted in Figure 1.7.

- In males, the largest significant decreases were for colorectal cancer (-4.0% per year since 2014), lung cancer (-2.6% per year since 2012) and leukemia (-2.0% per year since 2011).
- In females, the largest significant decreases were for colorectal (-3.1% per year since 2014), ovarian (-2.6% per year since 2014) and thyroid (-2.6% per year since 2012) cancers.

FIGURE 1.8 Age-standardized incidence rates (ASIR) for selected* cancers, males, Canada (excluding Quebec†), 1984–2023



* 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. Estimates for 2019 additionally exclude data from Nova Scotia as cases diagnosed in Nova Scotia in 2019 also had not been submitted to the Canadian Cancer Registry at the time of analysis.

Note: Rates are age-standardized to the 2011 Canadian standard population. Actual incidence data were available to 2019 in each province and territory except Nova Scotia and Quebec. Estimates for 2020–2023 are projected. 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 Population Health Data, Statistics Canada
Data sources: Canadian Cancer Registry and National Cancer Incidence Reporting System databases at Statistics Canada

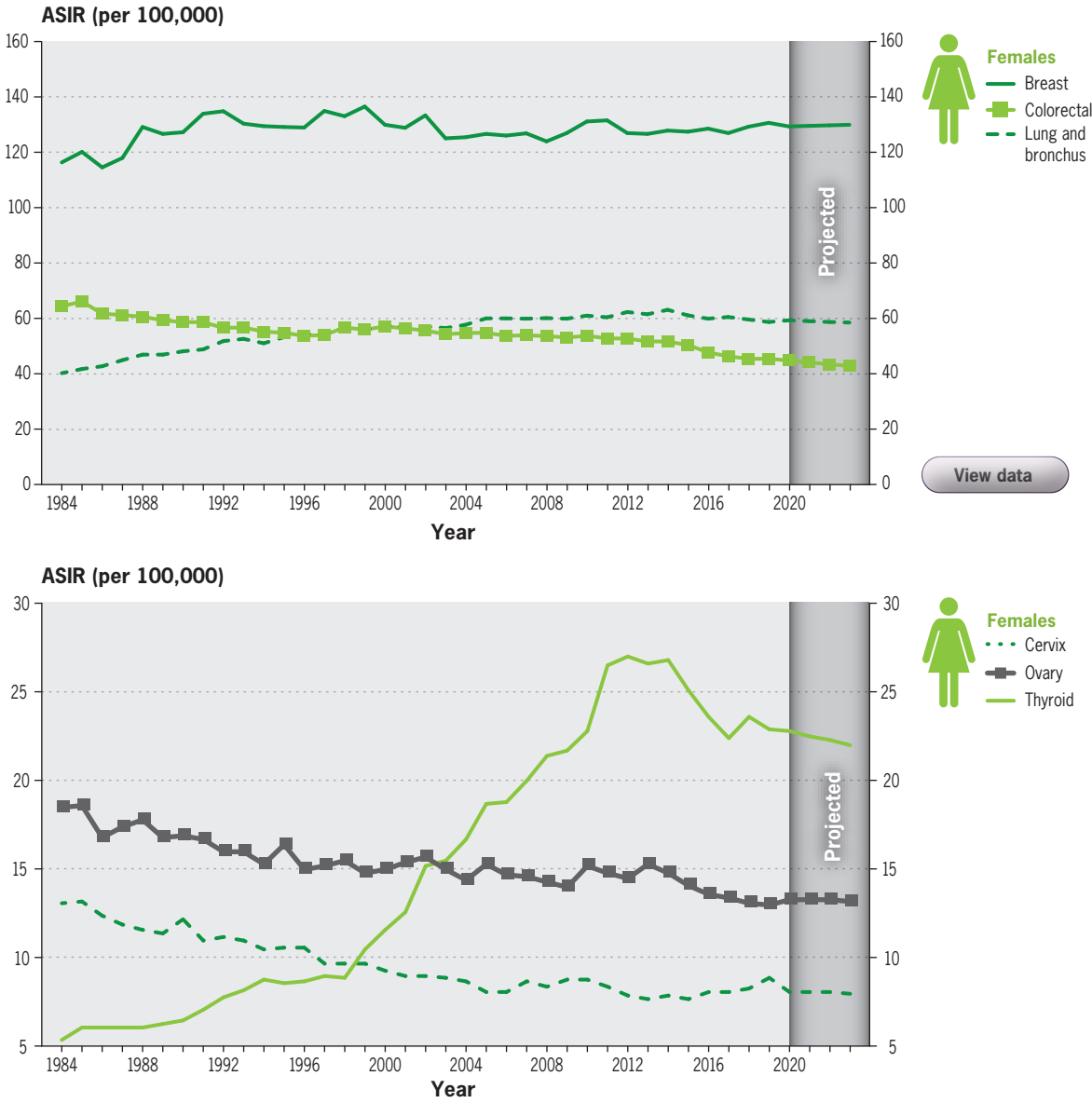
- The largest significant increase in males was observed for melanoma (2.2% per year since 1984). In females, cervical cancer increased the most (3.7% per year since 2015).
- Between 2005 and 2013, liver and intrahepatic bile duct cancer was rising steeply in both sexes. However, since 2013, this trend has levelled off (-0.2% per year).

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 2019 for all cancers and by cancer type.

- The trend for all cancers combined in males increased slowly until the early 1990s (0.9% per year) and then stabilized (-0.1% per year). Since 2011, the rate has decreased -1.2% 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 2012 (1.3% per year). Since 2012, the rate has been decreasing slightly in females (-0.4% per year).

FIGURE 1.9 Age-standardized incidence rates (ASIR) for selected* cancers, females, Canada (excluding Quebec†), 1984–2023



* 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. Estimates for 2019 additionally exclude data from Nova Scotia as cases diagnosed in Nova Scotia in 2019 also had not been submitted to the Canadian Cancer Registry at the time of analysis.

Note: Rates are age-standardized to the 2011 Canadian standard population. Actual incidence data were available to 2019 in each province and territory except Nova Scotia and Quebec. Estimates for 2020–2023 are projected. 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 Population Health Data, Statistics Canada
Data sources: Canadian Cancer Registry and National Cancer Incidence Reporting System databases at Statistics Canada

Figures 1.8 and 1.9 show the ASIR over time (projected to 2023) 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 and leukemia in males, and cervical, ovarian and thyroid cancers in females.

A short discussion of trends (based on Table 1.6) for each of these notable cancers is presented below. The list does not include esophageal cancer, despite an APC of 2.3% since 2015 in males, because the trend was not statistically significant.

Lung and bronchus (lung) cancer

In males, the incidence rate for lung cancer has decreased since 1990. For the periods of 1990–2003 and 2003–2012, the rate declined -2.2% and -1.0% per year, respectively. Since 2012, the lung cancer incidence rate shows a steeper decline, decreasing -2.6% per year. In 2023, the age-standardized incidence rate in males is projected to be 49% lower than it was at its peak in 1984. In females, the lung cancer incidence rate increased significantly between 1984 and 1988 (4.0% per year). The increase continued, but more slowly, from 1988 to 1998 (1.8% per year) and from 1998 to 2014 (0.7% per year). Since 2014, the rate has declined -1.4% per year.

The differences in trends in lung cancer rates in males and females largely reflect past differences in tobacco smoking, which is the main risk factor for this cancer.[5] In males, a decrease in the prevalence of daily tobacco smoking began in the mid-1960s in Canada, preceding the decrease in lung cancer incidence by about 20 years.[6] In females, the drop in tobacco smoking was not until the mid-1980s. Therefore, lung cancer rates in females only started to decrease more recently. These results are similar to those found in the United States (US).[7]

Efforts to control tobacco use are still needed to further reduce the incidence of lung cancer[8,9] because approximately 2.5 million people in Canada (8%) continue to smoke tobacco on a daily basis.[10] In addition, there is growing concern that vaping and e-cigarette use may also increase lung cancer risk, though definitive data are presently lacking.[11] E-cigarette devices and vaping fluids contain definite and probable carcinogens including nicotine derivatives, polycyclic aromatic hydrocarbons, heavy metals and complex organic compounds such as aldehydes.[11] E-cigarette use and vaping is particularly popular among younger cohorts, raising concerns for the future.[12] Among youth (i.e., aged 15 to 19 years) in 2020, the prevalence of cigarette smoking was 3%, while that of ever vaping was 35% and that of vaping in the past 30 days was 14%.[10]

Breast cancer (female)

In Canada, the breast cancer incidence rate in females rose between 1984 and 1991 by 1.9% per year. Since then it has shown a small but statistically significant decline of -0.1% per year. The trend in Canada has been stable for almost 30 years, which contrasts with recent international trends. For example, the US shows a small but significant increase of 0.5% per year in breast cancer rates from 2014 to 2018.[13,14] Similar increases are observed in recent years in several other regions of the world. The increase impacts all age groups and remains in most regions even after adjusting for varying fertility rates.[15] While the factors behind the recent increasing trends have yet to be identified, research suggests that obesity, alcohol consumption and older age when giving birth for the first time could be responsible for the increasing incidence in the US.[13]

Colorectal cancer

On average, colorectal cancer incidence rates decreased -1.0% per year between 1984 and 2019 for both sexes combined. The rates fluctuated slightly over time. However, a clear decline can be observed in recent years. Indeed, since 2014, colorectal cancer incidence rates have declined -4.0% per year in males and -3.1% per year in females. Currently in Canada, the incidence rate for colorectal cancer is declining the fastest. 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.[16,17] However, the decline in colorectal cancer incidence rates may be confined to older adults, who are eligible for screening. Incidence rates are reportedly increasing among adults younger than 50 years of age in Canada,[18,19] the US[20] and several other high-income countries.[21]

Colorectal cancer incidence is declining faster than any other cancer in Canada.

Prostate cancer

The incidence rate for prostate cancer increased rapidly from 1984 to 1993 (5.6% per year), levelled off, and then declined steeply from 2008 to 2014 (-6.1% per year) before levelling off once again. The incidence rate peaked in the mid-1990s and early 2000s, which mirrored intensified use of prostate-specific antigen (PSA) testing in Canada.[22] 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.[23,24] The considerable decline in prostate cancer following changes in PSA testing guidelines has also been reported in the US.[7,25]

Cervical cancer

Following a 30-year decline, the incidence rate for cervical cancer is now increasing 3.7% per year since 2015. Cancer of the cervix is now the fastest increasing cancer in females. Similar increases are also reported in several other countries, including Japan, Italy, United Kingdom (UK), Finland, Estonia, Sweden, Netherlands, Iceland, Denmark, Ireland, Belarus, Australia, Norway, Turkey, US and China.[26,27] The drivers of these trends are multifactorial and differ across ages, cohorts and populations. The increasing trend has been associated with suboptimal screening uptake, including less intensive screening in more recent years, lower coverage in younger females and lack of follow-up after screening, as well as higher prevalence of HPV due to changing sexual practices and suboptimal coverage of HPV vaccination.[26,27] Successful organized screening programs and uptake of HPV vaccination are critical to decrease cervical cancer incidence. However, adherence to screening guidelines varies significantly across Canada and uptake of HPV vaccination in publicly funded school-based programs across much of Canada remains suboptimal.[28]

Leukemia

Trends in the incidence rate for leukemia varied during the period between 1984 and 2019. In males, the incidence rate for leukemia decreased -0.8% per year until 1997, increased 1.4% per year until 2011, and has since declined -2.0% annually. In females, the modest rate of decrease seen until 2001 (-0.3% per year) was followed by a 2.2% annual increase until 2010. More recently, the rate has declined -1.9% annually. A similar trend in the incidence rate for leukemia has been reported in the US[29] and globally between 1990 and 2017, though the rate of decline varies between countries and leukemia subtypes.[30,31] 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).[32] Factors driving the trends in leukemia incidence are not well understood, though some suggest that changes in environmental exposures to carcinogens (e.g., benzene and radon), lifestyle (e.g., tobacco smoking) and parental behaviours (e.g., intake of folate before conception and during pregnancy) may be at play.[30,33]

Melanoma

Between 1984 and 2019, the incidence rate for melanoma increased an average of 2.2% per year in males. Among females, the incidence rate was stable between 1984 and 1993 but has since increased an average of 1.9% per year. Similar trends are reported in the US[34] and globally.[35,36] Currently, melanoma has seen one of the fastest expansions in incidence among cancers in developed countries.[35,36] Exposure to ultraviolet (UV) radiation through sunlight, tanning beds, tanning booths or sun lamps is a well-established risk factor for melanoma.[37,38] Past increases in sun exposure without adequate sun safety likely accounts for the continued rise in melanoma rates.[39] A recent study found notable geographic variation in melanoma incidence and mortality rates in Canada, where Nova Scotia, Prince Edward Island, southern Ontario, British Columbia and certain coastal communities of New Brunswick demonstrated higher incidence and mortality.[40,41] In this study, the Canadian researchers noted that programs to decrease UV radiation exposure have proven to be successful in curbing the increase of melanoma skin cancer in Australia, a country with one of the highest rates of melanoma in the world.[41–43]

Ovarian cancer

The incidence rate of ovarian cancer declined (-1.5% per year) between 1984 and 1996 and then levelled off until 2014. It has since been decreasing rapidly (-2.6% per year). In 2023, the ASIR is projected to be 29% lower than in 1984. A similar decline has also been reported in most of Europe, North America and South America.[44,45] Several factors could be contributing to the overall favourable trend, including changes in reproductive and protective risk factors, such as increased use of oral contraceptives and intra-uterine devices,[46,47] and decreased prevalence of tobacco smoking, as well as changes in disease classifications (i.e., since 2000, ovarian neoplasms with borderline or low malignant potential are no longer considered malignant tumours).[44,48,49] However, while the overall worldwide trends are decreasing, ovarian cancer is increasing among younger females in some countries.[45] The increasing prevalence of obesity, metabolic syndrome, estrogen exposure and nulliparity

among younger females may be driving the rate upward in some countries.[45]

Thyroid cancer

Rates of thyroid cancer increased rapidly in males between 1984 and 2013, and even more so in females between 1984 and 2012. The rates have since levelled off in males, but they have decreased -2.6% per year in females since 2012. These trends closely mirror those observed in the US and globally.[50] The previous increases in incidence have been largely attributed to over-diagnosis resulting from the growing scrutiny of the thyroid gland with improved diagnostic technologies such as ultrasound and fine needle aspiration.[50,51] Over-diagnosis can occur when a cancer is detected that would not necessarily lead to decreased quality of life or death and would not have otherwise been diagnosed in a person's lifetime in the absence of testing. Many reports have found evidence in support of the over-diagnosis hypothesis, noting there were increases primarily in small, indolent papillary cases with no concurrent increase in mortality.[52,53] Therefore, the decline in rates reported in recent years may be linked to less aggressive diagnostic work-up of small thyroid tumors due to a rising awareness of the problems associated with over-treatment of low-risk thyroid cancer. Nonetheless, a large study among people in the US diagnosed with thyroid cancer from 1974 to 2013 provides evidence of a concurrent increase in incidence and mortality rates for advanced-stage papillary thyroid cancer in previous years.[54] This would suggest that part of the increase in incidence prior to 2013 could represent a true increase in burden rather than only being the result of over-diagnosis of indolent tumours.

Average annual percent change (AAPC)

Table 1.6 also shows the average annual percent change (AAPC) in cancers between 1984 and 2019. By summarizing the various trends over time, the AAPC enables the comparison of changes in incidence across cancers for the same defined time period. 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.

- In both males and females, the greatest increases were observed for thyroid cancer (3.9% and 4.1% per year, respectively) and liver and intrahepatic bile duct cancer (3.4% and 3.2% per year, respectively). The greatest decrease in both males and females was in stomach cancer (-1.8% and -1.7% per year, respectively).
- For males, the second greatest decrease was observed for lung cancer (-1.7% per year).
- According to the AAPC, one of the greatest overall increases in incidence from 1984 to 2019 was observed for liver and intrahepatic bile duct cancers (AAPC of 3.4% per year); however, the most recent trend indicates incidence has levelled off (APC of -0.2% per year since 2013).
- Similarly, thyroid cancer had the greatest increase in incidence, overall, from 1984 to 2019 in both sexes (AAPC of 4.1% per year); however, since 2012, incidence has declined -1.9% per year.

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.

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 45% 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 2023 alone, a projected 239,100 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.[55] 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.[56] 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.[57] 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 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.

Since the early 2010s, cancer rates in males have declined more rapidly than in females, which has contributed to narrowing the gap historically observed between males and females. The trends in incidence rates for specific cancer types reveal the progress that has been made in preventing them. For example, the recent decreases in thyroid and prostate cancers likely reflect the success of evolving screening policies that limit over-screening and over-diagnosis, while the decrease in lung cancer incidence likely reflects success in tobacco control. Also, the decline in colorectal cancer likely reflects, at least in part, the successful implementation of screening programs. In contrast, there continues to be significant increases in some cancers, such as melanoma, and more recent increases for others, such as cervical cancer. This emphasizes the need for concerted efforts to mitigate these increases.

Supplementary resources

Cancer.ca/statistics houses supplementary resources for this chapter. These include:

- 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 and Nova Scotia*), 2019

	Lifetime probability of developing cancer					
	%			One in:		
	Both sexes	Males	Females	Both sexes	Males	Females
All cancers†	**44.8**	**45.3**	**44.5**	**2.2**	**2.2**	**2.2**
Lung and bronchus	7.1	7.1	7.1	14	14	14
Breast	6.5	0.1	12.8	15	782	8
Prostate	—	12.0	—	—	8	—
Colorectal	5.8	6.2	5.5	17	16	18
Bladder	2.9	4.5	1.4	34	22	70
Non-Hodgkin lymphoma	2.5	2.8	2.2	40	35	46
Melanoma	2.3	2.6	1.9	44	38	51
Kidney and renal pelvis	1.7	2.1	1.2	60	47	84
Uterus (body, NOS)	—	—	3.3	—	—	30
Head and neck	1.6	2.3	1.0	61	43	103
Pancreas	1.7	1.7	1.6	61	58	63
Thyroid	1.3	0.7	1.8	80	144	55
Leukemia	1.5	1.8	1.2	66	56	80
Liver and intrahepatic bile duct	0.9	1.2	0.7	105	80	153
Stomach	1.0	1.3	0.7	104	79	149
Multiple myeloma	0.9	1.0	0.8	112	98	128
Brain/CNS	0.7	0.8	0.6	144	121	176
Ovary	—	—	1.3	—	—	75
Esophagus	0.6	1.0	0.3	155	103	307
Soft tissue (including heart)	0.4	0.4	0.3	271	241	307
Cervix	—	—	0.7	—	—	141
Testis	—	0.5	—	—	221	—
Hodgkin lymphoma	0.2	0.3	0.2	424	372	493

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

* Quebec and Nova Scotia are excluded because cases diagnosed in Quebec from 2011 onward and cases diagnosed in Nova Scotia in 2019 had not been submitted to the Canadian Cancer Registry at the time of analysis.

† "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 and Nova Scotia in 2019. Mortality data from Yukon was imputed. 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. The ordering of cancer types reflects the ordering of projected incident cases in 2023 (Table 1.2) for both sexes combined. "One in" estimates are based on probabilities rounded to two decimal places.

Analysis by: Centre for Population Health Data, Statistics 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,* 2023

	New cases (2023 estimates)			Cases per 100,000		
	Total†	Males	Females	Both sexes	Males	Females
All cancers‡	**239,100**	**124,200**	**114,900**	**513.1**	**555.3**	**481.2**
Lung and bronchus	31,000	15,300	15,800	58.9	60.1	58.4
Breast	29,700	260	29,400	68.1	1.2	129.9
Prostate	25,900	25,900	—	57.1	120.8	—
Colorectal	24,100	13,500	10,600	51.1	60.5	42.7
Bladder	13,400	10,200	3,200	25.1	41.9	11.1
Non-Hodgkin lymphoma	10,900	6,100	4,700	24.0	28.8	19.9
Melanoma	9,700	5,600	4,100	24.3	29.2	20.4
Kidney and renal pelvis	8,600	5,600	2,900	18.6	25.6	12.2
Uterus (body, NOS)	8,500	—	8,500	19.6	—	37.8
Head and neck	7,900	5,800	2,100	16.8	25.7	8.8
Pancreas	7,200	4,000	3,200	14.3	16.8	12.0
Leukemia	6,400	3,900	2,500	14.3	18.6	10.4
Thyroid	6,300	1,900	4,400	15.9	9.6	22.0
Liver and intrahepatic bile duct	4,700	3,200	1,450	9.1	13.4	5.1
Stomach	4,100	2,700	1,450	8.5	11.7	5.7
Multiple myeloma	3,900	2,300	1,650	8.2	10.1	6.5
Brain/CNS	3,200	1,850	1,350	7.1	8.6	5.7
Ovary	3,100	—	3,100	6.9	—	13.2
Esophagus	2,700	2,100	600	5.8	9.6	2.5
Soft tissue (including heart)	1,700	950	730	3.9	4.6	3.3
Cervix	1,550	—	1,550	4.1	—	8.0
Testis	1,250	1,250	—	3.3	6.6	—
Hodgkin lymphoma	1,100	640	470	2.7	3.1	2.4
All other cancers	22,500	11,300	11,300	45.5	48.9	43.1

— 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,* 2023

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	**239,100**	**124,200**	**114,900**	**31,000**	**15,300**	**15,800**	**29,400**	**24,100**	**13,500**	**10,600**	**25,900**
0–14	1,050	590	450	—	—	—	—	10	—	5	—
15–29	2,900	1,450	1,400	25	15	10	120	230	110	120	—
30–39	6,100	2,200	3,900	100	50	55	1,200	470	240	230	5
40–49	13,600	4,700	8,900	540	210	330	3,700	1,250	640	600	310
50–59	31,300	14,300	16,900	2,500	1,150	1,400	5,700	3,200	1,850	1,350	3,200
60–69	65,800	36,200	29,600	8,600	4,200	4,400	8,100	6,200	3,700	2,400	10,100
70–79	70,300	39,400	30,900	11,600	5,800	5,800	6,800	7,200	4,200	2,900	8,400
80–89	38,500	20,800	17,700	6,300	3,300	3,100	3,000	4,500	2,300	2,300	3,200
90+	9,600	4,400	5,200	1,300	620	690	800	1,150	450	700	650
0–19	1,550	890	670	—	—	—	—	35	15	20	—
50–74	133,900	71,400	62,600	17,000	8,300	8,700	17,600	13,000	7,800	5,200	18,100
65+	154,700	85,100	69,500	24,200	12,100	12,100	14,800	16,200	9,000	7,200	18,100

— 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. 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).

‡ 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*), 2023

	Cases per 100,000										
	CA†	BC	AB	SK	MB	ON	QC*	NB	NS	PE	NL
Males											
All cancers‡	**555.3**	**506.8**	**542.8**	**514.6**	**532.3**	**577.4**		**551.7**	**616.3**	**540.5**	**557.8**
Prostate	120.8	119.1	138.2	117.3	119.3	118.6		114.1	118.2	114.8	106.4
Lung and bronchus	60.1	53.6	55.7	58.9	61.6	59.8		80.2	81.7	80.8	72.7
Colorectal	60.5	52.0	57.4	60.9	64.1	60.6		65.2	77.1	50.4	100.8
Bladder	41.9	39.8	41.4	41.4	37.2	43.6		40.0	42.2	38.9	40.0
Non-Hodgkin lymphoma	28.8	24.3	25.6	24.4	25.8	32.0		26.7	30.3	24.6	32.4
Head and neck	25.7	26.7	22.3	21.1	24.7	26.5		24.9	26.6	29.7	27.4
Kidney and renal pelvis	25.6	22.2	25.5	27.8	27.7	25.4		28.8	34.2	26.6	30.1
Melanoma	29.2	23.8	27.3	17.5	29.6	32.3		24.7	40.4	42.3	22.7
Pancreas	16.8	17.1	15.6	15.7	15.2	17.4		17.5	18.3	16.1	10.6
Leukemia	18.6	16.1	18.2	22.9	14.8	20.1		21.5	18.6	14.8	12.2
Liver and intrahepatic bile duct	13.4	17.0	13.4	11.5	12.8	12.7		9.7	13.6	10.5	8.6
Stomach	11.7	9.0	9.7	11.4	11.1	13.5		11.5	9.8	12.7	14.2
Multiple myeloma	10.1	9.1	9.5	10.0	10.7	10.9		8.0	9.1	10.7	8.5
Esophagus	9.6	10.9	9.4	9.5	8.8	8.8		9.2	15.4	11.4	9.9
Thyroid	9.6	5.9	9.2	7.0	6.2	11.7		8.0	9.5	5.4	9.9
Brain/CNS	8.6	8.8	8.5	7.5	8.2	8.6		8.4	9.3	9.4	9.4
Testis	6.6	6.4	6.3	6.5	6.2	7.0		7.3	6.9	4.2	5.1
Soft tissue (including heart)	4.6	3.9	4.4	3.6	4.2	5.4		4.0	3.7	4.6	3.3
Hodgkin lymphoma	3.1	3.0	3.0	2.5	3.2	3.2		3.8	4.0	3.9	2.7
Breast	1.2	1.1	1.0	1.1	0.8	1.3		1.1	1.7	—	1.4
Females											
All cancers‡	**481.2**	**426.2**	**475.7**	**450.5**	**469.0**	**503.0**		**469.8**	**509.0**	**462.8**	**536.7**
Breast	129.9	120.7	141.0	122.6	121.6	132.6		116.8	121.4	124.2	138.1
Lung and bronchus	58.4	56.8	60.3	67.8	60.8	55.0		67.9	75.4	64.4	72.8
Colorectal	42.7	38.6	41.9	38.7	47.5	41.9		48.3	52.5	50.8	66.3
Uterus (body, NOS)	37.8	30.4	36.4	36.3	45.5	40.4		35.1	39.3	31.0	43.1
Non-Hodgkin lymphoma	19.9	16.5	17.2	20.1	18.4	21.8		20.1	19.8	18.0	23.7
Thyroid	22.0	12.5	19.6	13.3	16.0	27.5		18.3	19.1	8.6	30.8
Melanoma	20.4	17.1	21.2	16.1	18.8	21.0		22.5	31.8	35.0	18.8
Pancreas	12.0	12.6	12.8	11.8	12.4	11.7		12.3	12.1	11.0	10.1
Bladder	11.1	11.0	10.5	9.4	10.2	11.3		11.7	12.7	11.6	15.4
Ovary	13.2	10.6	10.2	11.6	10.8	15.6		11.7	12.4	13.3	11.0
Kidney and renal pelvis	12.2	12.2	11.2	14.2	12.0	11.7		14.9	18.2	12.7	13.5
Leukemia	10.4	9.3	10.9	13.2	9.1	10.6		15.9	10.8	10.7	8.1
Head and neck	8.8	8.2	7.8	7.5	9.0	9.5		7.4	8.7	11.5	7.5
Multiple myeloma	6.5	5.4	5.5	5.3	5.9	7.7		5.5	5.2	5.7	4.9
Cervix	8.0	7.4	7.0	10.2	7.1	8.6		8.8	6.3	9.3	10.1
Liver and intrahepatic bile duct	5.1	5.3	6.2	4.2	6.1	4.9		5.3	4.7	3.3	5.9
Stomach	5.7	4.3	4.5	4.4	5.1	6.7		5.6	4.2	4.1	9.2
Brain/CNS	5.7	5.3	5.7	5.2	5.9	5.9		5.9	6.4	4.9	8.0
Soft tissue (including heart)	3.3	2.7	2.9	2.6	2.8	4.1		2.8	3.0	—	1.8
Esophagus	2.5	2.9	2.3	1.6	2.1	2.4		2.2	3.5	2.6	2.4
Hodgkin lymphoma	2.4	2.1	2.3	2.0	2.5	2.6		1.9	2.5	—	2.7

— 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*.

† Rates for Canada are based on 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,* 2023

	CA†	BC	AB	SK	MB	ON	QC‡	NB	NS	PE	NL
Males											
All cancers§	**124,200**	**16,000**	**11,900**	**3,200**	**3,800**	**48,300**	**31,400**	**2,900**	**3,900**	**550**	**2,000**
Prostate	25,900	3,900	3,100	760	870	10,300	5,000	630	790	120	410
Lung and bronchus	15,300	1,750	1,200	370	450	5,100	5,000	450	530	85	280
Colorectal	13,500	1,650	1,250	380	450	5,000	3,500	350	490	50	370
Bladder	10,200	1,300	880	260	270	3,700	3,100	220	270	40	150
Non-Hodgkin lymphoma	6,100	750	560	150	180	2,600	1,400	140	180	25	110
Head and neck	5,800	820	490	130	170	2,200	1,600	130	170	30	95
Kidney and renal pelvis	5,600	670	570	170	180	2,100	1,450	150	200	25	110
Melanoma	5,600	740	590	110	210	2,700	750	130	240	40	75
Pancreas	4,000	540	340	100	110	1,450	1,150	95	120	15	40
Leukemia	3,900	500	400	140	110	1,650	870	110	110	15	40
Liver and intrahepatic bile duct	3,200	560	300	70	90	1,050	970	55	95	10	30
Stomach	2,700	290	210	70	80	1,150	690	60	60	15	50
Multiple myeloma	2,300	290	210	60	75	920	590	45	60	10	30
Esophagus	2,100	350	210	60	60	740	450	50	95	10	35
Thyroid	1,900	170	210	45	40	900	430	35	50	5	30
Brain/CNS	1,850	250	190	50	60	680	480	40	50	10	30
Testis	1,250	170	160	40	45	520	250	25	30	5	10
Soft tissue (including heart)	950	110	95	20	30	430	210	20	20	5	10
Hodgkin lymphoma	640	80	70	15	25	240	170	15	20	5	10
Breast	260	35	20	5	5	110	65	5	10	—	5
Females											
All cancers§	**114,900**	**14,300**	**11,300**	**3,000**	**3,600**	**45,800**	**28,100**	**2,600**	**3,500**	**510**	**2,000**
Breast	29,400	3,900	3,300	780	900	11,500	7,000	610	780	130	490
Lung and bronchus	15,800	2,100	1,500	480	500	5,500	4,300	410	580	75	310
Colorectal	10,600	1,350	1,000	260	370	4,000	2,700	280	380	60	250
Uterus (body, NOS)	8,500	990	850	240	330	3,600	1,850	190	260	35	150
Non-Hodgkin lymphoma	4,700	570	410	140	150	2,100	1,050	110	140	20	95
Thyroid	4,400	350	450	80	110	2,100	970	80	100	10	90
Melanoma	4,100	550	500	100	140	1,900	540	110	200	35	60
Pancreas	3,200	460	320	85	100	1,150	850	75	90	15	40
Bladder	3,200	400	260	70	85	1,150	990	70	95	15	65
Ovary	3,100	350	240	75	80	1,400	730	65	85	15	35
Kidney and renal pelvis	2,900	410	270	90	90	1,050	730	80	120	15	50
Leukemia	2,500	310	260	90	75	1,000	520	85	75	10	30
Head and neck	2,100	270	190	50	70	870	520	40	60	10	25
Multiple myeloma	1,650	190	130	35	45	750	380	35	40	5	20
Cervix	1,550	200	170	60	50	670	320	35	35	10	25
Liver and intrahepatic bile duct	1,450	190	150	30	50	480	460	35	35	5	25
Stomach	1,450	150	110	30	40	640	380	35	30	5	35
Brain/CNS	1,350	170	140	35	45	520	370	30	40	5	25
Soft tissue (including heart)	730	85	70	20	20	350	160	15	20	—	5
Esophagus	600	110	55	10	15	240	130	15	25	5	10
Hodgkin lymphoma	470	55	50	10	20	200	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 2018 for Nova Scotia and to 2019 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*), 1984–2019

	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‡	**1984–2011**	**0.3 (0.2 , 0.4)**		**1984–1992**	**0.9 (0.2 , 1.6)**		**1984–2007**	**0.3 (0.2 , 0.4)**	
	2011–2019	**-0.6 (-1.0 , -0.2)**	**0.1 (0.0 , 0.2)**	**1992–2011**	**-0.1 (-0.3 , 0.0)**	**-0.1 (-0.3 , 0.1)**	**2007–2012**	**1.3 (0.4 , 2.1)**	**0.3 (0.2 , 0.4)**
				2011–2019	**-1.2 (-1.6 , -0.7)**		**2012–2019**	**-0.4 (-0.7 , -0.1)**	
Lung and bronchus	1984–1990	0.6 (-0.1 , 1.3)		1984-1990	-0.6 (-1.4 , 0.1)		1984-1988	4.0 (2.1 , 5.9)	
	1990–2003	-0.7 (-1.0 , -0.5)	-0.6 (-0.7 , -0.4)	1990-2003	-2.2 (-2.4 , -1.9)	-1.7 (-1.9 , -1.5)	1988-1998	1.8 (1.4 , 2.3)	1.1 (0.8 , 1.4)
	2003–2014	-0.3 (-0.5 , 0.0)		2003-2012	-1.0 (-1.4 , -0.6)		1998-2014	0.7 (0.5 , 0.8)	
	2014–2019	-2.1 (-2.8 , -1.5)		2012-2019	-2.6 (-3.1 , -2.1)		2014-2019	-1.4 (-2.1 , -0.6)	
Breast	1984–1991	1.8 (0.7 , 3.0)	0.2 (0.0 , 0.4)	1984-2019	0.5 (0.1 , 0.8)	0.5 (0.1 , 0.8)	1984-1991	1.9 (0.8 , 3.1)	0.3 (0.1 , 0.5)
	1991–2019	-0.2 (-0.3 , -0.1)					1991-2019	-0.1 (-0.2 , 0.0)	
Prostate				1984-1993	5.6 (3.7 , 7.6)				
				1993-2008	0.2 (-0.5 , 0.9)				
				2008-2014	-6.1 (-8.8 , -3.2)	0.4 (-0.4 , 1.3)			
				2014-2019	0.2 (-2.8 , 3.2)				
Colorectal	1984–1996	-1.0 (-1.3 , -0.8)		1984–1996	-0.7 (-1.0 , -0.4)		1984–1995	-1.6 (-1.9 , -1.4)	
	1996–2001	0.9 (-0.3 , 2.0)	-1.0 (-1.2 , -0.8)	1996–2001	0.8 (-0.7 , 2.3)	-1.0 (-1.2 , -0.7)	1995–2000	0.8 (-0.5 , 2.1)	-1.1 (-1.3 , -0.9)
	2001–2014	-0.7 (-0.9 , -0.5)		2001–2014	-0.7 (-1.0 , -0.5)		2000–2014	-0.6 (-0.8 , -0.5)	
	2014–2019	-3.5 (-4.1 , -2.8)		2014–2019	-4.0 (-4.8 , -3.1)		2014–2019	-3.1 (-3.8 , -2.3)	
Bladder§	1984–1992	-2.0 (-4.9 , 1.1)	-0.9 (-1.6 , -0.2)	1984–2019	-1.0 (-1.3 , -0.7)	-1.0 (-1.3 , -0.7)	1984–2019	-0.8 (-1.1 , -0.5)	-0.8 (-1.1 , -0.5)
	1992–2019	-0.6 (-1.0 , -0.2)							
Non-Hodgkin lymphoma	1984–1997	1.8 (1.4 , 2.2)		1984–1997	1.8 (1.3 , 2.3)		1984–1992	2.3 (1.2 , 3.3)	
	1997–2008	0.6 (0.1 , 1.0)	1.1 (0.8 , 1.5)	1997–2009	0.7 (0.2 , 1.2)	1.2 (0.8 , 1.6)	1992–2015	1.0 (0.8 , 1.2)	1.0 (0.7 , 1.4)
	2008–2013	2.6 (0.9 , 4.4)		2009–2014	2.8 (0.8 , 4.9)		2015–2019	-1.0 (-2.8 , 0.9)	
	2013–2019	-0.6 (-1.4 , 0.2)		2014–2019	-1.0 (-2.3 , 0.2)				
Melanoma	1984–2019	1.9 (1.8 , 2.1)	1.9 (1.8 , 2.1)	1984–2019	2.2 (2.1 , 2.3)	2.2 (2.1 , 2.3)	1984–1993	0.0 (-1.3 , 1.4)	1.4 (1.1 , 1.8)
							1993–2019	1.9 (1.7 , 2.1)	
Kidney and renal pelvis	1984–1989	4.1 (1.8 , 6.4)		1984–1989	4.0 (1.5 , 6.5)		1984–2019	1.1 (0.9 , 1.2)	
	1989–1998	-0.4 (-1.3 , 0.6)	1.4 (1.0 , 1.9)	1989–2003	0.1 (-0.3 , 0.6)	1.5 (1.0 , 1.9)			1.1 (0.9 , 1.2)
	1998–2012	1.9 (1.6 , 2.3)		2003–2012	2.7 (1.9 , 3.5)				
	2012–2019	0.8 (0.0 , 1.6)		2012–2019	0.8 (0.0 , 1.7)				

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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*), 1984–2019

	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
Uterus (body, NOS)							1984–1990	-1.5 (-3.1 , 0.0)	0.7 (0.3 , 1.1)
							1990–2006	0.5 (0.1 , 0.8)	
							2006–2011	3.5 (1.4 , 5.7)	
							2011–2019	1.1 (0.4 , 1.7)	
Head and neck	1984–2004	-2.0 (-2.2 , -1.8)	-0.9 (-1.0 , -0.7)	1984–2004	-2.4 (-2.7 , -2.2)	-1.1 (-1.3 , -0.9)	1984–2004	-1.1 (-1.4 , -0.9)	-0.5 (-0.7 , -0.3)
	2004–2019	0.6 (0.3 , 0.9)		2004–2019	0.6 (0.3 , 0.9)		2004–2019	0.4 (0.0 , 0.7)	
Pancreas	1984–2001	-1.0 (-1.3 , -0.6)	0.1 (-0.1 , 0.3)	1984–2002	-1.4 (-1.8 , -1.0)	0.0 (-0.3 , 0.2)	1984–2001	-0.4 (-0.9 , 0.0)	0.2 (0.0 , 0.5)
	2001–2019	1.1 (0.8 , 1.4)		2002–2019	1.4 (1.1 , 1.8)		2001–2019	0.8 (0.5 , 1.1)	
Leukemia	1984–2001	-0.3 (-0.6 , 0.0)	-0.1 (-0.3 , 0.2)	1984–1997	-0.8 (-1.4 , -0.1)	-0.2 (-0.6 , 0.2)	1984–2001	-0.3 (-0.6 , 0.0)	-0.1 (-0.4 , 0.2)
	2001–2010	2.2 (1.4 , 2.9)		1997–2011	1.4 (0.9 , 1.9)		2001–2010	2.2 (1.4 , 3.1)	
	2010–2019	-1.8 (-2.3 , -1.2)		2011–2019	-2.0 (-2.9 , -1.1)		2010–2019	-1.9 (-2.5 , -1.3)	
Thyroid	1984–1998	3.6 (2.7 , 4.6)	4.1 (3.3 , 4.8)	1984–1998	2.8 (1.4 , 4.2)	3.9 (3.2 , 4.6)	1984–1998	3.9 (3.0 , 4.8)	4.1 (3.3 , 4.8)
	1998–2003	9.8 (5.2 , 14.5)		1998–2013	6.9 (6.1 , 7.8)		1998–2003	10.9 (6.5 , 15.6)	
	2003–2012	6.4 (5.3 , 7.6)		2013–2019	-0.9 (-2.9 , 1.1)		2003–2012	6.1 (5.0 , 7.2)	
	2012–2019	-1.9 (-3.0 , -0.8)					2012–2019	-2.6 (-3.6 , -1.5)	
Liver and intrahepatic bile duct	1984–2005	3.3 (2.9 , 3.7)	3.4 (3.0 , 3.8)	1984–2006	3.6 (3.1 , 4.0)	3.4 (2.9 , 3.9)	1984–2005	2.4 (1.7 , 3.2)	3.2 (2.4 , 4.0)
	2005–2013	6.5 (5.1 , 7.8)		2006–2013	5.8 (4.0 , 7.8)		2005–2013	8.2 (5.6 , 10.8)	
	2013–2019	-0.2 (-1.5 , 1.1)		2013–2019	-0.2 (-1.7 , 1.3)		2013–2019	-0.5 (-2.8 , 1.9)	
Stomach	1984–2002	-2.6 (-2.8 , -2.3)	-1.7 (-1.8 , -1.5)	1984–2002	-2.6 (-2.8 , -2.3)	-1.8 (-2.0 , -1.7)	1984–1999	-3.0 (-3.4 , -2.6)	-1.7 (-2.0 , -1.5)
	2002–2019	-0.8 (-1.0 , -0.5)		2002–2019	-1.1 (-1.3 , -0.8)		1999–2019	-0.7 (-1.0 , -0.5)	
Multiple myeloma	1984–2003	0.3 (-0.2 , 0.7)	0.9 (0.6 , 1.2)	1984–2002	0.1 (-0.5 , 0.8)	0.9 (0.5 , 1.3)	1984–2003	0.2 (-0.3 , 0.7)	0.7 (0.4 , 1.0)
	2003–2019	1.6 (1.2 , 2.1)		2002–2019	1.7 (1.2 , 2.2)		2003–2019	1.3 (0.8 , 1.8)	
Brain/CNS	1984–2019	-0.4 (-0.5 , -0.3)	-0.4 (-0.5 , -0.3)	1984–2019	-0.3 (-0.4 , -0.2)	-0.3 (-0.4 , -0.2)	1984–2019	-0.5 (-0.6 , -0.4)	-0.5 (-0.6 , -0.4)
Ovary							1984–1996	-1.5 (-2.1 , -1.0)	-1.0 (-1.3 , -0.7)
							1996–2014	-0.3 (-0.5 , 0.0)	
							2014–2019	-2.6 (-4.2 , -0.9)	

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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*), 1984–2019

Cancer	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
Esophagus	1984–2005	0.1 (-0.2 , 0.4)	0.5 (-0.2 , 1.1)	1984–2005	0.3 (0.0 , 0.6)	0.6 (0.0 , 1.3)	1984–2019	-0.3 (-0.5 , -0.1)	-0.3 (-0.5 , -0.1)
	2005–2010	2.6 (-0.3 , 5.7)		2005–2010	3.4 (0.3 , 6.5)				
	2010–2015	-1.5 (-4.2 , 1.2)		2010–2015	-2.0 (-4.6 , 0.7)				
	2015–2019	2.3 (-0.3 , 5.0)		2015–2019	2.3 (-0.3 , 5.0)				
Soft tissue (including heart)	1984–2001	0.0 (-0.6 , 0.6)	0.8 (0.1 , 1.5)	1984–2001	-0.1 (-0.8 , 0.6)	0.7 (-0.1 , 1.5)	1984–2019	1.0 (0.8 , 1.3)	1.0 (0.8 , 1.3)
	2001–2006	4.2 (-0.2 , 8.8)		2001–2006	4.8 (-0.3 , 10.2)				
	2006–2019	0.5 (-0.1 , 1.2)		2006–2019	0.2 (-0.4 , 0.9)				
Cervix							1984–2005	-2.1 (-2.3 , -1.9)	-1.1 (-1.6 , -0.6)
							2005–2010	0.6 (-1.8 , 3.0)	
							2010–2015	-2.5 (-4.8 , -0.1)	
							2015–2019	3.7 (1.4 , 6.1)	
Testis				1984–2019	1.3 (1.2 , 1.5)	1.3 (1.2 , 1.5)			
Hodgkin lymphoma	1984–2019	-0.1 (-0.2 , 0.0)	-0.1 (-0.2 , 0.0)	1984–2012	-0.5 (-0.8 , -0.3)	-0.1 (-0.4 , 0.3)	1984–2019	0.1 (-0.1 , 0.3)	0.1 (-0.1 , 0.3)
				2012–2019	1.7 (0.1 , 3.4)				
All other cancers	1984–2019	0.6 (0.5 , 0.7)	0.6 (0.5 , 0.7)	1984–2019	0.5 (0.3 , 0.6)	0.5 (0.3 , 0.6)	1984–2019	0.8 (0.7 , 0.9)	0.8 (0.7 , 0.9)

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 at the time of analysis. Data for 2019 additionally excludes cases diagnosed in Nova Scotia as these cases also had not been submitted to the Canadian Cancer Registry at the time of analysis.

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

‡ "All cancers" includes *in situ* bladder 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 (version 4.7.0.0) 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 Population Health Data, Statistics 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*), 1984–2019

	Both sexes		Males		Females	
	Reference year	APC† (95% CL)	Reference year	APC† (95% CL)	Reference year	APC† (95% CL)
All cancers‡	**2011**	**-0.6 (-1.0 , -0.2)**	**2011**	**-1.2 (-1.6 , -0.7)**	**2012**	**-0.4 (-0.7 , -0.1)**
Lung and bronchus	2014	-2.1 (-2.8 , -1.5)	2012	-2.6 (-3.1 , -2.1)	2014	-1.4 (-2.1 , -0.6)
Breast	1991	-0.2 (-0.3 , -0.1)	1984	0.5 (0.1 , 0.8)	1991	-0.1 (-0.2 , 0.0)
Prostate	—	—	2014	0.2 (-2.8 , 3.2)	—	—
Colorectal	2014	-3.5 (-4.1 , -2.8)	2014	-4.0 (-4.8 , -3.1)	2014	-3.1 (-3.8 , -2.3)
Bladder§	1992	-0.6 (-1.0 , -0.2)	1984	-1.0 (-1.3 , -0.7)	1984	-0.8 (-1.1 , -0.5)
Non-Hodgkin lymphoma	2013	-0.6 (-1.4 , 0.2)	2014	-1.0 (-2.3 , 0.2)	2015	-1.0 (-2.8 , 0.9)
Melanoma	1984	1.9 (1.8 , 2.1)	1984	2.2 (2.1 , 2.3)	1993	1.9 (1.7 , 2.1)
Kidney and renal pelvis	2012	0.8 (0.0 , 1.6)	2012	0.8 (0.0 , 1.7)	1984	1.1 (0.9 , 1.2)
Uterus (body, NOS)	—	—	—	—	2011	1.1 (0.4 , 1.7)
Head and neck	2004	0.6 (0.3 , 0.9)	2004	0.6 (0.3 , 0.9)	2004	0.4 (0.0 , 0.7)
Pancreas	2001	1.1 (0.8 , 1.4)	2002	1.4 (1.1 , 1.8)	2001	0.8 (0.5 , 1.1)
Leukemia	2010	-1.8 (-2.3 , -1.2)	2011	-2.0 (-2.9 , -1.1)	2010	-1.9 (-2.5 , -1.3)
Thyroid	2012	-1.9 (-3.0 , -0.8)	2013	-0.9 (-2.9 , 1.1)	2012	-2.6 (-3.6 , -1.5)
Liver and intrahepatic bile duct	2013	-0.2 (-1.5 , 1.1)	2013	-0.2 (-1.7 , 1.3)	2013	-0.5 (-2.8 , 1.9)
Stomach	2002	-0.8 (-1.0 , -0.5)	2002	-1.1 (-1.3 , -0.8)	1999	-0.7 (-1.0 , -0.5)
Multiple myeloma	2003	1.6 (1.2 , 2.1)	2002	1.7 (1.2 , 2.2)	2003	1.3 (0.8 , 1.8)
Brain/CNS	1984	-0.4 (-0.5 , -0.3)	1984	-0.3 (-0.4 , -0.2)	1984	-0.5 (-0.6 , -0.4)
Ovary	—	—	—	—	2014	-2.6 (-4.2 , -0.9)
Esophagus	2015	2.3 (-0.3 , 5.0)	2015	2.3 (-0.3 , 5.0)	1984	-0.3 (-0.5 , -0.1)
Soft tissue (including heart)	2006	0.5 (-0.1 , 1.2)	2006	0.2 (-0.4 , 0.9)	1984	1.0 (0.8 , 1.3)
Cervix	—	—	—	—	2015	3.7 (1.4 , 6.1)
Testis	—	—	1984	1.3 (1.2 , 1.5)	—	—
Hodgkin lymphoma	1984	-0.1 (-0.2 , 0.0)	2012	1.7 (0.1 , 3.4)	1984	0.1 (-0.1 , 0.3)
All other cancers	1984	0.6 (0.5 , 0.7)	1984	0.5 (0.3 , 0.6)	1984	0.8 (0.7 , 0.9)

— 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 at the time of analysis. Data for 2019 additionally excludes cases diagnosed in Nova Scotia as these cases also had not been submitted to the Canadian Cancer Registry at the time of analysis.

† 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 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*.

‡ "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 Population Health Data, Statistics 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, geographic region 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, geographic region 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 22% of Canadians will die from cancer. The lifetime probability of dying from cancer is higher for males (24%) than females (21%).
- An estimated 86,700 Canadians are expected to die from cancer in 2023. About 1 in 4 of these deaths is expected to be caused by lung cancer.
- Colorectal cancer is expected to be the second leading cause of cancer death in 2023.
- Pancreatic cancer continues to feature prominently in cancer mortality and is expected to be the third leading cause of cancer death in 2023 in Canada for both sexes combined, ahead of breast and prostate cancers.
- Almost all cancer deaths (over 96%) in Canada are expected to occur in people 50 years of age and older.
- The common causes of cancer death in children and young people under the age of 30 (i.e., brain cancer, leukemia, soft tissue cancers and non-Hodgkin lymphoma) are very different than the ones common in older adults (i.e., lung, colorectal, pancreatic, breast and prostate cancers).
- 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.

Probability of dying from cancer

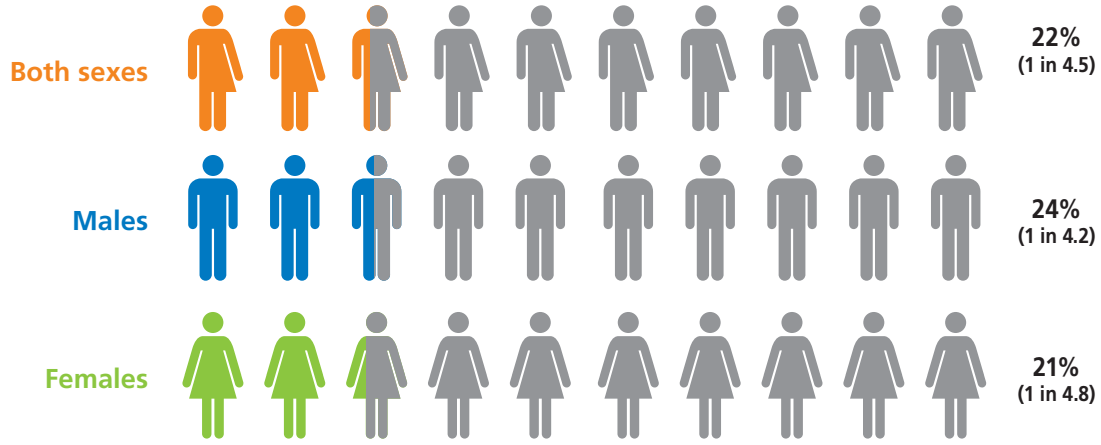
The probability of dying from a specific type of cancer depends on many factors, including the probability of developing that cancer, the treatments available and how the cancer responds to treatment. The estimated probabilities are for the general Canadian population and should not be interpreted as an individual's risk. These estimates are based on only the last year of available data (i.e., 2020 for this publication, excluding Nova Scotia and Quebec) and therefore may fluctuate from year to year and between publications.

- 22% of Canadians are expected to die from cancer (Figure 2.1).
- The probability of dying from cancer is higher for males (24%) than females (21%).

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

- Considering males and females together, Canadians are more likely to die from lung and bronchus (lung) cancer than any other type of cancer. An estimated 1 in 21 Canadians (4.8%) will die from lung cancer, followed by colorectal cancer (1 in 40; 2.5%) and pancreatic cancer (1 in 68; 1.5%).
- 1 in 30 (3.3%) males is expected to die from prostate cancer.
- 1 in 36 (2.8%) females is expected to die from breast cancer.

FIGURE 2.1 Lifetime probability of dying from cancer, Canada (excluding Quebec and Nova Scotia*), 2020



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

Projected cancer deaths in 2023

The cancer mortality data used for projections in this publication were from 1996 to 2020. These were the most recent data available when the analyses began. The data were used to project rates and deaths to 2023.

An estimated 86,700 Canadians are expected to die from cancer in 2023 (Table 2.2).

- It is expected that lung cancer will continue to be the leading cause of cancer death for both sexes, accounting for almost a quarter (24%) of all cancer deaths in Canada.
- Lung cancer is followed by colorectal cancer, which will account for 11% of all cancer deaths in Canada. Next is pancreatic cancer, which will account for 7% of Canada's cancer deaths.
- The five leading causes of cancer death (lung, colorectal, pancreatic, breast and prostate cancers) account for over half (53%) of all cancer deaths in Canada.

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

* Quebec and Nova Scotia are excluded in order to match the geographic exclusions applied in the estimation of the lifetime probability of developing cancer (Figure 1.1).

Note: The probability of dying from cancer is calculated based on age-, sex- and cause-specific mortality rates for Canada excluding Nova Scotia and Quebec in 2020. 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 2023.

- For each cancer type except breast and thyroid, a higher number of deaths is expected among males than females.
- More males (46,500) than females (40,200) are expected to die from cancer in 2023, with 54% of all cancer deaths expected to occur among males.
- The age-standardized mortality rate (ASMR) in males (212.3 per 100,000) is expected to be 37% higher than in females (154.6 per 100,000).

Figure 2.2 shows the expected distribution of cancer deaths in males and females in 2023.

- For males, lung cancer is expected to be the most common cause of cancer death, accounting for 23% of all cancer deaths. It is followed by colorectal cancer (11%) and prostate cancer (10%).
- For females, lung cancer is expected to be the leading cause of cancer death, accounting for 24% of all cancer deaths. It is followed by breast cancer (13%) and colorectal cancer (10%).
- Pancreatic cancer is expected to be the fourth most common cause of cancer death for each sex, accounting for 7% of all cancer deaths in both males and females.

FIGURE 2.2 Percent distribution of projected cancer deaths, by sex, Canada, 2023

Males
46,500
Deaths

Lung and bronchus	23.2%
Colorectal	11.2%
Prostate	10.5%
Pancreas	6.7%
Liver and intrahepatic bile duct*	4.7%
Esophagus	4.0%
Bladder	4.0%
Leukemia	3.9%
Non-Hodgkin lymphoma	3.9%
Head and neck	3.3%
Brain/CNS	3.1%
Stomach	2.7%
Kidney and renal pelvis	2.7%
Multiple myeloma	2.1%
Melanoma	1.8%
Soft tissue (including heart)	0.8%
Thyroid	0.3%
Hodgkin lymphoma	0.2%
Breast	0.1%
Testis	0.1%
All other cancers	10.8%

Females
40,200
Deaths

Lung and bronchus	24.4%
Breast	13.4%
Colorectal	10.2%
Pancreas	7.0%
Ovary	4.9%
Uterus (body, NOS)	3.9%
Leukemia	3.2%
Non-Hodgkin lymphoma	3.2%
Liver and intrahepatic bile duct*	3.2%
Brain/CNS	2.6%
Stomach	1.9%
Bladder	1.8%
Multiple myeloma	1.8%
Kidney and renal pelvis	1.6%
Head and neck	1.4%
Esophagus	1.4%
Melanoma	1.1%
Cervix	1.0%
Soft tissue (including heart)	0.7%
Thyroid	0.4%
Hodgkin lymphoma	0.1%
All other cancers	10.7%

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 2020 for all provinces and territories except Yukon, for which data were imputed for 2017 through 2020. Data were used to project cancer mortality to 2023.

Mortality by age

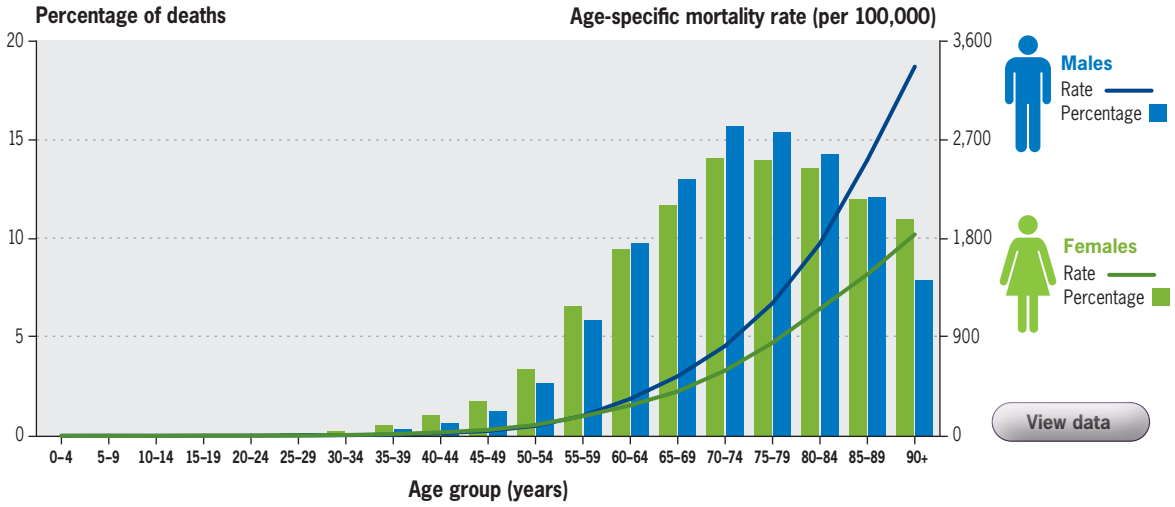
The number of cancer deaths increases dramatically with age (Table 2.3).

- More than 96% of cancer deaths are expected to occur in people 50 years of age and older, with more deaths expected at older ages. In fact, 67% of all cancer deaths are expected to occur in people 70 years of age or older.
- 44% of all cancer deaths will occur in people aged 50 to 74 years.
- 41% 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.
- 46% 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 those younger than 50 years of age.
- 93% of lung cancer deaths are expected to occur among Canadians 60 years of age and older. About half of all lung cancer deaths are expected in the age range proposed for lung cancer screening in Canada (aged 55 to 74 years with a 30 pack-year smoking history).[3]
- 89% of pancreatic cancer deaths are expected to occur among Canadians 60 years of age and older.
- 85% of prostate cancer deaths are expected to occur among Canadians 70 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 (ASMR) for all cancers, by age group and sex, Canada, 2018–2020

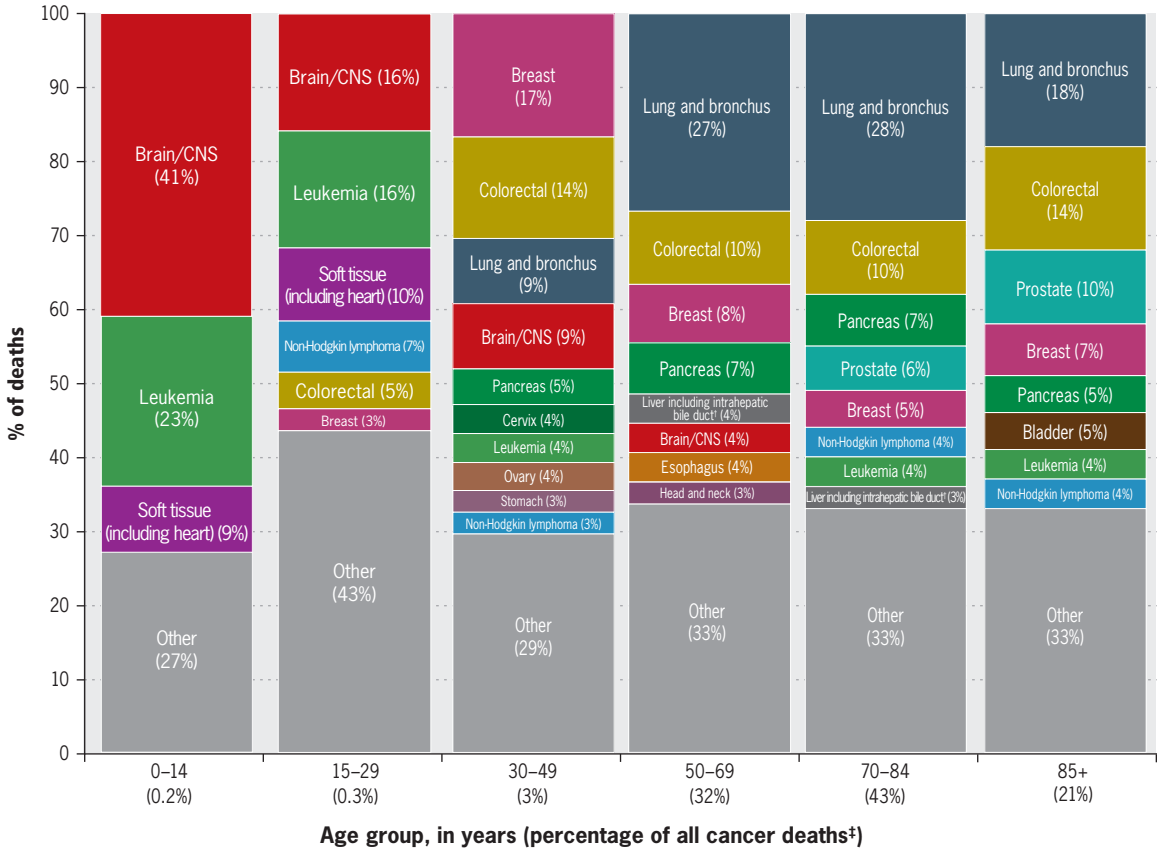


Analysis by: Centre for Population Health Data, Statistics Canada
Data source: Canadian Vital Statistics Death database at Statistics Canada

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 soft tissue (including heart) are the most common causes of cancer death. In the 0 to 14 years age group, these cancers make up about 73% of all cancer deaths, yet they comprise only 42% of all cancer deaths in the 15 to 29 years age group. A greater percentage of deaths in the older group were attributed to "adult" cancers (e.g., colorectal and breast).
- 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 (14%), lung (9%) and brain (9%) cancers are the next most common, accounting for another 32% of all cancer deaths in this age group.
- In all older age groups (50 years of age and older), lung cancer is by far the most common cause of cancer death, followed by colorectal cancer. Breast, pancreatic and prostate cancer deaths are also relatively common, with prostate cancer figuring more prominently with increasing age.

FIGURE 2.4 Distribution of cancer deaths for selected* cancers by age group, Canada, 2016–2020



CNS=central nervous system

*Selected cancers in each age group are based on unrounded values of at least 3%. As a result of subsequent rounding of these percentages, the sum of percentages for each age group may not sum to 100. In previous publications, the effective threshold for inclusion was 2.5% due to rounding prior to selection.

† Liver and intrahepatic bile duct 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*.

‡ The relative percentage is calculated based on the total number of cancer deaths over five years (2016–2020) 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 2023. 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.

The projected ASMR (Table 2.4) and the projected number of deaths (Table 2.5) by cancer type for each province and territory show that there are differences in mortality across Canada.

- 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 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.

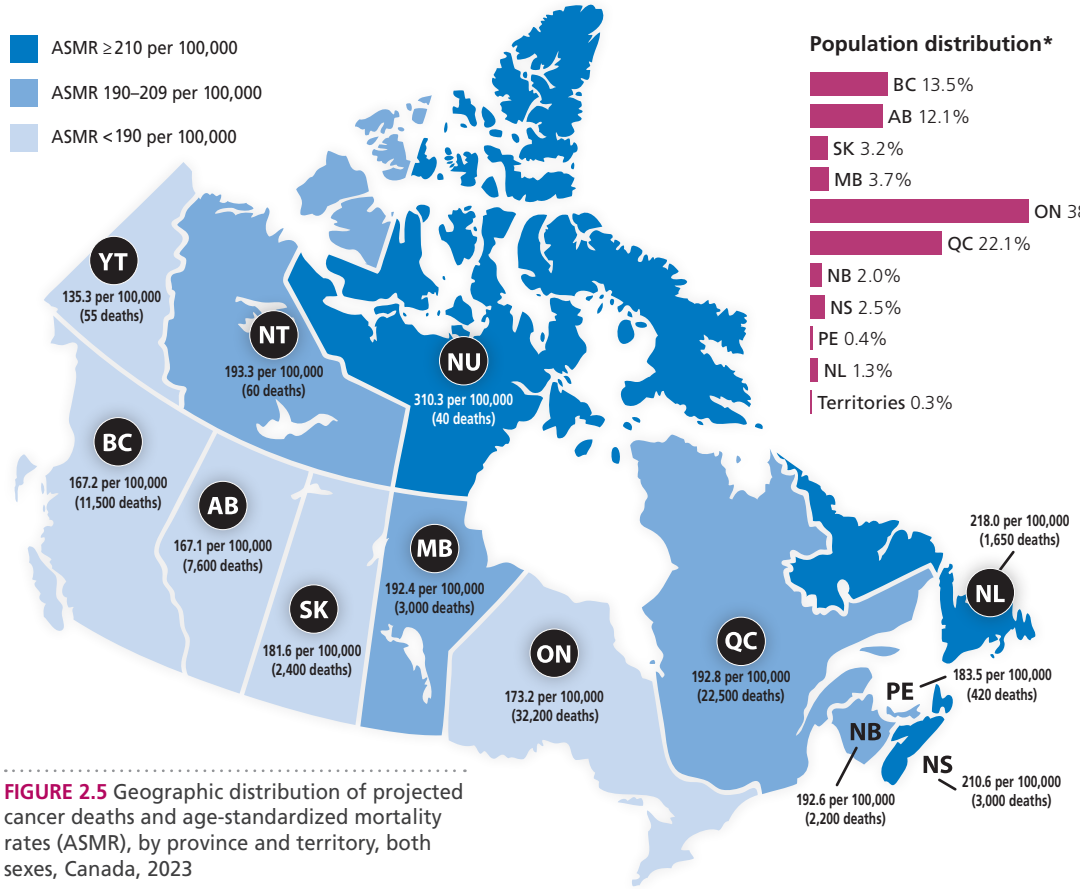


FIGURE 2.5 Geographic distribution of projected cancer deaths and age-standardized mortality rates (ASMR), by province and territory, both sexes, Canada, 2023

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

* Based on projected estimates of population size in 2023.

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

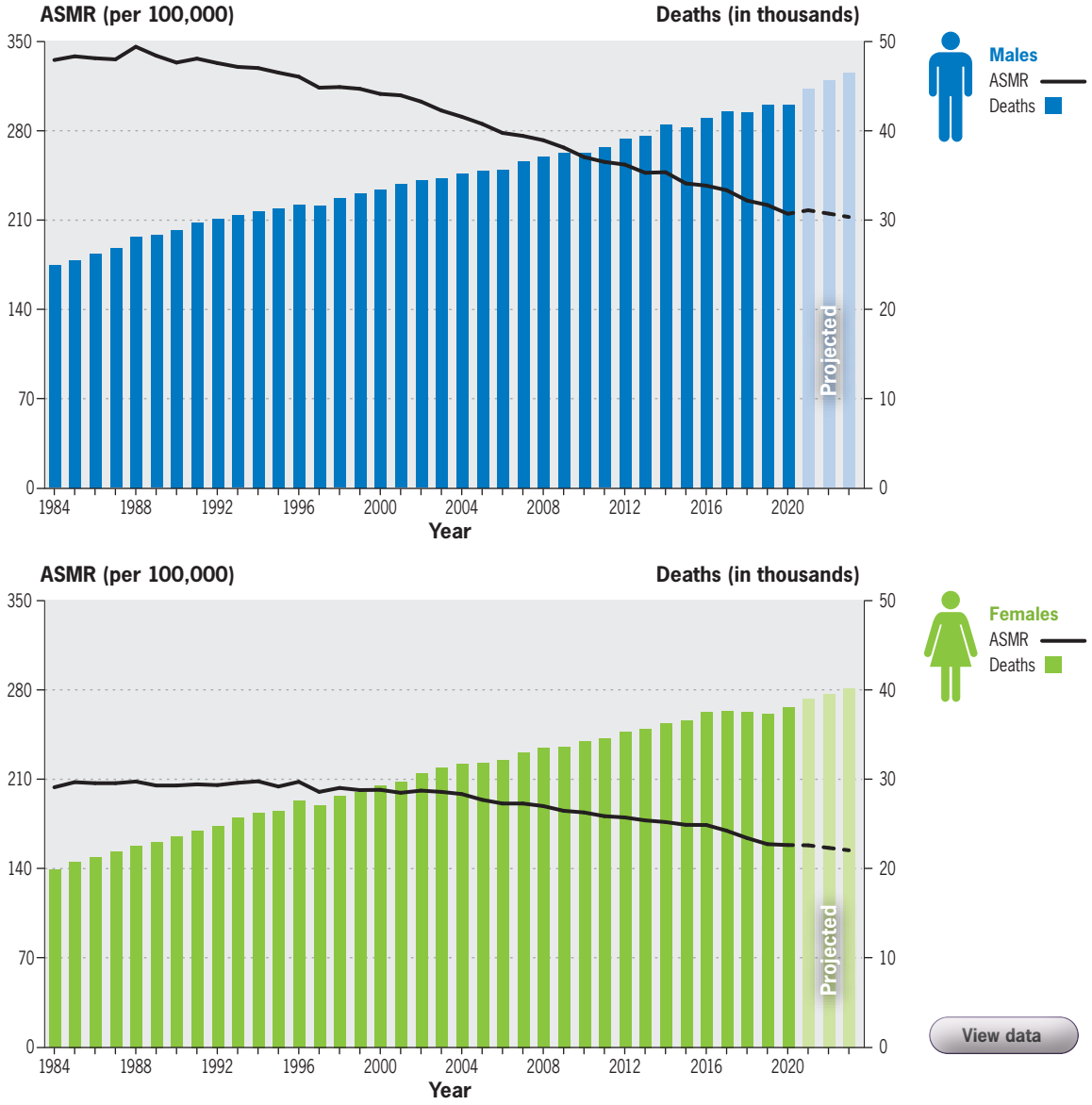
Monitoring mortality over time can help identify emerging trends, where progress has been made and where more needs to be done.

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

- From 1984 to 2023, mortality rates for all cancers combined decreased from 335.4 to an estimated 212.3 per 100,000 in males, and from 203.9 to an estimated 154.6 per 100,000 in females. Cancer death rates peaked in 1988 and have since decreased 39% in males and 26% in females.
- Over the same period, the number of cancer deaths has increased from 24,900 to an expected 46,500 in males, and from 19,900 to an expected 40,200 in females. This increase is due primarily to the growing and aging population in Canada.[6–8]

While the number of cancer deaths per year continues to increase, mortality rates have declined for many cancer types.

FIGURE 2.6 Deaths and age-standardized mortality rates (ASMR) for all cancers, Canada,* 1984–2023



* Actual mortality data were available to 2020 for all provinces and territories except Yukon, for which data were available to 2016 and imputed from 2017 to 2020. For further details, see *Appendix II: Data source and methods*.

Note: Rates are age-standardized to the 2011 Canadian standard population. Estimates for 2021–2023 were projected based on data up to 2020.

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

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.

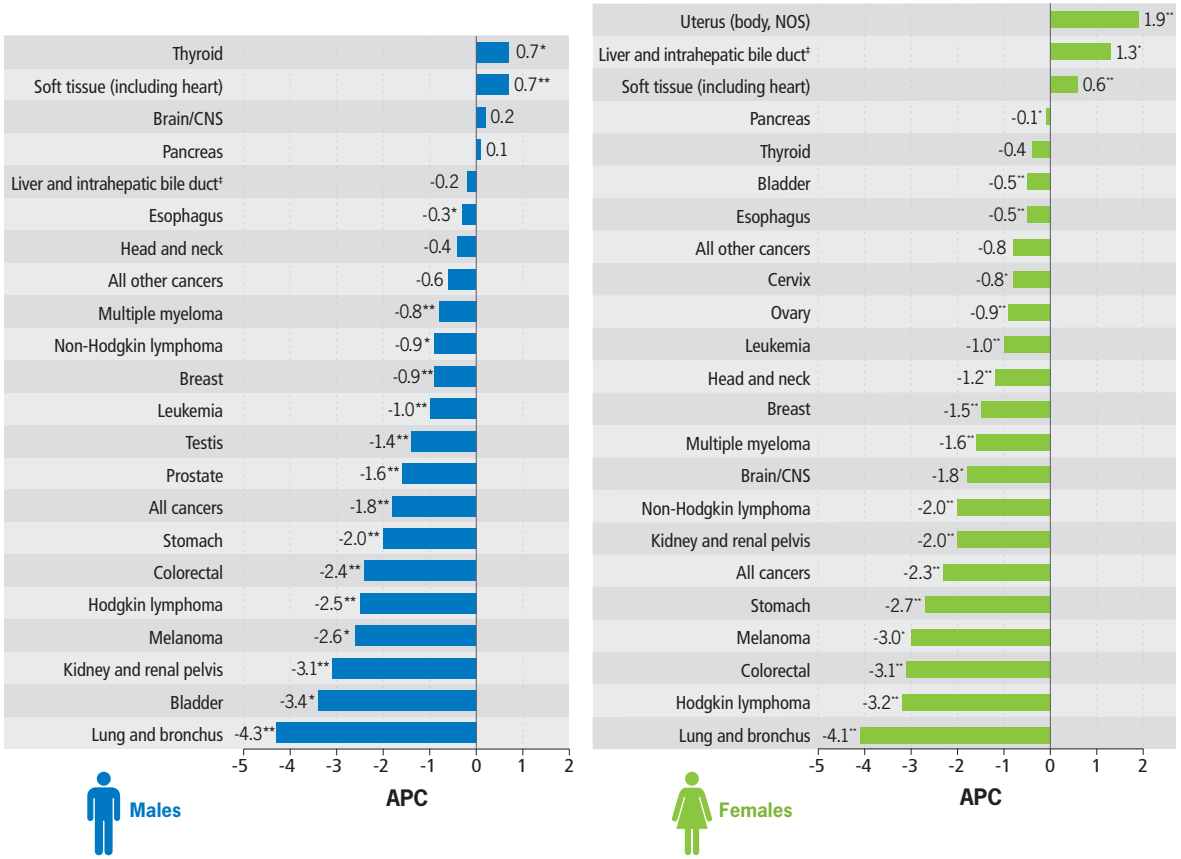
Statistical significance

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, 1984–2020



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 2020. Otherwise, the APC reflects the trend in rates over the entire period (1984–2020). For further details, see *Appendix II: Data sources and methods*.

‡ Liver and intrahepatic bile duct 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

Recent trends

Table 2.6 provides the complete picture of trends in cancer mortality rates between 1984 and 2020 for males and females, as measured by an annual percent change (APC). Table 2.7 draws out the most recent trends for each cancer. These recent trends are depicted in Figure 2.7.

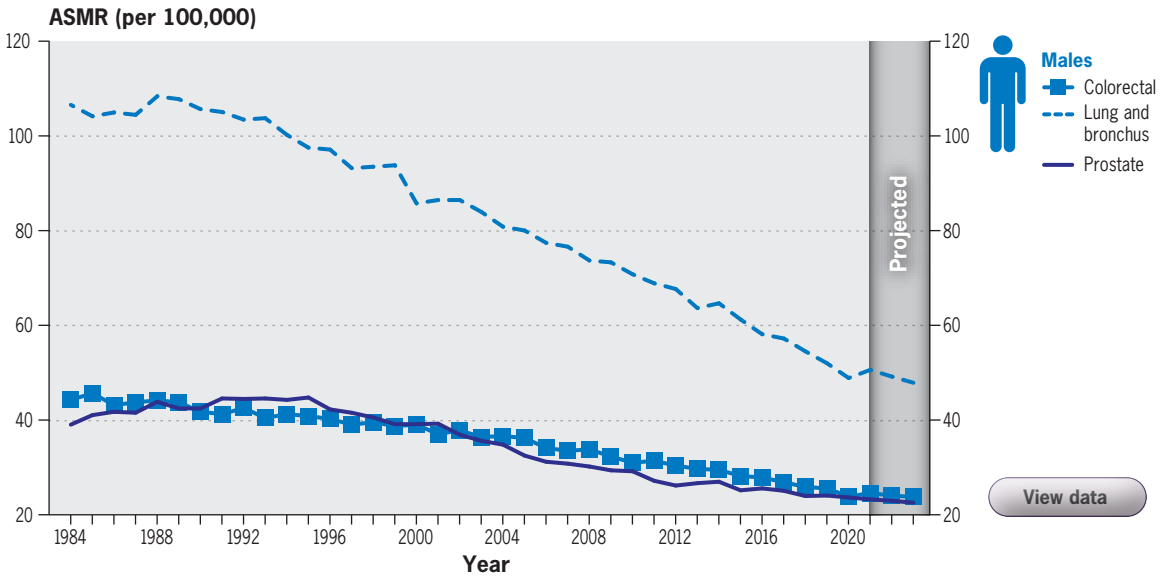
- In recent years, mortality rates have declined for two-thirds of the cancers reported.
- For both sexes and all cancers combined, mortality decreased at a rate of -2.2% per year since 2016.
- In males, the largest significant decreases were for the following cancer types: lung (-4.3% per year since 2014), bladder (-3.4% per year since 2016), kidney and renal pelvis (-3.1% per year since 2014), melanoma (-2.6% per year since 2013), Hodgkin lymphoma (-2.5% per year since 1996), colorectal (-2.4% per year since 2004) and stomach (-2.0% per year since 2012).
- In females, the largest significant decreases were for the following cancer types: lung (-4.1% per year since 2016), Hodgkin lymphoma (-3.2% per year since 1984), colorectal (-3.1% per year since 2014), melanoma (-3.0% per year since 2014), stomach (-2.7% per year since 1984), non-Hodgkin lymphoma (-2.0% per year since 1998) and kidney and renal pelvis (-2.0% per year since 2008).

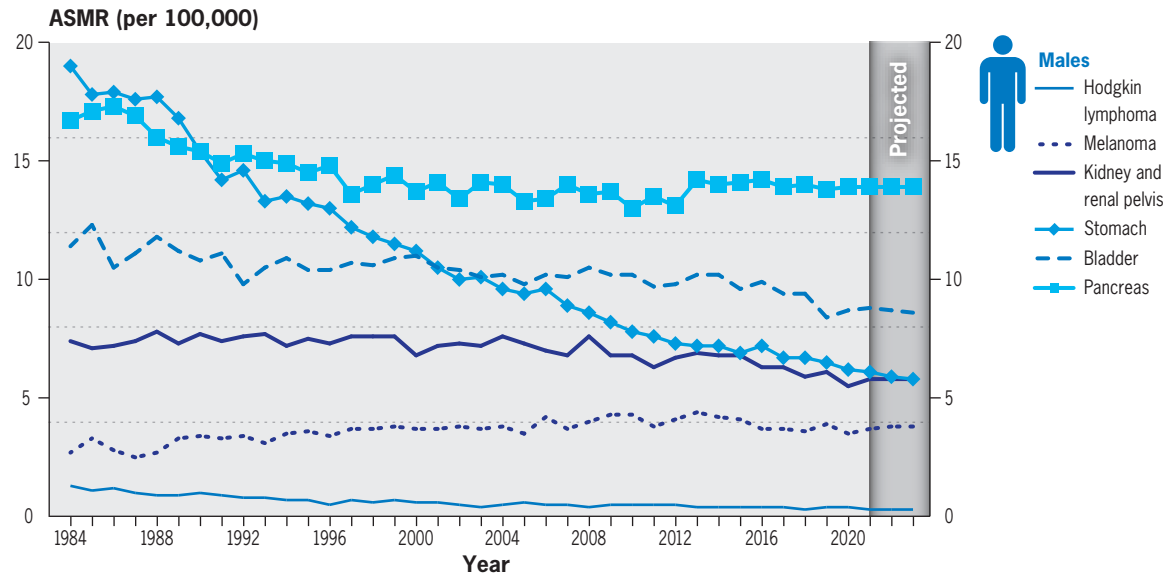
* Four most frequent causes of cancer death among males and cancers with a statistically significant change in mortality rate of at least 2% per year, as measured by the most recent annual percent change (see Table 2.7).

† Actual mortality data were available to 2020 for all provinces and territories except Yukon, for which data were available to 2016 and imputed from 2017 to 2020. For further details, see *Appendix II: Data sources and methods*.

Note: Rates are age-standardized to the 2011 Canadian standard population. Estimates for 2021–2023 were projected based on data up to 2020. The range of scales differs widely between the figures. The complete definition of the specific cancers included here can be found in Table A1.

FIGURE 2.8 Age-standardized mortality rates (ASMR) for selected* cancers, males, Canada,† 1984–2023





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

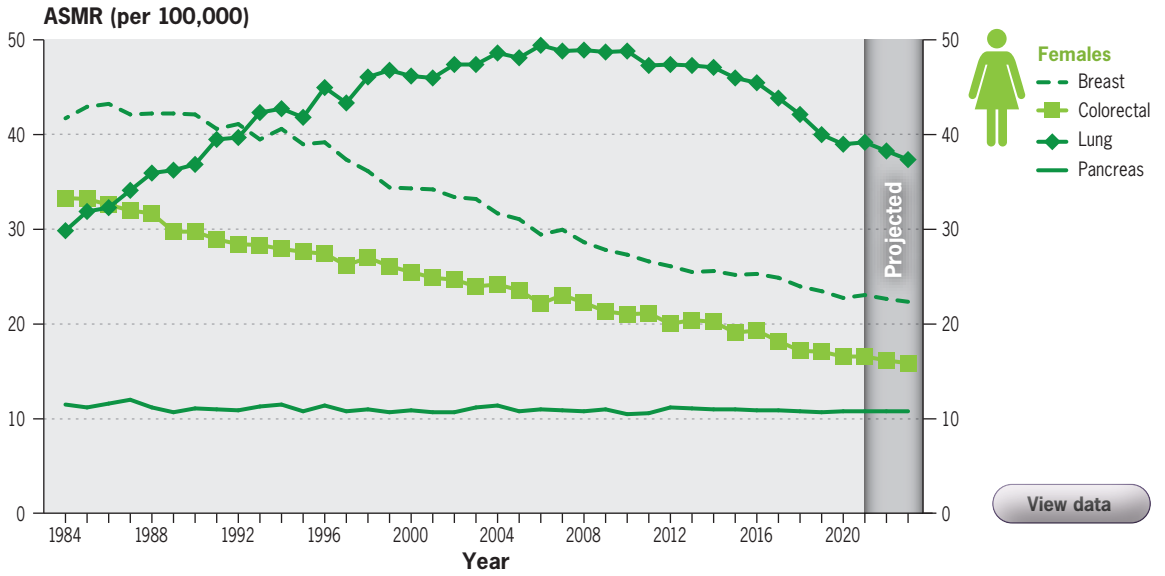
Long-term trends

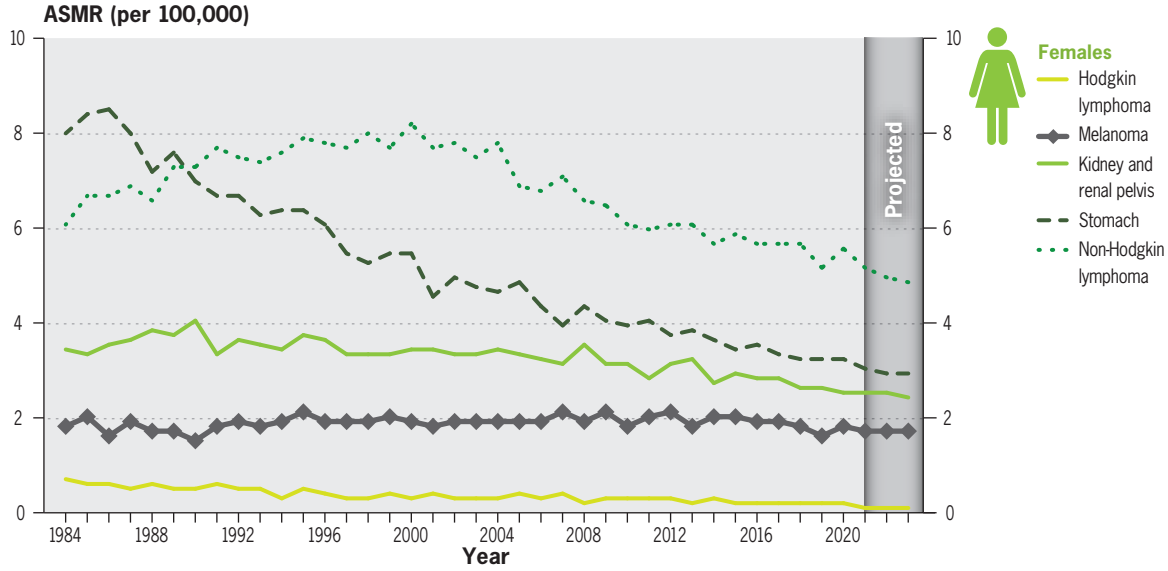
Longer-term trends provide additional context for understanding the success and challenges in reducing cancer mortality. Table 2.6 shows trends in mortality rates between 1984 and 2020 by cancer type.

- In males, the overall cancer mortality rate decreased -0.8% per year between 1988 and 2001. Since then, the rate of decline has doubled, with mortality decreasing -1.8% annually.
- In females, the overall cancer mortality rate has been decreasing since 1984. The rate of decline has been increasing over the years: -0.2 % per year between 1984 and 2002; -1.1% per year between 2002 and 2016; and -2.3 % per year since 2016.

Figures 2.8 and 2.9 show the ASMR over time (projected to 2023) 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, kidney and renal pelvis cancer, melanoma and stomach cancer for both sexes; bladder cancer in males; and non-Hodgkin lymphoma in females.

FIGURE 2.9 Age-standardized mortality rates (ASMR) for selected* cancers, females, Canada,† 1984–2023





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 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).

† Actual mortality data were available to 2020 for all provinces and territories except Yukon, for which data were available to 2016 and imputed from 2017 to 2020. 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 2020; estimates for 2021–2023 were projected based on data up to 2020. 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 contrast, the mortality rate continued to increase among females until 2006. While the initial decline in females was relatively modest (-0.8% between 2006 and 2016), the rate of decline for lung cancer mortality is now comparable between sexes, decreasing -4.3% per year in males and -4.1% per year in females. This represents the fastest decline in lung cancer mortality reported to date in Canada and the largest decline in cancer mortality across all cancer types. The pattern in lung cancer mortality largely mirrors that of lung cancer incidence, which in turn reflects patterns in 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] There is also concern that vaping and e-cigarette use may increase lung cancer risk and, thus, mortality. But we are presently lacking definitive data connecting vaping and e-cigarette use to lung cancer.[11]

Currently, about 70% of lung cancers are found at stage III or IV.[12–14] Less than 16% of people who are diagnosed at these late stages are expected to survive more than five years after their diagnosis.[15]

Lung cancer mortality is declining faster than any other cancer in Canada.

The recent recommendation to introduce screening programs for individuals at high risk is a positive step towards reducing future lung cancer mortality in Canada. The aim of the programs is to detect disease at an earlier stage when it may respond better to treatment.[16] This is a time of great optimism because innovations (including the ability to screen for the disease, minimally invasive surgery, targeted radiation therapy and new systemic therapies) are transforming all aspects of lung cancer care.

Colorectal cancer

The mortality rates for colorectal cancer have declined significantly for both sexes between 1984 and 2020. In males, the rate declined -1.0% per year until 2004 and -2.4% afterwards. In females, the rate initially declined -1.7% per year. But since 2014 the rate of decline has nearly doubled and mortality has decreased -3.1% per year. Similar declines in mortality have been observed in other high-income countries worldwide and have been attributed in part to screening interventions.[17] Colorectal cancer screening programs can find and remove precancerous polyps, which reduces incidence and helps detect cancer early, when treatment is most effective. Given the strong connection between stage at diagnosis and survival for colorectal cancer,[15,18,19] implementation of screening programs for early detection and improvements in treatment have contributed to the more rapid rate of decline observed in colorectal cancer mortality in recent years.[20] In some countries, such as Australia, New Zealand and several European counties, the declines in mortality may also reflect the relative reduction in risk and incidence. This is due to changing prevalence and distribution of key risk factors, including alcohol consumption, tobacco use and physical inactivity.[17]

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 2023. This is in part because the mortality rate for pancreatic cancer has stayed largely the same over the past 35 years, whereas the rates of more common cancers, including lung, breast, prostate and colorectal, have declined considerably. For both sexes combined, there was a marginal decrease in pancreatic cancer mortality rates between 1984 and 1999 (-0.9% per year) and no significant change since 2000 (0.0%). The mortality rates for pancreatic cancer are almost as high as the incidence rates for this cancer due to the low survival.[21–24] Between countries, trends in pancreatic cancer mortality rates varied in the past decade but have typically increased over time.[25,26] Countries with higher incidence and mortality are more likely to have higher prevalence of tobacco smoking, alcohol consumption, physical inactivity, obesity, hypertension and high cholesterol.[26]

Breast cancer (female)

The breast cancer mortality rate in females has been declining since the 1980s. After its peak in the late 1980s, the ASMR has fallen 47%, from 41.7 deaths per 100,000 in 1989 to a projected rate of 22.1 deaths per 100,000 in 2023. The downward trend was estimated at -2.4% per year between 1994 and 2011 and -1.5% per year between 2011 and 2020. The decline in breast cancer mortality in females has been largely attributed to a combination of increased mammography screening[27] and the use of more effective and multidisciplinary therapies following breast cancer diagnosis.[28,29] A similar decline has been observed in the US where the breast cancer death rate decreased by -1.3% per year between 2011 and 2020.[30] However, breast cancer

continues to be an important health concern internationally. Many countries report increases in incidence, prevalence and mortality rates.[31,32] In Canada, a large number of people continue to be diagnosed with breast cancer and die from the disease. In females, breast cancer is the second leading cause of cancer death after lung cancer and less than half (46%) of these deaths occurring in females aged 50 to 74 years.

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 [33–35] and advances in radiation therapy.[36] 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.[37,38] The Canadian Task Force on Preventive Health Care does not recommend the use of the PSA test for screening based on the current evidence.[39] A 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.[40]

Bladder

In males, the bladder cancer mortality rate had historically decreased marginally (-0.4%). However, since 2016, the rate of decline has been rapid at -3.4% per year. In females, the decrease in mortality rate has been stable at -0.5% per year since 1984. Similar patterns of decline have been reported in the UK,[41] 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. These include countries in Central and South America, some central, southern and eastern European countries and the Baltic countries.[42] Tobacco smoking is the main risk factor for bladder cancer, accounting for about half of all bladder cancer cases in some populations. So it is not surprising to see trends in bladder cancer incidence (see Table 1.6) and mortality partially mirroring smoking histories in Canada and elsewhere.[42]

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 2023 are expected to be about 77% and 86% lower than in 1984 for males and females, respectively. The latest studies of global mortality for Hodgkin lymphoma reported similar downward trends,[43,44] 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.[45,46]

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 -3.1% annual decline in male mortality rate since 2014 and a -2.0% annual decline in female mortality since 2008. Similar magnitude declines in kidney cancer mortality have been reported in the US[47] and globally, in high sociodemographic index regions.[48] 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.[47–50]

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 2014, and it has since declined -3.0% per year. Similar patterns have been reported in the US[51] and Europe.[52] The global declines observed in melanoma skin cancer mortality have largely been attributed to the introduction of improved therapies and early diagnosis, as well as the implementation of awareness programs.[53] However, it is important to note that, while the mortality rate for melanoma skin cancer continues to decline in Canada, a recent study shows important disparities in rates across the country. It notes that Nova Scotia and Prince Edward Island are the most impacted by melanoma with higher incidence and mortality rates than the rest of the country.[54]

Non-Hodgkin lymphoma

Non-Hodgkin lymphoma mortality rates increased prior to 2000 but have declined subsequently. 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 1998 at -2.0% per year. Trends in mortality rates vary considerably around the world, though declines are being observed in high sociodemographic index areas such as North America, western Europe and Australia.[55] The downward trend in mortality likely reflects continued improvements in treatment, such as immunotherapy (e.g., rituximab).[56] In addition,

the introduction of highly active antiretroviral therapy (HAART) in the late 1990s[57] for the human immunodeficiency virus (HIV) resulted in a decline of the aggressive forms of non-Hodgkin lymphoma attributable to HIV infection.

Stomach cancer

Stomach cancer mortality rates have been declining rapidly in both males and females since 1984. In males, the rate declined -3.3% per year until 2012, and then -2.0% afterwards. In females, the rate of decline has been constant since 1984 at -2.7% per year. In 2023, the mortality rate for both males and females is expected to be about three times lower relative to 1984. The trends in mortality rates have largely mirrored those in incidence. This pattern was reported in several regions of the world.[58,59] 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.[58–60]

All cancers combined

The mortality rate for all cancers combined (i.e., overall), has declined significantly over the past 35 years in Canada. Since 2016, the decline has been more rapid: the rate decreased -1.8% per year in males and -2.3% in females. In 2023, overall ASMR is projected to be 37% and 24% lower than it was in 1984 for males and females, respectively. The trend appears to be driven by lung and colorectal cancer mortality rates, for which declines steepened in recent years largely due to earlier detection and advances in treatments. A similar decline in mortality rate is reported in the US. There, death rates for all cancers combined dropped 32% from 1991 to 2019, translating to an estimated 3.5 million fewer cancer deaths than if mortality had remained at peak rates.[61] The decline in mortality rates observed in Canada, the US and several other countries[62] is a good indicator that some progress has been achieved in global cancer control.

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 2.6 also shows the average annual percent change (AAPC) in cancers between 1984 and 2019. By summarizing the various trends over time, the AAPC enables the comparison of changes in mortality across cancers for the same defined time period.

The AAPC also provides a measure of the overall change in a cancer over a period of time. 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.

- Since 1984, the greatest decrease in AAPC for both sexes combined were for Hodgkin lymphoma and stomach cancer, while the greatest increase was for liver and intrahepatic bile duct cancer.
- 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%).
- In Canada, the mortality rate for all cancers combined has decreased by an average of -1.0% per year since 1984.
- While the mortality rate for lung cancer in females increased marginally (AAPC=0.7%) between 1984 and 2020, it has decreased rapidly since 2016 (APC=-4.1%).

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.[12,15] 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[63] 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 uterine cancer in females, 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. These include:

- 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 and Nova Scotia*), 2020

	Lifetime probability of dying from cancer					
	%			One in:		
	Both sexes	Males	Females	Both sexes	Males	Females
All cancers	**22.4**	**24.0**	**21.0**	**4.5**	**4.2**	**4.8**
Lung and bronchus	4.8	5.0	4.8	21	20	21
Colorectal	2.5	2.6	2.3	40	38	43
Pancreas	1.5	1.5	1.5	68	67	69
Breast	1.4	0.0	2.8	71	2,760	36
Prostate	—	3.3	—	—	30	—
Leukemia	0.9	1.0	0.7	116	101	137
Non-Hodgkin lymphoma	0.9	1.0	0.8	111	100	123
Liver and intrahepatic bile duct†	0.8	1.0	0.6	126	103	162
Bladder	0.7	1.1	0.4	138	92	258
Esophagus	0.6	0.9	0.3	166	110	336
Brain/CNS	0.6	0.7	0.5	178	153	211
Head and neck	0.5	0.7	0.3	189	137	302
Kidney and renal pelvis	0.5	0.6	0.3	210	164	290
Ovary	—	—	1.0	—	—	104
Stomach	0.5	0.7	0.4	184	149	239
Multiple myeloma	0.4	0.5	0.4	230	200	270
Uterus (body, NOS)	—	—	0.7	—	—	136
Melanoma	0.3	0.4	0.2	306	235	433
Soft tissue (including heart)	0.2	0.2	0.1	647	599	704
Cervix	—	—	0.2	—	—	511
Thyroid	0.1	0.1	0.1	1,296	1,263	1,328
Hodgkin lymphoma	0.0	0.0	0.0	3,342	2,648	4,485
Testis	—	0.0	—	—	5,295	—

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

* Quebec and Nova Scotia are excluded in order to match the geographic exclusions applied in the estimation of the lifetime probability of developing cancer (Table 1.1). Mortality data from Yukon was imputed.

† Liver and intrahepatic bile duct 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 Nova Scotia and Quebec in 2020. 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. The ordering of cancer types reflects the ordering of projected death counts in 2023 (Table 2.2) for both sexes combined. "One in" estimates are based on probabilities rounded to two decimal places.

Analysis by: Centre for Population Health Data, Statistics 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, 2023

	Deaths (2023 estimates)			Deaths per 100,000		
	Total*	Males	Females	Both sexes	Males	Females
All cancers	**86,700**	**46,500**	**40,200**	**179.7**	**212.3**	**154.6**
Lung and bronchus	20,600	10,800	9,800	41.8	48.2	36.9
Colorectal	9,300	5,200	4,100	19.6	24.2	15.7
Pancreas	5,900	3,100	2,800	12.2	13.9	10.7
Breast	5,500	55	5,400	11.9	0.2	22.1
Prostate	4,900	4,900	—	9.8	23.0	—
Liver and intrahepatic bile duct†	3,500	2,200	1,300	7.2	9.9	4.9
Leukemia	3,100	1,800	1,300	6.4	8.3	4.9
Non-Hodgkin lymphoma	3,100	1,800	1,300	6.3	8.2	4.8
Bladder	2,600	1,850	720	5.2	8.6	2.6
Brain/CNS	2,500	1,450	1,050	5.6	6.8	4.5
Esophagus	2,400	1,850	550	5.0	8.3	2.1
Head and neck	2,100	1,550	580	4.4	7.0	2.2
Stomach	2,000	1,250	750	4.2	5.8	2.9
Ovary	1,950	—	1,950	4.2	—	7.9
Kidney and renal pelvis	1,900	1,250	650	4.0	5.8	2.4
Multiple myeloma	1,700	990	710	3.5	4.5	2.6
Uterus (body, NOS)	1,550	—	1,550	3.2	—	6.0
Melanoma	1,250	820	430	2.7	3.8	1.7
Soft tissue (including heart)	640	350	290	1.4	1.7	1.2
Cervix	400	—	400	1.0	—	1.9
Thyroid	270	120	150	0.6	0.5	0.6
Hodgkin lymphoma	110	70	35	0.2	0.3	0.1
Testis	30	30	—	0.1	0.2	—
All other cancers	9,300	5,000	4,300	19.2	23.2	15.9

— 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 and intrahepatic bile duct 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, 2023

Age	All cancers			Lung and bronchus			Colorectal		
	Both sexes*	Males	Females	Both sexes*	Males	Females	Both sexes*	Males	Females
All ages	**86,700**	**46,500**	**40,200**	**20,600**	**10,800**	**9,800**	**9,300**	**5,200**	**4,100**
0–14	100	60	40	0	0	0	0	0	0
15–29	220	130	95	5	5	0	5	5	—
30–39	670	290	380	40	20	20	95	55	40
40–49	2,000	900	1,150	240	120	120	290	170	120
50–59	6,600	3,300	3,300	1,200	650	570	800	470	330
60–69	18,700	10,200	8,500	5,200	2,700	2,500	1,750	1,100	660
70–79	27,500	15,300	12,200	7,600	4,000	3,500	2,600	1,550	1,050
80–89	22,600	12,400	10,300	5,100	2,700	2,400	2,600	1,350	1,200
90+	8,200	3,900	4,400	1,250	600	660	1,200	470	730
0–19	150	90	60	0	0	0	0	0	0
50–74	38,400	20,900	17,500	10,000	5,300	4,800	3,800	2,300	1,450
65+	69,200	37,600	31,600	17,000	9,000	8,100	7,400	4,000	3,400

Age	Pancreas			Breast	Prostate
	Both sexes*	Males	Females	Females	Males
All ages	**5,900**	**3,100**	**2,800**	**5,400**	**4,900**
0–14	0	0	0	0	0
15–29	0	0	0	5	0
30–39	15	5	5	130	0
40–49	110	60	45	340	5
50–59	500	300	210	700	95
60–69	1,400	810	610	1,150	620
70–79	2,000	1,050	920	1,350	1,400
80–89	1,450	690	760	1,150	1,900
90+	420	160	270	620	880
0–19	0	0	0	0	0
50–74	2,900	1,650	1,250	2,500	1,300
65+	4,700	2,400	2,300	3,700	4,600

— 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,* 2023

	CA	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL
Males											
All cancers	**212.3**	**199.5**	**195.5**	**211.5**	**223.7**	**206.4**	**224.6**	**228.7**	**253.0**	**227.5**	**257.0**
Lung and bronchus	48.2	38.8	40.2	43.9	46.7	44.0	60.2	58.4	60.7	57.7	60.7
Colorectal	24.2	21.0	22.6	26.8	26.6	21.8	27.1	26.5	30.9	27.8	45.2
Prostate	23.0	25.0	24.4	27.9	29.7	22.3	20.3	23.3	28.1	23.9	25.3
Pancreas	13.9	14.0	13.4	14.0	13.8	14.0	13.7	16.0	14.6	13.1	12.5
Liver and intrahepatic bile duct†	9.9	11.2	9.6	8.5	10.2	10.2	9.4	7.8	8.3	10.4	9.2
Esophagus	8.3	9.4	7.1	10.2	9.2	8.5	7.0	9.9	12.0	12.1	8.5
Bladder	8.6	8.2	6.7	9.5	10.6	8.0	9.7	10.2	10.7	8.1	8.6
Leukemia	8.3	7.7	8.1	10.7	9.3	8.1	8.6	9.5	9.9	7.9	7.3
Non-Hodgkin lymphoma	8.2	8.7	7.8	7.8	7.6	8.1	8.1	8.7	9.3	8.3	9.9
Head and neck	7.0	7.2	5.9	6.1	5.3	7.1	7.2	6.4	8.2	8.1	6.3
Brain/CNS	6.8	7.1	6.6	5.1	6.0	6.8	7.3	6.8	7.5	6.7	7.5
Stomach	5.8	4.5	4.8	4.6	4.8	6.3	6.2	5.6	5.7	5.3	9.7
Kidney and renal pelvis	5.8	6.1	4.9	7.2	7.3	4.9	6.1	7.9	8.4	9.0	9.8
Multiple myeloma	4.5	4.6	4.0	4.7	5.1	4.3	4.8	4.9	4.8	6.1	4.9
Melanoma	3.8	3.2	3.4	2.6	2.8	4.8	3.0	2.9	5.1	6.9	3.2
Soft tissue (including heart)	1.7	1.5	1.6	1.6	1.6	1.8	1.7	1.6	2.0	—	1.9
Thyroid	0.5	0.7	0.6	0.7	0.7	0.6	0.5	0.6	0.8	0.4	—
Hodgkin lymphoma	0.3	0.3	0.3	—	0.4	0.4	0.4	—	0.5	0.2	—
Breast	0.2	0.3	0.3	—	—	0.3	0.3	0.6	0.5	—	—
Testis	0.2	0.2	—	—	—	0.2	0.2	—	—	0.0	—
Females											
All cancers	**154.6**	**141.0**	**145.9**	**158.3**	**168.8**	**148.2**	**168.4**	**165.0**	**177.6**	**148.1**	**186.5**
Lung and bronchus	36.9	31.8	36.1	40.1	40.1	32.3	44.3	42.4	47.4	42.0	43.2
Breast	22.1	19.3	20.9	24.3	22.6	22.1	23.8	20.5	24.8	18.1	24.3
Colorectal	15.7	12.9	14.4	16.5	18.2	14.0	18.2	18.2	20.9	17.4	28.3
Pancreas	10.7	11.3	10.4	10.1	11.1	10.2	11.4	11.3	10.4	9.2	10.1
Ovary	7.9	8.7	7.4	7.5	8.8	7.7	7.8	7.4	8.7	9.1	8.8
Uterus (body, NOS)	6.0	5.1	6.1	5.6	6.7	6.3	5.9	5.5	6.9	4.7	5.7
Leukemia	4.9	4.8	4.0	4.9	5.5	4.9	5.4	5.3	5.1	4.4	5.1
Non-Hodgkin lymphoma	4.8	4.7	4.4	5.1	5.8	4.8	4.8	5.7	6.2	4.5	6.0
Liver and intrahepatic bile duct†	4.9	4.2	4.9	5.0	5.9	4.9	5.3	5.8	4.4	4.1	5.2
Brain/CNS	4.5	4.3	4.1	4.1	4.3	4.3	5.1	4.3	4.2	4.2	5.6
Stomach	2.9	2.5	2.6	2.3	2.5	3.0	3.2	3.4	2.3	2.5	4.4
Bladder	2.6	2.8	2.0	2.8	2.7	2.4	3.1	2.6	2.7	2.6	2.7
Multiple myeloma	2.6	2.5	2.4	2.9	3.2	2.5	2.8	2.9	3.1	2.8	3.1
Kidney and renal pelvis	2.4	2.2	2.2	3.1	3.3	2.1	2.9	3.6	3.6	4.1	4.4
Head and neck	2.2	2.4	2.1	1.6	2.2	2.2	2.5	2.2	2.3	2.8	2.4
Esophagus	2.1	2.7	1.9	2.2	2.2	2.1	1.8	2.4	2.7	3.3	2.0
Melanoma	1.7	1.5	1.6	1.6	1.4	1.8	1.8	2.2	2.3	3.6	1.4
Cervix	1.9	1.9	2.0	2.7	2.0	1.8	1.6	2.3	2.1	2.8	2.8
Soft tissue (including heart)	1.2	1.0	1.5	1.2	1.4	1.3	1.2	1.5	1.3	—	1.2
Thyroid	0.6	0.6	0.7	0.5	0.6	0.6	0.5	0.5	0.6	0.2	0.7
Hodgkin lymphoma	0.1	0.2	0.2	—	—	0.2	0.2	—	—	0.4	0.1

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

* Rates for Canada are based on provincial and territorial estimates. Territories are not listed due to small numbers.

† Liver and intrahepatic bile duct 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,* 2023

	CA	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL
Males											
All cancers	**46,500**	**6,300**	**4,100**	**1,300**	**1,550**	**17,200**	**12,000**	**1,200**	**1,600**	**230**	**900**
Lung and bronchus	10,800	1,250	850	270	340	3,800	3,300	320	400	60	230
Colorectal	5,200	650	470	170	180	1,800	1,400	140	200	30	160
Prostate	4,900	780	470	170	200	1,850	1,050	120	170	25	80
Pancreas	3,100	450	290	85	100	1,200	740	85	95	15	45
Liver and intrahepatic bile duct‡	2,200	370	210	55	75	870	510	40	55	10	35
Esophagus	1,850	300	160	65	65	720	380	50	75	10	30
Bladder	1,850	260	130	55	70	660	510	55	65	10	30
Leukemia	1,800	240	160	65	65	670	460	50	60	10	25
Non-Hodgkin lymphoma	1,800	280	160	45	50	670	430	45	55	10	35
Head and neck	1,550	230	130	40	35	600	380	35	50	10	25
Brain/CNS	1,450	210	150	30	40	550	380	35	45	5	25
Stomach	1,250	140	100	30	35	520	330	30	35	5	35
Kidney and renal pelvis	1,250	190	100	45	50	410	320	40	55	10	35
Multiple myeloma	990	150	80	30	35	360	260	25	30	5	20
Melanoma	820	100	70	15	20	400	160	15	30	5	10
Soft tissue (including heart)	350	45	35	10	10	150	85	5	10	—	5
Thyroid	120	20	15	5	5	50	30	5	5	—	—
Hodgkin lymphoma	70	10	5	—	5	30	20	—	5	—	—
Breast	55	10	5	—	—	25	15	5	5	—	—
Testis	30	5	—	—	—	20	10	—	—	—	—
Females											
All cancers	**40,200**	**5,200**	**3,600**	**1,150**	**1,400**	**15,000**	**10,500**	**1,050**	**1,350**	**180**	**750**
Lung and bronchus	9,800	1,200	890	290	340	3,300	2,800	270	370	50	180
Breast	5,400	680	510	180	180	2,100	1,400	120	180	20	90
Colorectal	4,100	480	360	120	160	1,450	1,150	120	160	20	110
Pancreas	2,800	420	260	75	95	1,050	720	70	80	10	40
Ovary	1,950	310	180	50	70	740	470	45	65	10	35
Uterus (body, NOS)	1,550	190	150	40	55	630	360	35	50	5	25
Leukemia	1,300	180	100	35	50	500	340	35	40	5	20
Non-Hodgkin lymphoma	1,300	180	110	35	50	490	310	35	50	5	25
Liver and intrahepatic bile duct‡	1,300	150	120	35	50	500	340	35	30	5	20
Brain/CNS	1,050	140	95	25	35	410	290	25	30	5	20
Stomach	750	90	65	15	20	300	210	20	20	5	20
Bladder	720	110	50	20	25	260	210	15	20	5	10
Multiple myeloma	710	95	60	20	25	260	180	20	25	5	15
Kidney and renal pelvis	650	80	55	20	30	220	180	25	30	5	15
Head and neck	580	85	50	10	20	220	150	15	20	5	10
Esophagus	550	100	45	15	20	220	110	15	20	5	10
Melanoma	430	50	40	10	10	180	110	10	15	5	5
Cervix	400	60	45	15	15	150	80	10	15	5	10
Soft tissue (including heart)	290	35	35	10	10	120	65	10	10	—	5
Thyroid	150	25	20	5	5	60	30	5	5	—	5
Hodgkin lymphoma	35	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 and intrahepatic bile duct 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, 1984–2020

	Both sexes			Males			Females		
	Period	APC* (95% CL)	AAPC* (95% CL), 1984–2020	Period	APC* (95% CL)	AAPC* (95% CL), 1984–2020	Period	APC* (95% CL)	AAPC* (95% CL), 1984–2020
All cancers	**1984–1992**	**-0.1 (-0.3 , 0.2)**	**-1.0 (-1.1 , -0.9)**	**1984–1988**	**0.6 (-0.2 , 1.5)**	**-1.2 (-1.3 , -1.1)**	**1984–2002**	**-0.2 (-0.3 , -0.1)**	**-0.8 (-0.9 , -0.7)**
	1992–2002	**-0.7 (-0.9 , -0.5)**		**1988–2001**	**-0.8 (-1.0 , -0.7)**		**2002–2016**	**-1.1 (-1.2 , -1.0)**	
	2002–2016	**-1.3 (-1.4 , -1.2)**		**2001–2020**	**-1.8 (-1.8 , -1.7)**		**2016–2020**	**-2.3 (-3.0 , -1.6)**	
	2016–2020	**-2.2 (-2.7 , -1.7)**							
Lung and bronchus	1984–1992	1.0 (0.6 , 1.5)	-1.0 (-1.2 , -0.8)	1984–1992	0.0 (-0.5 , 0.6)	–2.1 (–2.3 , –1.9)	1984–1993	3.7 (3.2 , 4.3)	0.7 (0.5 , 0.9)
	1992–2007	-0.8 (-0.9 , -0.6)		1992–2014	-2.2 (-2.3 , -2.1)		1993–2006	1.3 (1.0 , 1.5)	
	2007–2015	-1.7 (-2.1 , -1.2)		2014–2020	-4.3 (-5.0 , -3.6)		2006–2016	-0.8 (-1.1 , -0.4)	
	2015–2020	-3.8 (-4.5 , -3.1)					2016–2020	-4.1 (-5.3 , -3.0)	
Colorectal	1984–2004	-1.3 (-1.4 , -1.2)	-1.8 (-1.9 , -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 , -1.8)
	2004–2016	-2.0 (-2.2 , -1.8)		2004–2020	-2.4 (-2.6 , -2.2)		2014–2020	-3.1 (-3.9 , -2.3)	
	2016–2020	-3.4 (-4.4 , -2.3)							
Pancreas	1984–1999	-0.9 (-1.2 , -0.6)	-0.3 (-0.5 , -0.2)	1984–2000	-1.4 (-1.7 , -1.1)	-0.6 (-0.7 , -0.4)	1984–2020	-0.1 (-0.2 , -0.0)	-0.1 (-0.2 , -0.0)
	1999–2020	0.0 (-0.1 , 0.2)		2000–2020	0.1 (-0.1 , 0.3)				
Breast	1984–1994	-0.6 (-1.0 , -0.2)	-1.8 (-1.9 , -1.6)	1984–2020	-0.9 (-1.4 , -0.5)	-0.9 (-1.4 , -0.5)	1984–1994	-0.7 (-1.1 , -0.3)	-1.7 (-1.9 , -1.5)
	1994–2012	-2.4 (-2.6 , -2.3)					1994–2011	-2.4 (-2.6 , -2.2)	
	2012–2020	-1.7 (-2.2 , -1.2)					2011–2020	-1.5 (-2.0 , -1.1)	
Prostate				1984–1994	1.3 (0.8 , 1.8)	-1.4 (-1.6 , -1.2)			
				1994–2012	-2.8 (-3.0 , -2.6)				
				2012–2020	-1.6 (-2.1 , -1.0)				
Liver and intrahepatic bile duct†	1984–1988	4.9 (0.2 , 9.8)	3.1 (2.3 , 4.0)	1984–1992	0.1 (-2.2 , 2.4)	2.6 (2.0 , 3.2)	1984–1988	7.3 (1.2 , 13.7)	3.4 (2.3 , 4.4)
	1988–1993	-1.1 (-5.1 , 3.1)		1992–2016	4.0 (3.7 , 4.3)		1988–1993	-3.0 (-7.9 , 2.2)	
	1993–2008	3.9 (3.4 , 4.4)		2016–2020	-0.2 (-2.8 , 2.5)		1993–2008	4.2 (3.6 , 4.8)	
	2008–2013	6.4 (4.0 , 8.8)					2008–2013	7.3 (4.3 , 10.4)	
	2013–2020	1.3 (0.5 , 2.1)					2013–2020	1.3 (0.3 , 2.3)	
Leukemia	1984–2020	-0.9 (-1.0 , -0.8)	-0.9 (-1.0 , -0.8)	1984–2020	-1.0 (-1.1 , -0.9)	-1.0 (-1.1 , -0.9)	1984–2020	-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 (-0.5 , -0.1)	1984–2000	1.8 (1.5 , 2.2)	-0.1 (-0.4 , 0.2)	1984–1998	1.7 (1.1 , 2.3)	-0.6 (-0.8 , -0.3)
	2000–2010	-2.5 (-3.1 , -2.0)		2000–2010	-2.4 (-3.0 , -1.7)		1998–2020	-2.0 (-2.2 , -1.8)	
	2010–2020	-1.1 (-1.6 , -0.7)		2010–2020	-0.9 (-1.4 , -0.4)				
Bladder	1984–2016	-0.3 (-0.4 , -0.2)	-0.6 (-0.9 , -0.3)	1984–2016	-0.4 (-0.6 , -0.3)	-0.8 (-1.1 , -0.5)	1984–2020	-0.5 (-0.7 , -0.3)	-0.5 (-0.7 , -0.3)
	2016–2020	-2.9 (-5.4 , -0.4)		2016–2020	-3.4 (-5.9 , -0.9)				
Brain/CNS	1984–2005	-0.6 (-0.8 , -0.4)	-0.3 (-0.6 , -0.0)	1984–2003	-0.5 (-0.8 , -0.2)	-0.2 (-0.4 , 0.0)	1984–2006	-0.7 (-1.0 , -0.5)	-0.5 (-0.9 , -0.0)
	2005–2014	0.8 (0.1 , 1.6)		2003–2020	0.2 (-0.1 , 0.5)		2006–2014	1.4 (-0.0 , 2.8)	
	2014–2020	-1.0 (-2.0 , 0.1)					2014–2020	-1.8 (-3.4 , -0.2)	
Esophagus	1984–1999	0.8 (0.4 , 1.1)	0.2 (0.0 , 0.3)	1984–2001	0.9 (0.5 , 1.2)	0.3 (0.1 , 0.4)	1984–2020	-0.5 (-0.7 , -0.4)	-0.5 (-0.7 , -0.4)
	1999–2020	-0.2 (-0.4 , -0.1)		2001–2020	-0.3 (-0.5 , -0.1)				

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, 1984–2020

	Both sexes			Males			Females		
	Period	APC* (95% CL)	AAPC* (95% CL), 1984–2020	Period	APC* (95% CL)	AAPC* (95% CL), 1984–2020	Period	APC* (95% CL)	AAPC* (95% CL), 1984–2020
Head and neck	1984–1991	-0.8 (-2.2 , 0.5)	-1.4 (-1.8 , -1.1)	1984–1991	-0.6 (-2.0 , 0.8)	-1.6 (-2.0 , -1.3)	1984–2020	-1.2 (-1.4 , -1.0)	-1.2 (-1.4 , -1.0)
	1991–2009	-2.4 (-2.7 , -2.0)		1991–2009	-2.8 (-3.1 , -2.4)				
	2009–2020	-0.3 (-0.9 , 0.3)		2009–2020	-0.4 (-1.1 , 0.2)				
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)	1984–2020	-2.7 (-2.9 , -2.6)	-2.7 (-2.9 , -2.6)
	2010–2020	-2.0 (-2.6 , -1.5)		2012–2020	-2.0 (-2.8 , -1.1)				
Ovary							1984–2020	-0.9 (-1.0 , -0.8)	-0.9 (-1.0 , -0.8)
Kidney and renal pelvis	1984–2013	-0.4 (-0.6 , -0.2)	-0.9 (-1.1 , -0.6)	1984–2014	-0.4 (-0.6 , -0.2)	-0.8 (-1.1 , -0.5)	1984–2008	-0.4 (-0.8 , -0.1)	-1.0 (-1.3 , -0.7)
	2013–2020	-2.6 (-3.9 , -1.4)		2014–2020	-3.1 (-4.7 , -1.5)		2008–2020	-2.0 (-2.8 , -1.3)	
Multiple myeloma	1984–1994	0.7 (-0.3 , 1.8)	-0.5 (-0.8 , -0.2)	1984–1990	2.0 (-1.5 , 5.6)	-0.3 (-0.9 , 0.3)	1984–2002	-0.1 (-0.6 , 0.5)	-0.8 (-1.2 , -0.5)
	1994–2020	-1.0 (-1.1 , -0.8)		1990–2020	-0.8 (-1.0 , -0.6)		2002–2020	-1.6 (-2.0 , -1.1)	
Uterus (body, NOS)							1984–2005	-0.8 (-1.1 , -0.5)	0.3 (0.1 , 0.6)
							2005–2020	1.9 (1.5 , 2.3)	
Melanoma	1984–2013	0.9 (0.7 , 1.1)	0.3 (-0.0 , 0.6)	1984–2013	1.3 (1.0 , 1.6)	0.5 (0.1 , 0.9)	1984–2014	0.4 (0.1 , 0.7)	-0.2 (-0.6 , 0.3)
	2013–2020	-2.5 (-3.8 , -1.2)		2013–2020	-2.6 (-4.5 , -0.8)		2014–2020	-3.0 (-5.4 , -0.5)	
Soft tissue (including heart)	1984–2020	0.7 (0.5 , 0.9)	0.7 (0.5 , 0.9)	1984–2020	0.7 (0.4 , 0.9)	0.7 (0.4 , 0.9)	1984–2020	0.6 (0.3 , 0.9)	0.6 (0.3 , 0.9)
Cervix							1984–2006	-2.8 (-3.2 , -2.5)	-2.1 (-2.4 , -1.7)
							2006–2020	-0.8 (-1.5 , -0.2)	
Thyroid	1984–2020	0.0 (-0.3 , 0.4)	0.0 (-0.3 , 0.4)	1984–2020	0.7 (0.2 , 1.2)	0.7 (0.2 , 1.2)	1984–2020	-0.4 (-0.8 , 0.0)	-0.4 (-0.8 , 0.0)
Hodgkin lymphoma	1984–1997	-4.6 (-5.8 , -3.5)	-3.3 (-3.8 , -2.8)	1984–1996	-5.2 (-6.6 , -3.8)	-3.4 (-4.0 , -2.8)	1984–2020	-3.2 (-3.6 , -2.9)	-3.2 (-3.6 , -2.9)
	1997–2020	-2.5 (-3.1 , -2.0)		1996–2020	-2.5 (-3.0 , -1.9)				
Testis				1984–2020	-1.4 (-2.0 , -0.9)	-1.4 (-2.0 , -0.9)			
All other cancers	1984–2003	1.4 (1.0 , 1.8)	-0.4 (-0.8 , 0.1)	1984–2004	1.5 (1.1 , 2.0)	-0.3 (-0.8 , 0.2)	1984–2003	1.2 (0.8 , 1.6)	-0.5 (-0.9 , -0.0)
	2003–2015	-2.9 (-3.6 , -2.2)		2004–2015	-3.4 (-4.3 , -2.4)		2003–2015	-2.9 (-3.7 , -2.2)	
	2015–2020	-0.8 (-3.1 , 1.7)		2015–2020	-0.6 (-3.2 , 2.0)		2015–2020	-0.8 (-3.3 , 1.8)	

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 and intrahepatic bile duct 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, 1984–2020

	Both sexes		Males		Females	
	Reference year	APC* (95% CL)	Reference year	APC* (95% CL)	Reference year	APC* (95% CL)
All cancers	**2016**	**-2.2 (-2.7 , -1.7)**	**2001**	**-1.8 (-1.8 , -1.7)**	**2016**	**-2.3 (-3.0 , -1.6)**
Lung and bronchus	2015	-3.8 (-4.5 , -3.1)	2014	-4.3 (-5.0 , -3.6)	2016	-4.1 (-5.3 , -3.0)
Colorectal	2016	-3.4 (-4.4 , -2.3)	2004	-2.4 (-2.6 , -2.2)	2014	-3.1 (-3.9 , -2.3)
Pancreas	1999	0.0 (-0.1 , 0.2)	2000	0.1 (-0.1 , 0.3)	1984	-0.1 (-0.2 , -0.0)
Breast	2012	-1.7 (-2.2 , -1.2)	1984	-0.9 (-1.4 , -0.5)	2011	-1.5 (-2.0 , -1.1)
Prostate	—	—	2012	-1.6 (-2.1 , -1.0)	—	—
Liver and intrahepatic bile duct†	2013	1.3 (0.5 , 2.1)	2016	-0.2 (-2.8 , 2.5)	2013	1.3 (0.3 , 2.3)
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	-1.1 (-1.6 , -0.7)	2010	-0.9 (-1.4 , -0.4)	1998	-2.0 (-2.2 , -1.8)
Bladder	2016	-2.9 (-5.4 , -0.4)	2016	-3.4 (-5.9 , -0.9)	1984	-0.5 (-0.7 , -0.3)
Brain/CNS	2014	-1.0 (-2.0 , 0.1)	2003	0.2 (-0.1 , 0.5)	2014	-1.8 (-3.4 , -0.2)
Esophagus	1999	-0.2 (-0.4 , -0.1)	2001	-0.3 (-0.5 , -0.1)	1984	-0.5 (-0.7 , -0.4)
Head and neck	2009	-0.3 (-0.9 , 0.3)	2009	-0.4 (-1.1 , 0.2)	1984	-1.2 (-1.4 , -1.0)
Stomach	2010	-2.0 (-2.6 , -1.5)	2012	-2.0 (-2.8 , -1.1)	1984	-2.7 (-2.9 , -2.6)
Ovary	—	—	—	—	1984	-0.9 (-1.0 , -0.8)
Kidney and renal pelvis	2013	-2.6 (-3.9 , -1.4)	2014	-3.1 (-4.7 , -1.5)	2008	-2.0 (-2.8 , -1.3)
Multiple myeloma	1994	-1.0 (-1.1 , -0.8)	1990	-0.8 (-1.0 , -0.6)	2002	-1.6 (-2.0 , -1.1)
Uterus (body, NOS)	—	—	—	—	2005	1.9 (1.5 , 2.3)
Melanoma	2013	-2.5 (-3.8 , -1.2)	2013	-2.6 (-4.5 , -0.8)	2014	-3.0 (-5.4 , -0.5)
Soft tissue (including heart)	1984	0.7 (0.5 , 0.9)	1984	0.7 (0.4 , 0.9)	1984	0.6 (0.3 , 0.9)
Cervix	—	—	—	—	2006	-0.8 (-1.5 , -0.2)
Thyroid	1984	0.0 (-0.3 , 0.4)	1984	0.7 (0.2 , 1.2)	1984	-0.4 (-0.8 , 0.0)
Hodgkin lymphoma	1997	-2.5 (-3.1 , -2.0)	1996	-2.5 (-3.0 , -1.9)	1984	-3.2 (-3.6 , -2.9)
Testis	—	—	1984	-1.4 (-2.0 , -0.9)	—	—
All other cancers	2015	-0.8 (-3.1 , 1.7)	2015	-0.6 (-3.2 , 2.0)	2015	-0.8 (-3.3 , 1.8)

— 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 2020. Otherwise, the APC reflects the trend in rates over the entire period (1984–2020). For further details, see *Appendix II: Data sources and methods*.

† Liver and intrahepatic bile duct 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, geographic region and over time

Population-based cancer survival estimates consider the survival experience of 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 for all cancers combined is 64%.

Key findings

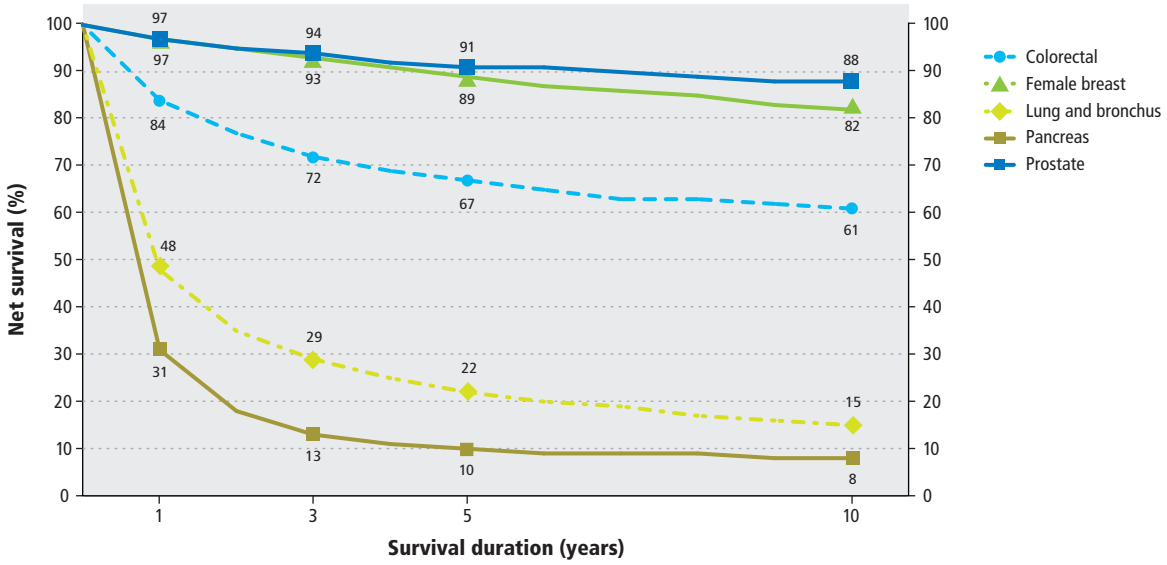
- For 2015 to 2017, the predicted five-year net survival for all cancers combined was 64%. This was up from 55% in the early 1990s.
- The highest five-year net survival was for cancers of the thyroid (97%) and testis (97%). It was lowest for cancers of the intrahepatic bile duct (6%), pancreas (10%) and esophagus (16%).
- Five-year net survival was generally higher among females (66%) than among males (62%).
- 84% of children diagnosed with cancer survived at least five years.
- Some of the biggest increases in five-year net survival have been for blood-related cancers.
- Since the early 1990s, survival has improved across all cancers reported, except for those of the central nervous system, intrahepatic bile duct, uterus and soft tissues.
- Significant progress has been made in five-year net survival in each province studied, though some provinces have experienced greater progress than others. The five-year net survival for all cancers combined is currently highest in Ontario (64%) and lowest in Nova Scotia (61%).[3]
- Five-year survival in Canada for the most commonly diagnosed cancers (i.e., lung, breast, prostate and colorectal) was found to decrease with increasing stage of disease at diagnosis.[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 to 99 years. 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).

- 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 intrahepatic bile duct (6%, 4%), pancreatic (10%, 8%) and esophageal (16%, 13%) cancers. Although not presented in this publication, five-year survival is also low for mesothelioma (9%).[7,8]
- Survival can vary considerably within a cancer group, in part due to differences in available treatments. For example, five-year survival is significantly lower for acute myeloid leukemia (23%) than for chronic lymphocytic leukemia (86%).

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



Net survival

The percentage of people diagnosed with a cancer who survive a given period past their diagnosis, in the absence of other causes of death unrelated to the cancer diagnosis. 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 underlying risks 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 uses a cross-sectional approach similar to that used by demographers to predict life expectancy. As a result, predicted survival provides more up-to-date estimates of cancer survival than those available using cohort-based analyses. Predicted estimates are based exclusively on survival data from a recent period (e.g., 2015–2017) and, as such, better reflect advances in cancer detection and treatment. Estimates tend to be more conservative than the actual estimates calculated years later, particularly when survival is increasing rapidly.[5,6]

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

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

Cancer survival generally decreases with time, with the sharpest decreases 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 lung and bronchus (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.
- 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 to 61% at 10 years post diagnosis.

Survival is typically lower among males than females.

Survival by sex

Cancer survival can vary between sexes, as shown by sex-specific estimates presented in Table 3.1. The following points largely pertain to five-year net survival.

- For all cancers combined, females had higher adjusted net survival (66%) than males (62%).
- The largest absolute differences between females and 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.[9] One partial explanation is that bladder cancer diagnoses among females may be more delayed as bladder cancer is less common in females than in males.[10]

The generally 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 those diagnosed between 15 and 54 years of age.[9]

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 to 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.

Survival by age

For most cancers diagnosed in adults, net survival decreases with advancing age at diagnosis.[7] 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 more than twice as high (43%) among people 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%).
- There is a considerable relative 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%). Large absolute declines in survival estimates between these age groups also exist for cancers of the kidney and renal pelvis (92% to 59%) and non-Hodgkin lymphoma (86% to 56%).

Five-year survival among children is about 84%.

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 the predicted one- and five-year observed survival estimates for children by childhood cancer diagnostic group and selected subgroups.[11,12]

- 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.

Statistically significant increases in both one- and five-year survival (2.7 and 7.5 percentage points, respectively) have been reported for all childhood cancers combined from 1992–1996 to 2013–2017.[13] 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.

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 consistent among the provinces for female breast cancer and thyroid cancer. There is also little inter-provincial variation in five-year survival for prostate cancer except for a relatively low predicted estimate for Saskatchewan (86%).
- The largest differences in net survival by region were seen for colorectal cancer with the estimates ranging from 62% in Nova Scotia to 68% in Newfoundland and Labrador; lung cancer with the estimates ranging from 18% in Saskatchewan to 24% in Ontario; and for pancreatic cancer for which five-year net survival ranged from 7% in British Columbia to 12% in Ontario.
- Some of these differences in survival may reflect variations in the stage at which cancers are typically diagnosed in different provinces.[14] Stage at diagnosis can be impacted by symptom awareness and presentation, screening and diagnostic pathways.

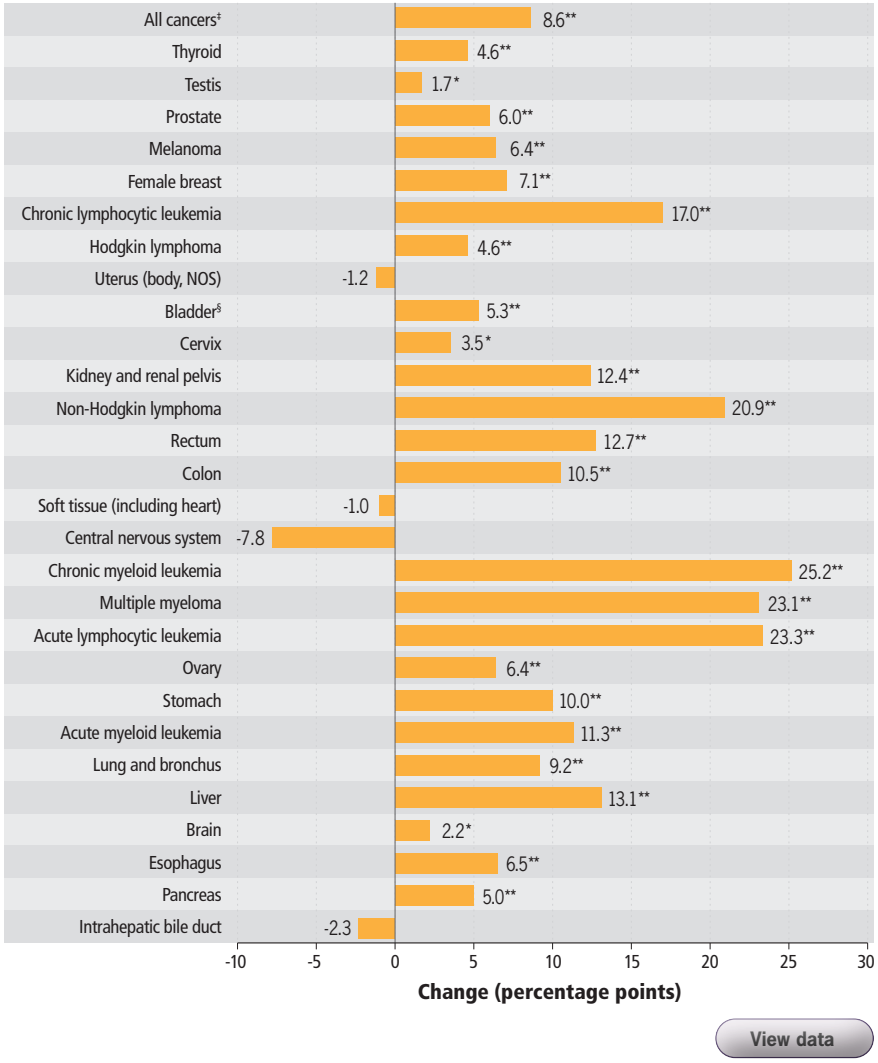
Survival over time

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 has increased for most cancers, but it has not improved for uterine, soft tissue, central nervous system and intrahepatic bile duct cancers.
- 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 hematologic cancers, specifically 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).

Increased survival for hematologic cancers has been largely attributed to improvements in earlier diagnosis, treatment (including immunotherapy) and improved supportive care. Due to improvements in treatment, many hematologic cancers have shifted from acute to longer-term management associated with longer survival. The use of precision medicine has also been key in improved outcomes.[15]

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



NOS=not otherwise specified

* change in net survival differs significantly from 0, p<0.05

** change in net survival differs significantly from 0, p<0.001

† Quebec is excluded because cases diagnosed in Quebec from 2011 onward have not been submitted to the Canadian Cancer Registry at a time of analysis.

‡ 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*.

§ The 1992–1994 net survival estimate for bladder cancer does not include *in situ* cases for Ontario because such cases were not submitted to the Canadian Cancer Registry prior to the 2010 diagnosis year.

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

The cancer survival index

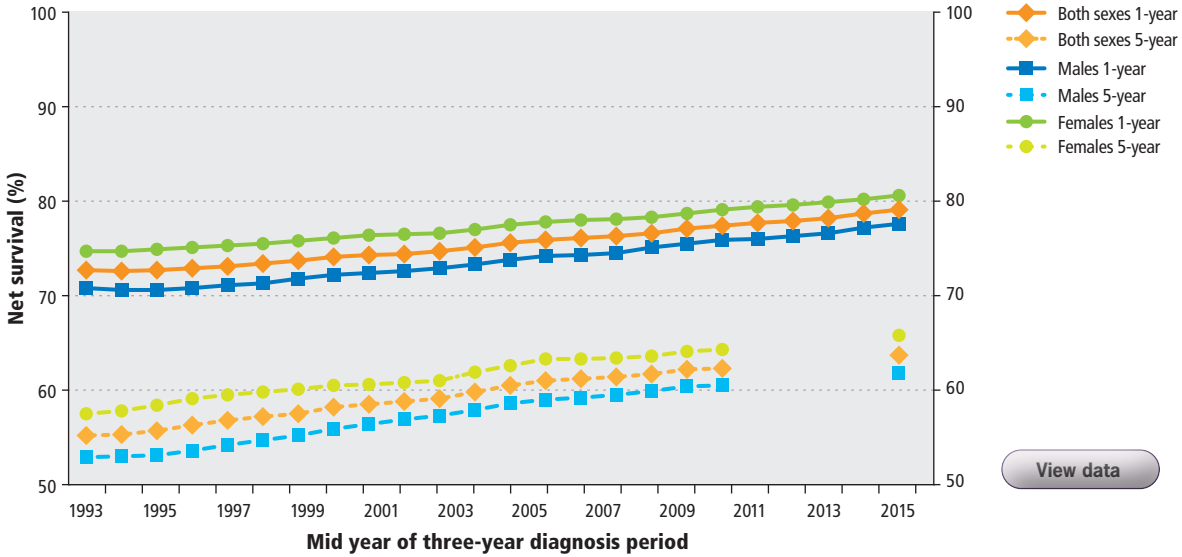
The study "The cancer survival index: Measuring progress in cancer survival to help evaluate cancer control efforts in Canada" provided the first comprehensive evaluation of progress in cancer survival in Canada for all cancer types combined.[8] Figure 3.3 presents some results from this study.

- From the 1992–1994 period to the 2015–2017 period, the five-year cancer survival index (CSI) increased 8.6 percentage points to almost 64%, and the one-year CSI increased 6.4 percentage points to 79%.
- Over the most recent 10-year span between the 2005–2007 period and the 2015–2017 period, there was a greater percentage point increase for the one-year CSI compared to the five-year CSI (3.1 vs. 2.7).
- While the five-year CSI was consistently higher among females than males, the difference decreased slightly over time. The five-year CSI increased by 8.9 percentage points to 62% among males, and by 8.2 percentage points to 66% among females.

Cancer survival index

The cancer survival index (CSI) provides a measure of cancer survival for all cancers combined. It adjusts for potential differences in the age distribution of cancer cases within populations being compared. It also accounts for differences in the distribution of incident cancer cases by cancer type and sex.

FIGURE 3.3 One- and five-year net cancer survival index estimates, by sex, ages 15–99, Canada (excluding Quebec), overlapping three-year time periods from 1992–1994 to 2015–2017



Note: Quebec is excluded because cases diagnosed in Quebec from 2011 onward had not been submitted to the Canadian Cancer Registry at a time of analysis. Net cancer survival index (CSI) estimates for both sexes combined were calculated as a weighted average of sex- and cancer-specific age-standardized net survival estimates. Sex-specific net CSI estimates were calculated as a weighted average of cancer-specific age-standardized net survival estimates for each sex separately. CSI estimates for the 2015–2017 period were predicted using period analysis.

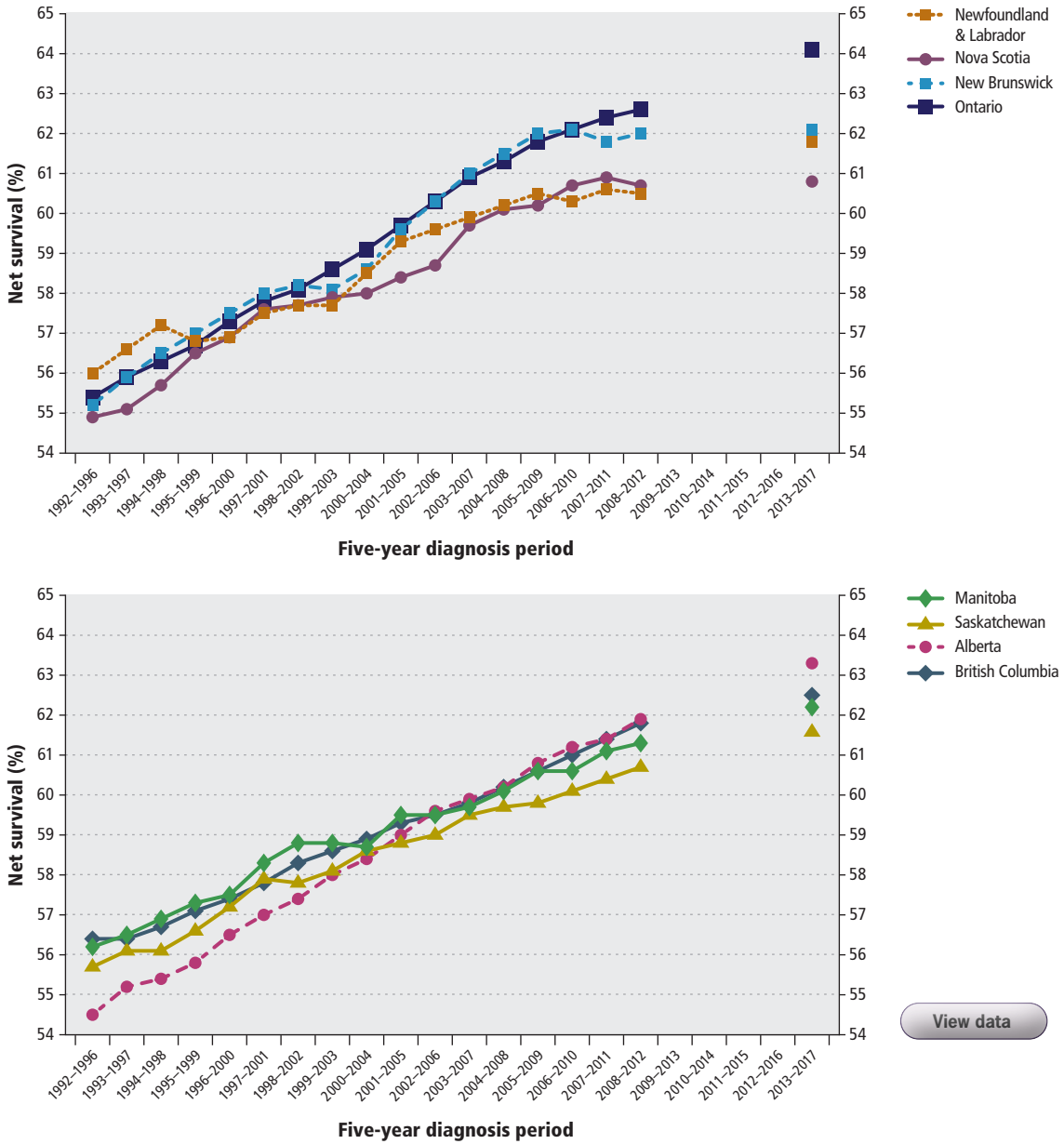
Source: Ellison LF. The cancer survival index: Measuring progress in cancer survival to help evaluate cancer control efforts in Canada. Health Rep. 2021;32 (9):14–26.

The cancer survival index by geographic region

The first comprehensive evaluation of overall cancer survival at the provincial level was provided in the study "Measuring progress in cancer survival across Canadian provinces: Extending the cancer survival index to further evaluate cancer control efforts."[3] Figure 3.4 presents some results from this study. Issues related to data availability (Quebec) and sufficiency (Prince Edward Island and the territories) precluded CSI calculations for all jurisdictions.

- The five-year survival index is currently highest in Ontario (64%) and lowest in Nova Scotia (61%).
- Since the early 1990s, significant progress has been made in the five-year net cancer survival in each province studied, though some provinces have experienced greater progress than others.
- From the 1992–1996 period to the 2013–2017 period, Alberta and Ontario experienced the largest increases of 8.7 and 8.6 percentage points, respectively.

FIGURE 3.4 Five-year cancer survival index estimates for selected provinces, both sexes, ages 15–99, overlapping five-year time periods from 1992–1996 to 2013–2017



Note: Net cancer survival index (CSI) estimates were calculated as a weighted average of sex- and cancer-specific age-standardized net survival estimates. CSI estimates for the overlapping five-year periods from the 2009–2013 period to the 2012–2016 period are not yet available. CSI estimates for the 2013–2017 period were predicted using period analysis.

Sources: Ellison LF. The cancer survival index: Measuring progress in cancer survival to help evaluate cancer control efforts in Canada. Health Rep. 2021;32 (9):14–26;

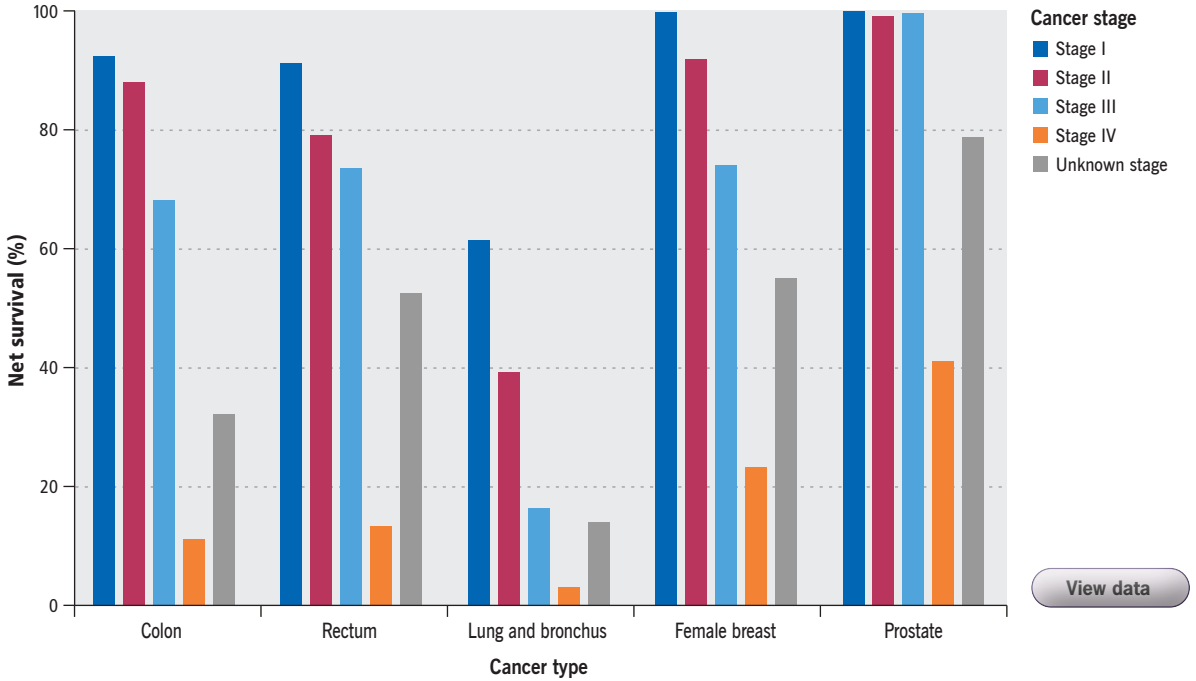
Ellison LF. Measuring progress in cancer survival across Canadian provinces: Extending the cancer survival index to further evaluate cancer control efforts. Health Rep. 2022;33(6):17–29.

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.[16] 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 two-point difference between the five-year net survival (88%) and the five-year conditional net survival (91%) for this cancer.

FIGURE 3.5 Five-year stage-specific net survival, selected cancers, ages 15–99, Canada (excluding Quebec), 2010–2017 period



Note: Quebec is excluded because cases diagnosed in Quebec from 2011 onward had not been submitted to the Canadian Cancer Registry at the time of analysis. Follow-up of cases is available to the end of 2017.

Source: Ellison LF. The cancer survival index: Measuring progress in cancer survival to help evaluate cancer control efforts in Canada. Health Rep. 2021;32 (9):14–26;

Ellison LF, Saint-Jacques N. Five-year cancer survival by stage at diagnosis in Canada. Health Rep. 2023;34(1):3–15.

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 only the deaths related to the cancer of interest are possible.

Cancer survival by stage at diagnosis

Examining cancer survival by stage at diagnosis can help us evaluate the effectiveness of early detection. The study "Five-year cancer survival by stage at diagnosis in Canada," published in early 2023, filled an important gap in cancer surveillance by providing the first five-year stage-specific net cancer survival estimates in Canada.[4] Figure 3.5 presents some results from this study, which reported on lung, breast, prostate, colon and rectum cancer cases diagnosed from 2010 to 2017 and followed to the end of 2017.

- Five-year survival for the most commonly diagnosed cancers in Canada decreased with increasing stage of disease at diagnosis. For example, five-year net survival estimates for female breast cancer were almost 100% for stage I, 92% for stage II, 74% for stage III and 23% for stage IV.
- For colon cancer, net survival ranged from 92% when diagnosed at stage I to 11% when diagnosed at stage IV. But for prostate cancer the prognosis was close to 100% for the first three stages, then declined to 41% when diagnosed at stage IV.
- Survival for stage I diagnoses exceeded 90% for each cancer studied except lung cancer (62%).
- Cases diagnosed at stage III fared considerably better than those diagnosed at stage IV. For example, rectal cancer survival was about 60 percentage points higher when diagnosed at stage III (74%) versus stage IV (13%).

What do these statistics mean?

Cancer survival statistics are important indicators of the effectiveness of early detection, treatment and clinical management of the disease. Several factors influence survival, including sex (females have better survival than males), age (survival typically decreases with age), access to quality care (which can vary between regions) and other prognostic and clinical factors.

Fortunately, we are making progress. Cancer survival has improved for most cancers over the last 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 advances in diagnosis and treatment.[15,17,18]

While colorectal cancer survival has also improved, its five-year survival is still only 67%. This likely reflects the fact that almost 50% of colorectal cancers are diagnosed at an advanced stage (i.e., stage III or IV) when treatment modalities are less effective.[14] However, screening for colorectal cancer has improved over time with modernized tests (e.g., fecal immunochemical test, or FIT) that provide better accuracy and are easier for participants to use. These tests are used in population-based colorectal cancer screening programs across the country, which have expanded over the past decade to facilitate access and participation. With increased participation in these programs, it is expected that more cancers will be diagnosed early, and that colorectal cancer survival will continue to increase.

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 2023. The low survival probabilities for these cancers are largely reflected in the late stage at which they are diagnosed.[14]

Nonetheless, lung cancer survival has improved in recent years[3] with advances in treatment, including the increasing use of targeted and immunotherapies, playing a role.[19] This improvement has been identified as a key factor in the recent improvement in survival for all cancers combined.[3] 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. For pancreatic cancer, early detection and effective treatments are needed to improve survival.

Continuing to monitor cancer survival by sex, age, geographic region and time helps point to areas where greater efforts are required to detect, diagnose and treat cancer. This data can also tell us where more research is needed to develop better treatments and to understand why disparities exist.

Supplementary resources

Cancer.ca/statistics houses supplementary resources for this chapter. These include:

- 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 Cancer Survival Standard Weights[7] and the International Cancer Survival Standard (ICSS) weights.[20]
- 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	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 (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)
Soft tissue (including heart)	61 (59–63)	60 (57–63)	62 (58–65)	58 (54–62)	56 (50–62)	62 (57–66)
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)
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)
Liver and intrahepatic bile duct	18 (17–19)	19 (18–20)	17 (15–19)	14 (13–15)	14 (13–15)	13 (11–15)
Liver	22 (21–23)	22 (21–23)	22 (20–25)	16 (15–18)	16 (14–18)	18 (15–21)
Intrahepatic bile duct	6 (5–8)	5 (3–7)	8 (6–10)	4 (3–6)	3 (2–5)	5 (3–8)
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 at a time of analysis.

† 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 at a time of analysis.

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 at a time of analysis.

† 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 at a time of analysis.

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)
Soft tissue (including heart)	79 (78–81)	78 (76–80)	81 (79–83)	76 (74–79)	77 (74–80)	76 (72–79)
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)
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)
Liver and intrahepatic bile duct	45 (44–46)	47 (46–48)	41 (39–43)	41 (39–43)	41 (38–43)	41 (37–45)
Liver	50 (48–51)	51 (49–52)	47 (44–49)	45 (42–47)	44 (41–46)	48 (43–52)
Intrahepatic bile duct	31 (29–34)	30 (27–33)	32 (29–36)	21 (17–25)	15 (10–21)	25 (19–31)
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 at a time of analysis.

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

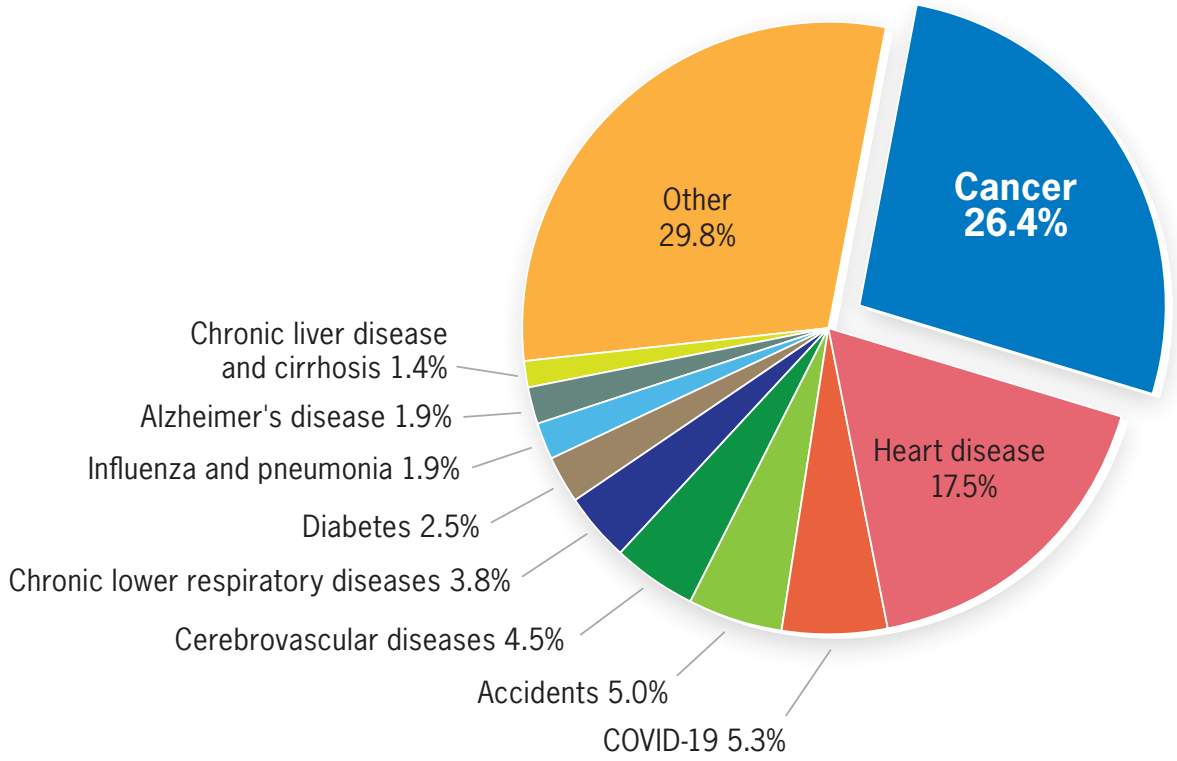
Cancer in context: The impact of cancer in Canada

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 45% of Canadians are expected to be diagnosed with cancer in their lifetime and 22% are expected to die from the disease. In 2020, cancer was responsible for a significantly higher proportion of all deaths (26.4%) than any of the other leading causes of death in Canada, including heart disease (17.5%), COVID-19 (5.3%), accidents (5.0%) and cerebrovascular diseases (4.5%) (Figure 4.1).

Cancer also remains 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). During the period from 2018 to 2020, the PYLL for all cancers combined was about 1,322,600 years (Figure 4.2), which was considerably higher than any of the other leading causes of premature death in Canada. For example, accidents had the second highest total PYLL of approximately 711,300 years over the period from 2018 to 2020.

FIGURE 4.1 Proportion of deaths due to cancer and other causes, Canada, 2020



Note: The total of all deaths in 2020 in Canada was 307,205.
Analysis by: Centre for Population Health Data, Statistics Canada
Data source: Statistics Canada. Table 13-10-0394-01 Leading causes of death, total population, by age group (accessed November 2, 2022)

Cancer is a complex disease

Cancer is a complex disease that is influenced by many factors, including genetics, lifestyle and the environment. Cancer is not just one disease, but rather a collection of over 100 distinct diseases characterized by the 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.

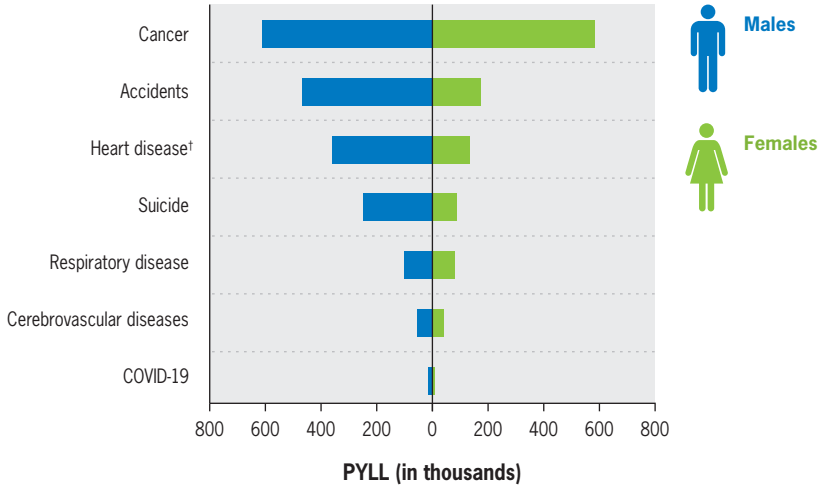
How cancers are categorized

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 grow and spread slowly and closely resemble normal cells (low-grade cancer cells). Others appear drastically different from normal cells and spread rapidly (high-grade cancer cells). Each cancer type has its own staging and grading systems, which are used to help determine prognosis and plan treatment. Thorough categorization of cancer and related cell types is vital for effective clinical management of various cancers.

How cancer spreads

Any type of cancer can spread (metastasize) from their point of origin to other areas of the body. Whether or not and to what extent a cancer spreads will depend on several factors, including the type of cancer, the aggressiveness of the cancer cells, where the cancer started, how long it has been present in the body and the availability and effectiveness of treatments. Once cancer has spread (metastasized), it is more difficult to treat. This can lead to lower survival for certain cancers. For example, almost half of all lung cancer cases diagnosed in Canada are in stage IV (cancer has spread distantly),[1] resulting in low survival.[2]

FIGURE 4.2 Selected causes of death* and their associated potential years of life lost (PYLL), Canada, 2018–2020



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

†The PYLL estimates for heart disease reported in the previous versions of this publication were calculated based on ischæmic heart disease only, whereas those reported here were calculated based on all types of heart disease and therefore attain much higher values.

Note: Causes are displayed in decreasing order of total PYLL for males and females combined. While these estimates were calculated based on three full years of data, deaths attributed to COVID-19 were only reported from March 2020 onward. As a consequence, the PYLL estimates reported here only account for 10 months of mortality data.

Analysis by: Centre for Population Health Data, Statistics Canada

Data sources: Canadian Vital Statistics Death Database at Statistics Canada

How cancer is detected

Finding cancer early can significantly improve outcomes. However, early detection largely depends on the availability and efficacy of screening and diagnostic tools, the diagnostic process, the location and extent of the tumour, as well as when symptoms appear. This is why cancer of the pancreas, which is deep in the body and often has non-specific symptoms, is typically detected much later than testicular cancer, where a lump may be felt. Cancers that are more likely to be detected early, such as breast cancer, generally have significantly higher survival compared to those that are typically detected later, as is the case with lung cancer.

Potential years of life lost

Potential years of life lost (PYLL) is an estimate of the additional number of years a person would have lived if they had not died prematurely (i.e., 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 five years of life lost.

Cancer has a substantial economic burden on people living in Canada

Canadian research has shed light on the financial burden faced by many people with cancer and their families, which highlights that the hardship of cancer goes beyond the physical and emotional challenges related to the disease.[3–6] A national survey, administered in 20 cancer centres across Canada, found that one-third of survey respondents experienced a high financial burden, reporting "somewhat, large or worst possible" financial difficulty caused by expenses related to their care.[7] This was particularly experienced by those with lower incomes. Overall, respondents spent an average of 34% of their monthly income on cancer-related costs, which include expenses for medical equipment, childcare, homecare and transportation.

In terms of total dollar impact from a societal perspective, cancer-related costs were projected to total $26.2 billion in Canada in 2021.[8] The cost to people with cancer and their families, including out-of-pocket expenses and time away from work, was $7.8 billion.[8] Given the increasing number of cancer cases diagnosed each year in Canada, the total societal cost of cancer care is expected to rise.

A cancer diagnosis can place profound financial stress on individuals and families.

Canada ranks favourably in cancer control, but there are areas for improvement

Comparable measures of cancer control between Canada and other countries can be found through various international resources, such as those provided in *Appendix I*. The most recent International Cancer Benchmarking Partnership (ICBP) study showed that Canada's cancer survival is one of the highest among comparable high-income countries with universal healthcare systems.[1] According to the Economist Intelligence Unit's Index of Cancer Preparedness, Canada ranks sixth out of 28.[10] In their most recent year of data available (2019), the Organisation for Economic Co-operation and Development (OECD) shows that Canada ranks 18th (out of 34) for deaths from cancer (per 100,000 people). This performance is above some comparable countries, including the UK, Netherlands and Germany. But it remains below the US, Australia and Sweden.[11] 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.[12]

Progress has been made but the challenge continues

There is no doubt that a lot of progress has been made as we have learned more about how cancer develops, what increases risk 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 39% in males and 26% in females since the cancer death rate peaked in 1988 (Figure 4.3).

However, significant challenges remain, including the aging and growing population in Canada, inequities in access to care and outcomes for different populations, and new challenges that continue to arise. For example, colorectal cancer rates among younger people are rising.[13] The reasons for this remain unclear and research is needed to understand how we can mitigate this increase.

The challenge of a growing and aging population

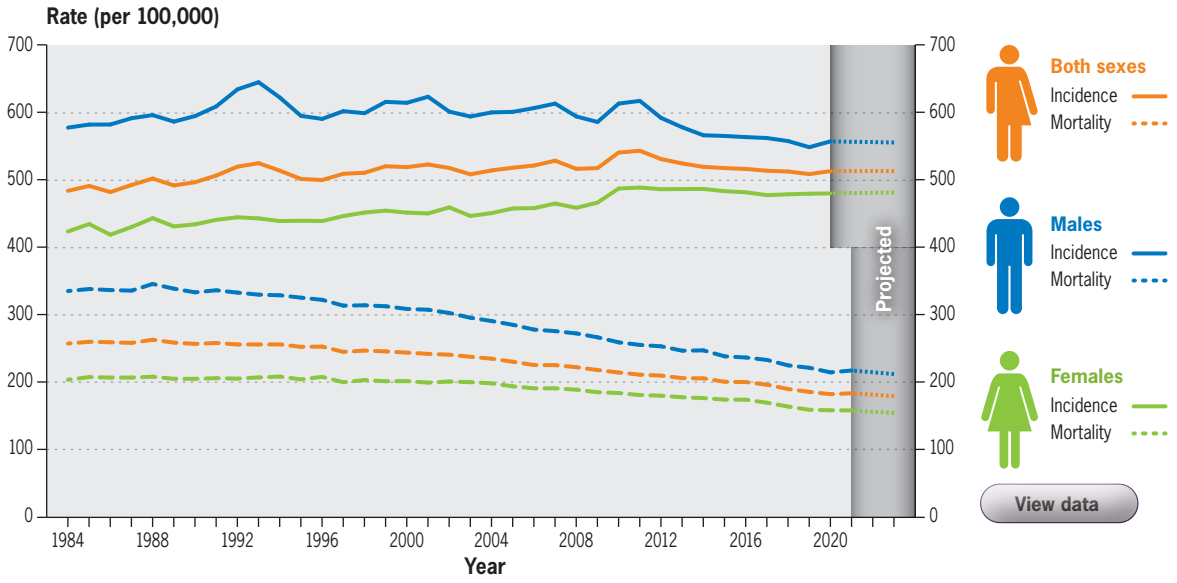
While incidence and mortality rates have declined for many cancer types, the total number of new cases of cancer and the number of cancer deaths continues to increase each year in Canada. These increases can largely be explained by the aging and growing population. Cancer is most often diagnosed among older adults, so the increasing proportion of people over the age of 65 can be an indication of expected cancer burden. Recent projections suggest that in 2051 nearly one-quarter (25%) of Canadians could be aged 65 and older compared with one-fifth (19%) in 2021.[14]

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 impact on reducing the overall number of cancer cases diagnosed. But they have had a more meaningful impact on reducing the number of Canadians who die from cancer. Unfortunately, the progress made has been overshadowed by the impact of an aging population, followed by population growth, both of which have led to a dramatic increase in the number of cancer cases and deaths each year.

Because the Canadian population is continuing to grow and age,[15] the average annual number of cancer cases is projected to be 79% higher in 2028–2032 than it was in 2003–2007.[16] As a result, the Canadian healthcare system is expected to face a rising demand for cancer-related services, such as 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.[17] Although many individuals who survive a cancer diagnosis lead fulfilling and productive lives, their cancer experience can lead to ongoing physical, emotional, spiritual and financial challenges long

FIGURE 4.3 Age-standardized incidence and mortality rates for all cancers combined, by sex, Canada,* 1984–2023



* 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 2019 and projected thereafter. Actual mortality data were available to 2021; estimates for 2021–2023 were projected based on data up to 2020. 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

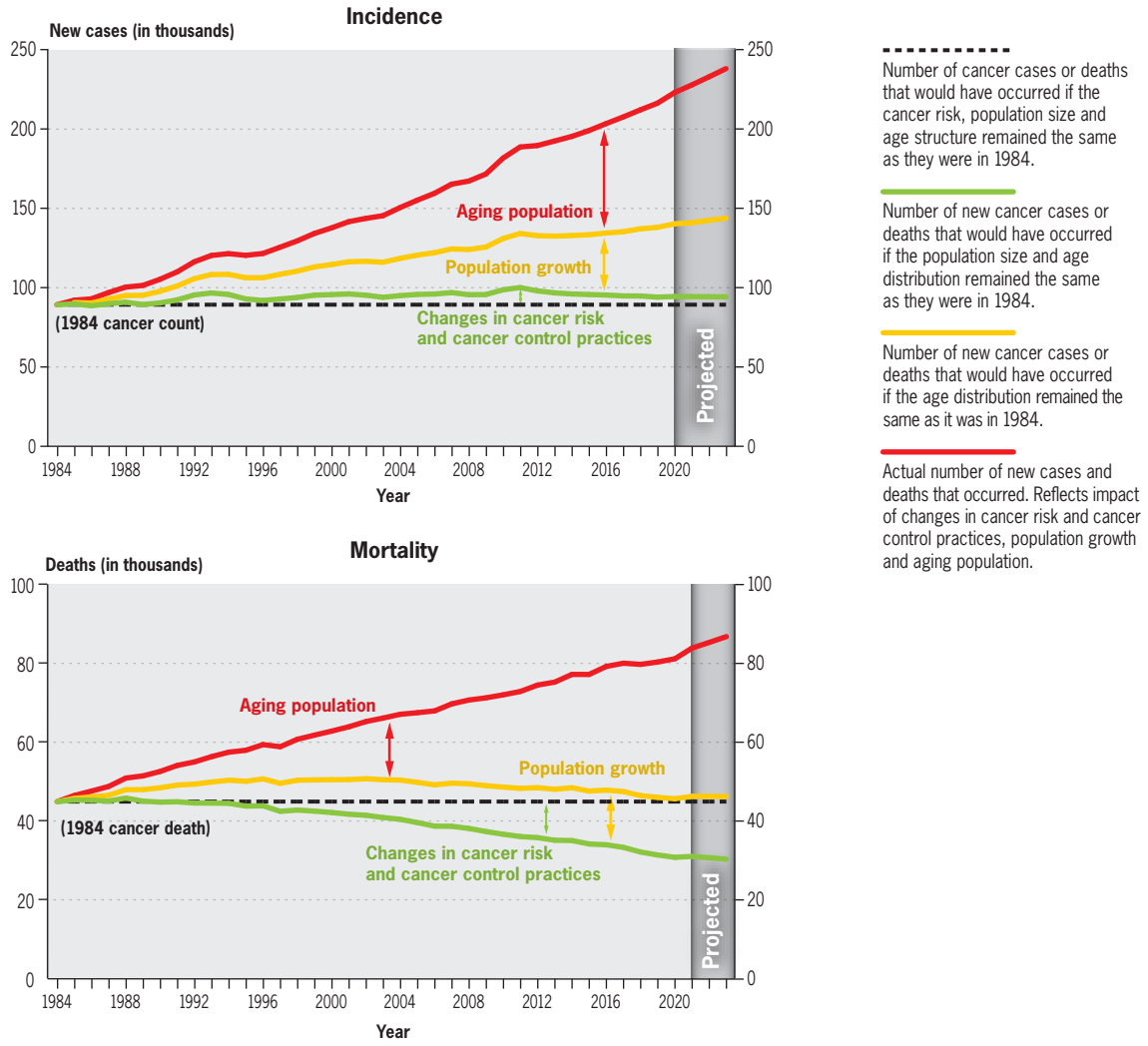
after the disease is treated.[17,18] This growing population of survivors will require continued support and services.

Cancer outcomes are not equitable among people in Canada

While there have been steady improvements in population-level cancer outcomes in Canada, it is important to understand the extent and nature of disparities in incidence, mortality and survival by race and ethnicity, age, language, geography, gender identity, sexual orientation and socio-economic status, among other factors. More specifically, we need to understand the extent to which inequities in health and healthcare are underpinned by systemic and structural racism, marginalization, discrimination and stigma, which create barriers to accessing care that affect some populations more than others. It is also important to recognize, as proposed by legal scholar Kimberlé Crenshaw, the intersectionality of how social identities and systems of oppression shape people's experiences.[19]

First Nations, Inuit and Métis Peoples accessing the healthcare system have experienced widespread systemic racism where they were disrespected and mistreated, as well as faced difficulty accessing care. These experiences discourage them from seeking the care they need, which negatively impacts their health.[20] First Nations, Inuit and Métis communities also face geographic and economic barriers in accessing cancer care.[21] For example, Inuit who live in Inuit Nunangat (Inuvialuit Settlement Region, Nunavut, Nunavik and Nunatsiavut) must travel long distances to receive health and cancer care that is not available locally. This is because delivering healthcare services in remote areas can be challenging for several reasons, including the size of the territory, dispersion of the small population,

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, 1984–2023



Note: New cases exclude non-melanoma skin cancer (neoplasms, NOS; epithelial neoplasms, NOS; and basal and squamous). Actual incidence data was available to 2019 for all provinces and territories except Quebec and Nova Scotia and mortality data to 2020 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

weather and reliance on air transportation.[22,23] As a result, many Inuit are faced with the difficult decision to leave their home, including their family, friends and community, or opt out of cancer treatment.[24] While certain aspects of this are unavoidable (such as being unable to provide radiation treatment in remote communities), the experience can be significantly enhanced through availability of culturally safe navigation services, travel support for people with cancer and their families, and better digital health solutions supported by improved internet bandwidth infrastructure.

Research has emphasized the impact of such barriers on cancer outcomes. For example, one study showed that people living in Inuit Nunangat are more than twice as likely to be diagnosed with lung cancer than people living in the rest of Canada.[22,25] Additionally, a report on lung cancer and equity showed that there are significant inequities in health outcomes for First Nations, Inuit and Métis people.[22,25] The report noted that First Nations adults have similar lung cancer incidence rates as the general population, but they are 35% less likely to survive five years or more after their diagnosis. Métis adults are more likely to be diagnosed with lung cancer than the general population, and they are 30% less likely to survive it beyond five years.[25] First Nations people had poorer survival than the general population for 14 of the 15 most commonly diagnosed cancers, but this disparity could not be explained by income and rurality.[25–27] These disparities in outcomes are likely due to inequitable access to healthcare and delayed diagnoses.

Racialized communities accessing the healthcare system have also experienced widespread systemic racism and difficulty accessing care or having symptoms taken seriously.[28] Research in Canada has shown that some racialized communities and immigrants face additional barriers to accessing cancer care, resulting in less participation in screening and worse outcomes.[29–33]

LGBTQ2+ people also face discrimination and stigmatization when accessing healthcare, reporting refusal of care, harassment and providers' lack of knowledge specific to the community.[34] Existing research highlights some of these inequities, with data showing that fewer lesbian, gay and bisexual Canadians reported having a regular healthcare provider compared to heterosexual individuals.[35] Structural barriers that lower screening rates and access to appropriate care have been noted for LGBTQ2+ populations, which can lead to poorer health outcomes.[36–38]

Further, data shows disproportionately low screening rates and higher cancer mortality among other underserved communities, such as people living with low-income and people in rural or remote areas.[39] 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.[25] People living in rural and remote communities face many barriers in accessing screening, including longer travel times, higher costs and fewer available healthcare resources.[40]

Systematically collected race-based and ethnicity-specific surveillance data are lacking in Canada, which makes it challenging to comprehensively quantify the cancer outcomes experienced in underserved communities. As a result, it is difficult to assess how well certain communities can access healthcare, their experiences in the healthcare system and their health outcomes, and to compare this information with that for the general population. 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 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. In addition to recently launching important data collection initiatives, Statistics Canada and the Public Health Agency of Canada are focused on better integrating socio-economic and ethno-cultural data with cancer and outcome data. The 2019–2029 Canadian Strategy for Cancer Control identifies several priorities related to building analytic capacity, including support for Indigenous-led efforts in data collection, reporting and data governance. This helps advance self-determination and ensure First Nations, Inuit and Métis people have the data needed to improve their health and well-being.[39] The Canadian Institute for Health Information (CIHI) has endorsed the collection of race-based and ethnicity data, outlining proposed standards of data collection to facilitate better reporting of population groups that typically experience inequitable access and outcomes.[41] CIHI has further developed their Measuring Health Inequalities Toolkit to contain a variety of resources that help users understand the process of measuring and reporting on health inequalities.[42] Jurisdictions across Canada have also made efforts to collect data for populations that are underserved. For example, Nova Scotia and Manitoba have recently committed to collecting race-based data in healthcare to help identify and address inequities and racism in healthcare.[43,44] The Government of British Columbia has introduced the *Anti-Racism Data Act*, which

aims to introduce a system to securely collect and safely analyze demographic information on race, ethnicity, faith, gender, sex, ability, income and other social identity markers.[45] In these ways, the cancer control community is working together to address these important gaps in data so that we can better identify inequities in access and outcomes for increased attention and investment.

How statistics can help guide cancer control

The wide variation we observe in incidence, mortality and survival across cancer types reflects the complexity of the disease. Prevention, screening and early detection, treatment, survivorship and palliative care all play an important role in cancer control and must also be considered when assessing how to address the ongoing impact of cancer in Canada.

Figure 4.5 presents a simplified approach to categorizing cancers based on their relative impact 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 to their preventability, detectability, incidence, survival and mortality using the statistics in this publication and information about modifiable risk factors and early detection programs.

This simplified approach does not take into account the fact that less common cancers and childhood cancers can still have a devastating impact on people with cancer and their families. It is recognized that other measures, such as the potential years of life lost (PYLL) and economic impacts described earlier, are also important and should be considered when assessing the impact of cancer in Canada. Despite these limitations, Figure 4.5 aims to illustrate that, when assessed

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

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

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 in 2023, 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 2023 (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 2023 (Table 2.2).

together, the statistics reported in this publication can be used to highlight gaps and opportunities in cancer control strategies and identify priority areas for clinical and health services research. The goal of reporting cancer statistics is to change the future of cancer and ultimately improve the health and well-being of all people across Canada.

Preventability

The World Health Organization suggests that prevention offers the most cost-effective, long-term strategy for controlling cancer and other non-communicable diseases.[46] Research suggests that a large number of cancers can be prevented through reductions in exposure to adverse environmental, occupational, lifestyle and infectious factors.[47]

For example, an estimated 3,300 new cancer cases diagnosed in Canada in 2015 were due to alcohol consumption.[48–50] In January 2023, the Canadian Centres on Substance Use and Addiction released Canada's Guidance on Alcohol and Health, which encourages people to think about whether or not they will consume alcohol and help people make informed decisions about their health.[51] The guidance is designed to remove shame and stigma from the conversation about alcohol and to inform people that the less they drink, the lower their health risks.

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 impact of cancer in Canada. For example, about 72% of lung cancer cases in Canada are due to smoking tobacco.[52] The Canadian Cancer Society and Canadian Partnership Against Cancer have collaborated on a national smoking cessation initiative intended for First Nations, Inuit, Métis and urban Indigenous people, who have significantly higher rates of smoking than non-Indigenous populations.[48–50]

Cervical cancer can be prevented by receiving the human papillomavirus (HPV) vaccine prior to HPV exposure and by screening for precancerous conditions of the cervix. Because of these prevention opportunities, many believe that cervical cancer could be virtually eliminated in some countries.[53] 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, to replace traditional Pap testing with HPV primary screening and to ensure that precancerous lesions are treated.[54,55] However, as shown with the recent increase in cervical cancer incidence, ongoing vigilance and concerted effort to improve access to and uptake of HPV prevention strategies is still needed to realize the goal of virtually eliminating cervical cancer in Canada, where fewer than four cases are diagnosed per 100,000 females (age-standardized) every year.[56] 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 HPV immunization, screening and follow-up of abnormal screening results to reduce cervical cancer incidence.[54]

Detectability

Detecting cancer early (e.g., through screening tests or diagnostic follow-up of worrisome symptoms) 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 impact of these diseases.

Lung cancer screening for populations at high risk for the disease 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. Some provinces have begun to roll out organized lung cancer screening programs or pilot programs, with all provinces planning to implement them in the coming years.[57]

The widespread adoption of population-based screening has had a meaningful impact on the incidence and mortality of several common cancers in Canada, including colorectal cancer. Since the adoption of organized screening programs in most provinces and territories,[58] the incidence and mortality rates for colorectal cancer have been declining. In fact, colorectal cancer incidence in Canada is now declining faster than other cancer types for both males and females.

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 prevention, 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.[59,60] 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

The COVID-19 pandemic impacted many aspects of cancer care and control efforts. Data to date suggest that there were considerable drops in the number of cancers diagnosed for many cancer types with larger impacts observed for cancer types with organized screening programs.[21] Administrative health data from the Canadian Institute of Health Information (CIHI) showed a 25% reduction in diagnostic imaging and a 20% reduction in the number of cancer surgeries in the first six months of the pandemic.[61]

International efforts also suggest that cancer diagnoses were reduced by 40% between March 9 and May 17, 2020, compared to diagnoses averaged over the same time period in 2018 and 2019.[62] The long-term impact of COVID-19 on cancer outcomes among Canadians will not be known for several years and possibly decades. What is known is that additional efforts and potentially surges in capacity are needed to catch up with missed procedures. Several initiatives are underway at the national, provincial and territorial levels to understand and mitigate the impacts of COVID-19 on cancer care in Canada.[21]

Given the disproportionate impact of the pandemic on Black and other racialized communities,[63,64] it is likely that individuals from these communities have also experienced greater access challenges and adverse outcomes that will be observed in the years to come. Overall, COVID-19 has impacted marginalized populations more than others and exacerbated the inequities faced by many, including Indigenous peoples, racialized communities, LGBTQ2+ people and others.[65]

The incidence projections in this publication do not account for any changes in diagnosis or cancer control due to the COVID-19 pandemic as they are based on data up to 2019. Mortality data for 2020 are included in the projections, but, as noted in Figures 4.1 and 4.2, mortality and PYLLs due to cancer are much larger than those for COVID-19 and therefore no major changes in cancer mortality were observed. We expect that interruptions to cancer control efforts will have an impact on future cancer survival and mortality estimates due to the widely reported diagnostic delays. Changes to cancer control efforts during the COVID-19 pandemic are also expected to have had different impacts at different times across the country. These impacts will be evaluated in future analyses.

Summary

Despite the limitations of the approach taken in generating Figure 4.5, it is an exercise that can help focus cancer control efforts. It also helps reinforce that measures of cancer impact must be assessed in a variety of ways and alongside each other to provide a comprehensive view of the impact of cancer. These measures 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. These include:

- 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

For the first time, the data included as part of this publication are available in an online, interactive data dashboard at https://cancerstats.ca. The data can be filtered by age, sex and geographic region to create custom visualizations and downloads to support the cancer control community in Canada. Future data updates will be made available on the dashboard as part of the dissemination of *Canadian Cancer Statistics* by the Canadian Cancer Statistics Advisory Committee. The dashboard is the product of a collaborative effort between Dr Darren Brenner's team at the University of Calgary, the Canadian Cancer Statistics Advisory Committee, the Canadian Cancer Society, Statistics Canada and the Public Health Agency of Cancer, made possible through funding from the Canadian Cancer Society.

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

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

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.

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-X.

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
13-10-0840-01	**Cancer incidence trends, by sex and cancer type** Provides cancer incidence trends—annual percent change and average annual percent change—for Canada (excluding Quebec), by selected cancer type and sex
13-10-0839-01	**Cancer mortality trends, by sex and cancer type** Provides cancer mortality trends—annual percent change and average annual percent change—for Canada (excluding Quebec), by selected cancer type and sex

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 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, morality, prevalence and screening practices over time and by sex, age and province or territory. 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 C[17] 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)]

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APPENDIX II

Data sources and methods

Summary

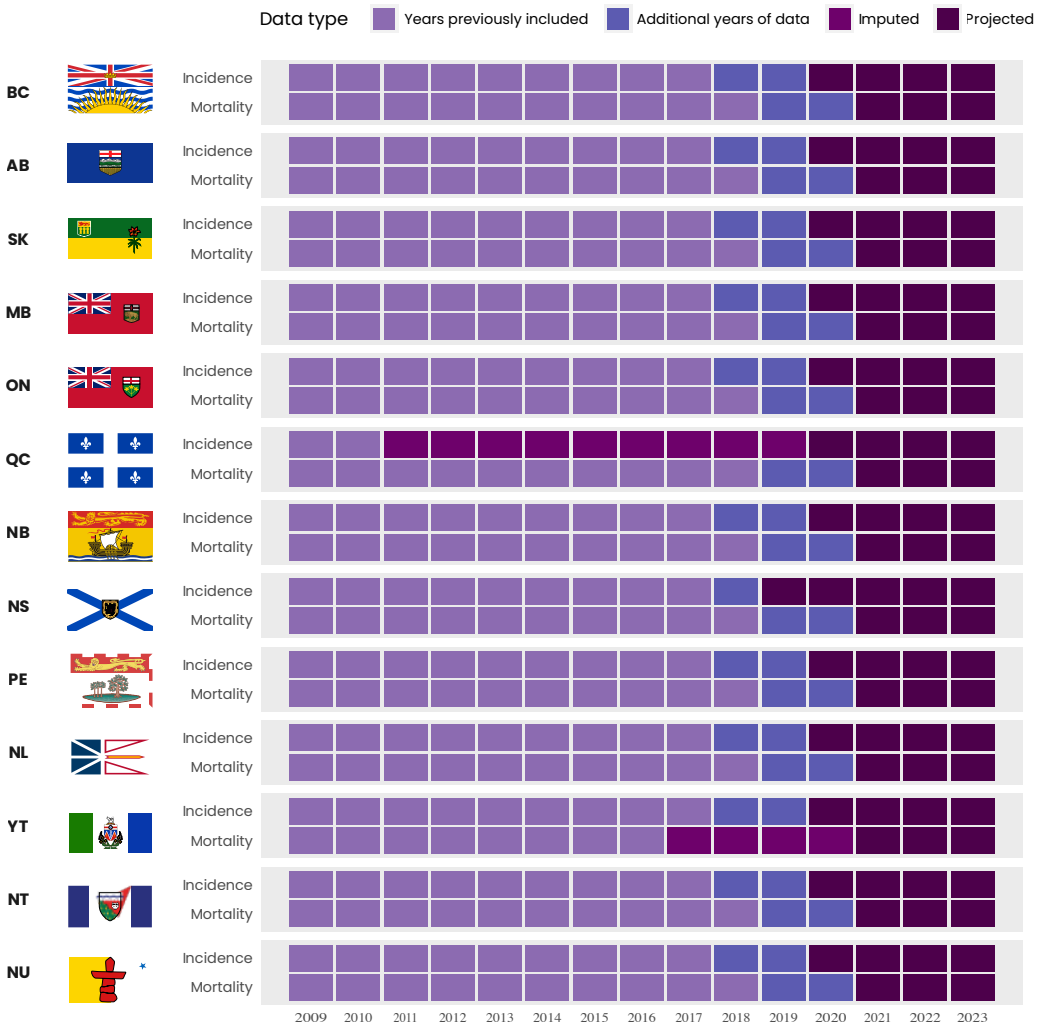
Who was involved?

The Centre for Population Health Data at Statistics Canada conducted all of the analyses that are presented in this publication, except for Figure 4.4 which was completed by the Centre for Surveillance and Applied Research at the Public Health Agency of Canada. 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 2019 (except Quebec and Nova Scotia, for which data were available to 2010 and 2018, respectively). For some cancer types, 2018 incident case counts for Nova Scotia were augmented using a correction factor (see *Data and methods issues*).
- Actual cancer mortality data covered the period from 1984 to 2020. Yukon data from 2017 to 2020 were not available and were imputed.

Figure A2-1 Data used at the time of analysis by geographic region



- Cancer incidence and mortality projections up to 2023 were based on the most recent 25 years of data that were available for each province and territory.
- Survival analyses were based on cases diagnosed from 1992 to 2017 and followed to the end of 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 and mortality[3] over time.
- Net survival was calculated using the Pohar Perme estimator.[4]

Data sources

Incidence data: The Canadian Cancer Registry (CCR)

Actual cancer incidence data used in this publication cover the period of 1984 to 2019 (except Quebec and Nova Scotia, for which data were available to 2010 and 2018, respectively). Data for 1992 to 2019 were obtained from the CCR Tabulation Master File,[5] released August 23, 2022 (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 in the current file 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*,[6] from 1992 onward. 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).[7]
- The International Agency for Research on Cancer (IARC) rules[8] 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 2020 and were obtained from the Canadian Vital Statistics—Death Database (CVSD).[9] Yukon data for 2017 to 2020 were not available and were imputed.

- 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-9[7] from 1984 to 1999 and ICD-10 from 2000 onward.[10]

- 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 2021 were obtained from Statistics Canada.[11] These estimates are final intercensal up to 2015, final postcensal for 2016 to 2019, updated postcensal for 2020 and preliminary postcensal for 2021.
- Projected population estimates are used for 2022 and 2023, as prepared by Statistics Canada under assumptions of medium growth (scenario M1).[12] 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.[13] 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 was also obtained from the CVSD[9] 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).[14]
- The analytic file follows the multiple primary coding rules of IARC.[8]
- 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.[15]
- 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[16] and from complete Canadian life tables[15] using a method suggested by Dickman et al.[17] For ages 100 to 109, where this was not possible for these jurisdictions, complete Canadian life values were directly used.

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

Cancer definitions

- Cancer cases were defined according to ICD-9[7] prior to 1992 and ICD-O-3[6] thereafter. Cancer deaths were defined according to ICD-9[7] prior to 2000 and ICD-10[10] 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 — soft tissue (including heart) — has been included with this edition of the publication. In addition, intrahepatic bile duct cancers have been included with liver cancer cases to form a collective group.
- For Figure 1.4 and Table 3.3, new cancers for children (aged 0 to 14 years) were classified and reported according to the Surveillance, Epidemiology and End Results Program (SEER) update[18] of the *International Classification of Childhood Cancer, Third Edition* (ICCC-3).[19] The update was in response to new morphology codes introduced by the World Health Organization.[20] 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).

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 — 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 2023

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 over-dispersion. 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)
- 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. Trends in age-specific incidence and mortality rates were extrapolated to 2023. The projected numbers of cancer cases and deaths in 2023 were calculated by multiplying these extrapolated rates by the sex-, age- and province-specific projected population figures for 2023.

Selection of "best" projections

The process for selecting the "best" projected counts and rates by sex, cancer type and geographic region 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 close or equal to zero, the five-year average projection

was used. This happened more often in the territories and Prince Edward Island, as well as for 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 to 2023. Specifically:

- Sex-, age- and cancer-specific correction factors for Quebec were calculated as the ratio of sex-, age- and cancer-specific rate estimates for Quebec relative to Canada (excluding Quebec) for the 2006 to 2010 years.
- Actual (2011 to 2019*) and projected (2020* to 2023) Canada rates that excluded Quebec by year, sex and five-year age group were applied to the 2011 to 2023 Quebec population to estimate preliminary Quebec-specific counts. (*Actual incidence data for Nova Scotia was available up to 2018; projected data from 2019 to 2023 was used for Nova Scotia.)
- The Quebec-specific 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. 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 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 2023 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,[3] 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.[21] 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 2019 for incidence, and 1984 to 2020 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. Incidence data from Nova Scotia for 2019 were excluded because these cases had not been submitted to the CCR. Imputed cancer incidence rates for Quebec for 2011 to 2019 and for Nova Scotia for 2019 were not used as a replacement for the missing incidence data.
- Imputed mortality data for Yukon for 2017 to 2020 was used for the analysis of mortality trends.
- 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 2015 to 2019 for incidence, and 2016 to 2020 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 2019 for incidence or 1984 to 2020 for mortality). 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 2019. 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.[22]

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 be 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 and Nova Scotia) in 2019 were calculated using 20 age groups (0 to <1, 1–4, 5–9, 10–14, …, 85–89 and 90+ years). Quebec and Nova Scotia could not be included because incidence data were only available to 2010 and 2018, respectively.

- The lifetime probability of developing cancer was calculated by dividing the total number of cancers occurring over the complete life (age 0 to 90+) by the hypothetical cohort of 10,000,000 live births. This calculation does not assume that an individual lives to a set 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 2020 (excluding Quebec and Nova Scotia) were calculated using 20 age groups (0 to <1, 1–4, 5–9, 10–14, …, 85–89 and 90+ years). Quebec and Nova Scotia were excluded to match the geographic exclusions applied in the estimation of the lifetime probability of developing cancer. Imputed mortality data for Yukon for 2020 was used in the calculation.

- The lifetime probability of dying from cancer is the total number of cancer deaths occurring over the complete life (age 0 to 90+) divided by the hypothetical cohort of 10,000,000 live births. This calculation does not assume that an individual lives to a set 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 2018 to 2020 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
COVID-19	COVID-19	U07.1-U07.2

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*[6] and classified using Surveillance, Epidemiology, and End Results (SEER) Program grouping definitions.[23]
- 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 at the time of file creation. 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, liver and intrahepatic bile duct cancers, head and neck cancers, uterine cancers, leukemias and brain and other nervous systems cancers), diagnosed from 1992 to 2017.[24-27]
- 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[18] of the *International Classification of Childhood Cancer, Third Edition* (ICCC-3).[6] The update was in response to new morphology codes introduced by the World

Health Organization.[20] 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[28] 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[4] 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.[29] 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.[30-32] 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.[33]
- Conditional five-year net survival[34,35] 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 to 2017, but 2013 to 2017 for childhood cancer — were derived using period analysis.[36] The period approach to survival analysis provides up-to-date predictions of cancer survival[37] 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 assume 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.[37-39] When survival is generally increasing (or decreasing), a period estimate tends to be a conservative prediction of the survival that is eventually observed.[38,40]
- 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.[33] For the six 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[41] 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.[42]
- 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.[42] Note, however, that the collective weights for corpus uteri and uterus not otherwise specified and the weights for other female genital organs were inadvertently displayed in an inverted fashion in Table 1 of the referenced study.
- 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) and 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.[14]
- 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 in this publication does not include cases diagnosed in the province of Quebec from 2011 onward as these cases had not been submitted to the CCR. Incidence data for Nova Scotia for 2019 were also excluded from the analytic file because these data had not been submitted to the CCR by the time of file release.
- 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 2019.
- 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 sub provincial 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.[43] 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 in the CCR).
- At the time of publication, no death certificate only (DCO) cases had been reported to the CCR from Manitoba for 2013 to 2019 and from Quebec for 2010. DCO cases in Manitoba were estimated by using the DCO cases diagnosed in 2006 to 2012 and randomly assigning them to the period from 2013 to 2019. DCOs for Quebec were imputed by randomly assigning DCO cases diagnosed in 2007 to 2009 to the period from 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.[5] 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.
- Case completeness was identified as an issue for some cancer types in the 2018 data from Nova Scotia. To address this, a correction factor was applied that augmented the sex- and age group-specific case counts of cancer types in this province for which the associated 2018 ASIR was more than 15% below the expected ASIR. ASIR for specific cancers was determined through a weighted average of the corresponding rates for 2015 to 2017. Weights were assigned as follows: 1/6 for 2015, 2/6 for 2016 and 3/6 for 2017. Where applicable, cancer-specific correction factors were calculated as the inverse of the ratio of the actual to expected 2018 ASIR.

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.[44] 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[45] 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:

- The analytic file used for the mortality analysis did not include deaths from Yukon for the 2017 to 2020 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 2020.
- Liver and intrahepatic bile duct cancer mortality statistics in this publication exclude liver, unspecified (C22.9). This decision was based on unpublished analyses performed by PHAC 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 and intrahepatic bile duct cancer mortality definition used in this publication results in underestimated liver and intrahepatic bile duct cancer deaths. The impact of adding liver, unspecified (C22.9) to the current liver and intrahepatic bile duct cancer mortality definition would be substantial, increasing the number of liver cancer deaths in Canada in 2020 by 32.9% and the corresponding number of liver and intrahepatic bile duct cancer deaths by 15.9%. Therefore, the method of defining liver and intrahepatic bile duct 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 by SEER.[23,46]) 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.

Survival

Survival analyses do not include data from Quebec because cases diagnosed in this province from 2011 onward have not been submitted to the CCR at the time of the creation of the file used for the analysis.

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TABLE A1 Cancer definitions

Cancer	ICD-O-3 Site/type	ICD-9	ICD-10	ICD-9
	Incidence (1992–2017)	Incidence (1984–1991)	Mortality (2000–2019)	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 and intrahepatic bile duct	C22.0, C22.1	155.0, 155.1	C22.0–C22.4, C22.7	155.0, 155.1
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
Soft tissue (including heart)	C38.0, C47, C49	164.1, 171	C38.0, C47, C49	164.1, 171
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*.[6] ICD-10 refers to the *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision*.[10] ICD-9 refers to the *International Statistical Classification of Diseases and Related Health Problems, Ninth Revision*.[7]

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 2023, this publication reports on a new cancer category: soft tissue (including heart) cancers (which were previously part of the "all other cancers" category). Intrahepatic bile duct cancers (which was previously part of the "all other cancers" category) is now included in liver cancers.

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*.[10]

Note: As of 2023, this publication reports on a new cancer category: soft tissue (including heart) cancers (which were previously part of the "all other cancers" category). Intrahepatic bile duct cancers (which was previously part of the "all other cancers" category) is now included in liver cancers.

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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 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

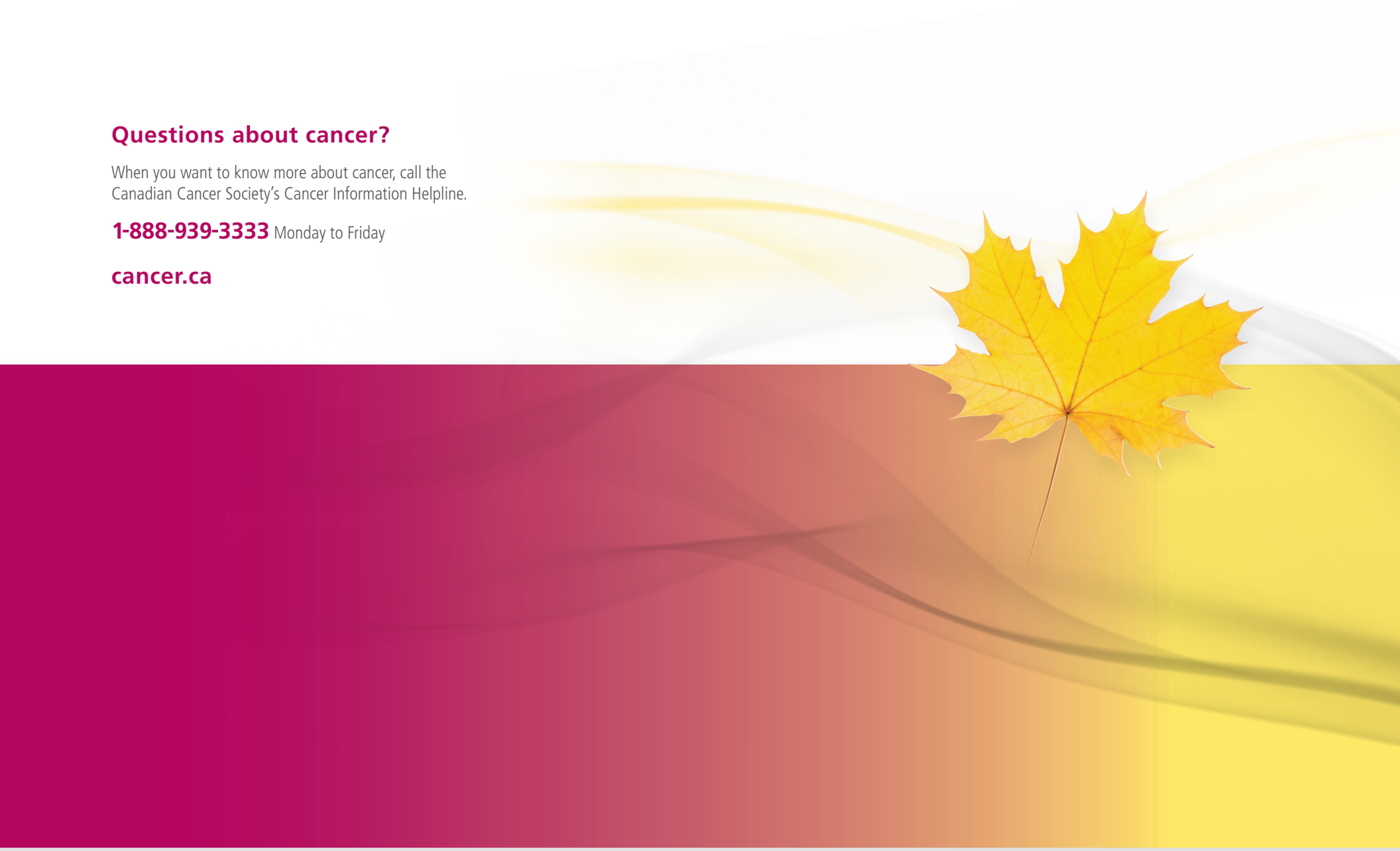
Mortality data are supplied to Statistics Canada by the provincial and territorial Vital Statistics Registrars to form the Canadian Vital Statistics—Death Database (CVSD). The Canadian Vital Statistics System is governed by the Vital Statistics Council for Canada (VSCC) since 1945. The VSCC is a collaboration 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