Canadian Cancer Statistics

2025

Government of Canada Gouvernement du Canada

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 previous 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 future publications, complete the evaluation form or email stats@cancer.ca.

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Executive summary

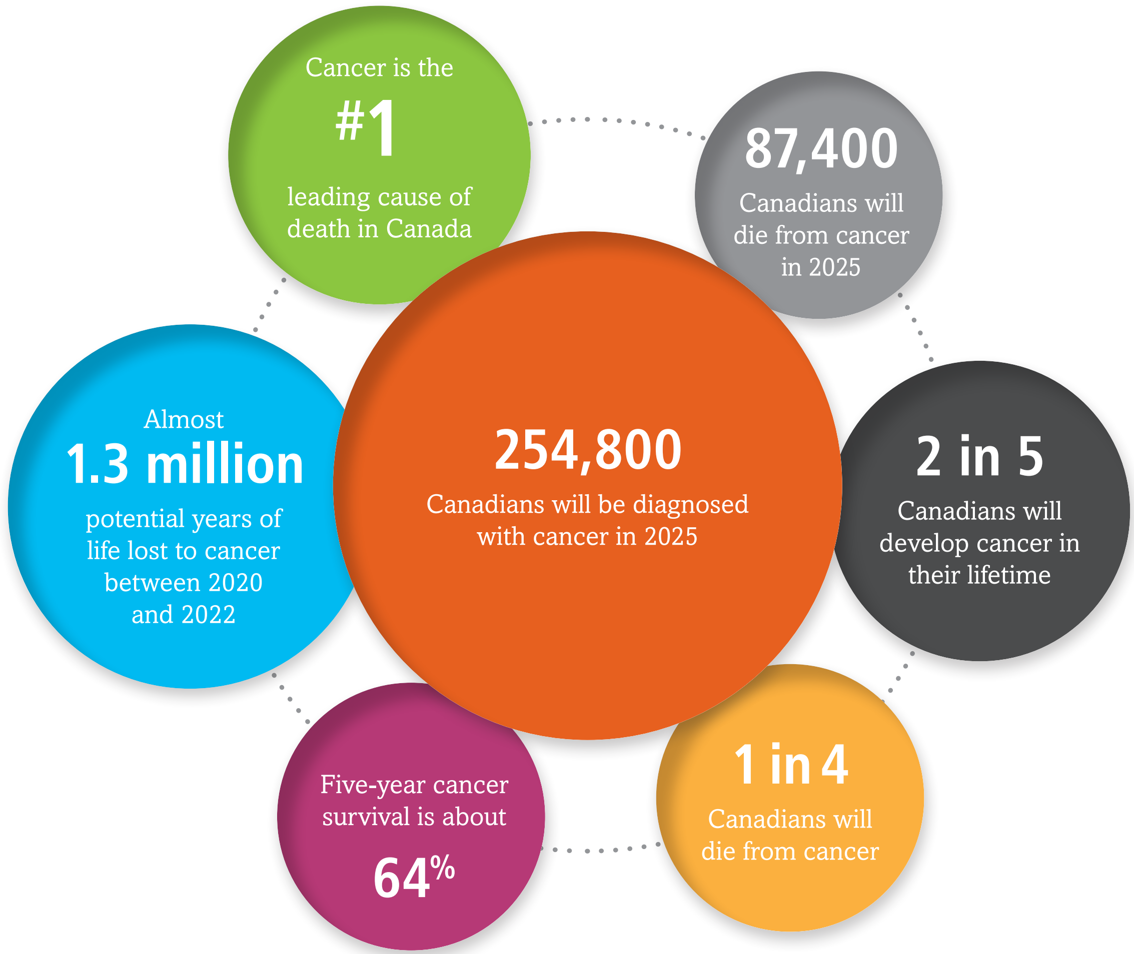
Canadian Cancer Statistics is a publication that provides comprehensive, up-to-date estimates of the impact of cancer in Canada.

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 2025 alone, it is expected that 254,800 people in Canada will be diagnosed with cancer and 87,400 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 the leading cause of death in Canada, and it is by far the leading cause of premature death. Almost 1.3 million potential years of life were lost from premature death due to cancer between 2020 and 2022.

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

- Lung cancer remains the leading cause of cancer death, and it is expected to account for more than 1 in 5 cancer deaths in Canada this year. 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.
- Considerable progress for other cancer types has also been observed in recent years, including declining death rates for bladder and stomach cancers in both sexes. Incidence and death rates for leukemia have also declined in recent years.
- As a result of the progress made with lung, colorectal and other cancers, cancer death rates have decreased 42% in males and 28% 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 estimates show that it has reached 64%.
- Survival has also increased for most cancer types with the largest increases observed for hematologic (blood) cancers.
- However, survival varies widely by the type of cancer and stage at diagnosis. Findings from Statistics Canada[1] revealed decreasing survival with increasing stage at diagnosis. For example, the estimated five-year net survival for lung cancer was 62% for those diagnosed at stage I, 39% for stage II, 16% for stage III and only about 3% for stage IV.

Perspectives of people affected by cancer

Anjum Karimi had screening mammography in 2012. The results showed that she had stage I breast cancer.

"My breast cancer was caught so early that I was able to come out of it very quickly. Getting screened is what saved me."

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

- Little progress has been made in reducing the mortality rate for pancreatic cancer over the last 20 years, and pancreatic cancer remains the third leading cause of cancer death.
- Liver and intrahepatic bile duct cancer incidence rates may be declining among males in recent years. However, a similar decline has not materialized for females. Concerningly, liver and intrahepatic bile duct cancers have very low survival.
- Cervical cancer is not one of the most common causes of cancer death for females in Canada, but each one of the 430 deaths expected in 2025 due to this cancer was potentially preventable. Continued efforts are needed to ensure access to and uptake of available prevention strategies, such as cervical screening and human papillomavirus (HPV) vaccination.
- While lung cancer incidence rates have been declining in both males and females, it is now expected that more females than males will be diagnosed with lung cancer in 2025. The survival outcomes by stage, particularly for lung cancer, remind us how critical early detection is for better outcomes for people affected by this cancer.

Measures of the impact of cancer in Canada are vital. 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. The information provided in this publication 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 people with cancer and their families.

The effect of the COVID-19 pandemic on cancer diagnosis and control is an important issue that is discussed in Chapter 4. At the time of analysis for this publication, incidence data up to 2021 and mortality data up to 2022 were available. The registration of new cancer cases in Canada may have been impacted by disruptions in screening and diagnostic services during the COVID-19 pandemic. The incidence projections presented here are based on validated historical data (up to 2019) and are meant to reflect the underlying cancer incidence trends in the population, rather than account for the likely changes in patterns of diagnosis due to the COVID-19 pandemic. Although the COVID-19 pandemic has had limited impact on cancer-specific mortality, its impacts on cancer control efforts are expected to have longer-term effects on outcomes like mortality.

We hope that our readers consider what these numbers and statistics 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.

Perspectives of people affected by cancer

At the peak of the COVID-19 pandemic, **Eli** was diagnosed with leukemia. His family faced countless trips to the hospital, emotional stress and the daunting task of taking care of a sick child. They also had the unique experience of navigating the healthcare system during lockdown.

"One of the biggest complicating factors was that we couldn't have our entire family in the same room," his father, **Michael Daykin**, says. *"My wife and I had to make the difficult decision that I wouldn't remain in the hospital with them. The thing about this experience is that you need to think about the patient, but also about your whole family. It was a very isolating experience for Katie and me."*

Notable new statistics

Compared with the last full *Canadian Cancer Statistics* publication in 2023, several new patterns have emerged. Notably:

- After increasing for decades, the incidence rate of melanoma in males has levelled off. Unfortunately, melanoma has not followed the same trend in females and the incidence rate is still notably on the rise.
- In the last full publication, trend analyses identified an increase in cervical cancer incidence in recent years. New data and analyses in this publication indicate that cervical cancer incidence is no longer decreasing after a long period of decline (between 1984 and 2005). Considerable variability in annual cervical cancer incidence rates over the more recent period (2005 onwards) was observed, which underscores the need for continued monitoring of this issue.
- Lung cancer incidence rates have declined in recent years for each of the sexes, but more females (17,500) than males (15,400) are expected to be diagnosed with lung cancer in 2025.
- In recent years, the lung cancer mortality rate has been declining faster than that of most other cancer types. Despite this, lung cancer remains the leading cause of cancer death in Canada. In 2025, more than 1 in 5 cancer deaths are expected to be due to lung cancer, while in previous years about 1 in 4 cancer deaths were due to the disease.

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 2025 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 selected types of cancer. 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 (2025). 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?

Continual 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 and mortality statistics

In the 2023 edition, incidence estimates were based on data to 2019. This edition of the publication uses incidence data up to 2021—the most recently available data released by Statistics Canada at the time of the analysis. However, the COVID-19 pandemic may have influenced the registration of new cases diagnosed in 2020. Therefore, new cancer cases diagnosed in 2020 were excluded in some analyses to minimize potential biases in estimation due to temporary anomalies in 2020 data. As a result, incidence projections in this publication are based on updated data to 2019. (The exception is for Quebec: cancer incidence data submitted to the Canadian Cancer Registry were up to 2017 at the time of this publication and incidence was projected from 2018 to 2025.) Analyses of cancer incidence trends use data up to 2021 but exclude the 2020 data year. These data provide the opportunity to examine recent trends in cancer incidence in Canada, which are presented in Chapter 1.

Estimates of cancer mortality in the 2023 publication were based on data up to 2020. At time of analysis for this new edition, Statistics Canada had released cancer mortality data up to 2022, which 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 2025 were based on mortality data to 2022.

Survival data in Chapter 3 are based on the same years of data (up to 2017) as in the 2021 and 2023 publications. We have included findings from published Canadian literature on cancer survival,[4–6] including the cancer survival index and survival by stage.

Box 2 Projecting the cancer burden to 2025

This publication strives to provide the most up-to-date statistics. However, because time is required for reporting, collating, verifying, analyzing and publishing surveillance data, the most recent data available are several years behind the publication year. For this publication, actual cancer incidence data up to 2021 (except Quebec and Nova Scotia, for which cancer incidence data were available to 2017 and 2019, respectively) and cancer death data up to 2022 were available at the time of analysis.

The COVID-19 pandemic disrupted screening and diagnostic services, which may have impacted the registration of new cancer cases in Canada. Therefore, the incidence projections to 2025 are based on validated historical data (up to 2019) and are meant to reflect the underlying cancer incidence trends in the population, not the likely changes in diagnosis patterns due to the COVID-19 pandemic. (The exception is for Quebec: cancer incidence data submitted to the Canadian Cancer Registry were up to 2017 and incidence was projected from 2018 to 2025.)

The mortality projections presented here are also based on quality historical data and include data up to 2022. To date, the COVID-19 pandemic has had limited impact on cancer mortality, but its impact may be observed over time. These potential impacts are discussed further in Chapter 4.

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.

2. Change in standard population

In each edition, incidence and mortality rates are standardized to a common age structure to account for differences in the age distribution of populations and enable comparisons of rates over time and between populations. A notable change for this year's edition is that incidence and mortality rates are now standardized to the 2021 Canadian standard population, whereas they were standardized to the 2011 Canadian standard population in previous editions (2016 to 2024). As a result, the age-standardized rates reported in this edition will generally appear higher than those reported in previous editions. This does not necessarily mean there has been a sudden increase in the historical rate of cancer diagnosis or death, nor in the risk for developing or dying from cancer. Instead, it reflects the fact that the 2021 Canadian population has a higher proportion of people in older age groups, in which cancer is more common, than the 2011 population.(7) The change in standard population was made this year to more accurately reflect the current age structure of the Canadian population and to align with the efforts of other health organizations, including Statistics Canada. The rates in this publication should not be compared to previous editions, nor should they be compared to rates standardized to different populations (e.g., between countries that use different standard populations). The supplemental data file includes incidence and mortality rates, standardized to the 2021 Canadian population, from 1984 onwards for all cancer types included in this edition to support our readers so they do not need to refer to previous editions.

3. New labelling for two cancer types: brain and other nervous system cancers and myeloma

Previous editions of *Canadian Cancer Statistics* had used the older labels "brain and central nervous system (brain/CNS)" and "multiple myeloma." To align with the labelling used by Statistics Canada and other cancer surveillance and reporting agencies, "brain and other nervous system" and "myeloma" will be used for this publication. The definitions for these cancer types have not changed.

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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

- Cancer continues to impact a larger number of people in Canada each year. This trend is largely driven by the growing and aging population.
- It is estimated that 42% of people in Canada will be diagnosed with cancer in their lifetime.
- 254,800 new cases of cancer are expected to be diagnosed in Canada in 2025. The number of cases expected in males (131,800) is higher than in females (122,900).
- Together, the four most commonly diagnosed cancers (lung, breast, prostate and colorectal cancers) are expected to account for about 48% of all cancers diagnosed in 2025.
- 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 people 50 years of age and older.
- Quebec is expected to have the highest cancer incidence rate, followed by Newfoundland and Labrador. British Columbia is expected to have the lowest cancer incidence rate of all the provinces.
- Overall, cancer rates have declined -1.2% annually since 2011 for males and -0.4% annually since 2012 for females.
- Since 2016, the incidence rate for melanoma skin cancer stopped increasing in males, but it continues to increase in females. This is a largely preventable cancer.

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 people in Canada will develop cancer at some point during their lifetime. These estimates are based on only the last year of available data (i.e., 2021 for this publication, excluding Quebec and Nova Scotia) and therefore may vary from year to year and between publications.

- 42% of people in Canada are expected to be diagnosed with cancer in their lifetime (Figure 1.1).
- The probability of developing cancer is the same for males and females.

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

- The lifetime probability of developing breast, prostate, colorectal or lung cancer remains high.
- 1 in 9 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.
- Considering males and females together, 1 in 16 people in Canada is expected to be diagnosed with lung cancer and 1 in 18 is expected to be diagnosed with colorectal cancer in their lifetime.

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).

FIGURE 1.1 Lifetime probability of developing cancer, Canada (excluding Quebec and Nova Scotia*), 2021

Analysis by: Centre for Population Health Data, Statistics Canada
Data sources: Canadian Cancer Registry and Canadian Vital Statistics Death database at Statistics Canada

* Quebec and Nova Scotia are excluded because cases diagnosed in Quebec from 2018 onward and cases diagnosed in Nova Scotia from 2020 onward 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 2021. 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.

Projected new cancer cases in 2025

The cancer incidence data used for this publication were from 1984 to 2021 (1984 to 2017 for Quebec and 1984 to 2019 for Nova Scotia). Data from 1995 to 2019 were used to project rates and counts to 2025. These were the most recent data that were available and not affected by the pandemic when analyses began.

An estimated 254,800 new cases of cancer are expected to be diagnosed in Canada in 2025 (Table 1.2).

Lung cancer is expected to be the most commonly diagnosed cancer in Canada with an estimated 32,900 cases in 2025. It is followed by breast cancer (31,900), prostate cancer (30,400) and colorectal cancer (26,400).

- The four most commonly diagnosed cancers are expected to account for about half (48%) of all cancers diagnosed in 2025.

Every day in 2025, nearly 700 people are expected to be diagnosed with cancer in Canada.

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 (131,800) than females (122,900) are expected to be diagnosed with cancer in 2025.
- The age-standardized incidence rate (ASIR) in males (663.6 per 100,000) is expected to be about 19% higher than in females (557.4 per 100,000).
- A greater number of females (17,500) than males (15,400) are expected to be diagnosed with lung cancer in 2025.
- The rate at which cancer is diagnosed is expected to be higher in males than in females for all cancer types except breast and thyroid cancers.

Figure 1.2 shows the expected distribution of cancer cases in males and females in 2025.

- In males, prostate cancer is expected to be the most commonly diagnosed cancer, accounting for more than 1 in 5 (23%) new cases. It is followed by lung cancer (12%), colorectal cancer (11%), bladder cancer (7%) 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 (10%), uterine cancer (7%) and non-Hodgkin lymphoma (4%).

FIGURE 1.2 Percent distribution of projected new cancer cases, by sex, Canada, 2025

Males 131,800 new cases		Females 122,900 new cases	
Prostate	23.1%	Breast	25.7%
Lung and bronchus	11.7%	Lung and bronchus	14.2%
Colorectal	11.2%	Colorectal	9.5%
Bladder	7.2%	Uterus (body, NOS)	7.0%
Non-Hodgkin lymphoma	5.2%	Non-Hodgkin lymphoma	4.2%
Melanoma	4.6%	Thyroid	4.0%
Kidney and renal pelvis	4.6%	Melanoma	3.8%
Head and neck	4.4%	Pancreas	2.8%
Leukemia	3.2%	Kidney and renal pelvis	2.5%
Pancreas	2.9%	Bladder	2.5%
Liver and intrahepatic bile duct	2.5%	Ovary	2.5%
Stomach	2.0%	Leukemia	2.2%
Myeloma	1.9%	Head and neck	1.9%
Esophagus	1.6%	Myeloma	1.5%
Thyroid	1.5%	Cervix	1.3%
Brain and other nervous system	1.5%	Liver and intrahepatic bile duct	1.2%
Testis	1.0%	Stomach	1.2%
Soft tissue (including heart)	0.7%	Brain and other nervous system	1.1%
Hodgkin lymphoma	0.5%	Soft tissue (including heart)	0.6%
Breast	0.2%	Esophagus	0.5%
All other cancers	8.6%	Hodgkin lymphoma	0.4%
		All other cancers	9.4%

NOS=not otherwise specified

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 2021 Canadian standard population. In this publication, ASIR is also referred to as "incidence rate."

Projected incidence

Actual cancer incidence data were available to 2021 for all provinces and territories except Quebec (data were available to 2017) and Nova Scotia (data were available to 2019). Data from 1995 to 2019 were used to project cancer incidence to 2025, as these were the most recent data available that were not affected by the pandemic when the analyses began.

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

Incidence by age

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

- Cancer rates peak in males and females aged 85–89 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 20 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 2025.

- 9 in 10 cancers in Canada are expected to be diagnosed in people aged 50 years and older.
- Of all cancers diagnosed, a projected 1,000 cases (<1%) will be diagnosed in children (aged 0–14 years) and 9,700 (almost 4%) in adolescents and young adults (aged 15–39 years), while 168,400 (66%) will be diagnosed in seniors (aged 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 (52%) of colorectal cancer cases are expected to occur in people who fall within the age covered by the screening guidelines (aged 50–74 years) in Canada.[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 35% of breast cancer cases will be diagnosed in females aged 30–59 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 (blood) 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.

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

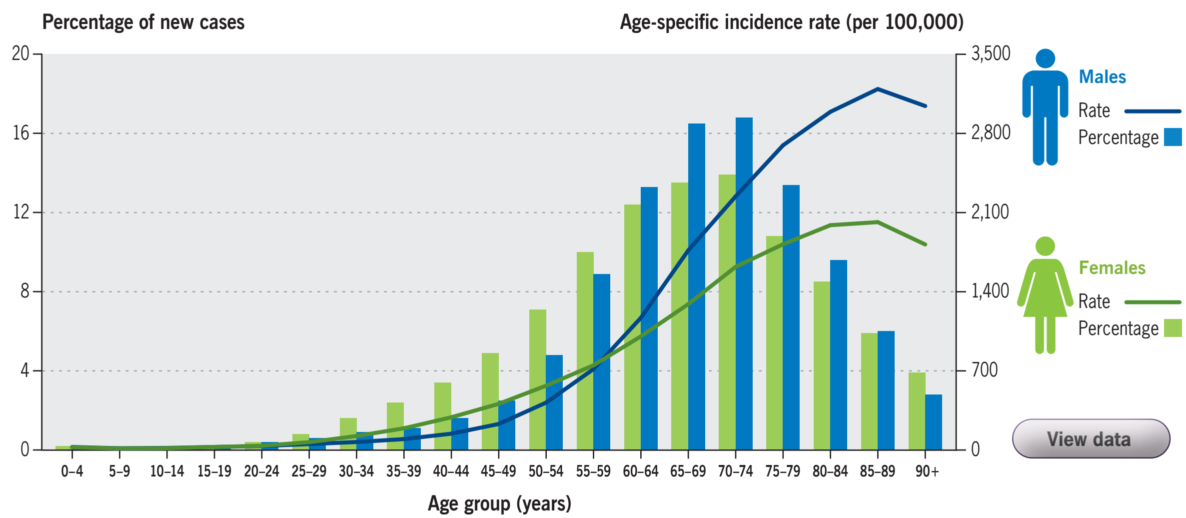
- In the youngest age group (children, aged 0–14 years), the most commonly diagnosed cancers were leukemia (33%), followed by central nervous system (CNS) cancers (18%), lymphoma (14%), neuroblastoma and other peripheral nervous cell tumours (7%) and soft tissue (6%).

Perspectives of people affected by cancer

Alex Hajjar was diagnosed with Hodgkin lymphoma when he was in high school. He is now cancer-free and volunteers on the Youth Prevention Team. He visits schools and summer camps to teach kids how they can prevent cancer.

"I've been through cancer myself and if I have any capacity to avoid—or help others avoid—the disease, I am going to take all possible steps."

FIGURE 1.3 Percentage of new cases and age-specific incidence rates for all cancers, by age group and sex, Canada (excluding Quebec and partially Nova Scotia*), 2018–2021†



* Quebec is excluded from 2018–2021 and Nova Scotia is excluded from 2020–2021 because cases diagnosed in Quebec from 2018 onward and cases diagnosed in Nova Scotia from 2020 onward had not been submitted to the Canadian Cancer Registry at the time of analysis.

† New cancer cases diagnosed in 2020 were excluded to minimize potential biases in estimation due to temporary anomalies in 2020 data.

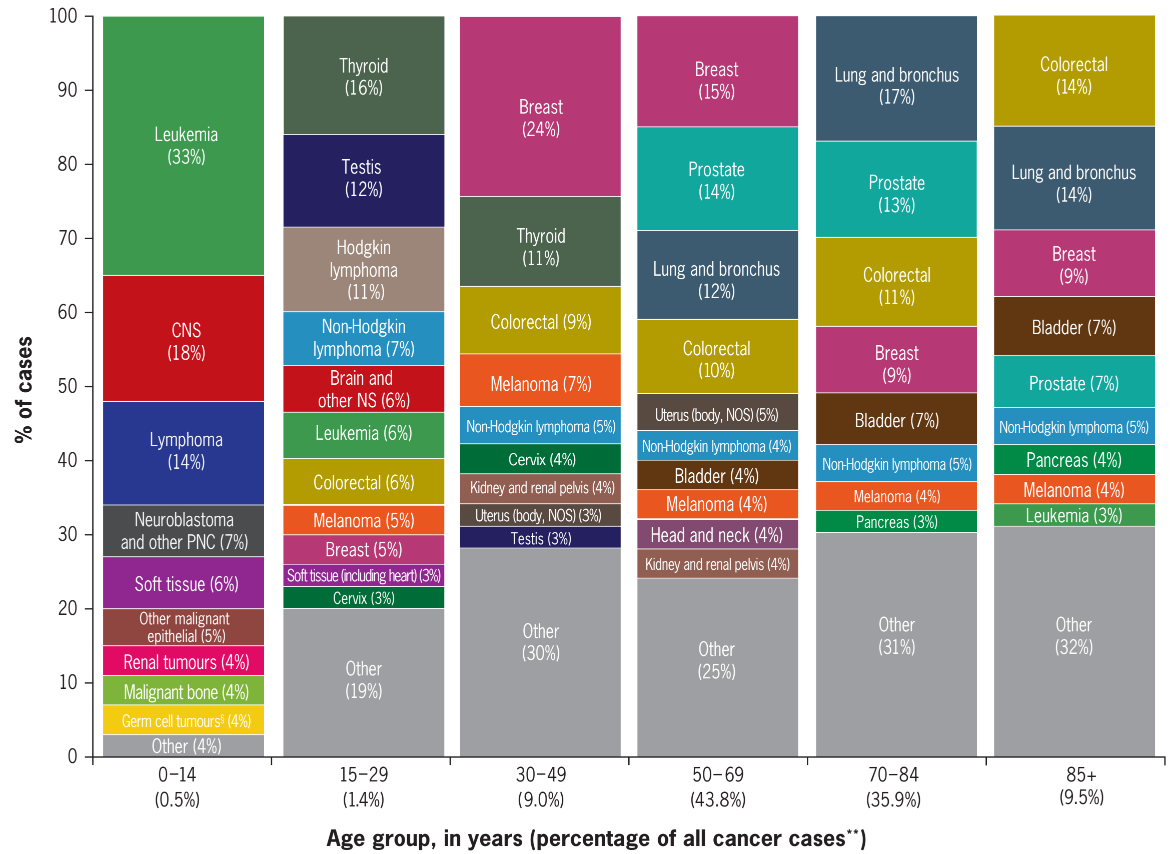
Analysis by: Centre for Population Health Data, Statistics Canada

Data source: Canadian Cancer Registry database at Statistics Canada

- Among people aged 15–29 years, the most commonly diagnosed cancers were thyroid (16%), testicular (12%), Hodgkin lymphoma (11%) and non-Hodgkin lymphoma (7%).
- In people aged 30–49 years, the most commonly diagnosed cancers in Canada were breast (24%), thyroid (11%), colorectal (9%) and melanoma (7%).
- Between the ages of 50 and 84 years, lung, breast, colorectal and prostate 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.

FIGURE 1.4 Distribution of new cancer cases for selected* cancers, by age group, Canada (partially excluding Quebec and Nova Scotia†), 2016–2021‡



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

* 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 percentages for each age group may not sum to 100.

† Quebec is excluded from 2018–2021 and Nova Scotia is excluded from 2020–2021 because cases diagnosed in Quebec from 2018 onward and cases diagnosed in Nova Scotia from 2020 onward had not been submitted to the Canadian Cancer Registry at the time of analysis.

‡ New cancer cases diagnosed in 2020 were excluded to minimize potential biases in estimation due to temporary anomalies in 2020 data.

§ Also includes trophoblastic tumours and neoplasms of gonads.

** The relative percentage is calculated based on the total number of cancer cases over five years (2016–2021 excluding 2020) 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 2025. 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.

- Quebec is expected to have the highest cancer incidence rate, followed by Newfoundland and Labrador.
- British Columbia is expected to have the lowest cancer incidence rate.

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.

- Quebec is expected to have the highest ASIR in males (727.4 per 100,000) and females (618.4 per 100,000). These numbers reflect that Quebec is projected to have the highest rates for three of the most commonly diagnosed cancers (lung, breast and prostate).
- For males and females, the highest rates of colorectal cancer are expected in Newfoundland and Labrador (116.8 per 100,000 and 71.4 per 100,000, respectively). For males, colorectal cancer rates are expected to be the lowest in Alberta (64.0 per 100,000), while they will be lowest for females in Saskatchewan (42.6 per 100,000).
- The rates of prostate cancer across the country are expected to range from a low of 137.0 per 100,000 in New Brunswick to a high of 169.7 per 100,000 in Quebec.
- Rates of breast cancer in females are expected to be lowest in New Brunswick (125.5 per 100,000) and highest in Quebec (166.1 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, data collection and data availability. For example, projections for Quebec are based on data up to 2017, while data up to 2019 were available for other provinces and territories, which could have influenced Quebec's ranking.

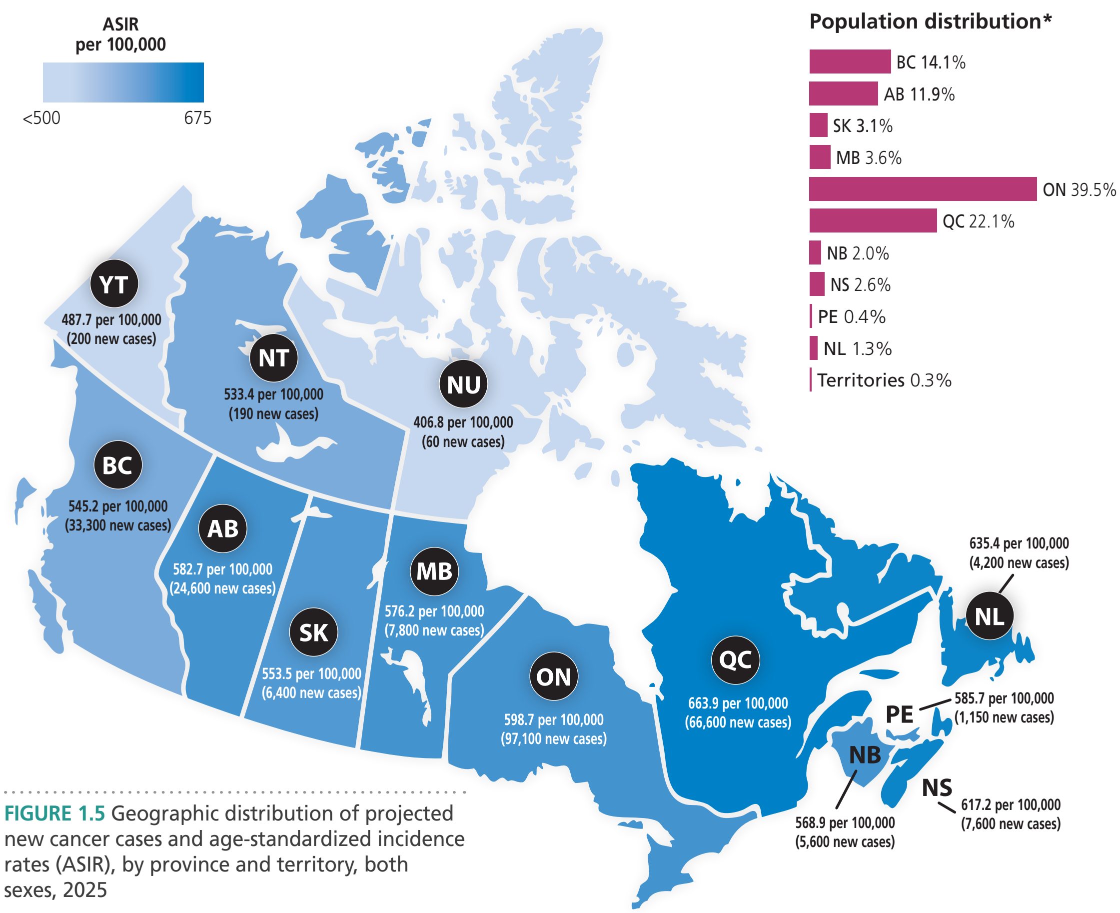


FIGURE 1.5 Geographic distribution of projected new cancer cases and age-standardized incidence rates (ASIR), by province and territory, both sexes, 2025

* Based on projected estimates of population size in 2025.

Note: Rates are age-standardized to the 2021 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

Importantly, these estimates do not include a measure of precision, such as confidence intervals or p-values, so it cannot be determined 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.

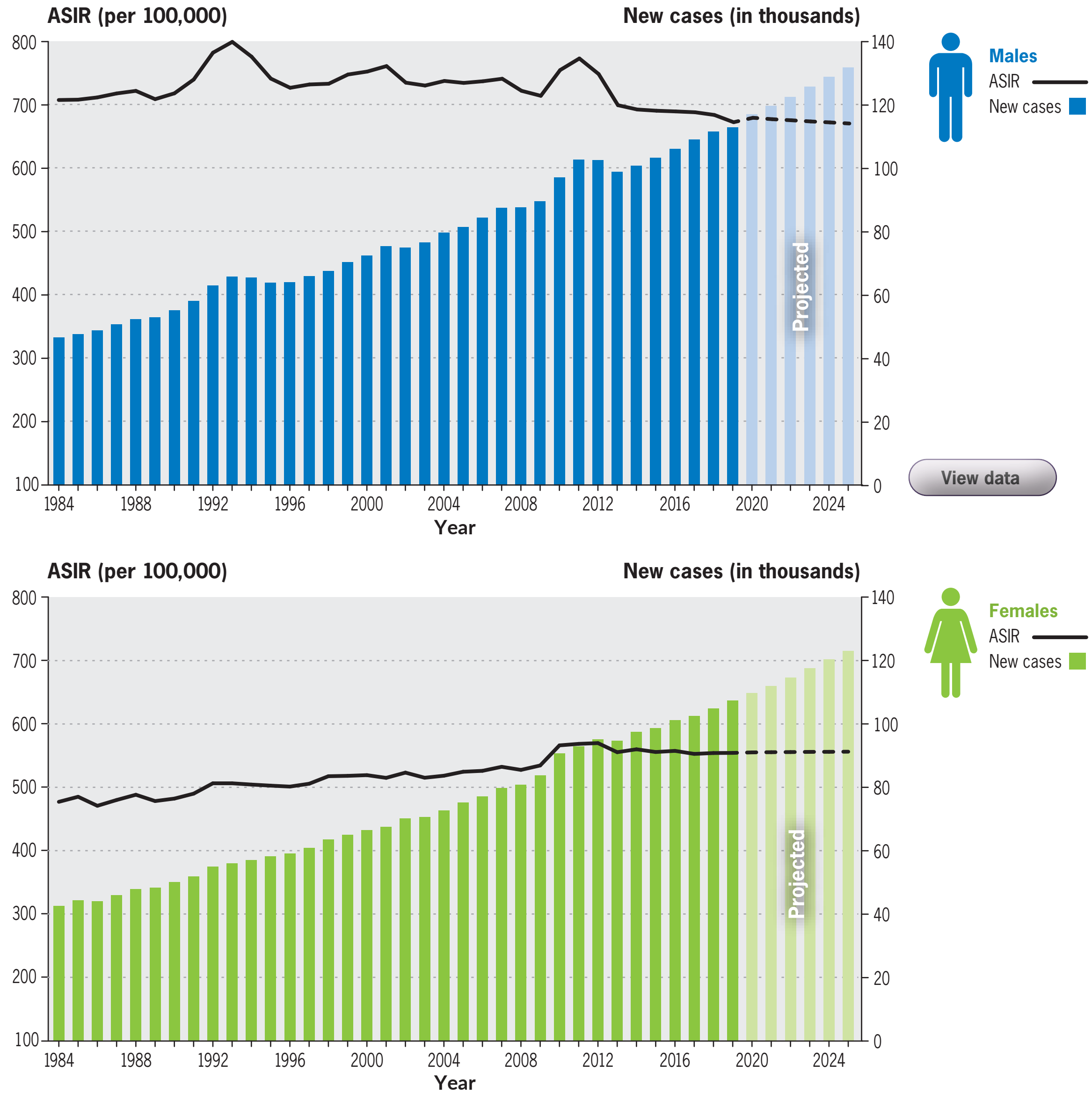
Incidence over time

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 700.2 per 100,000 and is projected to be 663.6 per 100,000 in 2025, which is a decrease of about 5%. For females, it was 478.1 in 1984 and is projected to be 557.4 per 100,000 in 2025, which is an increase of about 17%.
- The number of new cases diagnosed each year rose steadily, from 46,700 in 1984 to a projected 131,800 in males in 2025, and from 42,500 to a projected 122,900 in females. The steady increase in the number of new cases diagnosed each year is primarily due to the growing and aging population in Canada.[2–5]
- The difference in cancer rates between males and females has been narrowing over time. 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.

FIGURE 1.6 New cases and age-standardized incidence rates (ASIR) for all cancers, Canada, 1984–2025



Note: Rates are age-standardized to the 2021 Canadian standard population. Actual incidence data were available up to 2019 in each province and territory except Quebec (2017 was the latest data year submitted to the Canadian Cancer Registry for this province at the time of analysis). Projected case counts for Quebec in 2018 and 2019 were used to facilitate the calculation of national estimates for these years. Estimates for 2020–2025 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 Incidence Reporting System at Statistics Canada

Average annual percent change (AAPC)

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.

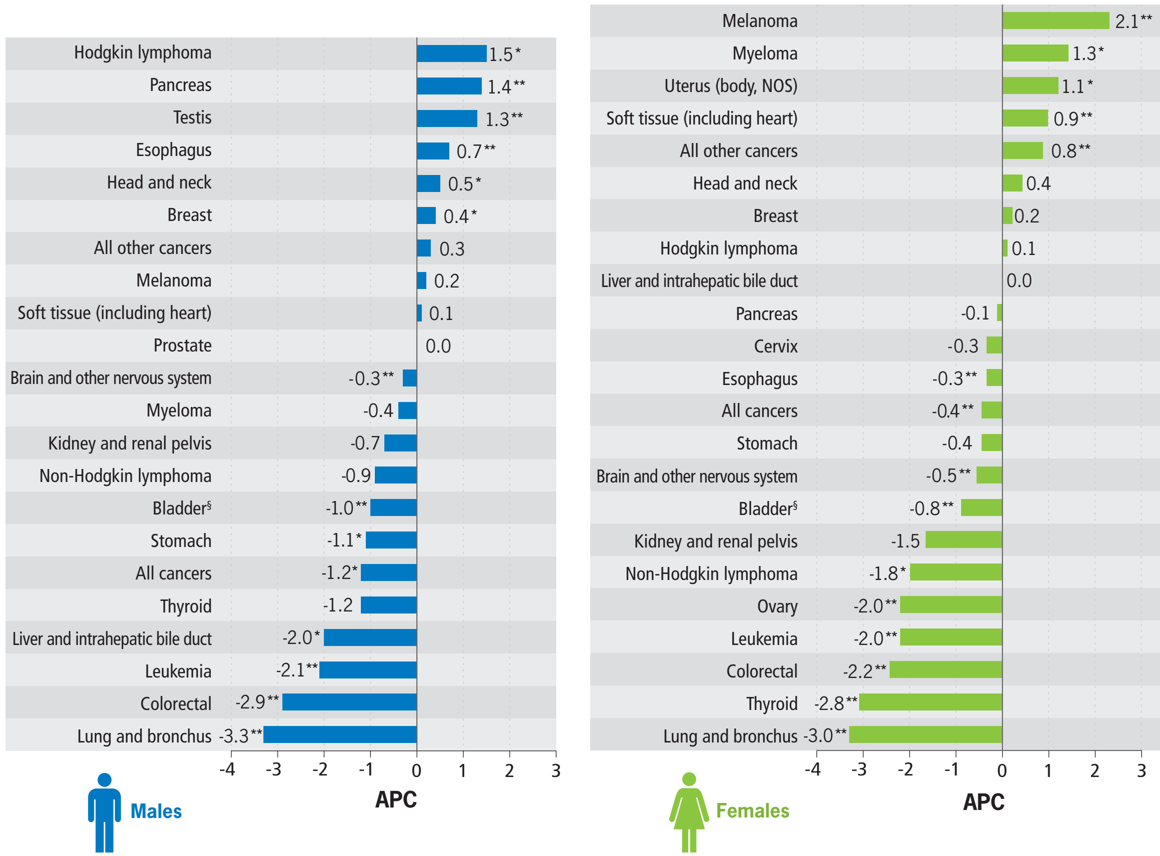
Statistical significance

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 and partially Nova Scotia‡), 1984–2021



† The APC was calculated using the Joinpoint Regression Program where data for 2020 is removed as an anomaly and rates age-standardized to the 2021 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 2021. Otherwise, the APC reflects the trend in rates over the entire period (1984–2021). For further details, see *Appendix II: Data sources and methods*.

‡ Quebec is excluded because cases diagnosed in Quebec from 2018 onward had not been submitted to the Canadian Cancer Registry at the time of analysis. Additionally, data for 2021 exclude cases diagnosed in Nova Scotia as these cases had also 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 (version 5.2.0.0) 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 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

NOS=not otherwise specified

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

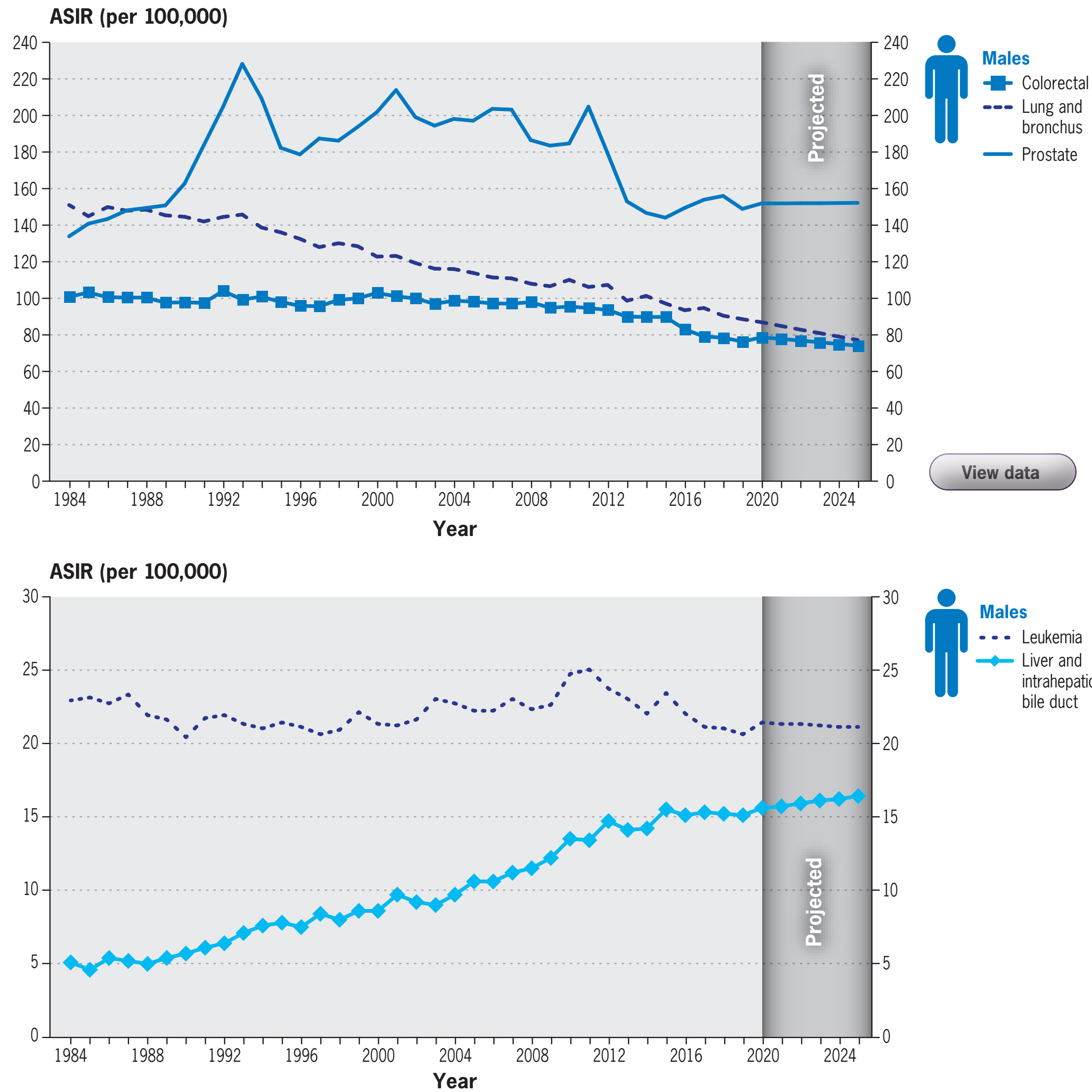
** APC differs significantly from 0, $p<0.001$

Recent trends

Table 1.6 provides details on trends between 1984 and 2021 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, most recent significant decreases in incidence rates were observed for lung cancer (-3.3% per year since 2014), colorectal cancer (-2.9% per year since 2011), leukemia (-2.1% per year since 2011) and liver and intrahepatic bile duct cancers (-2.0% per year since 2015).
- In females, the largest, most recent significant decreases in incidence rates were observed for lung cancer (-3.0% per year since 2016), thyroid cancer (-2.8% per year since 2012), colorectal cancer (-2.2% per year since 2012), leukemia (-2.0% per year since 2010) and ovarian cancer (-2.0% per year since 2013).
- The incidence rate for cervical cancer stopped decreasing after a long period of decline (1984–2005).

FIGURE 1.8 Age-standardized incidence rates (ASIR) for selected* cancers, males, Canada, 1984–2025



Analysis by: Centre for Population Health Data, Statistics Canada

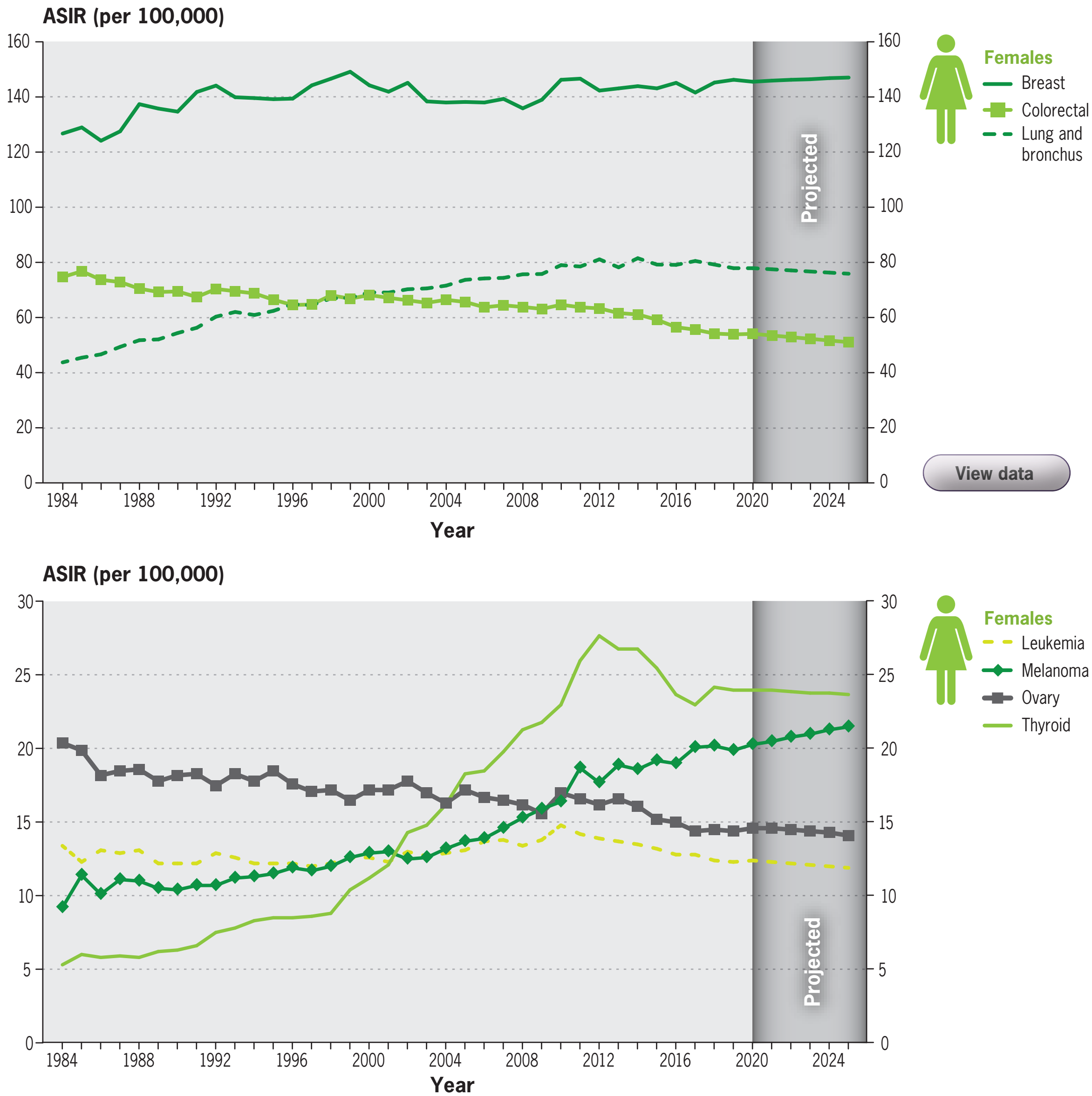
Data sources: Canadian Cancer Registry database at Statistics Canada and National Incidence Reporting System at Statistics Canada

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

Note: Rates are age-standardized to the 2021 Canadian standard population. Actual incidence data were available up to 2019 in each province and territory except Quebec (2017 was the latest data year submitted to the Canadian Cancer Registry for this province at the time of analysis). Projected case counts for Quebec in 2018 and 2019 were used to facilitate the calculation of national estimates for these years. Estimates for 2020–2025 are projected. For further details, see *Appendix II: Data source and methods*. The range of scales differs widely between the figures. The complete definition of the specific cancers included here can be found in Table A1.

- The largest, most recent significant increase in males was observed for Hodgkin lymphoma (1.5% per year since 2012). In females, melanoma cancer increased the most (2.1% per year since 1994).
- Recent trends show that the incidence rate for liver and intrahepatic bile duct cancer rose steeply in both sexes since 1984, but it has levelled off in females since 2012 and has decreased -2.0% per year in males since 2015.

FIGURE 1.9 Age-standardized incidence rates (ASIR) for selected* cancers, females, Canada, 1984–2025



Analysis by: Centre for Population Health Data, Statistics Canada

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

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

Note: Rates are age-standardized to the 2021 Canadian standard population. Actual incidence data were available up to 2019 in each province and territory except Quebec (2017 was the latest data year submitted to the Canadian Cancer Registry for this province at the time of analysis). Projected case counts for Quebec in 2018 and 2019 were used to facilitate the calculation of national estimates for these years. Estimates for 2020–2025 are projected. For further details, see *Appendix II: Data source and methods*. The range of scales differs widely between the figures. The complete definition of the specific cancers included here can be found in Table A1.

Long-term trends

Longer-term trends provide additional context for understanding the achievements and challenges in reducing cancer incidence. Table 1.6 shows trends in incidence rates between 1984 and 2021 for all cancers and by cancer type.

- In males, the overall cancer incidence rate increased slowly until the early 1990s (1.0% per year) and then stabilized (-0.2% per year). Since 2011, the rate has decreased -1.2% per year.
- In females, the overall cancer incidence rate 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 incidence rate has been decreasing slightly in females (-0.4% per year).

Figures 1.8 and 1.9 show the ASIR over time (projected to 2025) 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: leukemia in both sexes; liver and intrahepatic bile duct in males; and melanoma, 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.

Lung and bronchus (lung) cancer

In males, the incidence rate for lung cancer has decreased since 1990. Since 2014, the lung cancer incidence rate in males has decreased -3.3% per year, which is a steeper decline than previously reported. In 2025, the age-standardized incidence rate in males is projected to be 49% lower than it was in 1984. In females, the lung cancer incidence rate increased significantly between 1984 and 2016, but more slowly in later years (Table 1.6). Since 2016, the rate has declined -3.0% per year. Currently, the incidence rate for lung cancer in Canada is declining faster than for any other reported cancer type, and this rate of decline is similar between males and females.

Historical differences in trends for lung cancer incidence rates in males and females largely reflect past differences in tobacco smoking.[6] 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.[7] In females, the drop in tobacco smoking did not happen until the mid-1980s. Therefore, lung cancer rates in females only started to decrease more recently. Other high-income countries with established tobacco control programs, such as the United States and United Kingdom, report similar trends.[8,9]

Lung cancer remains the most commonly diagnosed cancer in Canada. Continued efforts to reduce exposure to known and emerging risk factors are essential to sustain the progress made in reducing lung cancer incidence, as discussed in Chapter 4. For instance, about 3.5 million (11%) Canadians aged 15 years and older continue to smoke cigarettes on a daily basis, which highlights the need to control the use of commercial tobacco.[10–12] In addition, the rise of vaping or e-cigarette use among youth and young adults is a growing health concern[13–18], with a high proportion of Canadian youth and young adults having ever vaped.[19] Though definitive data are presently lacking, vaping or e-cigarette use may increase lung cancer risk.[20] This is because e-cigarettes and vaping fluids contain definite and probable carcinogens and produce fine particulate matter ($PM_{2.5}$), which is a well-established risk factor for lung cancer.[21,22] Long-term exposure to environmental risk factors, including radon, asbestos, air pollution and arsenic in well drinking water, has also been shown to increase the risk for lung cancer.[23–28] Radon is a naturally radioactive gas that can concentrate to high and cancer-causing levels in indoor air. It is the second leading cause of lung cancer (after smoking), and it is the number one cause of lung cancer among non-smokers.[23,29–31] Approximately 25% of lung cancers in non-smokers have been attributed to residential radon exposure.[32] Long-term exposure to radon increases lung cancer risk and is known to elevate lung cancer risk even higher (i.e., have a synergistic effect) with other risk factors, including smoking and vaping.[22,31,33–35]

Lung cancer rates are declining at similar rates for both males and females.

Breast cancer (female)

In Canada, the breast cancer incidence rate in females rose 2.2% per year until 1991 and then declined -0.3% per year until 2006. Since then, the rate has increased at 0.2% per year. Similar increases in breast cancer rates have been observed in recent years in several other regions of the world.[36–38] The increases have impacted all age groups, but women younger than 50 years of age in particular.[38] A recent study reporting on age-specific trends confirms the higher magnitude annual increases in the incidence rate for breast cancer amongst younger women in Canada.[39] For women in their 20s, the rate rose 3.1% per year between 2001 and 2019; for those in their 30s, the rate increased 1.3% per year between 2009 and 2019; and for those in their 40s, the rate increased 0.8% per year between 2015 and 2019. The factors behind the increasing trends have yet to be identified. However, research suggests that obesity, alcohol consumption and sedentary behaviour, all of which have been increasing globally, as well as late age at first birth, could be responsible for the increasing incidence rate.[36,38,40]

Colorectal cancer

On average, colorectal cancer incidence rates decreased -1.1% per year between 1984 and 2021 for both sexes combined. The rates fluctuated slightly over time. However, since 2011, colorectal cancer incidence rates have declined -2.9% per year in males, and they have declined -2.2% per year in females since 2012. The rate of decline in more recent years 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.[41,42] 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,[43–45] the United States[46] and several other high-income countries.[47,48] The reported increase of colorectal cancer risk among younger adults may reflect increases in poor diet, sedentary lifestyle and obesity rates in post-baby boomer generations.[44,48]

Perspectives of people affected by cancer

Alexis Juliao was diagnosed with stage I colon cancer at the age of 35, when she was a young mom. Her diagnosis came as a shock because she had no family history of cancer.

"It may have been easy to dismiss bleeding since I had just recently had a baby, but working in healthcare I understood that what I was experiencing was abnormal and I had concerns about my symptoms."

Prostate cancer

The incidence rate for prostate cancer increased rapidly from 1984 to 1993 (5.7% per year), levelled off, and then declined steeply from 2008 to 2014 (-5.9% 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.[49] The US Preventive Services Task Force advised against PSA screening in men over 75 years of age in 2008, then in asymptomatic men of all ages in 2011, and then to shared decision-making with a physician for men aged 55-69 years in 2018. Canada released similar guidelines in 2014.[50,51] The considerable decline in prostate cancer following changes in PSA testing guidelines has also been reported in the US.[9,52]

Liver and intrahepatic bile cancer

In males, the incidence rate for liver and intrahepatic bile duct cancer has decreased -2.0% per year since 2015, following a sustained and steep rise dating since 1984. A similar annual decrease in the incidence rate has not yet happened in females, though the rate has levelled off since 2012. Similar trends have been reported globally,[53] although the latest statistics for the US continue to show a 2.0% annual increase in the rate among females.[9] Furthermore, using disaggregated data for liver and intrahepatic bile duct cancers, a recent study suggested that the declining rate for liver cancer in the US could be largely driven by a decrease in early-onset liver cancers (when the disease develops in people 20–49 years of age).[54] The most common type of liver cancer, hepatocellular carcinoma (HCC), has been associated with chronic viral hepatitis B and C infection, heavy alcohol use and non-alcoholic fatty liver disease.[53] Smoking and consuming grains and legumes contaminated by certain moulds that produce aflatoxins also increase the risk for liver cancer.[55–57] Based on 2015 data, it is estimated that about 24% of liver cancers diagnosed in Canada could be attributable to smoking; 23% could be attributable to viral hepatitis infections; 9% could be linked to living with excess weight; and 4% could be attributable to alcohol consumption.[58]

Leukemia

Trends in the incidence rate for leukemia varied between 1984 and 2021. 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 -2.1% 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 -2.0% annually. A similar trend in the incidence rate for leukemia has been reported in the US[9,59] and globally between 1990 and 2017, though the rate of decline varies between countries and leukemia subtypes.[60,61] 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).[62] 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.[60,63]

Melanoma

Between 1984 and 2016, the incidence rate for melanoma increased an average of 2.5% per year in males, but they have levelled off since then. Among females, melanoma continues to have the fastest rising incidence rate of all reported cancer types, increasing 2.1% per year since 1994. Similar trends are reported in the US.[9,64] Globally, melanoma has seen one of the fastest expansions in incidence among cancers in developed countries.[9,64–66] However, in countries with historically high rates of melanoma, recent trends have been favourable in adults aged 20–44 years, a shift attributed to changing lifestyle and increased awareness of skin cancer and how to prevent it.[67] Exposure to ultraviolet (UV) radiation through sunlight, tanning beds, tanning booths or sun lamps is a well-established risk factor for melanoma, in addition to sunburns and cumulative sun damage.[68–70] Past increases in sun exposure without adequate sun safety likely account for the continued global rise in melanoma rates.[71] In Canada, there are notable geographic variations in melanoma incidence and mortality rates. Nova Scotia and Prince Edward Island have the highest rates, and it is believed that increased sun exposure rather than low awareness or lower use of sun protection in these provinces partly explains this trend.[72,73] These provinces also have among the highest percentage of individuals with a I or II skin type on the Fitzpatrick scale (i.e., skin always or easily burns and never tans or tans minimally), who are at a higher risk for melanoma.

Ovarian cancer

The incidence rate for ovarian cancer declined -1.5% per year between 1984 and 1996 and then levelled off until 2013. It has since been decreasing -2.0% per year. In 2025, the age-standardized incidence rate (ASIR) is projected to be 31% lower than in 1984. A similar decline has also been reported in most of Europe, North America and South America.[74–77] 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)[78,79] 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).[74,75,80] However, while the overall worldwide trends are decreasing, ovarian cancer is increasing among younger females in some countries.[76,81] The increasing prevalence of obesity, metabolic syndrome, estrogen exposure and nulliparity among younger females may be driving the rate upward in some countries.[75,76]

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 decreased -1.2% per year in males and -2.8% per year in females. These trends closely mirror those observed in the US and globally.[82,83] 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.[82–84] 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.[85,86] Therefore, the decline in rates reported in recent years may be linked to less aggressive diagnostic work-up of small thyroid tumours 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.[87] 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 cancer incidence rates between 1984 and 2021. 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 males, thyroid cancer (3.5%), liver and intrahepatic bile cancer (3.0%) and melanoma (2.2%) showed the largest increase in average AAPC from 1984 to 2021. During the same period, stomach cancer (-1.8%) and lung cancer (-1.8%) showed the largest decrease in AAPC. However, as discussed previously, most recent APC in incidence show that liver and intrahepatic bile duct cancer is declining -2.0% annually since 2015, thyroid cancer is declining -1.2% since 2013, and the rate for melanoma has stabilized since 2016 (0.2% per year).
- In females, thyroid cancer (3.6%), liver and intrahepatic bile cancer (3.2%) and melanoma (1.6%) showed the largest increases in AAPC from 1984 to 2021. Stomach cancer (-1.6%) and cervical cancer (-1.4%) cancer showed the largest decreases during the same period. However, most recent trends point to a -2.8% annual decline for thyroid cancer in females since 2012, and a levelling off in the rate for liver and intrahepatic bile duct cancer since 2012. Unlike for males, the rate for melanoma has continued to increase 2.1% annually since 1994 in females. Since the early 2000s, the rates for both stomach cancer and cervical cancer has stabilized in females.

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.

It is estimated that approximately 42% of people in Canada 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 2025 alone, a projected 254,800 people in Canada will be diagnosed with cancer. An increased focus on primary prevention efforts should be employed to minimize the risk for 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.[88] 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.[89] 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.[90] 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 on the age continuum. For example, females are more likely than males to be diagnosed with cancer in between the ages of 20 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 under the age of 30, but these cancers have a significant and lasting impact on both the individuals and their caregivers.

Cancer incidence rates vary across the country. These data can help inform screening and support efforts in each jurisdiction. 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.

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 decrease in lung cancer incidence likely reflects success in tobacco control, and 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 the continuing rise in melanoma incidence among females. There are also moderate but persistent increases in other cancer types, including pancreatic and esophageal cancers in males and multiple myeloma and uterine cancer in females. 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 used throughout this chapter

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TABLE 1.1 Lifetime probability of developing cancer, Canada (excluding Quebec and Nova Scotia*), 2021

	Lifetime probability of developing cancer					
	%			One in:		
	Both sexes	Males	Females	Both sexes	Males	Females
All cancers†	**42.0**	**41.7**	**42.3**	**2.4**	**2.4**	**2.4**
Lung and bronchus	6.1	6.0	6.3	16	17	16
Breast	6.3	0.1	12.6	16	812	8
Prostate	—	11.6	—	—	9	—
Colorectal	5.5	5.8	5.3	18	17	19
Bladder	2.8	4.2	1.3	36	24	75
Non-Hodgkin lymphoma	2.4	2.7	2.1	41	37	47
Melanoma	2.2	2.4	2.0	45	41	51
Kidney and renal pelvis	1.5	2.0	1.1	65	51	93
Uterus (body, NOS)	—	—	3.4	—	—	29
Head and neck	1.6	2.2	1.0	63	46	101
Pancreas	1.6	1.6	1.5	65	62	67
Thyroid	1.1	0.6	1.6	91	157	64
Leukemia	1.4	1.7	1.2	69	59	85
Liver and intrahepatic bile duct	0.8	1.1	0.6	119	91	176
Myeloma	0.9	1.0	0.8	112	103	123
Stomach	1.0	1.2	0.8	100	81	132
Brain and other nervous system	0.6	0.7	0.6	155	137	177
Ovary	—	—	1.3	—	—	78
Esophagus	0.6	0.9	0.3	167	112	331
Soft tissue (including heart)	0.4	0.4	0.3	280	249	320
Cervix	—	—	0.6	—	—	159
Testis	—	0.4	—	—	230	—
Hodgkin lymphoma	0.2	0.3	0.2	438	395	495

— Not applicable; NOS=not otherwise specified

* Quebec and Nova Scotia are excluded because cases diagnosed in Quebec from 2018 onward and cases diagnosed in Nova Scotia from 2020 onward had not been submitted to the Canadian Cancer Registry.

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

Note: The probability of developing cancer is calculated based on age-, sex- and cancer-specific incidence and mortality rates for Canada excluding Quebec and Nova Scotia in 2021. 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 2025 (Table 1.2) for both sexes combined. "One in" estimates are based on unrounded probabilities.

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 selected cancers, by sex, Canada, 2025

	New cases (2025 estimates)			Cases per 100,000		
	Total*	Males	Females	Both sexes	Males	Females
All cancers†	**254,800**	**131,800**	**122,900**	**603.5**	**663.6**	**557.4**
Lung and bronchus	32,900	15,400	17,500	76.3	77.2	76.3
Breast	31,900	290	31,600	77.0	1.5	147.1
Prostate	30,400	30,400	—	—	152.2	—
Colorectal	26,400	14,700	11,700	62.2	74.1	51.6
Bladder	12,600	9,500	3,100	29.2	48.0	13.4
Non-Hodgkin lymphoma	12,000	6,800	5,200	28.3	34.2	23.2
Melanoma	10,800	6,100	4,700	25.6	30.8	21.5
Kidney and renal pelvis	9,100	6,000	3,100	21.9	30.4	14.1
Uterus (body, NOS)	8,600	—	8,600	—	—	40.6
Head and neck	8,100	5,800	2,300	19.5	29.5	10.4
Pancreas	7,100	3,800	3,400	16.7	19.0	14.6
Thyroid	6,900	2,000	4,900	16.9	10.0	23.7
Leukemia	6,800	4,200	2,700	16.1	21.1	11.9
Liver and intrahepatic bile duct	4,800	3,300	1,500	11.3	16.4	6.6
Myeloma	4,300	2,500	1,800	10.0	12.6	7.9
Stomach	4,100	2,700	1,450	9.6	13.4	6.3
Brain and other nervous system	3,300	1,950	1,400	8.0	9.7	6.5
Ovary	3,100	—	3,100	—	—	14.1
Esophagus	2,800	2,100	640	6.5	10.6	2.8
Soft tissue (including heart)	1,700	950	750	4.1	4.8	3.5
Cervix	1,650	—	1,650	—	—	8.0
Testis	1,300	1,300	—	—	6.4	—
Hodgkin lymphoma	1,150	650	530	2.9	3.2	2.5
All other cancers	23,000	11,400	11,500	53.7	58.4	50.7

— Not applicable; 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.

† "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 2021 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, 2025

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	**254,800**	**131,800**	**122,900**	**32,900**	**15,400**	**17,500**	**31,600**	**26,400**	**14,700**	**11,700**	**30,400**
0–14	1,000	540	450	—	—	—	—	5	—	5	—
15–29	3,000	1,450	1,600	15	10	10	160	260	110	150	—
30–39	6,700	2,400	4,300	100	40	65	1,400	500	260	250	10
40–49	14,300	4,900	9,400	490	190	300	3,900	1,300	690	630	360
50–59	30,900	14,100	16,800	2,000	950	1,100	5,800	3,200	1,850	1,350	3,400
60–69	69,200	37,800	31,400	9,200	4,100	5,100	8,500	6,500	3,900	2,500	11,600
70–79	77,300	43,100	34,200	12,400	6,000	6,400	7,600	8,200	4,700	3,400	10,500
80–89	42,200	22,800	19,400	7,200	3,500	3,700	3,400	5,200	2,700	2,500	3,700
90+	10,100	4,800	5,400	1,500	670	830	870	1,250	490	750	720
0–19	1,550	840	700	—	—	—	—	35	15	20	—
50–74	140,200	74,400	65,700	17,400	8,000	9,300	18,400	13,800	8,200	5,600	21,100
65+	168,400	92,400	76,000	26,600	12,600	14,000	16,200	18,200	10,100	8,100	21,800

— Fewer than 3 cases.

* "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, 2025

	Cases per 100,000										
	CA*	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL
Males											
All cancers†	**663.6**	**617.8**	**638.2**	**605.7**	**640.4**	**652.5**	**727.4**	**632.6**	**670.1**	**675.5**	**676.8**
Prostate	152.2	145.4	166.2	139.4	160.3	142.6	169.7	137.0	137.4	148.0	153.3
Lung and bronchus	77.2	62.3	67.8	67.4	64.8	63.6	109.5	92.5	90.2	95.7	85.8
Colorectal	74.1	74.8	64.0	67.5	71.2	67.2	85.4	73.6	76.9	85.7	116.8
Bladder	48.0	48.3	49.5	53.3	44.6	47.5	48.1	47.4	47.9	47.1	47.7
Non-Hodgkin lymphoma	34.2	27.9	28.2	27.7	29.7	36.6	38.7	30.2	31.7	26.2	35.6
Melanoma	30.8	27.9	33.1	21.5	38.2	34.8	24.9	24.5	43.7	44.3	25.7
Kidney and renal pelvis	30.4	26.7	30.2	33.3	30.4	29.6	32.6	30.5	37.7	29.4	36.1
Head and neck	29.5	31.2	23.3	23.6	27.9	29.4	32.1	28.2	27.9	33.5	31.0
Leukemia	21.1	19.9	21.4	26.4	16.4	21.6	21.3	24.3	19.9	17.1	13.5
Pancreas	19.0	21.8	18.5	19.1	18.4	18.3	19.1	21.0	18.6	18.6	12.8
Liver and intrahepatic bile duct	16.4	22.2	17.6	14.4	17.1	14.9	16.0	10.6	16.7	13.4	10.0
Stomach	13.4	10.2	12.8	13.3	13.7	16.0	11.7	13.0	10.5	15.7	15.8
Myeloma	12.6	11.6	11.1	11.9	13.7	13.4	13.2	9.5	9.8	12.6	8.3
Esophagus	10.6	13.2	11.0	12.2	10.5	10.0	8.8	10.8	17.8	13.4	13.8
Thyroid	10.0	5.5	10.2	7.6	9.6	12.4	9.7	8.0	7.4	5.8	10.8
Brain and other nervous system	9.7	9.8	9.7	9.1	9.1	9.3	10.4	9.4	9.9	10.1	10.3
Testis	6.4	6.2	6.2	5.6	6.4	6.9	6.3	7.2	5.6	4.1	4.6
Soft tissue (including heart)	4.8	4.3	4.6	4.0	4.7	5.6	4.2	3.8	4.1	5.3	3.4
Hodgkin lymphoma	3.2	2.7	3.0	2.7	3.3	3.2	3.7	3.4	3.4	4.3	2.8
Breast	1.5	1.2	1.1	1.3	1.0	1.5	1.7	1.4	2.1	—	1.6
Females											
All cancers†	**557.4**	**484.3**	**539.0**	**509.2**	**524.7**	**558.9**	**618.4**	**518.4**	**575.5**	**518.2**	**600.4**
Breast	147.1	133.4	156.2	134.2	130.3	143.3	166.1	125.5	134.2	137.6	152.1
Lung and bronchus	76.3	63.6	66.7	82.0	71.4	64.3	105.1	80.1	91.5	72.3	89.9
Colorectal	51.6	52.9	47.7	42.6	53.2	45.3	59.3	54.3	66.8	56.1	71.4
Uterus (body, NOS)	40.6	32.4	39.2	42.8	50.9	46.5	35.6	37.1	37.1	35.5	48.1
Non-Hodgkin lymphoma	23.2	18.3	19.7	22.9	21.3	25.1	25.2	23.0	23.1	21.0	22.7
Thyroid	23.7	13.1	21.3	16.6	16.3	27.2	29.0	17.9	16.9	8.8	32.0
Melanoma	21.5	17.0	24.7	17.0	21.9	23.7	18.2	21.5	34.9	38.3	20.8
Pancreas	14.6	15.1	15.0	13.9	14.6	13.8	15.9	14.8	14.2	13.1	12.0
Kidney and renal pelvis	14.1	12.0	12.9	14.4	13.5	13.4	15.9	16.9	20.7	14.8	17.4
Bladder	13.4	13.3	12.7	10.6	12.0	12.1	16.2	13.6	14.8	13.4	19.2
Ovary	14.1	11.5	11.0	12.6	10.9	17.1	13.3	14.5	13.0	14.6	11.9
Leukemia	11.9	10.4	12.5	14.9	10.3	11.7	12.6	15.2	11.2	12.3	10.4
Head and neck	10.4	9.3	8.9	7.6	10.9	10.7	11.7	10.8	9.6	12.5	8.1
Myeloma	7.9	6.9	6.1	6.4	6.4	9.3	8.0	6.4	5.9	6.6	6.1
Cervix	8.0	7.5	8.5	10.1	7.0	8.3	7.8	7.8	8.0	9.4	10.2
Liver and intrahepatic bile duct	6.6	7.7	8.1	5.4	7.9	5.7	7.2	4.7	6.5	3.8	8.2
Stomach	6.3	4.8	5.6	4.9	5.8	7.5	5.8	6.5	4.7	4.8	10.5
Brain and other nervous system	6.5	5.4	6.4	6.5	6.5	6.2	7.5	6.5	6.9	5.0	7.5
Soft tissue (including heart)	3.5	3.0	2.9	2.9	2.9	4.4	2.9	3.1	2.9	—	1.9
Esophagus	2.8	3.4	2.6	1.8	2.4	2.8	2.6	2.6	4.4	3.1	2.8
Hodgkin lymphoma	2.5	2.1	2.2	2.0	2.6	2.6	3.3	2.1	2.2	—	2.6

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

* Rates for Canada are based on provincial and territorial estimates. 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 2021 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, 2025

	CA*	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL
Males											
All cancers†	**131,800**	**17,800**	**12,700**	**3,400**	**4,100**	**49,300**	**34,800**	**3,000**	**3,900**	**600**	**2,200**
Prostate	30,400	4,200	3,300	780	1,000	10,800	8,100	660	810	130	510
Lung and bronchus	15,400	1,800	1,300	370	410	4,800	5,300	450	530	85	290
Colorectal	14,700	2,100	1,300	370	450	5,100	4,100	350	440	75	380
Bladder	9,500	1,400	940	290	280	3,600	2,300	230	280	40	160
Non-Hodgkin lymphoma	6,800	800	570	160	190	2,800	1,850	140	180	25	110
Melanoma	6,100	800	660	120	240	2,600	1,200	110	250	40	80
Kidney and renal pelvis	6,000	760	620	190	200	2,200	1,550	140	210	25	120
Head and neck	5,800	890	470	130	180	2,200	1,500	130	160	30	100
Leukemia	4,200	570	420	150	110	1,650	1,000	120	110	15	40
Pancreas	3,800	630	360	110	120	1,400	920	100	110	15	40
Liver and intrahepatic bile duct	3,300	640	350	80	110	1,100	770	50	100	10	35
Stomach	2,700	290	250	75	85	1,200	560	60	60	15	50
Myeloma	2,500	340	220	65	85	1,000	640	45	55	10	25
Esophagus	2,100	380	220	70	65	750	420	50	100	10	45
Thyroid	2,000	160	230	45	65	950	450	35	40	5	30
Brain and other nervous system	1,950	280	210	55	60	710	480	45	55	10	30
Testis	1,300	180	160	35	45	570	270	25	30	5	10
Soft tissue (including heart)	950	120	95	20	30	420	200	15	20	5	10
Hodgkin lymphoma	650	75	70	15	25	250	170	15	20	5	10
Breast	290	35	20	5	5	120	85	5	10	—	5
Females											
All cancers†	**122,900**	**15,500**	**11,900**	**3,100**	**3,700**	**47,800**	**31,800**	**2,600**	**3,700**	**520**	**2,100**
Breast	31,600	4,200	3,500	790	910	12,000	8,200	620	830	140	510
Lung and bronchus	17,500	2,100	1,450	510	520	5,700	5,700	430	630	75	330
Colorectal	11,700	1,750	1,050	260	380	3,900	3,200	290	450	60	250
Uterus (body, NOS)	8,600	1,000	840	250	350	3,800	1,750	180	230	35	160
Non-Hodgkin lymphoma	5,200	590	430	140	150	2,200	1,350	120	150	20	80
Thyroid	4,900	390	490	95	110	2,200	1,300	80	95	10	95
Melanoma	4,700	540	550	100	160	2,000	900	100	210	35	65
Pancreas	3,400	500	330	85	110	1,250	880	80	95	15	45
Kidney and renal pelvis	3,100	380	280	85	95	1,150	810	85	130	15	60
Bladder	3,100	440	280	65	85	1,100	870	75	100	15	70
Ovary	3,100	360	240	75	75	1,450	680	75	85	15	40
Leukemia	2,700	330	280	90	75	1,000	670	80	70	10	35
Head and neck	2,300	290	200	45	80	910	590	55	60	10	25
Myeloma	1,800	230	130	40	45	820	430	35	40	5	20
Cervix	1,650	220	200	60	50	670	350	30	45	10	25
Liver and intrahepatic bile duct	1,500	250	180	35	55	510	390	25	45	5	30
Stomach	1,450	160	120	30	40	660	320	35	30	5	35
Brain and other nervous system	1,400	170	150	40	45	520	370	30	40	5	25
Soft tissue (including heart)	750	90	65	20	20	370	140	15	15	—	5
Esophagus	640	110	55	10	20	240	140	15	30	5	10
Hodgkin lymphoma	530	60	50	10	20	210	150	10	10	—	5

— Fewer than 3 cases; 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.

† "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 and partially Nova Scotia*), 1984–2021

	Both sexes			Males			Females		
	Period	APC[†] (95% CL)	AAPC[†] (95% CL), 1984–2021	Period	APC[†] (95% CL)	AAPC[†] (95% CL), 1984–2021	Period	APC[†] (95% CL)	AAPC[†] (95% CL), 1984–2021
All cancers[‡]	**1984–2011**	**0.3 (0.2 , 0.4)**		**1984–1992**	**1.0 (0.3 , 2.5)**		**1984–2007**	**0.3 (0.2 , 0.4)**	
	2011–2021	**-0.7 (-1.2 , -0.4)**	**0.04 (-0.0 , 0.1)**	**1992–2011**	**-0.2 (-0.5 , 0.0)**	**-0.2 (-0.3 , -0.0)**	**2007–2012**	**1.3 (0.7 , 1.6)**	**0.3 (0.2 , 0.3)**
				2011–2021	**-1.2 (-1.9 , -0.8)**		**2012–2021**	**-0.4 (-0.8 , -0.2)**	
Lung and bronchus	1984–1988	1.1 (-0.2 , 2.1)		1984–1990	-0.6 (-1.2 , 0.4)		1984–1996	2.7 (2.3 , 3.4)	
	1988–2016	-0.4 (-0.5 , -0.3)	-0.6 (-0.8 , -0.5)	1990–2003	-2.1 (-2.8 , -1.9)	-1.8 (-1.9 , -1.7)	1996–2016	0.8 (0.6 , 1.0)	0.9 (0.8 , 1.0)
	2016–2021	-3.3 (-3.9 , -2.4)		2003–2014	-1.1 (-1.4 , -0.3)		2016–2021	-3.0 (-3.9 , -2.0)	
				2014–2021	-3.3 (-4.0 , -2.8)				
Breast	1984–1991	2.1 (1.1 , 3.7)		1984–2021	0.4 (0.1 , 0.8)		1984–1991	2.2 (1.2 , 3.8)	
	1991–2006	-0.5 (-1.6 , -0.2)	0.2 (0.1 , 0.4)			0.4 (0.1 , 0.8)	1991–2006	-0.3 (-1.4 , -0.1)	0.4 (0.3 , 0.6)
	2006–2021	0.1 (-0.1 , 0.8)					2006–2021	0.2 (-0.0 , 0.9)	
Prostate				1984–1993	5.7 (4.0 , 9.0)				
				1993–2008	-0.00 (-0.7 , 0.8)	0.3 (0.0 , 0.8)			
				2008–2014	-5.9 (-7.9 , -4.0)				
				2014–2021	-0.01 (-1.7 , 2.5)				
Colorectal	1984–1995	-1.1 (-1.7 , -0.9)		1984–2011	-0.3 (-0.4 , -0.2)		1984–1995	-1.6 (-2.2 , -1.3)	
	1995–2000	0.8 (-0.1 , 1.3)	-1.1 (-1.2 , -1.0)	2011–2021	-2.9 (-3.5 , -2.5)	-1.0 (-1.1 , -0.9)	1995–2000	0.8 (-0.2 , 1.3)	-1.1 (-1.2 , -1.0)
	2000–2012	-0.6 (-1.1 , -0.3)					2000–2012	-0.7 (-1.2 , -0.4)	
	2012–2021	-2.6 (-3.1 , -2.3)					2012–2021	-2.2 (-2.8 , -1.8)	
Bladder[§]	1984–2021	-0.9 (-1.2 , -0.6)	-0.9 (-1.2 , -0.6)	1984–2021	-1.0 (-1.3 , -0.7)	-1.0 (-1.3 , -0.7)	1984–2021	-0.8 (-1.1 , -0.5)	-0.8 (-1.1 , -0.5)
Non-Hodgkin lymphoma	1984–1997	1.8 (1.5 , 2.6)		1984–2016	1.4 (1.3 , 1.6)		1984–1989	3.2 (1.6 , 5.2)	
	1997–2008	0.7 (-0.6 , 1.0)	1.1 (1.0 , 1.2)	2016–2021	-0.9 (-1.9 , 0.5)	1.1 (1.0 , 1.2)	1989–2016	1.1 (0.9 , 1.2)	1.0 (0.8 , 1.2)
	2008–2013	2.7 (1.7 , 3.3)					2016–2021	-1.8 (-2.6 , -0.6)	
	2013–2021	-0.6 (-1.3 , -0.2)							
Melanoma	1984–2021	2.1 (2.0 , 2.2)	2.1 (2.0 , 2.2)	1984–2016	2.5 (2.4 , 2.7)	2.2 (2.0 , 2.4)	1984–1994	0.3 (-2.4 , 1.5)	1.6 (1.4 , 1.9)
				2016–2021	0.2 (-0.8 , 1.8)		1994–2021	2.1 (1.9 , 2.4)	
Kidney and renal pelvis	1984–1989	4.0 (2.2 , 6.3)		1984–1989	4.1 (1.8 , 8.0)		1984–2016	1.2 (1.0 , 1.8)	
	1989–1998	-0.2 (-1.9 , 0.5)	1.2 (1.1 , 1.4)	1989–2001	-0.1 (-2.6 , 0.6)	1.3 (1.1 , 1.7)	2016–2021	-1.5 (-2.9 , 0.8)	0.8 (0.6 , 1.2)
	1998–2016	1.8 (1.7 , 2.3)		2001–2016	2.2 (1.9 , 4.1)				
	2016–2021	-0.9 (-1.6 , 0.4)		2016–2021	-0.7 (-2.1 , 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 and partially Nova Scotia*), 1984–2021

	Both sexes			Males			Females		
	Period	APC† (95% CL)	AAPC† (95% CL), 1984–2021	Period	APC† (95% CL)	AAPC† (95% CL), 1984–2021	Period	APC† (95% CL)	AAPC† (95% CL), 1984–2021
Uterus (body, NOS)							1984–1990	-1.4 (-2.9 , -0.3)	0.7 (0.6 , 0.8)
							1990–2005	0.3 (-0.1 , 1.0)	
							2005–2011	3.2 (2.2 , 4.1)	
							2011–2021	1.1 (0.5 , 1.5)	
Head and neck	1984–2004	-2.0 (-2.3 , -1.7)	-0.8 (-0.9 , -0.7)	1984–2004	-2.4 (-2.7 , -2.2)	-1.1 (-1.2 , -1.0)	1984–2004	-1.1 (-1.7 , -0.8)	-0.4 (-0.6 , -0.3)
	2004–2021	0.6 (0.3 , 0.9)		2004–2021	0.5 (0.2 , 0.9)		2004–2021	0.4 (-0.0 , 1.2)	
Pancreas	1984–2000	-0.9 (-2.0 , -0.3)	0.03 (-0.1 , 0.1)	1984–2002	-1.4 (-1.9 , -0.9)	0.04 (-0.1 , 0.2)	1984–2006	-0.3 (-0.8 , 0.1)	0.2 (-0.0 , 0.3)
	2000–2008	0.4 (-1.1 , 1.1)		2002–2021	1.4 (1.1 , 1.8)		2006–2012	2.2 (-0.4 , 3.3)	
	2008–2013	2.7 (1.5 , 3.4)					2012–2021	-0.1 (-1.3 , 0.8)	
	2013–2021	0.04 (-0.9 , 0.5)							
Thyroid	1984–1998	3.5 (2.3 , 4.3)	3.5 (3.3 , 3.8)	1984–1998	2.8 (-0.6 , 4.3)	3.5 (3.1 , 3.9)	1984–1998	3.8 (2.3 , 4.7)	3.6 (3.4 , 3.9)
	1998–2003	10.0 (7.5 , 11.4)		1998–2013	6.8 (6.1 , 8.7)		1998–2003	10.8 (8.0 , 12.3)	
	2003–2013	5.7 (4.5 , 6.4)		2013–2021	-1.2 (-2.8 , 0.1)		2003–2012	6.0 (4.4 , 6.8)	
	2013–2021	-3.0 (-3.9 , -2.1)					2012–2021	-2.8 (-3.6 , -2.0)	
Leukemia	1984–1997	-0.7 (-1.4 , -0.2)	-0.2 (-0.4 , -0.1)	1984–1997	-0.8 (-2.0 , -0.2)	-0.3 (-0.5 , -0.2)	1984–2001	-0.3 (-0.8 , 0.0)	-0.2 (-0.3 , -0.1)
	1997–2011	1.5 (1.1 , 2.2)		1997–2011	1.4 (1.0 , 2.6)		2001–2010	2.2 (1.5 , 3.8)	
	2011–2021	-2.0 (-2.7 , -1.5)		2011–2021	-2.1 (-2.9 , -1.5)		2010–2021	-2.0 (-2.6 , -1.5)	
Liver and intrahepatic bile duct	1984–2007	3.4 (2.9 , 3.8)	3.2 (3.0 , 3.4)	1984–2004	3.4 (1.1 , 4.0)	3.0 (2.7 , 3.3)	1984–2007	2.7 (1.8 , 3.4)	3.2 (2.8 , 3.5)
	2007–2013	7.8 (6.0 , 9.4)		2004–2015	5.1 (4.4 , 7.3)		2007–2012	11.1 (7.2 , 13.0)	
	2013–2021	-0.6 (-1.7 , 0.3)		2015–2021	-2.0 (-4.0 , -0.4)		2012–2021	-0.00 (-1.8 , 1.2)	
Myeloma	1984–2007	0.3 (-0.3 , 0.6)	0.7 (0.5 , 0.9)	1984–2008	0.3 (-0.4 , 0.7)	0.7 (0.4 , 0.9)	1984–2003	0.2 (-1.7 , 0.7)	0.7 (0.5 , 1.0)
	2007–2012	3.7 (1.5 , 4.8)		2008–2013	4.5 (1.8 , 5.8)		2003–2021	1.3 (0.9 , 2.4)	
	2012–2021	0.2 (-1.2 , 1.0)		2013–2021	-0.4 (-2.5 , 0.8)				
Stomach	1984–2002	-2.6 (-3.0 , -2.3)	-1.7 (-1.8 , -1.5)	1984–2002	-2.6 (-3.0 , -2.3)	-1.8 (-1.9 , -1.7)	1984–2002	-2.8 (-3.4 , -2.4)	-1.6 (-1.8 , -1.4)
	2002–2021	-0.7 (-1.0 , -0.4)		2002–2021	-1.1 (-1.3 , -0.7)		2002–2021	-0.4 (-0.8 , 0.1)	
Brain and other nervous system	1984–2021	-0.4 (-0.5 , -0.3)	-0.4 (-0.5 , -0.3)	1984–2021	-0.3 (-0.4 , -0.2)	-0.3 (-0.4 , -0.2)	1984–2021	-0.5 (-0.6 , -0.3)	-0.5 (-0.6 , -0.3)
Ovary							1984–1996	-1.5 (-3.0 , -0.9)	-1.0 (-1.2 , -0.9)
							1996–2013	-0.3 (-0.5 , 1.1)	
							2013–2021	-2.0 (-3.3 , -1.2)	

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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 and partially Nova Scotia*), 1984–2021

	Both sexes			Males			Females		
Cancer	Period	APC† (95% CL)	AAPC† (95% CL), 1984–2021	Period	APC† (95% CL)	AAPC† (95% CL), 1984–2021	Period	APC† (95% CL)	AAPC† (95% CL), 1984–2021
Esophagus	1984–2021	0.5 (0.3 , 0.6)	0.5 (0.3 , 0.6)	1984–2021	0.7 (0.5 , 0.8)	0.7 (0.5 , 0.8)	1984–2021	-0.3 (-0.5 , -0.1)	-0.3 (-0.5 , -0.1)
Soft tissue (including heart)	1984–2001	-0.1 (-1.7 , 0.5)	0.7 (0.5 , 0.9)	1984–2001	-0.1 (-1.6 , 0.5)	0.7 (0.4 , 0.9)	1984–2021	0.9 (0.7 , 1.2)	0.9 (0.7 , 1.2)
	2001–2006	4.4 (1.7 , 5.7)		2001–2006	4.9 (2.0 , 6.4)				
	2006–2021	0.4 (-0.6 , 0.9)		2006–2021	0.1 (-0.8 , 0.7)				
Cervix							1984–2005	-2.2 (-2.6 , -1.9)	−1.4 (−1.5 , −1.2)
							2005–2021	-0.3 (-0.8 , 0.4)	
Testis				1984–2021	1.3 (1.1 , 1.5)	1.3 (1.1 , 1.5)			
Hodgkin lymphoma	1984–2013	-0.2 (-1.2 , -0.0)	0.04 (-0.2 , 0.2)	1984–2012	-0.5 (-1.0 , -0.3)	-0.05 (-0.3 , 0.2)	1984–2021	0.1 (-0.1 , 0.3)	0.1 (-0.1 , 0.3)
	2013–2021	1.0 (-0.0 , 2.5)		2012–2021	1.5 (0.3 , 3.4)				
All other cancers	1984–2021	0.6 (0.5 , 0.7)	0.6 (0.5 , 0.7)	1984–1992	2.1 (0.7 , 5.5)	0.7 (0.4 , 1.0)	1984–2021	0.8 (0.7 , 0.9)	0.8 (0.7 , 0.9)
				1992–2021	0.3 (-0.2 , 0.5)				

CL=confidence limits; NOS=not otherwise specified

* Quebec is excluded because cases diagnosed in Quebec from 2018 onward had not been submitted to the Canadian Cancer Registry at the time of analysis. Additionaly, data for 2021 exclude cases diagnosed in Nova Scotia as these cases had also not been submitted to the Canadian Cancer Registry at the time of analysis.

† The APC and AAPC are calculated using the Joinpoint Regression Program where data for 2020 is removed as an anomaly and rates age-standardized to the 2021 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 5.2.0.0) 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) for selected cancers, by sex, Canada (excluding Quebec and partially Nova Scotia*), 1984–2021

	Both sexes		Males		Females	
	Reference year	APC† (95% CL)	Reference year	APC† (95% CL)	Reference year	APC† (95% CL)
All cancers‡	**2011**	**-0.7 (-1.2 , -0.4)**	**2011**	**-1.2 (-1.9 , -0.8)**	**2012**	**-0.4 (-0.8 , -0.2)**
Lung and bronchus	2016	-3.3 (-3.9 , -2.4)	2014	-3.3 (-4.0 , -2.8)	2016	-3.0 (-3.9 , -2.0)
Breast	2006	0.1 (-0.1 , 0.8)	1984	0.4 (0.1 , 0.8)	2006	0.2 (-0.0 , 0.9)
Prostate	—	—	2014	-0.01 (-1.7 , 2.5)	—	—
Colorectal	2012	-2.6 (-3.1 , -2.3)	2011	-2.9 (-3.5 , -2.5)	2012	-2.2 (-2.8 , -1.8)
Bladder§	1984	-0.9 (-1.2 , -0.6)	1984	-1.0 (-1.3 , -0.7)	1984	-0.8 (-1.1 , -0.5)
Non-Hodgkin lymphoma	2013	-0.6 (-1.3 , -0.2)	2016	-0.9 (-1.9 , 0.5)	2016	-1.8 (-2.6 , -0.6)
Melanoma	1984	2.1 (2.0 , 2.2)	2016	0.2 (-0.8 , 1.8)	1994	2.1 (1.9 , 2.4)
Kidney and renal pelvis	2016	-0.9 (-1.6 , 0.4)	2016	-0.7 (-2.1 , 0.9)	2016	-1.5 (-2.9 , 0.8)
Uterus (body, NOS)	—	—	—	—	2011	1.1 (0.5 , 1.5)
Head and neck	2004	0.6 (0.3 , 0.9)	2004	0.5 (0.2 , 0.9)	2004	0.4 (-0.0 , 1.2)
Pancreas	2013	0.04 (-0.9 , 0.5)	2002	1.4 (1.1 , 1.8)	2012	-0.1 (-1.3 , 0.8)
Thyroid	2013	-3.0 (-3.9 , -2.1)	2013	-1.2 (-2.8 , 0.1)	2012	-2.8 (-3.6 , -2.0)
Leukemia	2011	-2.0 (-2.7 , -1.5)	2011	-2.1 (-2.9 , -1.5)	2010	-2.0 (-2.6 , -1.5)
Liver and intrahepatic bile duct	2013	-0.6 (-1.7 , 0.3)	2015	-2.0 (-4.0 , -0.4)	2012	-0.00 (-1.8 , 1.2)
Myeloma	2012	0.2 (-1.2 , 1.0)	2013	-0.4 (-2.5 , 0.8)	2003	1.3 (0.9 , 2.4)
Stomach	2002	-0.7 (-1.0 , -0.4)	2002	-1.1 (-1.3 , -0.7)	2002	-0.4 (-0.8 , 0.1)
Brain and other nervous system	1984	-0.4 (-0.5 , -0.3)	1984	-0.3 (-0.4 , -0.2)	1984	-0.5 (-0.6 , -0.3)
Ovary	—	—	—	—	2013	-2.0 (-3.3 , -1.2)
Esophagus	1984	0.5 (0.3 , 0.6)	1984	0.7 (0.5 , 0.8)	1984	-0.3 (-0.5 , -0.1)
Soft tissue (including heart)	2006	0.4 (-0.6 , 0.9)	2006	0.1 (-0.8 , 0.7)	1984	0.9 (0.7 , 1.2)
Cervix	—	—	—	—	2005	-0.3 (-0.8 , 0.4)
Testis	—	—	1984	1.3 (1.1 , 1.5)	—	—
Hodgkin lymphoma	2013	1.0 (-0.0 , 2.5)	2012	1.5 (0.3 , 3.4)	1984	0.1 (-0.1 , 0.3)
All other cancers	1984	0.6 (0.5 , 0.7)	1992	0.3 (-0.2 , 0.5)	1984	0.8 (0.7 , 0.9)

— Not applicable; CL=confidence limits; NOS=not otherwise specified

* Quebec was excluded because cases diagnosed in Quebec from 2018 onward had not been submitted to the Canadian Cancer Registry at the time of analysis. Additionally, data for 2021 exclude cases diagnosed in Nova Scotia as these cases had also not been submitted to the Canadian Cancer Registry at the time of analysis.

† The APC was calculated using the Joinpoint Regression Program where data for 2020 is removed as an anomaly and rates age-standardized to the 2021 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 2021. Otherwise, the APC reflects the trend in rates over the entire period (1984–2021). 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 (version 5.2.0.0) 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

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 of 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.

About 1 in 4 Canadians are expected to die from cancer.

Key findings

- It is estimated that 22% of people in Canada will die from cancer. The lifetime probability of dying from cancer is higher for males (23%) than females (21%).
- An estimated 87,400 people in Canada are expected to die from cancer in 2025. About 22% of these deaths are expected to be caused by lung cancer.
- Pancreatic cancer continues to feature prominently in cancer mortality. For both sexes combined, it is expected to be the third leading cause of cancer death in 2025 (behind lung and colorectal cancers, and ahead of breast and prostate cancers).
- Almost all cancer deaths (over 95%) 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.
- In recent years, the mortality rates for lung, colorectal and bladder cancers have been declining rapidly (more than -3% per year). In addition, leukemia mortality rates have been decreasing by almost -3% per year since 2017, which follows a long period of more gradual decline.

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., 2022 for this publication) and therefore may fluctuate from year to year and between publications.

- 22% of people in Canada are expected to die from cancer (Figure 2.1).
- The probability of dying from cancer is higher for males (23%) 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, people in Canada are more likely to die from lung and bronchus (lung) cancer than any other type of cancer. An estimated 1 in 21 people (4.8%) will die from lung cancer, followed by colorectal cancer (1 in 41; 2.4%) and pancreatic cancer (1 in 68; 1.5%).
- 1 in 34 (3.0%) males is expected to die from prostate cancer.
- 1 in 35 (2.8%) females is expected to die from breast cancer.

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 2021 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 2022 for all provinces and territories except Yukon, for which data were imputed for 2017 through 2022. Data were used to project cancer mortality to 2025.

FIGURE 2.1 Lifetime probability of dying from cancer, Canada,* 2022

* Mortality data from Yukon were imputed.

Note: The probability of dying from cancer is calculated based on age-, sex- and cause-specific mortality rates for Canada in 2022. 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 Vital Statistics Death database at Statistics Canada

Projected cancer deaths in 2025

The cancer mortality data used for projections in this publication were from 1998 to 2022. These were the most recent data available when the analyses began. The data were used to project rates and deaths to 2025.

An estimated 87,400 people in Canada are expected to die from cancer in 2025 (Table 2.2).

- It is expected that lung cancer will continue to be the leading cause of cancer death for both sexes, accounting for 22% of all cancer deaths in Canada.
- Lung cancer is followed by colorectal cancer, which will account for 10% of all cancer deaths in Canada. Next is pancreatic cancer, which will account for 7% of Canada's cancer deaths in 2025.
- The five leading causes of cancer death (lung, colorectal, pancreatic, breast and prostate cancers) account for over half (52%) of all cancer deaths in Canada.

Colorectal cancer is responsible for about 1 in 10 cancer deaths in Canada.

FIGURE 2.2 Percent distribution of projected cancer deaths, by sex, Canada, 2025

Males
46,700
Deaths

Lung and bronchus	21.6%
Prostate	11.1%
Colorectal	10.5%
Pancreas	7.1%
Liver and intrahepatic bile duct*	4.9%
Esophagus	4.2%
Non-Hodgkin lymphoma	4.1%
Leukemia	4.0%
Bladder	3.9%
Head and neck	3.4%
Brain and other nervous system	3.3%
Kidney and renal pelvis	2.8%
Stomach	2.8%
Myeloma	2.2%
Melanoma	1.7%
Soft tissue (including heart)	0.8%
Thyroid	0.3%
Hodgkin lymphoma	0.2%
Breast	0.1%
Testis	0.1%
All other cancers	11.1%

Females
40,700
Deaths

Lung and bronchus	22.9%
Breast	13.3%
Colorectal	10.3%
Pancreas	7.4%
Ovary	4.9%
Uterus (body, NOS)	4.2%
Liver and intrahepatic bile duct*	3.3%
Leukemia	3.3%
Non-Hodgkin lymphoma	3.2%
Brain and other nervous system	2.7%
Stomach	1.9%
Bladder	1.8%
Myeloma	1.8%
Kidney and renal pelvis	1.6%
Head and neck	1.5%
Esophagus	1.4%
Melanoma	1.1%
Cervix	1.1%
Soft tissue (including heart)	0.8%
Thyroid	0.4%
Hodgkin lymphoma	0.1%
All other cancers	11.5%

NOS=not otherwise specified

* 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 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 sex

Table 2.2 shows the number and rate of cancer deaths projected for males and females in 2025.

- More males (46,700) than females (40,700) are expected to die from cancer in 2025, with 53% of all cancer deaths expected to occur among males.
- The age-standardized mortality rate (ASMR) in males (239.6 per 100,000) is expected to be 37% higher than in females (174.3 per 100,000).
- For each cancer type except breast and thyroid, a higher number of deaths is expected among males than females.

Figure 2.2 shows the expected distribution of cancer deaths in males and females in 2025.

- For males, lung cancer is expected to be the most common cause of cancer death, accounting for 22% of all cancer deaths. It is followed by prostate cancer (11%) and colorectal cancer (10%).
- For females, lung cancer is expected to be the leading cause of cancer death, accounting for 23% 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 cancer deaths in both males and females.

Mortality by age

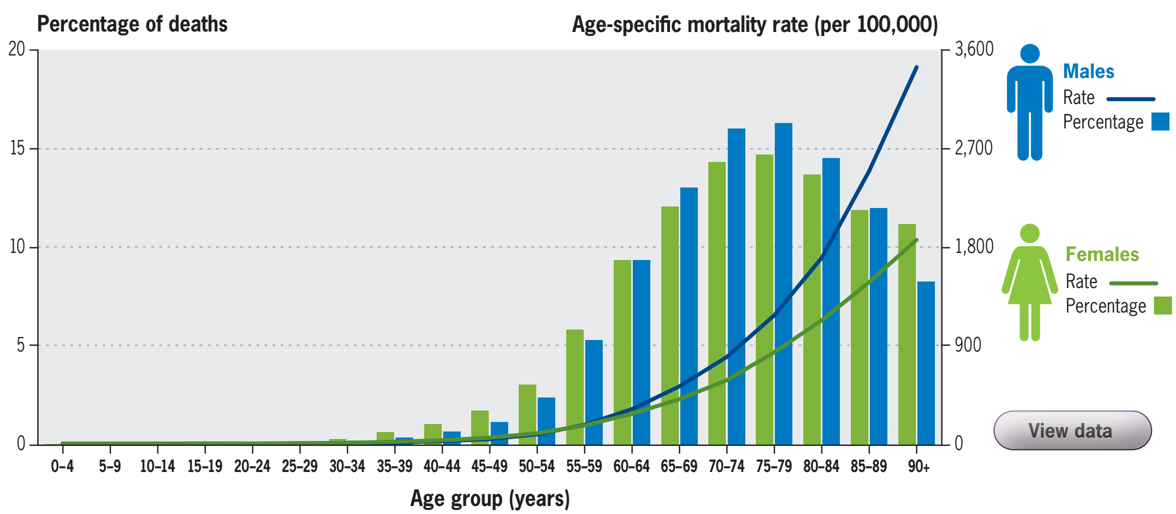
The number of cancer deaths increases dramatically with age (Table 2.3).

- More than 95% of cancer deaths are expected to occur in people 50 years of age and older, with more deaths expected at older ages. In fact, 81% of all cancer deaths are expected to occur in people aged 65 years and older.
- 43% of all cancer deaths will occur in people aged 50–74 years.
- 40% of colorectal cancer deaths are expected to occur among people in Canada who fall within the age covered by the screening guidelines (aged 50–74 years),[1] while 4% are expected to occur among those who are younger than 50 years of age.
- 44% of breast cancer deaths are expected to occur among females who fall within the age covered by the current screening guidelines (aged 50–74 years),[2] while 6% of breast cancer deaths are expected to occur among those aged 40–49 years and 2% among those aged 15–39 years.
- 94% 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 55–74 years with a 30 pack-year smoking history).[3]
- 91% of pancreatic cancer deaths in Canada are expected to occur among people 60 years of age and older.
- 94% of prostate cancer deaths in Canada are expected to occur among people 65 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 people 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, 2020–2022



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

Perspectives of people affected by cancer

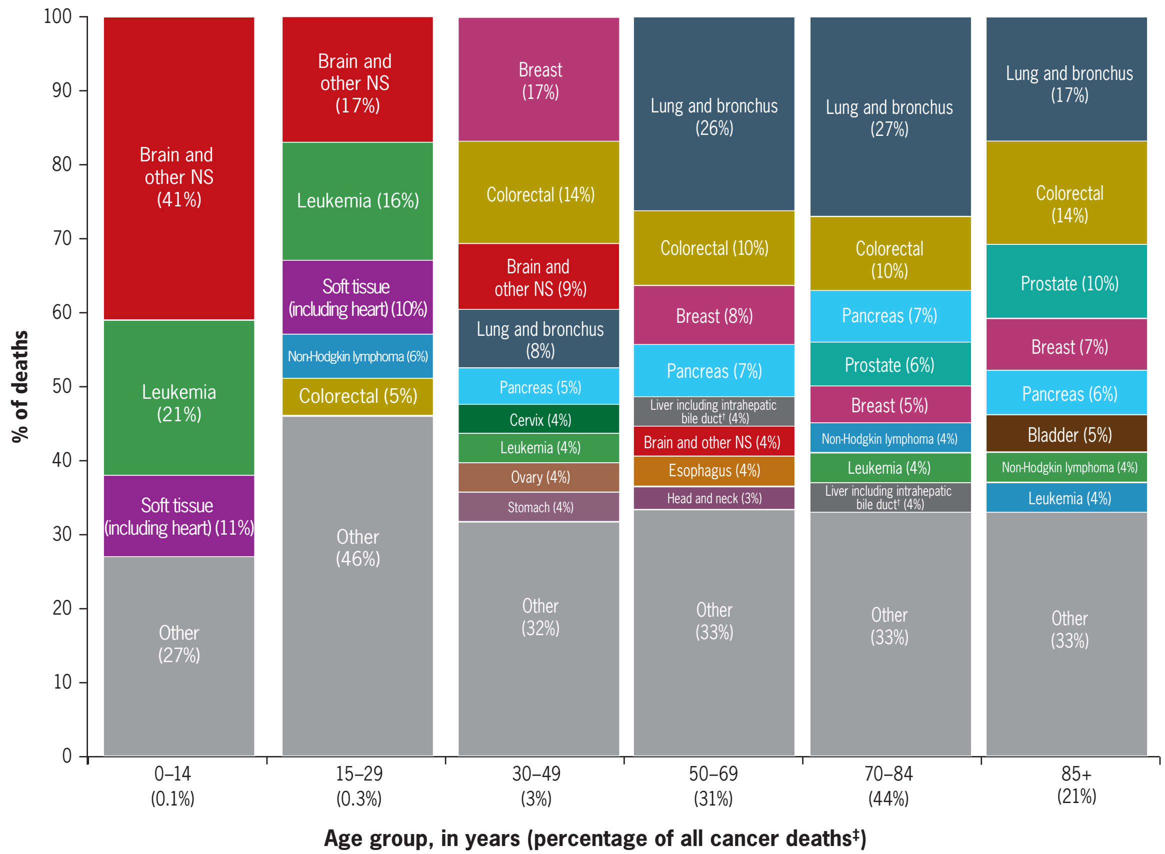
Vincent Latreille has lost three family members to cancer. At 16, he became a full-time caregiver for his mother, who was living with lung cancer, and his grandmother, who had breast cancer.

"You have to enjoy the time you have with your loved ones, and you have to give to receive so that no other loved one has to die of cancer," Vincent says. *"Because we have to invest more in research. In 10 years, someone else's mother might survive because of new treatments discovered through research."*

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

- In the youngest age groups (aged 0–14 years and 15–29 years), brain cancer, leukemia and soft tissue (including heart) cancer are the most common causes of cancer death. In the 0–14 years age group, these cancers make up about 73% of all cancer deaths, yet they comprise only 43% of all cancer deaths in the 15–29 years age group, where a greater percentage of deaths were attributed to "adult" cancers (e.g., colorectal).
- Among people aged 30–49 years, breast cancer is the leading cause of cancer death and accounts for 17% of all cancer deaths. Colorectal (14%), brain (9%), and lung (8%) cancers are the next most common, accounting for another 31% 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 the next most common in the oldest age groups, with prostate cancer figuring more prominently with increasing age.

FIGURE 2.4 Distribution of cancer deaths for selected* cancers by age group, Canada, 2018–2022



NS=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.

† 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 (2018–2022) 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 2025. 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.

- 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. This pattern is observed as well for females; however, Saskatchewan is also projected to have a high lung cancer mortality rate among females.
- Colorectal cancer mortality rates are highest in Newfoundland and Labrador for both males and females (48.1 per 100,000 and 32.2 per 100,000, respectively). Newfoundland and Labrador also has a high incidence rate for colorectal cancer (Table 1.4).
- Mortality rates for stomach cancer are also highest in Newfoundland and Labrador for both males (10.8 per 100,000) and females (4.2 per 100,000).
- Prostate cancer mortality rates vary from a low of 25.7 per 100,000 in Quebec and New Brunswick to a high of 35.0 per 100,000 in Saskatchewan.

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 precision, such as confidence intervals or p-values, so it cannot be determined 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.

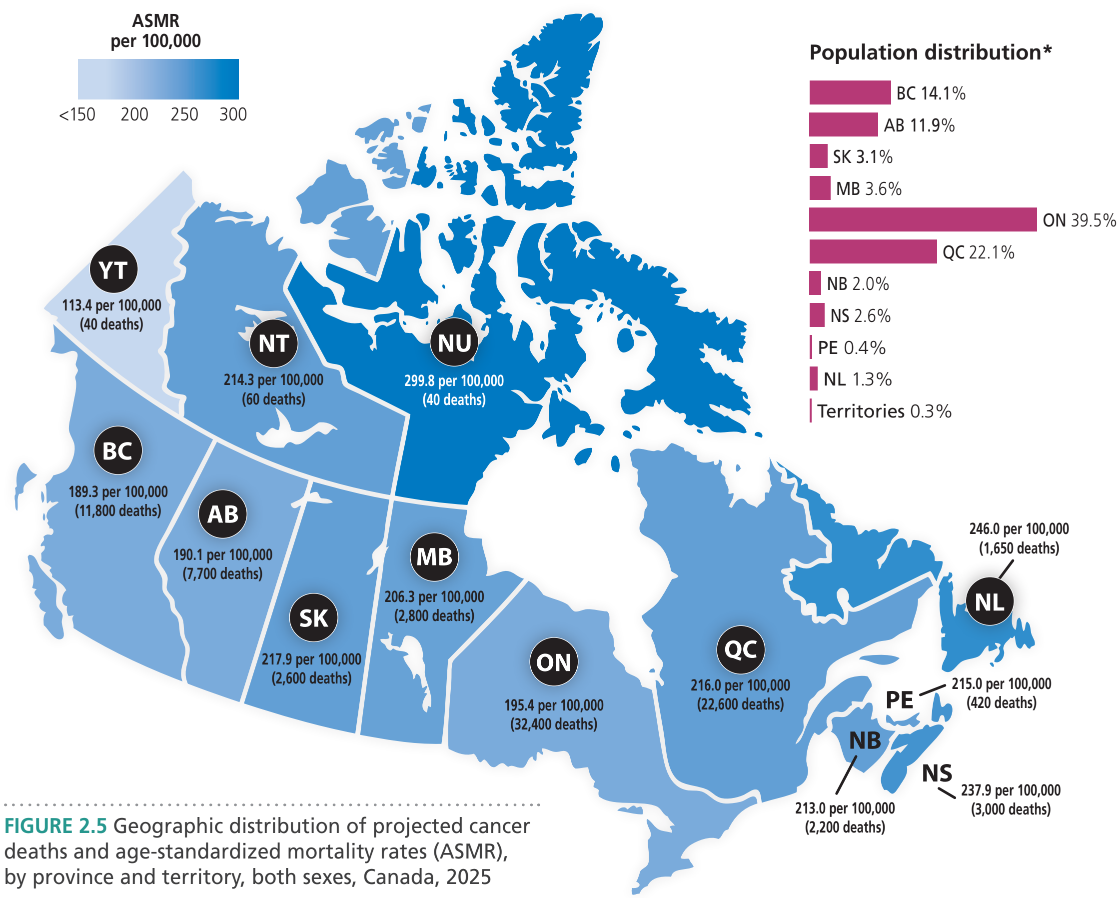


FIGURE 2.5 Geographic distribution of projected cancer deaths and age-standardized mortality rates (ASMR), by province and territory, both sexes, Canada, 2025

* Based on projected estimates of population size in 2025.

Note: Rates are age-standardized to the *2021 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.

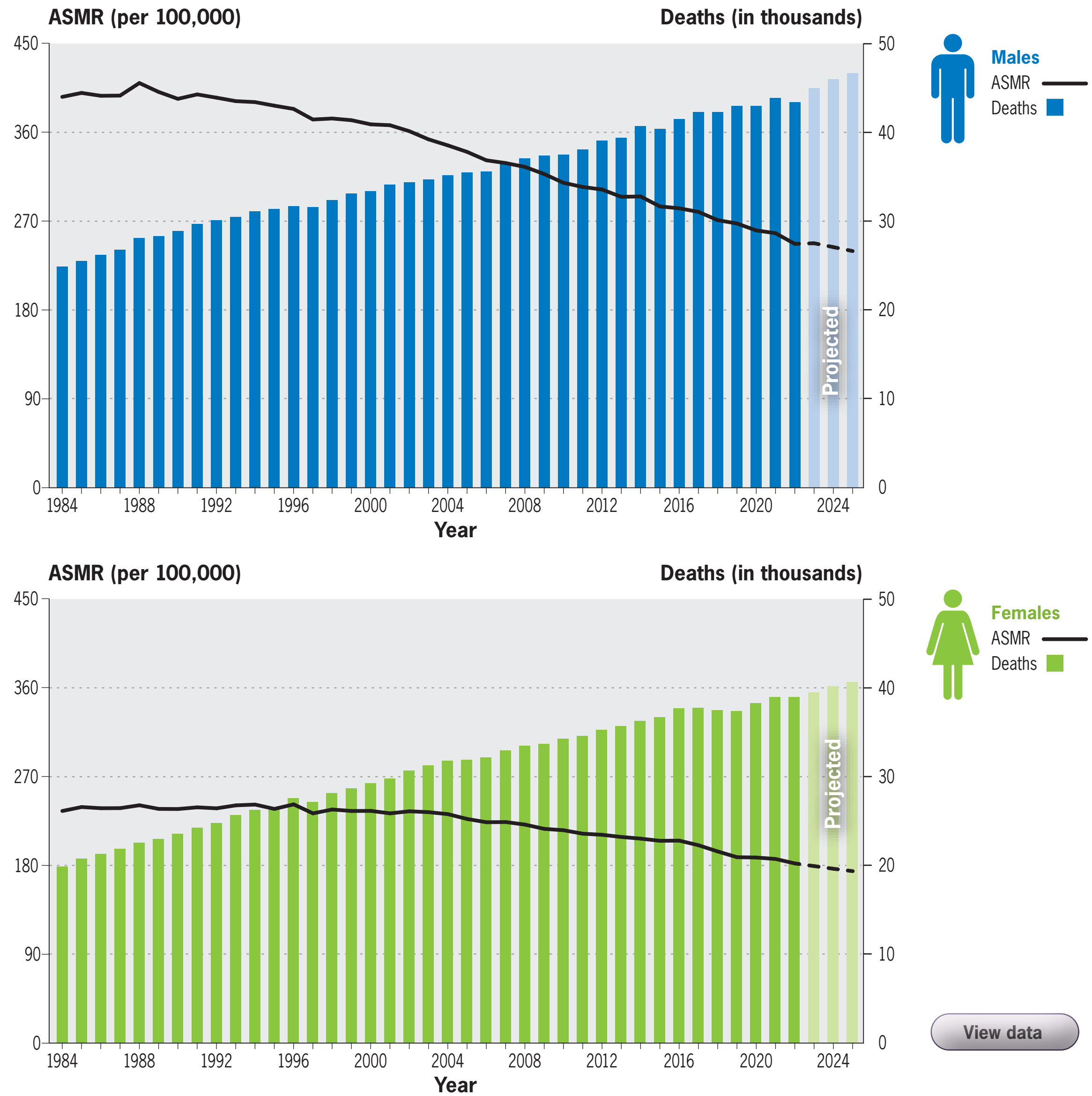
Figure 2.6 provides a high-level view of patterns in mortality over time for all cancers combined.

- From 1984 to 2025, mortality rates for all cancers combined decreased from 395.7 to an estimated 239.6 per 100,000 in males, and from 235.2 to an estimated 174.3 per 100,000 in females. Cancer death rates peaked in late 1980s in males and in mid-1990s in females. The rates have since decreased 42% in males and 28% in females.
- Over the same period, the number of cancer deaths has increased from 24,900 in 1984 to a projected 46,700 in males in 2025, and from 19,900 to a projected 40,700 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.

Note: Rates are age-standardized to the 2021 Canadian standard population. Actual mortality data were available to 2022 for all provinces and territories except Yukon, for which data were available to 2016 and imputed from 2017 to 2022. Estimates for 2023–2025 were projected. For further details, see *Appendix II: Data source and methods*.

FIGURE 2.6 Deaths and age-standardized mortality rates (ASMR) for all cancers, Canada, 1984–2025



View data

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.

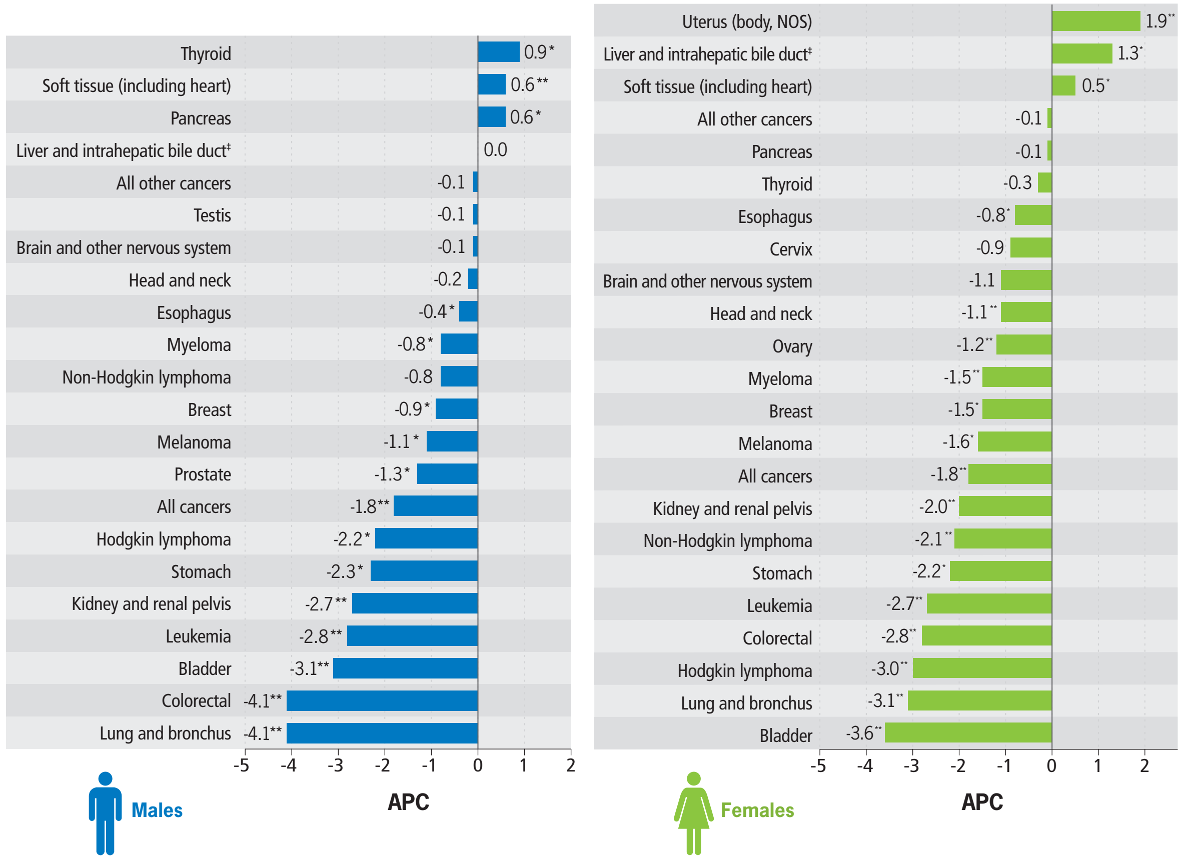
Statistical significance

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 es imated.

FIGURE 2.7 Most recent annual percent change (APC)† in age-standardized mortality rates (ASMR) for selected cancers, by sex, Canada, 1984–2022



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 2021 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 2022. Otherwise, the APC reflects the trend in rates over the entire period (1984–2022). 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

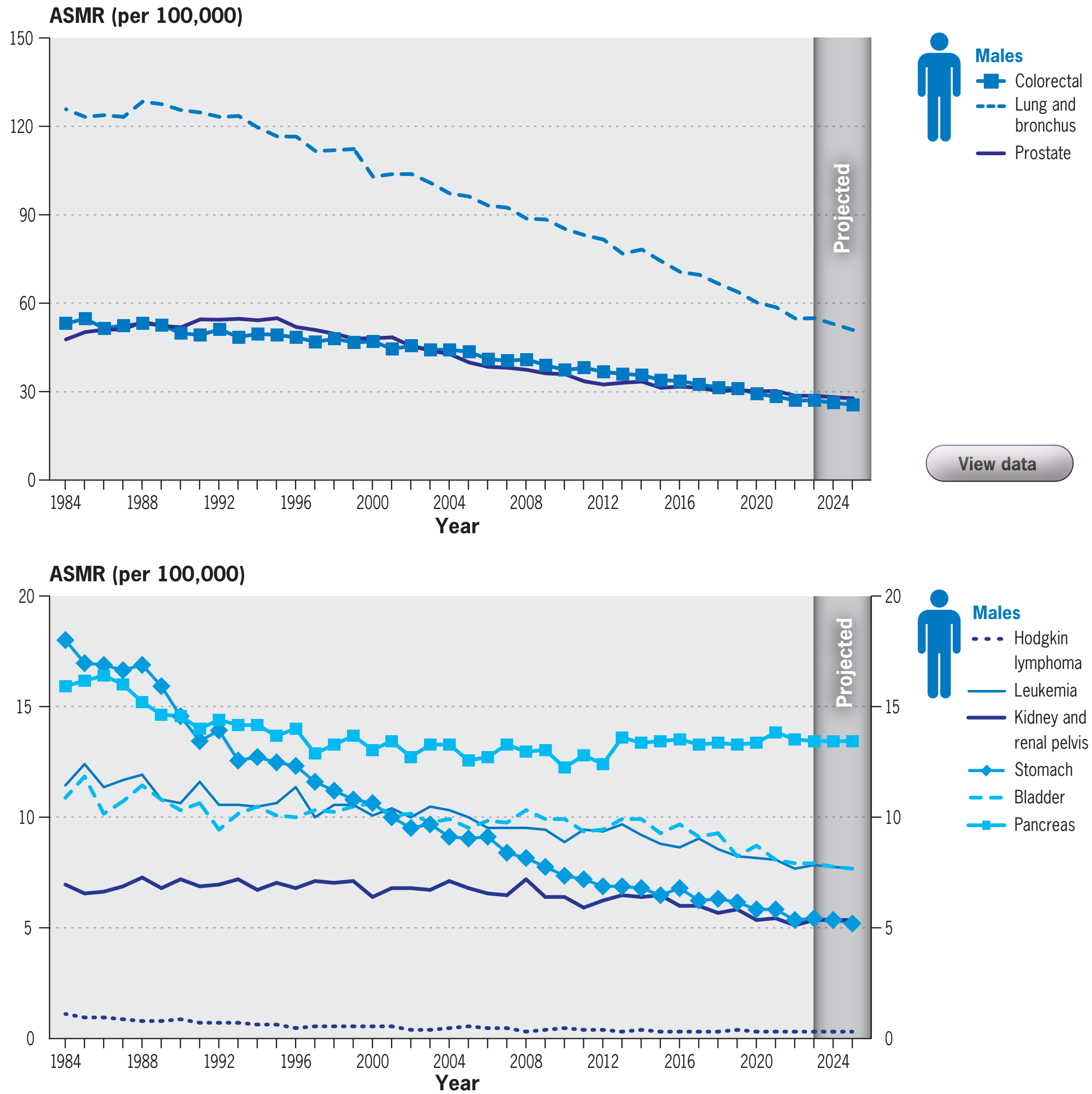
Data source: Canadian Vital Statistics Death database at Statistics Canada

Recent trends

Table 2.6 provides the complete picture of trends in cancer mortality rates between 1984 and 2022 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 most of the cancers reported.
- For both sexes and all cancers combined, mortality decreased at a rate of -2.0% per year since 2017.
- Lung, colorectal and bladder cancer mortality rates have been declining rapidly—by more than -3% per year—in recent years (since 2015, 2016 and 2017, respectively). In addition, leukemia mortality rates have been decreasing by almost -3% per year since 2017 after a long period of more gradual decline.
- In males, the largest, most recent significant decreases were observed for lung cancer (-4.1% per year since 2014), colorectal cancer (-4.1% per year since 2018), bladder cancer (-3.1% per year since 2016), leukemia (-2.8% per year since 2017), kidney cancer (-2.7% per year since 2014), stomach cancer (-2.3% per year since 2011) and Hodgkin lymphoma (-2.2% per year since 1996).

FIGURE 2.8 Age-standardized mortality rates (ASMR) for selected* cancers, males, Canada, 1984–2025



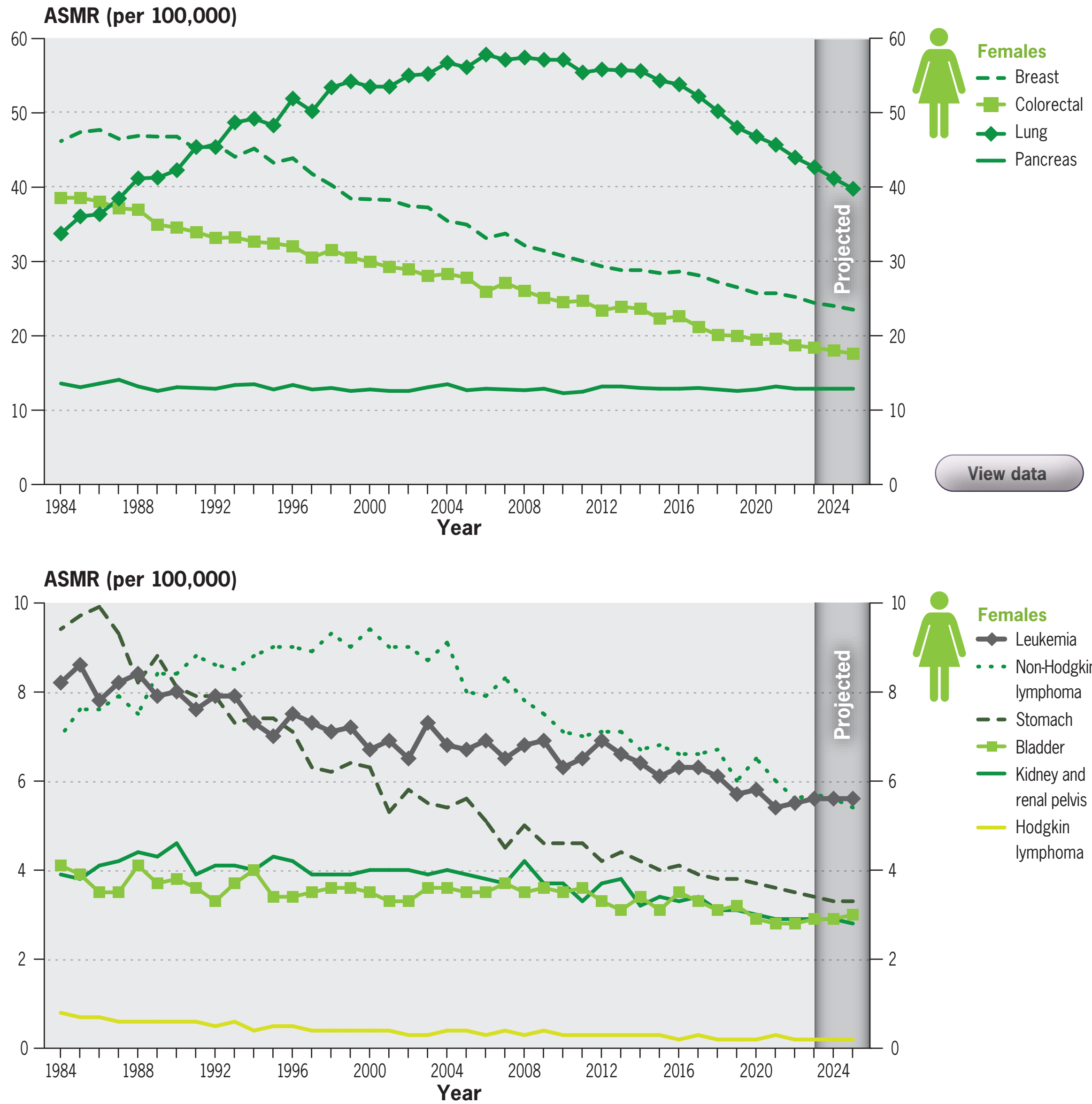
Analysis by: Centre for Population Health Data, Statistics Canada
Data source: Canadian Vital Statistics Death database at Statistics Canada

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

Note: Rates are age-standardized to the 2021 Canadian standard population. Actual mortality data were available to 2022 for all provinces and territories except Yukon, for which data were available to 2016 and imputed from 2017 to 2022. Estimates for 2023–2025 were projected. For further details, see *Appendix II: Data sources and methods*. The range of scales differs widely between the figures. The complete definition of the specific cancers included here can be found in Table A1.

- Slight increases in cancer mortality rates were seen for a few cancer types in males, including thyroid (0.9% per year since 1984), pancreas (0.6% per year since 2010) and soft tissue (0.6% per year since 1984).
- In females, the largest and most recent significant decreases were observed for bladder cancer (-3.6% per year since 2017), lung cancer (-3.1% per year since 2015), Hodgkin lymphoma (-3.0% per year since 1984), colorectal cancer (-2.8% per year since 2014), leukemia (-2.7% per year since 2017), stomach cancer (-2.2% per year since 2007), non-Hodgkin lymphoma (-2.1% per year since 1999) and kidney cancer (-2.0% per year since 2008).
- Increases in cancer mortality rates were seen for a few cancer types in females, including uterine (1.9% per year since 2005), liver and intrahepatic bile duct (1.3% per year since 2013) and soft tissue (0.5% per year since 1984).

FIGURE 2.9 Age-standardized mortality rates (ASMR) for selected* cancers, females, Canada, 1984–2025



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).

Note: Rates are age-standardized to the 2021 Canadian standard population. Actual mortality data were available to 2022 for all provinces and territories except Yukon, for which data were available to 2016 and imputed from 2017 to 2022. Estimates for 2023–2025 were projected. For further details, see *Appendix II: Data sources and methods*. The range of scales differs widely between the figures. The complete definition of the specific cancers included here can be found in Table A1.

Long-term trends

Longer-term trends provide additional context for understanding the success and challenges in reducing cancer mortality. Table 2.6 shows trends in mortality rates between 1984 and 2022 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 more than doubled, with mortality decreasing -1.8% annually.
- In females, the overall cancer mortality rate started to decrease at a rate of -0.3% per year in 1994. The rate of decline increased over the years to -1.1% per year between 2003 and 2016 and then -1.8 % per year since 2016.

Figure 2.8 and Figure 2.9 show the ASMR over time (projected to 2025) for the leading causes of cancer death and cancers that had a statistically significant change in APC of at least ±2% in the most recent trend: bladder, Hodgkin lymphoma, kidney and renal pelvis, leukemia and stomach in both sexes; and non-Hodgkin lymphoma in females.

Lung and bronchus (lung) cancer

In males, the mortality rate for lung cancer was stable throughout the 1980s and has been declining since 1993. The downward trend was estimated at -2.2% per year between 1993 and 2014 and -4.1% per year between 2014 and 2022. Comparatively, lung cancer mortality rate continued to increase among females until 2006. While the initial decline in females was modest (-0.5% until 2015), the rate of decline increased to -3.1% per year between 2015 and 2022. In males, mortality rate projected for 2025 will be 60% lower than at its peak in 1988; in females, the projected mortality rate will be about 30% lower than at its peak in 2006.

The pattern in lung cancer mortality tends to mirror that of lung cancer incidence (Chapter 1). 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. Sustained efforts in lung cancer prevention are still required, as discussed in Chapter 4. For instance, commercial tobacco control is still needed to further reduce the burden of lung cancer.[9–11] There is also concern that vaping and e-cigarette use may increase lung cancer risk and, thus, mortality.[12] Long-term exposure to many environmental toxicants (such as radon, asbestos, arsenic and air pollution) has also been shown to increase the risk of developing lung cancer and, thus, dying from the disease.[13–21] These factors also magnify the risk associated with tobacco use and further increase mortality rates in people who smoke.[16]

Currently, about 70% of lung cancers in Canada are found at stage III or IV.[22–24] Less than 16% of people who are diagnosed at these late stages are expected to survive more than five years after their diagnosis.[25] The recent recommendation to introduce screening programs for individuals at high risk is a positive step towards reducing future lung cancer mortality in this country. The aim of the programs is to detect disease at an earlier stage when it may respond better to treatment.[26] 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 2022. In males, the rate declined -1.0% per year between 1984 and 2003; -2.2% per year between 2003 and 2018; and -4.1% per year since 2018. In females, the rate declined -1.7% per year until 2014, but it has since declined -2.8% per year. Colorectal cancer mortality in males is declining almost twice as fast as previously reported and the rate of decline now surpasses that of females. For both sexes, colorectal cancer mortality rates for 2025 are projected to be more than 50% lower than what they were 40 years ago. Similar declines in mortality have been observed in other high-income countries worldwide, although the US recently showed a 1.2% per year increase in the colorectal mortality rate for people younger than 50 years of age. This pattern is attributed to early-onset colorectal cancer often being diagnosed at a more advanced stage.[27]

Globally, declines in colorectal cancer mortality have been associated in part to screening interventions.[27,28] Colorectal cancer screening programs can find precancerous polyps so they can be removed, which reduces incidence and helps detect cancer early, when treatment is most effective. Given the strong connection between stage at diagnosis and survival,[25,29,30]

The colorectal cancer mortality rate is 50% lower than it was 40 years ago.

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.[31] In some countries, such as Australia, New Zealand and several European countries, 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.[28]

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 2025. This is in part because the mortality rate for pancreatic cancer has stayed largely the same over the past 40 years, whereas the rates of more common cancers, including lung, breast, prostate and colorectal, have declined considerably. In males, the mortality rate for pancreatic cancer decreased -1.5% per year between 1984 and 1997. Since 2010, the rate has steadily risen 0.6% per year. In females, the rate has remained unchanged since 1984.

Because of the low survival rates for pancreatic cancer, the mortality rates are almost as high as the incidence rates.[32–35] Between countries, trends in pancreatic cancer mortality rates varied in the past decade but have typically increased over time.[36–38] 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.[37]

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 51%, from 47.6 deaths per 100,000 in 1986 to a projected rate of 23.5 deaths per 100,000 in 2025. The downward trend was estimated at -2.3% per year between 1994 and 2011 and -1.5% per year between 2011 and 2022. The decline in breast cancer mortality in females has been largely attributed to a combination of increased mammography screening[39] and the use of more effective and multidisciplinary therapies following breast cancer diagnosis.[40,41] A similar magnitude of decline in breast cancer mortality is reported in the US, where the rate dropped 58% between 1975 and 2019.[42,43] About 25% of this reduction was associated with screening, 29% was associated with treating metastatic breast cancer and 47% with treating stage I to III breast cancers.[44] Globally, breast cancer continues to be an important health concern. Many countries report increases in incidence, prevalence and mortality rates.[45,46] 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 (44%) of these deaths occurred in females aged 50–74 years.

Prostate cancer

The mortality rate for prostate cancer has been decreasing since the mid-1990s. Initially, the rate declined -2.9% per year, and since 2012 the decline has slowed to -1.3% per year. The decline likely reflects improved treatment following the introduction of hormonal therapy for early- and advanced-stage disease[47–49] and advances in radiation therapy.[50] 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.[51,52] The Canadian Task Force on Preventive Health Care does not recommend the use of the PSA test for screening based on the current evidence.[53] 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.[54]

Bladder

In males, the bladder cancer mortality rate declined -3.1% per year since 2016. A comparable decline is now observed in females: the most recent trend shows a decrease of -3.6% per year since 2017. This represents a much steeper decrease than previously reported, and it means that bladder cancer has the fastest declining mortality among cancers in females. A similar trend has been reported in the US.[55] 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.[56] Tobacco smoking is the main risk factor for bladder cancer, and it accounts 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.[56]

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 -2.3% per year. Based on this trend, mortality rates in 2025 are expected to be about 75% lower than those reported in 1984 for both sexes. The latest studies of global mortality for Hodgkin lymphoma reported similar downward trends,[57,58] 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.[59,60]

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 -2.7% annual decline the mortality rate for males since 2014 and a -2.0% annual decline in mortality for females since 2008. Similar rates of decline in kidney cancer mortality have been reported in the US[61] and in other regions with high sociodemographic index globally.[62] 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.[61–64]

Perspectives of people affected by cancer

Amélie Perron, 44, was diagnosed with advanced kidney cancer in 2018. Since then, she has received a series of treatments as the disease progressed. First, she had surgery to remove her right kidney. Then, in 2020, the cancer metastasized to the bone and targeted treatments were initiated. Recently, she had radiation therapy to treat cancer that spread to her lung. Today, Amélie balances her ongoing treatment with being a busy parent.

"The survival statistics weighed heavily on me, especially when I was given a 50% chance of living for five more years. But I decided not to let those numbers bring me down."

Leukemia

The mortality rate for leukemia decreased -0.9% per year in both males and females between 1984 and 2017. Since then, the rate of decline has been -2.8% per year in males and -2.7% per year in females. A similar downward trend in mortality has been observed globally.[65,66] Around the world, mortality in males is estimated to be almost 50% higher than in females, and it is about 30% greater in higher-income countries than in lower-income countries.[65] Smoking, physical inactivity, living with excess weight, obesity and high levels of cholesterol increase mortality risk.[65] Between 1990 and 2019, the proportion of deaths attributable to a high body mass index (BMI) increased worldwide, especially in regions with high sociodemographic indices.[66,67] In Canada, mortality rates projected for 2025 for both sexes will be about one-third of what they were at their peak in 1985, with the rate in males expected to be 71% higher than in females.

Non-Hodgkin lymphoma

Non-Hodgkin lymphoma mortality rates increased prior to 2000 but have declined subsequently. In males, the rate decreased -2.3% per year between 2000 and 2010, and then -0.8% per year thereafter. In females, the rate of decline has been constant since 1999 at -2.1% 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.[68,69] The downward trend in mortality likely reflects continued improvements in treatment, such as immunotherapy (e.g., rituximab).[70] In addition, the introduction of highly active antiretroviral therapy (HAART) in the late 1990s[71] 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 2011, and then -2.3% afterwards. In females, the rate declined -3.0% per year until 2007 and has since declined -2.2% per year. In Canada, the mortality rate projected for 2025 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.[72,73] 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.[72–75] Slower rates of decline observed in recent years have also been reported in the US and many European countries, where the prevalence of *Helicobacter pylori* infection has stabilized after previous declines.[75] However, for the US and Canada, the same study identified an increasing trend in mortality rate in younger (aged 35–64 years) Canadian males and US females. These trends warrant continued monitoring.

Average annual percent change (AAPC)

Table 2.6 also shows the overall average annual percent change (AAPC) in cancer mortality rates between 1984 and 2022. 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 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 (-3.1%) and stomach cancer (-2.8%), while the greatest increase was for liver and intrahepatic bile duct cancer (2.8%). However, most recent APC for liver and intrahepatic bile duct cancer shows a slower rate of increase in females since 2013 (1.3%) and a levelling off in rate amongst males since 2016 (0.03%).
- In Canada, the mortality rate for all cancers combined has decreased by an average of -1.0% per year since 1984.

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?

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.(22,25) 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(76) 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 for some cancers, like uterine and liver and intrahepatic bile duct cancers in females, continues to increase. Improving early detection and treatment for people diagnosed with cancer, as well as support 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,* 2022

	Lifetime probability of dying from cancer					
	%			One in:		
	Both sexes	Males	Females	Both sexes	Males	Females
All cancers	**21.9**	**23.1**	**20.8**	**4.6**	**4.3**	**4.8**
Lung and bronchus	4.8	5.0	4.7	21	20	21
Colorectal	2.4	2.5	2.4	41	40	42
Pancreas	1.5	1.5	1.4	68	67	69
Breast	1.4	0.0	2.8	70	3,180	35
Prostate	—	3.0	—	—	34	—
Liver and intrahepatic bile duct†	0.7	0.9	0.6	134	110	172
Leukemia	0.8	0.9	0.7	124	108	146
Non-Hodgkin lymphoma	0.8	1.0	0.7	119	103	140
Brain and other nervous system	0.6	0.6	0.5	178	156	208
Bladder	0.7	1.0	0.4	143	97	259
Esophagus	0.5	0.8	0.3	189	126	381
Head and neck	0.5	0.7	0.3	191	135	327
Stomach	0.5	0.6	0.4	197	164	245
Ovary	—	—	1.0	—	—	105
Kidney and renal pelvis	0.5	0.6	0.3	217	172	289
Myeloma	0.4	0.5	0.4	226	197	265
Uterus (body, NOS)	—	—	0.7	—	—	140
Melanoma	0.3	0.4	0.2	332	257	464
Soft tissue (including heart)	0.2	0.2	0.1	657	621	697
Cervix	—	—	0.2	—	—	556
Thyroid	0.1	0.1	0.1	1,363	1,457	1,295
Hodgkin lymphoma	0.0	0.0	0.0	3,353	2,832	4,107
Testis	—	0.0	—	—	6,604	—

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

* Mortality data from Yukon were 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 in 2022. 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 2025 (Table 2.2) for both sexes combined. "One in" estimates are based on unrounded probabilities.

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 selected cancers, by sex, Canada, 2025

	Deaths (2025 estimates)			Deaths per 100,000		
	Total*	Males	Females	Both sexes	Males	Females
All cancers	**87,400**	**46,700**	**40,700**	**202.6**	**239.6**	**174.3**
Lung and bronchus	19,400	10,100	9,300	44.6	50.9	39.7
Colorectal	9,100	4,900	4,200	21.2	25.5	17.6
Pancreas	6,300	3,300	3,000	14.7	16.8	12.9
Breast	5,400	55	5,400	12.8	0.3	23.5
Prostate	5,200	5,200	—	—	27.7	—
Liver and intrahepatic bile duct†	3,600	2,300	1,350	8.4	11.3	5.9
Leukemia	3,200	1,850	1,350	7.4	9.6	5.6
Non-Hodgkin lymphoma	3,200	1,900	1,300	7.3	9.7	5.4
Brain and other nervous system	2,600	1,550	1,100	6.3	7.8	4.9
Bladder	2,500	1,800	730	5.8	9.6	3.0
Esophagus	2,500	1,950	550	5.8	9.7	2.4
Head and neck	2,200	1,600	620	5.2	8.2	2.6
Stomach	2,100	1,300	770	4.8	6.5	3.3
Ovary	2,000	—	2,000	—	—	8.7
Kidney and renal pelvis	1,950	1,300	670	4.6	6.7	2.8
Myeloma	1,750	1,050	720	4.0	5.2	3.0
Uterus (body, NOS)	1,700	—	1,700	—	—	7.3
Melanoma	1,250	790	440	2.9	4.1	1.9
Soft tissue (including heart)	690	380	310	1.6	1.9	1.4
Cervix	430	—	430	—	—	2.0
Thyroid	290	140	150	0.7	0.7	0.6
Hodgkin lymphoma	120	75	45	0.3	0.4	0.2
Testis	35	35	—	—	0.2	—
All other cancers	9,900	5,200	4,700	22.8	26.8	19.6

— Not applicable; 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 2021 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, 2025

Age	All cancers			Lung and bronchus			Colorectal			Pancreas			Breast	Prostate
	Both sexes*	Males	Females	Both sexes*	Males	Females	Both sexes*	Males	Females	Both sexes*	Males	Females	Females	Males
All ages	**87,400**	**46,700**	**40,700**	**19,400**	**10,100**	**9,300**	**9,100**	**4,900**	**4,200**	**6,300**	**3,300**	**3,000**	**5,400**	**5,200**
0–14	100	60	45	—	—	—	—	—	—	—	—	—	—	—
15–29	230	140	95	5	—	—	10	5	5	—	—	—	5	—
30–39	650	280	370	25	15	10	85	45	40	20	10	5	120	—
40–49	2,000	880	1,100	180	90	95	290	170	130	110	65	45	320	5
50–59	6,000	3,000	3,000	930	490	440	740	430	310	490	280	200	640	90
60–69	18,100	9,800	8,300	4,700	2,400	2,200	1,700	1,000	680	1,500	850	640	1,100	640
70–79	28,200	15,600	12,600	7,400	3,900	3,500	2,500	1,500	1,050	2,200	1,150	1,050	1,350	1,500
80–89	23,600	12,800	10,800	4,900	2,600	2,400	2,500	1,300	1,250	1,600	800	820	1,250	2,000
90+	8,600	4,100	4,500	1,250	580	660	1,200	480	720	450	170	280	630	950
0–19	150	85	65	—	—	—	—	—	—	—	—	—	—	—
50–74	37,300	20,100	17,200	9,200	4,800	4,400	3,600	2,100	1,450	3,000	1,650	1,350	2,400	1,350
65+	71,200	38,400	32,700	16,600	8,600	7,900	7,200	3,800	3,400	5,100	2,600	2,500	3,800	4,900

— 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, 2025

	Deaths per 100,000										
	CA*	**BC**	**AB**	**SK**	**MB**	**ON**	**QC**	**NB**	**NS**	**PE**	**NL**
Males											
All cancers	**239.6**	**225.0**	**223.2**	**252.8**	**250.5**	**232.9**	**251.5**	**256.6**	**278.8**	**283.3**	**288.5**
Lung and bronchus	50.9	41.3	42.5	48.9	50.2	45.7	64.8	59.9	62.6	66.6	63.3
Prostate	27.7	29.4	29.7	35.0	34.7	26.5	25.7	25.7	32.8	27.1	29.6
Colorectal	25.5	22.0	24.7	30.5	29.8	24.4	25.8	29.6	30.4	28.9	48.1
Pancreas	16.8	17.2	15.5	16.7	16.5	16.6	17.0	19.0	17.6	16.4	17.0
Liver and intrahepatic bile duct†	11.3	12.5	9.4	10.3	10.4	12.0	11.0	8.6	9.6	14.0	11.0
Esophagus	9.7	11.1	9.4	11.5	10.7	9.7	7.7	12.6	16.2	12.7	9.3
Non-Hodgkin lymphoma	9.7	9.6	9.4	8.9	9.3	9.5	10.1	9.2	11.3	10.9	10.6
Leukemia	9.6	9.0	9.5	12.0	10.9	9.1	10.3	10.2	12.0	9.8	8.9
Bladder	9.6	8.4	7.4	11.1	11.2	8.7	11.8	11.9	10.2	8.3	9.7
Head and neck	8.2	8.4	6.6	6.8	5.5	8.2	9.5	6.8	7.7	10.2	7.6
Brain and other nervous system	7.8	8.3	7.1	5.7	6.5	7.9	8.1	7.8	8.6	8.0	8.2
Kidney and renal pelvis	6.7	6.4	5.7	7.6	8.2	6.0	7.1	9.0	9.5	9.6	9.9
Stomach	6.5	5.0	5.6	5.2	5.6	7.1	7.2	6.7	5.7	5.8	10.8
Myeloma	5.2	5.4	5.0	5.8	5.9	5.1	5.1	6.0	5.9	6.2	6.0
Melanoma	4.1	3.7	3.9	3.8	3.2	4.8	3.2	4.0	5.6	7.8	4.1
Soft tissue (including heart)	1.9	1.8	2.0	1.6	2.0	2.1	1.9	1.9	1.8	—	1.7
Thyroid	0.7	0.8	0.8	0.9	0.8	0.8	0.6	0.7	1.0	0.4	1.0
Hodgkin lymphoma	0.4	0.4	0.3	0.5	—	0.4	0.5	—	0.5	—	—
Breast	0.3	0.3	0.3	—	—	0.2	0.3	0.7	0.8	—	—
Testis	0.2	0.2	0.1	0.4	—	0.2	0.2	0.6	—	0.0	0.2
Females											
All cancers	**174.3**	**160.4**	**165.3**	**192.1**	**171.8**	**166.9**	**189.6**	**180.6**	**207.5**	**164.6**	**213.2**
Lung and bronchus	39.7	31.5	36.5	47.1	36.6	35.2	49.7	43.6	56.0	48.2	50.4
Breast	23.5	22.0	24.0	25.9	22.5	22.7	25.1	22.6	27.5	17.3	25.9
Colorectal	17.6	15.7	15.8	18.9	18.8	16.0	19.5	21.5	23.1	17.6	32.2
Pancreas	12.9	13.3	12.9	12.2	13.0	12.5	13.6	13.4	13.1	9.8	11.1
Ovary	8.7	9.3	8.2	8.8	8.1	8.5	9.2	8.2	8.8	10.7	8.2
Uterus (body, NOS)	7.3	6.7	7.3	7.7	7.9	7.8	7.1	6.8	7.0	6.1	8.0
Liver and intrahepatic bile duct†	5.9	5.8	6.4	6.4	5.5	6.0	5.6	4.8	6.9	4.5	6.7
Leukemia	5.6	5.4	4.8	6.0	6.1	5.5	6.1	6.5	5.6	4.0	5.6
Non-Hodgkin lymphoma	5.4	4.6	5.0	5.8	6.4	5.3	6.0	6.0	7.1	5.5	7.0
Brain and other nervous system	4.9	4.9	4.6	4.7	4.5	4.7	5.3	5.5	5.2	3.4	7.5
Stomach	3.3	2.7	2.9	2.3	2.8	3.4	3.7	3.8	3.1	—	4.2
Bladder	3.0	3.0	2.1	3.7	3.1	2.6	3.7	3.0	3.2	3.0	3.4
Myeloma	3.0	2.9	2.6	3.8	3.0	2.9	3.2	3.1	3.0	3.6	4.7
Kidney and renal pelvis	2.8	2.4	2.5	3.8	3.2	2.3	3.3	3.9	4.5	5.0	5.7
Head and neck	2.6	3.0	2.2	2.3	2.7	2.6	2.9	2.3	2.7	—	2.9
Esophagus	2.4	2.7	2.1	2.7	2.6	2.5	2.1	2.8	3.2	3.8	2.4
Melanoma	1.9	1.8	1.8	1.9	1.6	2.0	1.8	2.2	2.6	3.1	1.9
Cervix	2.0	1.9	2.0	2.6	2.0	2.0	1.9	2.4	2.6	3.5	3.0
Soft tissue (including heart)	1.4	1.1	1.5	1.5	1.6	1.5	1.5	1.7	1.3	—	1.1
Thyroid	0.6	0.8	0.9	0.6	0.7	0.6	0.6	0.7	0.8	—	0.7
Hodgkin lymphoma	0.2	0.2	0.2	—	—	0.2	0.3	—	—	0.2	0.1

— ASMR based on fewer than 3 deaths; 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 2021 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, 2025

	CA*	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL
Males											
All cancers	**46,700**	**6,400**	**4,100**	**1,350**	**1,550**	**17,300**	**12,000**	**1,200**	**1,600**	**250**	**900**
Lung and bronchus	10,100	1,200	800	270	310	3,400	3,200	290	370	60	210
Prostate	5,200	830	500	180	200	1,900	1,200	110	170	25	85
Colorectal	4,900	620	460	160	180	1,800	1,200	140	170	25	140
Pancreas	3,300	500	290	90	100	1,250	820	90	100	15	55
Liver and intrahepatic bile duct†	2,300	360	180	55	65	910	530	40	55	10	35
Esophagus	1,950	320	180	60	65	730	370	60	95	10	30
Non-Hodgkin lymphoma	1,900	280	170	50	60	710	490	45	65	10	35
Leukemia	1,850	260	170	65	65	670	490	45	70	10	30
Bladder	1,800	240	130	55	65	630	540	55	55	5	30
Head and neck	1,600	240	130	35	35	610	450	30	45	10	25
Brain and other nervous system	1,550	240	150	35	40	600	390	35	50	5	25
Kidney and renal pelvis	1,300	190	110	40	50	450	330	40	55	10	30
Stomach	1,300	140	110	30	35	520	340	30	30	5	35
Myeloma	1,050	160	90	30	35	380	250	30	35	5	20
Melanoma	790	110	75	20	20	360	150	20	30	5	15
Soft tissue (including heart)	380	50	40	10	15	160	90	10	10	—	5
Thyroid	140	25	15	5	5	55	25	5	5	—	5
Hodgkin lymphoma	75	10	5	5	—	30	20	—	5	—	—
Breast	55	10	5	—	—	20	15	5	5	—	—
Testis	35	5	5	5	—	20	10	5	—	—	—
Females											
All cancers	**40,700**	**5,400**	**3,600**	**1,200**	**1,250**	**15,200**	**10,600**	**1,000**	**1,450**	**180**	**770**
Lung and bronchus	9,300	1,100	800	300	270	3,200	2,800	240	390	50	180
Breast	5,400	720	530	170	160	2,000	1,350	120	190	20	90
Colorectal	4,200	530	350	120	140	1,500	1,150	120	160	20	120
Pancreas	3,000	450	280	75	95	1,150	760	75	90	10	40
Ovary	2,000	310	180	55	60	750	500	45	60	10	30
Uterus (body, NOS)	1,700	220	160	45	60	690	390	35	50	5	30
Liver and intrahepatic bile duct†	1,350	190	140	40	40	550	320	25	45	5	25
Leukemia	1,350	190	110	40	45	510	350	35	40	5	20
Non-Hodgkin lymphoma	1,300	160	110	40	50	490	350	35	50	5	25
Brain and other nervous system	1,100	160	100	30	30	400	280	30	35	5	25
Stomach	770	90	65	15	20	310	220	20	20	—	15
Bladder	730	110	45	25	25	260	220	20	25	5	15
Myeloma	720	100	60	25	20	270	180	20	20	5	20
Kidney and renal pelvis	670	80	55	25	25	210	190	20	30	5	20
Head and neck	620	100	50	15	20	240	160	15	20	—	10
Esophagus	550	90	45	15	20	220	120	15	20	5	10
Melanoma	440	60	40	10	10	190	95	10	15	5	5
Cervix	430	60	45	15	15	170	90	10	15	5	10
Soft tissue (including heart)	310	35	35	10	10	130	75	10	10	—	5
Thyroid	150	25	20	5	5	60	35	5	5	—	5
Hodgkin lymphoma	45	5	5	—	—	20	15	—	—	—	—

— Fewer than 3 deaths; 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, 1984–2022

	Both sexes			Males			Females		
	Period	APC* (95% CL)	AAPC* (95% CL), 1984–2022	Period	APC* (95% CL)	AAPC* (95% CL), 1984–2022	Period	APC* (95% CL)	AAPC* (95% CL), 1984–2022
All cancers	**1984–1993**	**-0.1 (-0.2 , 0.3)**	**-1.0 (-1.0 , -0.9)**	**1984–1988**	**0.7 (-0.0 , 1.3)**	**-1.2 (-1.2 , -1.1)**	**1984–1994**	**0.1 (-0.1 , 0.6)**	**-0.7 (-0.7 , -0.6)**
	1993–2002	**-0.7 (-0.9 , -0.5)**		**1988–2001**	**-0.8 (-1.0 , -0.7)**		**1994–2003**	**-0.3 (-1.2 , -0.1)**	
	2002–2017	**-1.3 (-1.4 , -1.2)**		**2001–2022**	**-1.8 (-1.8 , -1.7)**		**2003–2016**	**-1.1 (-1.2 , -0.8)**	
	2017–2022	**-2.0 (-2.4 , -1.7)**					**2016–2022**	**-1.8 (-2.3 , -1.5)**	
Lung and bronchus	1984–1993	1.0 (0.6 , 1.5)	-1.0 (-1.1 , -1.0)	1984–1993	-0.1 (-0.5 , 0.4)	-2.1 (-2.2 , -2.0)	1984–1993	4.0 (3.5 , 4.6)	0.7 (0.6 , 0.8)
	1993–2007	-0.7 (-0.9 , -0.5)		1993–2014	-2.2 (-2.3 , -2.1)		1993–2006	1.4 (1.1 , 1.6)	
	2007–2015	-1.6 (-2.2 , -1.2)		2014–2022	-4.1 (-4.7 , -3.7)		2006–2015	-0.5 (-0.9 , -0.2)	
	2015–2022	-3.6 (-4.2 , -3.2)					2015–2022	-3.1 (-3.6 , -2.7)	
Colorectal	1984–2004	-1.3 (-1.4 , -1.1)	-1.8 (-1.9 , -1.7)	1984–2003	-1.0 (-1.2 , -0.7)	-1.8 (-1.9 , -1.7)	1984–2014	-1.7 (-1.8 , -1.6)	-1.9 (-2.0 , -1.8)
	2004–2016	-2.0 (-2.3 , -1.6)		2003–2018	-2.2 (-2.4 , -1.6)		2014–2022	-2.8 (-3.7 , -2.3)	
	2016–2022	-3.1 (-4.0 , -2.5)		2018–2022	-4.1 (-5.0 , -2.7)				
Pancreas	1984–2000	-0.9 (-1.4 , -0.6)	-0.3 (-0.4 , -0.2)	1984–1997	-1.5 (-3.0 , -0.7)	-0.4 (-0.6 , -0.3)	1984–2022	-0.1 (-0.2 , 0.0)	-0.1 (-0.2 , 0.0)
	2000–2022	0.2 (0.0 , 0.4)		1997–2010	-0.3 (-1.7 , 0.7)				
				2010–2022	0.6 (0.1 , 1.7)				
Breast	1984–1994	-0.5 (-0.9 , 0.0)	-1.7 (-1.8 , -1.6)	1984–2022	-0.9 (-1.4 , -0.3)	-0.9 (-1.4 , -0.3)	1984–1994	-0.6 (-1.0 , -0.1)	-1.6 (-1.7 , -1.5)
	1994–2012	-2.4 (-2.9 , -2.2)					1994–2011	-2.3 (-2.7 , -2.1)	
	2012–2022	-1.7 (-2.0 , -0.8)					2011–2022	-1.5 (-1.8 , -0.8)	
Prostate				1984–1995	0.9 (0.4 , 1.5)	-1.4 (-1.5 , -1.3)			
				1995–2012	-2.9 (-3.3 , -2.7)				
				2012–2022	-1.3 (-1.7 , -0.5)				
Liver and intrahepatic bile duct†	1984–1995	1.0 (-1.8 , 2.3)	2.8 (2.5 , 3.0)	1984–1992	0.01 (-4.1 , 2.4)	2.5 (2.2 , 2.9)	1984–1988	7.4 (1.3 , 11.7)	3.3 (3.0 , 3.7)
	1995–2016	4.4 (4.1 , 5.0)		1992–2016	4.0 (3.8 , 4.6)		1988–1993	-2.8 (-4.3 , 3.6)	
	2016–2022	0.2 (-1.5 , 1.4)		2016–2022	0.03 (-1.8 , 1.3)		1993–2008	4.2 (3.1 , 5.0)	
							2008–2013	7.4 (5.4 , 8.3)	
							2013–2022	1.3 (0.5 , 1.9)	
Leukemia	1984–2017	-0.8 (-0.9 , -0.7)	-1.0 (-1.2 , -0.9)	1984–2017	-0.9 (-1.0 , -0.6)	-1.1 (-1.3 , -0.9)	1984–2017	-0.9 (-1.0 , -0.2)	-1.1 (-1.3 , -0.9)
	2017–2022	-2.7 (-4.0 , -1.5)		2017–2022	-2.8 (-4.4 , -1.3)		2017–2022	-2.7 (-4.6 , -1.1)	
Non-Hodgkin lymphoma	1984–2000	1.7 (1.4 , 2.1)	-0.3 (-0.4 , -0.2)	1984–2000	1.9 (1.5 , 2.3)	-0.1 (-0.2 , 0.1)	1984–1999	1.5 (1.1 , 2.1)	-0.6 (-0.8 , -0.5)
	2000–2010	-2.4 (-3.4 , -1.9)		2000–2010	-2.3 (-3.5 , -1.7)		1999–2022	-2.1 (-2.3 , -1.8)	
	2010–2022	-1.2 (-1.5 , -0.3)		2010–2022	-0.8 (-1.2 , 0.2)				
Brain and other nervous system	1984–2005	-0.6 (-1.1 , -0.2)	-0.3 (-0.4 , -0.1)	1984–2022	-0.1 (-0.2 , 0.0)	-0.1 (-0.2 , 0.0)	1984–2006	-0.7 (-1.4 , -0.3)	-0.4 (-0.6 , -0.2)
	2005–2014	0.8 (-0.3 , 2.1)					2006–2014	1.3 (-0.3 , 2.9)	
	2014–2022	-0.7 (-2.0 , 0.1)					2014–2022	-1.1 (-3.0 , 0.0)	
Bladder	1984–2017	-0.3 (-0.4 , -0.2)	-0.7 (-0.9 , -0.6)	1984–2016	-0.4 (-0.5 , -0.2)	-0.8 (-1.0 , -0.7)	1984–2017	-0.4 (-0.6 , -0.1)	-0.8 (-1.1 , -0.6)
	2017–2022	-3.4 (-5.1 , -2.0)		2016–2022	-3.1 (-5.1 , -1.8)		2017–2022	-3.6 (-6.2 , -1.4)	
Esophagus	1984–2000	0.8 (0.4 , 1.4)	0.1 (0.0 , 0.3)	1984–2002	0.9 (0.5 , 1.6)	0.2 (0.1 , 0.4)	1984–1993	0.9 (-0.4 , 4.4)	-0.4 (-0.7 , -0.1)
	2000–2022	-0.3 (-0.6 , -0.1)		2002–2022	-0.4 (-0.8 , -0.1)		1993–2022	-0.8 (-1.5 , -0.6)	

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, 1984–2022

	Both sexes			Males			Females		
	Period	APC* (95% CL)	AAPC* (95% CL), 1984–2022	Period	APC* (95% CL)	AAPC* (95% CL), 1984–2022	Period	APC* (95% CL)	AAPC* (95% CL), 1984–2022
Head and neck	1984–1991	-0.7 (-1.7 , 1.4)	-1.3 (-1.5 , -1.1)	1984–1991	-0.6 (-1.7 , 1.6)	-1.5 (-1.6 , -1.3)	1984–2022	-1.1 (-1.3 , -1.0)	-1.1 (-1.3 , -1.0)
	1991–2009	-2.3 (-3.4 , -2.0)		1991–2010	-2.6 (-3.4 , -2.4)				
	2009–2022	-0.3 (-0.8 , 0.3)		2010–2022	-0.2 (-0.7 , 0.6)				
Stomach	1984–2010	-3.1 (-3.3 , -3.0)	-2.8 (-2.9 , -2.7)	1984–2011	-3.3 (-3.6 , -3.2)	-3.0 (-3.1 , -2.9)	1984–2007	-3.0 (-3.6 , -2.8)	-2.7 (-2.9 , -2.5)
	2010–2022	-2.1 (-2.5 , -1.3)		2011–2022	-2.3 (-2.8 , -1.0)		2007–2022	-2.2 (-2.6 , -0.7)	
Ovary							1984–2003	-0.5 (-0.7 , 0.5)	-0.8 (-1.0 , -0.7)
							2003–2022	-1.2 (-1.9 , -1.0)	
Kidney and renal pelvis	1984–2013	-0.3 (-0.5 , -0.1)	-0.9 (-1.0 , -0.7)	1984–2014	-0.3 (-0.5 , -0.1)	-0.8 (-1.0 , -0.7)	1984–2008	-0.3 (-0.6 , 0.1)	-1.0 (-1.2 , -0.8)
	2013–2022	-2.5 (-3.8 , -1.7)		2014–2022	-2.7 (-4.3 , -1.8)		2008–2022	-2.0 (-3.0 , -1.5)	
Myeloma	1984–1994	0.9 (0.0 , 2.9)	-0.5 (-0.6 , -0.3)	1984–1991	1.7 (-0.4 , 6.3)	-0.4 (-0.7 , 0.0)	1984–2002	0.01 (-0.6 , 1.6)	-0.8 (-1.0 , -0.5)
	1994–2022	-1.0 (-1.2 , -0.8)		1991–2022	-0.8 (-1.6 , -0.6)		2002–2022	-1.5 (-2.4 , -1.1)	
Uterus (body, NOS)							1984–2005	-0.8 (-1.3 , -0.5)	0.4 (0.2 , 0.6)
							2005–2022	1.9 (1.5 , 2.4)	
Melanoma	1984–2012	1.1 (0.9 , 1.4)	0.4 (0.2 , 0.6)	1984–2010	1.6 (1.3 , 2.1)	0.7 (0.5 , 1.0)	1984–2012	0.6 (0.3 , 1.0)	-0.01 (-0.2 , 0.2)
	2012–2022	-1.5 (-2.6 , -0.8)		2010–2022	-1.1 (-2.2 , -0.3)		2012–2022	-1.6 (-3.5 , -0.6)	
Soft tissue (including heart)	1984–2022	0.6 (0.4 , 0.8)	0.6 (0.4 , 0.8)	1984–2022	0.6 (0.4 , 1.0)	0.6 (0.4 , 1.0)	1984–2022	0.5 (0.2 , 0.8)	0.5 (0.2 , 0.8)
Cervix							1984–2006	-3.0 (-3.4 , -2.6)	-2.1 (-2.3 , -1.9)
							2006–2022	-0.9 (-1.5 , 0.0)	
Thyroid	1984–2022	0.1 (-0.1 , 0.5)	0.1 (-0.1 , 0.5)	1984–2022	0.9 (0.4 , 1.6)	0.9 (0.4 , 1.6)	1984–2022	-0.3 (-0.7 , 0.1)	-0.3 (-0.7 , 0.1)
Hodgkin lymphoma	1984–1997	-4.6 (-7.9 , -3.5)	-3.1 (-3.4 , -2.7)	1984–1996	-5.1 (-8.7 , -3.8)	-3.2 (-3.5 , -2.8)	1984–2022	-3.0 (-3.4 , -2.6)	-3.0 (-3.4 , -2.6)
	1997–2022	-2.3 (-2.8 , -1.0)		1996–2022	-2.2 (-2.7 , -1.2)				
Testis				1984–2002	-2.9 (-9.9 , -1.3)	-1.4 (-2.2 , -0.6)			
				2002–2022	-0.1 (-1.5 , 6.6)				
All other cancers	1984–2003	1.5 (1.1 , 1.9)	-0.2 (-0.4 , -0.1)	1984–2004	1.6 (1.2 , 2.1)	-0.2 (-0.4 , 0.0)	1984–2003	1.2 (0.9 , 1.7)	-0.3 (-0.5 , -0.2)
	2003–2015	-3.0 (-4.2 , -2.4)		2004–2015	-3.4 (-5.3 , -2.7)		2003–2015	-3.0 (-4.3 , -2.4)	
	2015–2022	-0.1 (-1.2 , 1.8)		2015–2022	-0.1 (-1.3 , 2.3)		2015–2022	-0.1 (-1.2 , 2.1)	

CL=confidence limits; NOS=not otherwise specified

* The APC and the AAPC are calculated using the Joinpoint Regression Program and rates age-standardized to the 2021 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, 1984–2022

	Both sexes		Males		Females	
	Reference year	APC* (95% CL)	Reference year	APC* (95% CL)	Reference year	APC* (95% CL)
All cancers	**2017**	**-2.0 (-2.4 , -1.7)**	**2001**	**-1.8 (-1.8 , -1.7)**	**2016**	**-1.8 (-2.3 , -1.5)**
Lung and bronchus	2015	-3.6 (-4.2 , -3.2)	2014	-4.1 (-4.7 , -3.7)	2015	-3.1 (-3.6 , -2.7)
Colorectal	2016	-3.1 (-4.0 , -2.5)	2018	-4.1 (-5.0 , -2.7)	2014	-2.8 (-3.7 , -2.3)
Pancreas	2000	0.2 (0.0 , 0.4)	2010	0.6 (0.1 , 1.7)	1984	-0.1 (-0.2 , 0.0)
Breast	2012	-1.7 (-2.0 , -0.8)	1984	-0.9 (-1.4 , -0.3)	2011	-1.5 (-1.8 , -0.8)
Prostate	—	—	2012	-1.3 (-1.7 , -0.5)	—	—
Liver and intrahepatic bile duct†	2016	0.2 (-1.5 , 1.4)	2016	0.03 (-1.8 , 1.3)	2013	1.3 (0.5 , 1.9)
Leukemia	2017	-2.7 (-4.0 , -1.5)	2017	-2.8 (-4.4 , -1.3)	2017	-2.7 (-4.6 , -1.1)
Non-Hodgkin lymphoma	2010	-1.2 (-1.5 , -0.3)	2010	-0.8 (-1.2 , 0.2)	1999	-2.1 (-2.3 , -1.8)
Brain and other nervous system	2014	-0.7 (-2.0 , 0.1)	1984	-0.1 (-0.2 , 0.0)	2014	-1.1 (-3.0 , 0.0)
Bladder	2017	-3.4 (-5.1 , -2.0)	2016	-3.1 (-5.1 , -1.8)	2017	-3.6 (-6.2 , -1.4)
Esophagus	2000	-0.3 (-0.6 , -0.1)	2002	-0.4 (-0.8 , -0.1)	1993	-0.8 (-1.5 , -0.6)
Head and neck	2009	-0.3 (-0.8 , 0.3)	2010	-0.2 (-0.7 , 0.6)	1984	-1.1 (-1.3 , -1.0)
Stomach	2010	-2.1 (-2.5 , -1.3)	2011	-2.3 (-2.8 , -1.0)	2007	-2.2 (-2.6 , -0.7)
Ovary	—	—	—	—	2003	-1.2 (-1.9 , -1.0)
Kidney and renal pelvis	2013	-2.5 (-3.8 , -1.7)	2014	-2.7 (-4.3 , -1.8)	2008	-2.0 (-3.0 , -1.5)
Myeloma	1994	-1.0 (-1.2 , -0.8)	1991	-0.8 (-1.6 , -0.6)	2002	-1.5 (-2.4 , -1.1)
Uterus (body, NOS)	—	—	—	—	2005	1.9 (1.5 , 2.4)
Melanoma	2012	-1.5 (-2.6 , -0.8)	2010	-1.1 (-2.2 , -0.3)	2012	-1.6 (-3.5 , -0.6)
Soft tissue (including heart)	1984	0.6 (0.4 , 0.8)	1984	0.6 (0.4 , 1.0)	1984	0.5 (0.2 , 0.8)
Cervix	—	—	—	—	2006	-0.9 (-1.5 , 0.0)
Thyroid	1984	0.1 (-0.1 , 0.5)	1984	0.9 (0.4 , 1.6)	1984	-0.3 (-0.7 , 0.1)
Hodgkin lymphoma	1997	-2.3 (-2.8 , -1.0)	1996	-2.2 (-2.7 , -1.2)	1984	-3.0 (-3.4 , -2.6)
Testis	—	—	2002	-0.1 (-1.5 , 6.6)	—	—
All other cancers	2015	-0.1 (-1.2 , 1.8)	2015	-0.1 (-1.3 , 2.3)	2015	-0.1 (-1.2 , 2.1)

— Not applicable; CL=confidence limits; NOS=not otherwise specified

* The APC was calculated using the Joinpoint Regression Program and rates age-standardized to the 2021 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 2022. Otherwise, the APC reflects the trend in rates over the entire period (1984–2022). 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

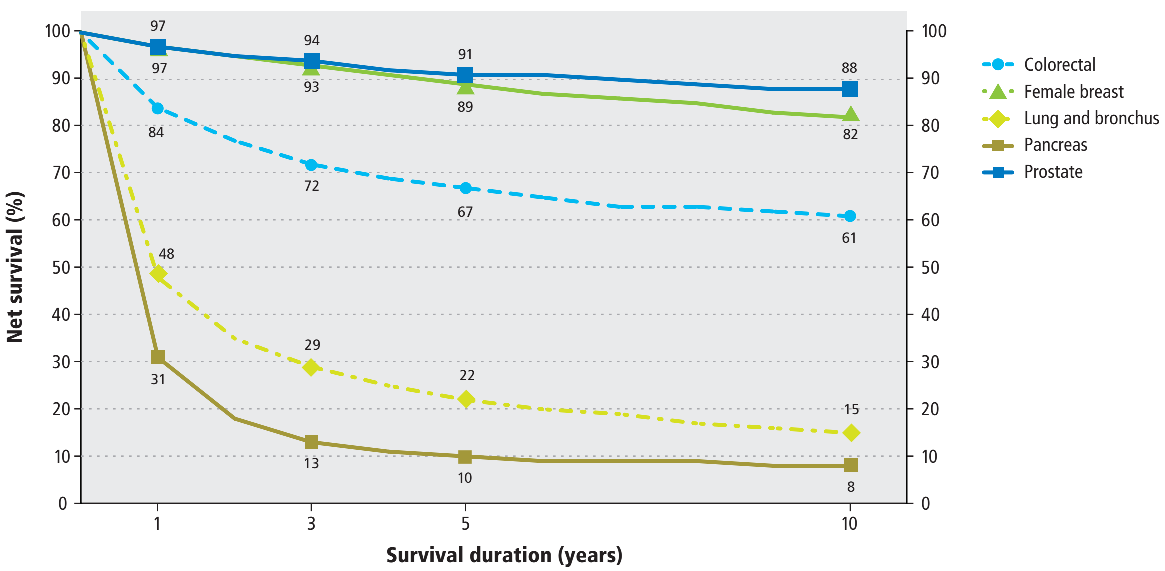
- For 2015 to 2017, the predicted five-year net survival for all cancers combined was 64%. This was up from 55% in the early 1990s.
- The highest five-year net survival was for cancers of the thyroid (97%) and testis (97%). It was lowest for cancers of the intrahepatic bile duct (6%), pancreas (10%) 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) decreased 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 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 the 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%).

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 by childhood cancer diagnostic group and selected subgroups.[11,12]

Five-year survival among children is about 84%.

- 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%).

Perspectives of people affected by cancer

Renée Meyer is a caregiver for her daughter, Ava, who was diagnosed with a brain tumour in 2012. Ava lost vision in her left eye and she received chemotherapy for a year and a half to stabilize the tumour and prevent further vision loss.

"It was very stressful. It was hard to hold it together. When I think about it now, I don't know how I did it, but I think as a parent or a caregiver, you do what you have to do, regardless of how you feel."

- 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.

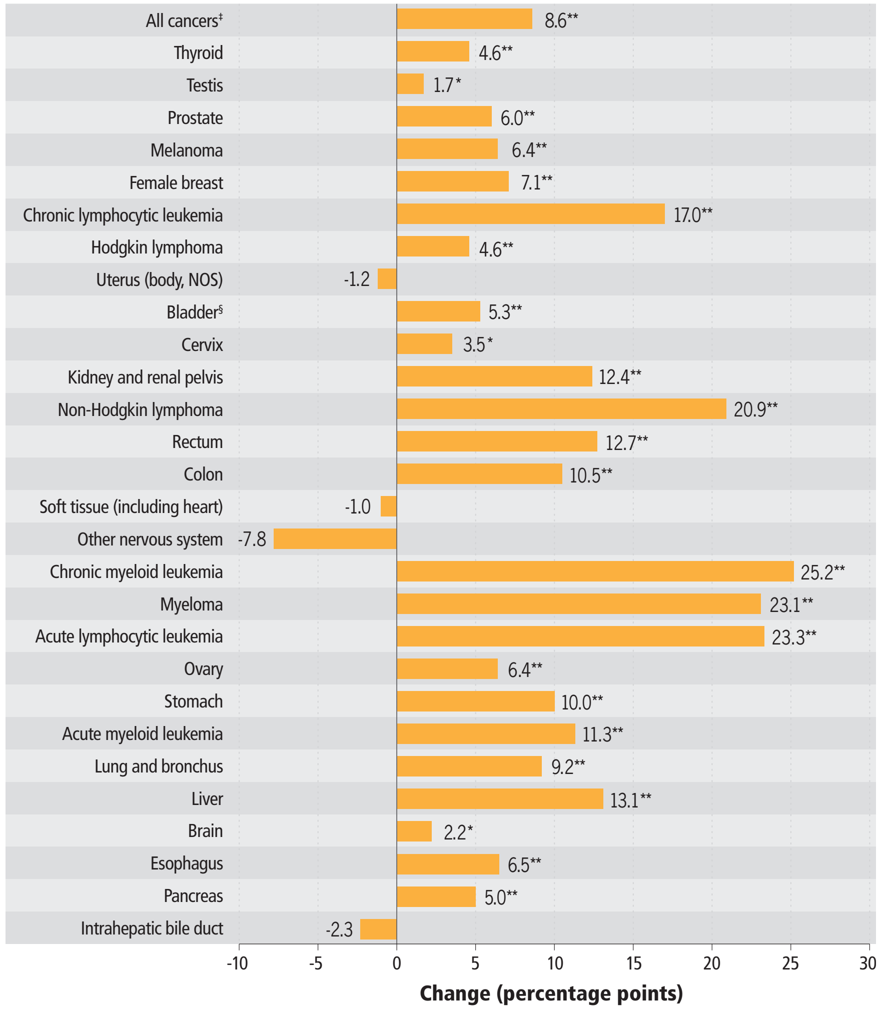
Survival over time

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 (blood) 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 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



View data

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

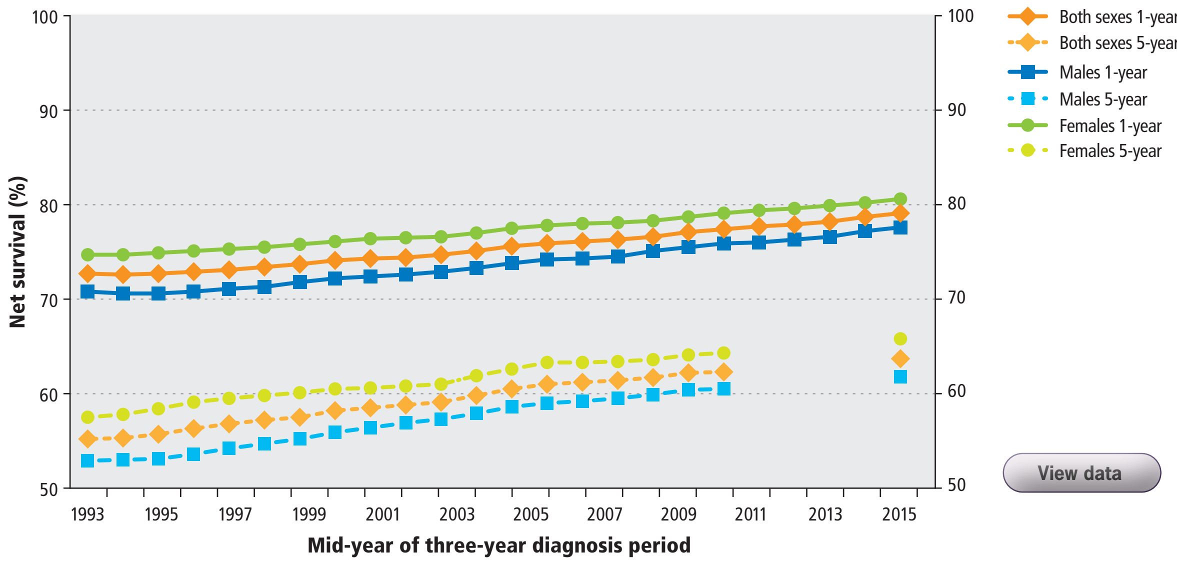
The study "The cancer survival index: Measuring progress in cancer survival to help evaluate cancer control efforts in Canada" provided the first comprehensive evaluation of progress in cancer survival in Canada for all cancer types combined.[8] Figure 3.3 presents some results from this study.

- 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.

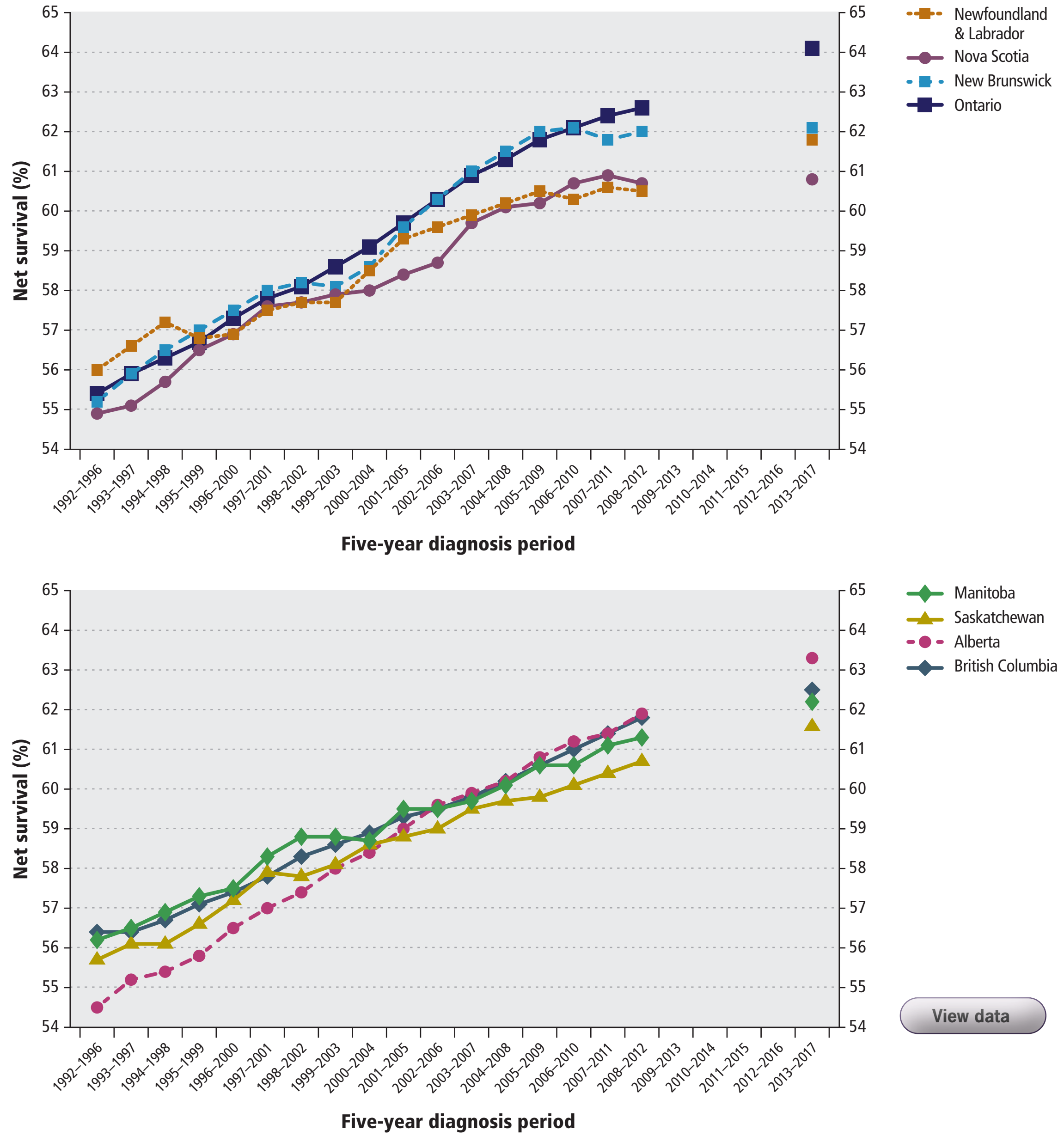
Source: Ellison LF. The cancer survival index: Measuring progress in cancer survival to help evaluate cancer control efforts in Canada. Health Rep. 2021;32 (9):14–26.

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;

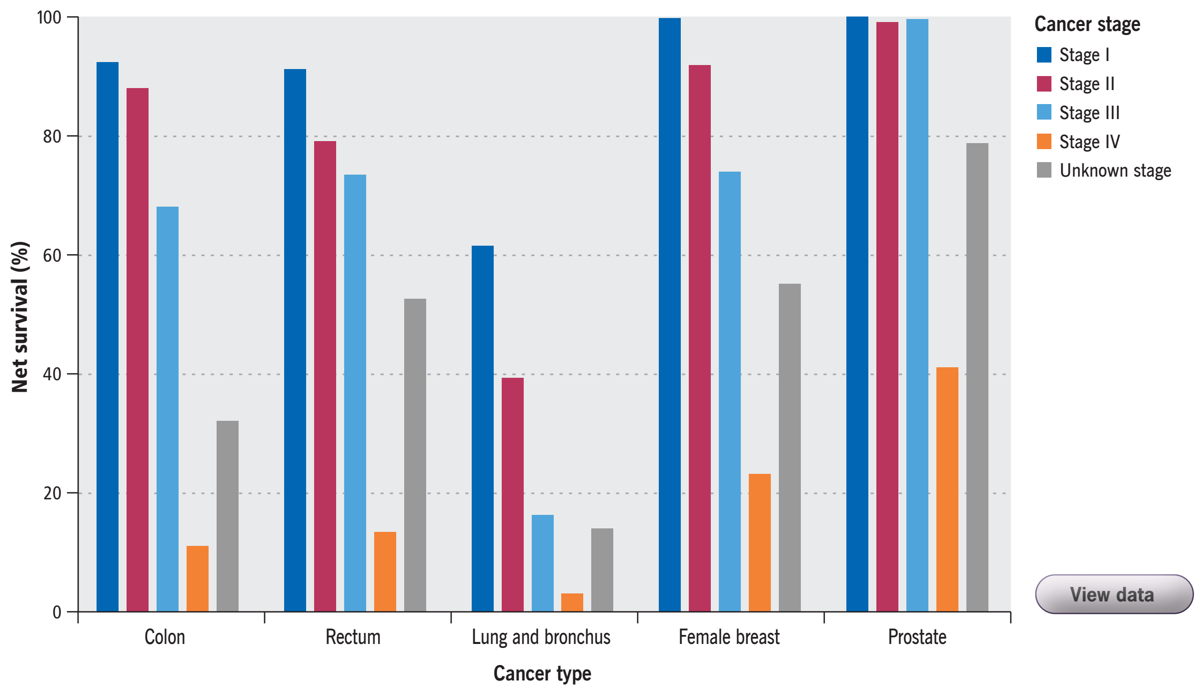
Ellison LF. Measuring progress in cancer survival across Canadian provinces: Extending the cancer survival index to further evaluate cancer control efforts. Health Rep. 2022;33(6):17–29.

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, 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)
Myeloma	50 (49–52)	50 (48–52)	51 (48–53)	30 (28–32)	28 (26–31)	32 (29–35)
Ovary	—	—	44 (43–45)	—	—	35 (33–36)
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 and other nervous system	22 (21–23)	21 (20–22)	23 (21–24)	17 (16–18)	16 (15–17)	18 (16–20)
Other nervous system	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; 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)
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 and other nervous system	49 (48–50)	49 (47–50)	50 (47–52)	44 (42–46)	43 (40–46)	45 (42–48)
Other nervous system	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; 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

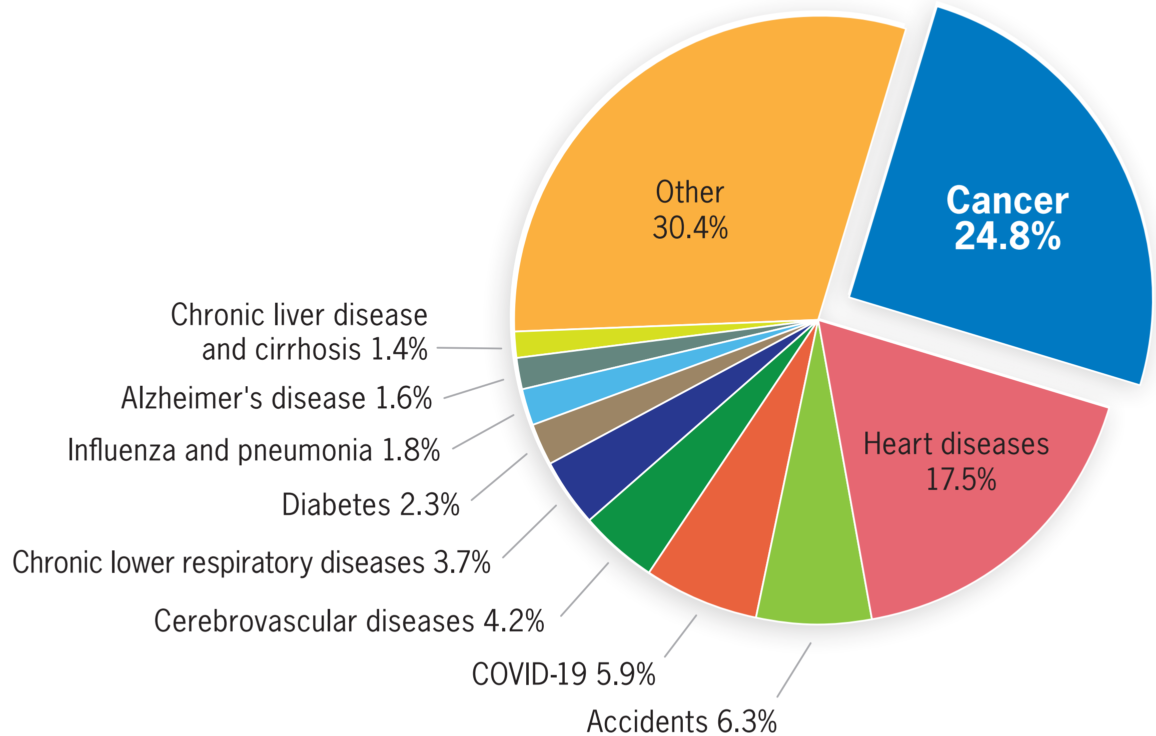
Cancer in context: The impact of cancer in Canada

Cancer is the leading cause of death in Canada

Cancer poses an enormous burden on both the health of people in Canada and the Canadian healthcare system. This publication shows that 42% of people in Canada are expected to be diagnosed with cancer in their lifetime and 22% are expected to die from the disease. In 2022, cancer was responsible for a considerably higher proportion of all deaths (24.8%) than any of the other leading causes of death in Canada, including heart diseases (17.5%), accidents (6.3%), COVID-19 (5.9%) and cerebrovascular diseases (4.2%) (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 2020 to 2022, the PYLL for all cancers combined was about 1,288,360 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 871,800 years over the period from 2020 to 2022.

FIGURE 4.1 Proportion of deaths due to cancer and other causes, Canada, 2022



Note: The total of all deaths in 2022 in Canada was 336,998.

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 February 19, 2025)

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 is a complex disease

Cancer is a complex disease that is influenced by many factors, including genetics, health behaviours 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 ability to invade nearby tissues. This abnormal cell growth can begin almost anywhere in the body, and it will often 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

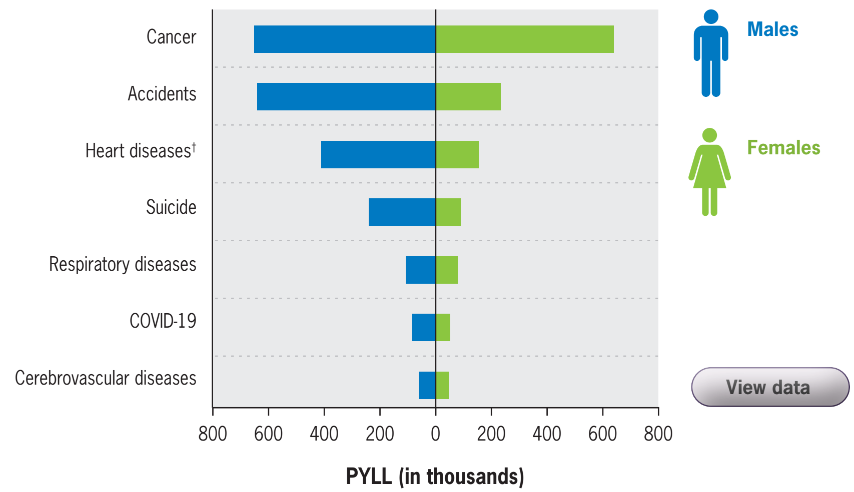
Any type of cancer can spread (metastasize) from their point of origin to other areas of the body. Whether or not and to what extent a cancer spreads will depend on several factors, including the type of cancer, the aggressiveness of the cancer cells, where the cancer started, how long it has been present 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)]

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.

This report highlights the continued impact that colorectal and cervical screening have had to reduce cancer incidence by identifying and removing pre-cancerous lesions.

FIGURE 4.2 Selected causes of death* and their associated potential years of life lost (PYLL), Canada, 2020–2022



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

† The PYLL estimates for heart disease reported in the 2021 and previous versions of this publication were calculated based on ischæmic heart disease only, whereas those reported here and in 2023 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.

Analysis by: Centre for Population Health Data, Statistics Canada

Data sources: Canadian Vital Statistics Death database at Statistics Canada

Cancers that are detected early generally have better outcomes. For example, breast cancer mortality has been on the decline for several decades due to earlier detection through population-based mammography screening paired with improvements in clinical management after diagnosis.

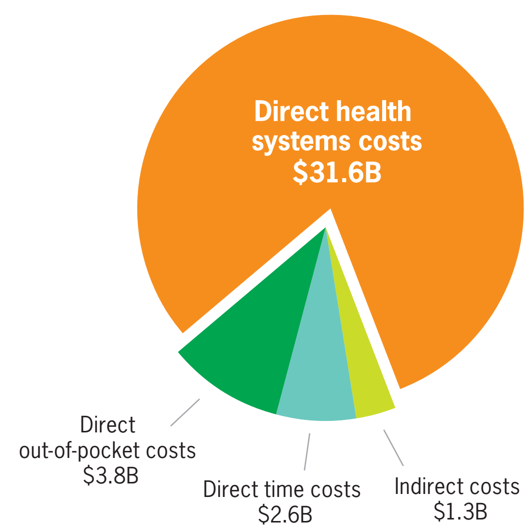
Over the last few years, there have been notable efforts to expand cancer screening programs for people in Canada. Lung cancer screening programs[3] have been implemented or the planning for implementation is taking place in several jurisdictions. The development of lung screening programs is a major step forward for reducing the impact of the most common and most deadly cancer in Canada. Efforts are underway to expand breast screening[4] eligibility to younger age groups as more provinces are moving to lower the age when screening begins, from 50 to 45 or even 40 years of age. Additionally, the federal government has increased research investments[5] to better understand differences in breast screening and outcomes for diverse populations. Lastly, many jurisdictions have or are working toward a switch from the Pap test to the HPV DNA test, which will improve the effectiveness of cervical screening[6] in Canada. These tests will be impactful as cohorts of people that previously received HPV vaccination reach screening-eligible ages. The continued evolution of screening programs demonstrates the importance of research and innovation to maximize the benefits of cancer prevention and early detection for all people living in Canada.

Cancer has a substantial economic burden on people 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.[7–10] 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.[11] 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. Another Canadian study[12] found that up to 40% of people with cancer experience financial distress and noted that coverage for cancer-related treatments varies across provinces and territories. Most recently, a report on the economic burden of cancer[13,14] estimated that, on average, people with cancer face a significant financial burden of nearly $33,000 in their lifetime, comprised of out-of-pocket expenses and lost opportunities related to time and income throughout their cancer experience. Out-of-pocket expenses

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

FIGURE 4.3 Projected economic impact of cancer from a societal perspective, including direct health systems costs, direct out-of-pocket costs, direct time costs and indirect costs, Canada, 2025



Analysis by: University of Calgary

Data sources: Multiple sources of data were used to develop this figure. For further details, see Canadian Cancer Statistics: a 2024 special report on the cost of cancer in Canada.

Perspectives of people affected by cancer

Kayla Ouellette was 26 and in her second week at a new job when she noticed a lump on her throat. As a mother of two, she was extremely concerned when she was diagnosed with thyroid cancer. For six weeks, she travelled to Saint John, NB, for radiation, which took almost three hours each way. Now unemployed and with limited income assistance, Kayla faced significant financial burdens.

“It was stressful to figure out from one week to another if I was going to have enough gas to get back and forth to treatment. It was the same thing every day: would I have enough money?”

are projected to increase without any support or systematic intervention. In 2025, it is estimated that cost of cancer for people with cancer and their caregivers will amount to $7.8 billion (Figure 4.3). In terms of total dollar impact to Canadian society, cancer-related costs are projected to total $39.3 billion in 2025, a 50% increase from 2021 estimates.[14] Given the increasing number of cancer cases diagnosed each year in Canada and the rapidly increasing cost of treatment,[15] the total societal cost of cancer care is expected to rise.

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

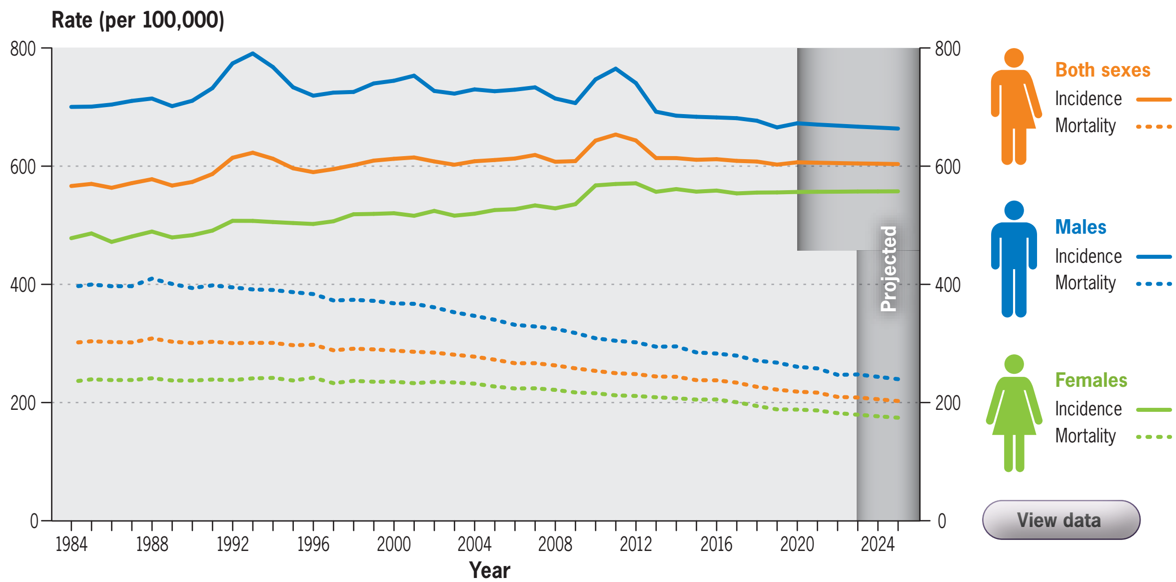
Comparable measures of cancer control between Canada and other countries can be found through various international resources, such as those provided in Appendix I. According to the Economist Intelligence Unit's Index of Cancer Preparedness, Canada ranks sixth out of 28 countries.[16] An International 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.[9,17] Ongoing exploratory research through the ICBP is focused on understanding why cancer outcomes vary between high-income countries. For example, studies have explored rates of cancer cases diagnosed following an emergency department visit[18] and differences in the use of radiation[19] and chemotherapy.[20] Additional investigation is needed to explore differences in access to diagnostics, optimal treatments and healthcare system structures.[21]

Canada participates in several international initiatives to advance cancer prevention and care. As part of the World Health Organization's global strategy,[22] work is underway to eliminate cervical cancer in Canada by 2040[23] through increased HPV vaccination, switching from the Pap test to the HPV DNA test for cervical screening and improving follow-up for abnormal screening results. With respect to commercial tobacco use, researchers found that Canada is one of the countries that is "nearly endgame ready" (i.e., reduce smoking prevalence to less than 5%).[24] A recent report found that over 95% of cancer centres across Canada are offering smoking cessation supports as part of comprehensive cancer care.[25]

Progress has been made, but the challenge continues

A great deal of progress has been made as we have learned more about how cancer develops, what increases risk and how best to prevent and treat the various types of cancer. This progress is reflected by decreases in incidence rates over time and even more so in trends in mortality rates,

FIGURE 4.4 Age-standardized incidence and mortality rates for all cancers combined, by sex, Canada,* 1984–2025



* Actual incidence data were available up to 2019 in each province and territory except Quebec (2017 was the latest data year submitted to the Canadian Cancer Registry for this province at the time of analysis). Projected case counts for Quebec in 2018 and 2019 were used to facilitate the calculation of national estimates for these years. Actual mortality data were available to 2022 for all provinces and territories except Yukon, for which data were available to 2016 and imputed from 2017 to 2022. Incidence rates for 2020–2025 and mortality rates for 2023–2025 are projected. For further details, see *Appendix II: Data sources and methods*.

Note: Rates are age-standardized to the 2021 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). 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 which have decreased 42% in males and 28% in females since the cancer death rate peaked in 1988 (Figure 4.4). Recent studies suggest that cancer control efforts, including prevention, screening and early detection and treatment, have already averted over half a million deaths from cancer among Canadians since mortality rates peaked for all-cancers in the late 1980s. Since that time, despite a steadily growing and aging population, death rates for most cancer types have dropped considerably due to the progress made to date.[26]

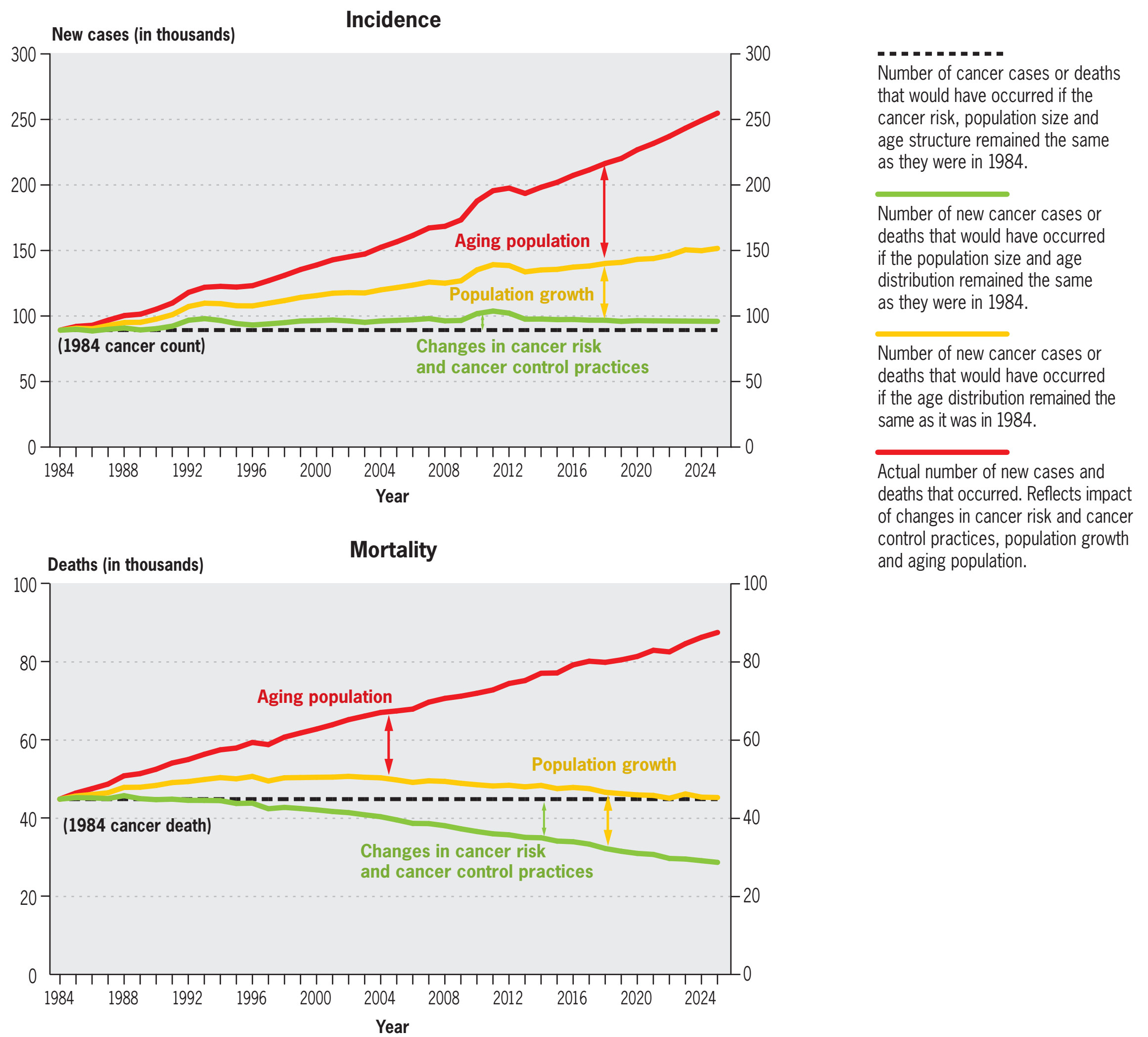
However, significant challenges remain, including the aging and growing population in Canada, inequities in access to care and outcomes for different populations, and new challenges that continue to arise. For example, cancer rates among younger people are rising in Canada and other Western countries.[27–29] 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 people in Canada could be aged 65 years and older compared with one-fifth (19%) in 2021.[30]

Figure 4.5 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

FIGURE 4.5 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, 1984–2025



Note: New cases exclude non-melanoma skin cancer (neoplasms, NOS; epithelial neoplasms, NOS; and basal and squamous). Actual incidence data were available to 2019 for all provinces and territories except Quebec and mortality data to 2022 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 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 people in Canada 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. 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 people are surviving their cancer diagnosis, meaning there is an increasing number of cancer survivors in the population.[31] In 2018, there were over 1.5 million people in Canada living with or after a cancer diagnosis and cancer prevalence was on the rise.[31] 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 after the disease is treated.[31,32] 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, 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, needs to be better understood. 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.[33]

First Nations, Inuit and Métis peoples accessing the healthcare system continue to experience widespread systemic racism where they are disrespected and mistreated, as well as face difficulty accessing care. These experiences discourage individuals from seeking the care they need, which negatively impacts their health.[34] First Nations, Inuit and Métis communities also face geographic and economic barriers in accessing cancer care.[35] 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, weather and reliance on air transportation.[36,37] 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.[38] 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 disparities in 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.[36,39] Additionally, a report on lung cancer and equity showed that there are significant inequities in health outcomes for First Nations, Inuit and Métis people.[36,39] 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.[39] 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.[39–41] These disparities in outcomes are likely due to inequitable access to healthcare and delayed diagnoses. Research suggests that rate of cancer screening for most cancer types is lower among many First Nations communities. For instance, First Nations communities in Alberta have an almost 24% lower participation rate in breast screening and a 14% lower participation rate in cervical screening when compared to other communities in Alberta.[42,43]

Racialized communities accessing the healthcare system have also experienced widespread systemic racism and difficulty accessing care or having symptoms taken seriously.[44] 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.[45–49]

2SLGBTQI+ people also face discrimination and stigmatization when accessing healthcare, reporting refusal of care, harassment and providers' lack of knowledge specific to the community.[50] 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.[51] Structural barriers that lower screening rates and access to appropriate care have been noted for 2SLGBTQI+ populations, which can lead to poorer health outcomes.[52-54]

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.[55] 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.[39] People living in rural and remote communities face many barriers in accessing screening, including longer travel times, higher costs and fewer available healthcare resources.[56]

Systematically collected race-based and ethnicity-specific health data are lacking in Canada, which makes it challenging to adequately quantify the cancer outcomes experienced across the diversity of communities in Canada. 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. 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 and the Canadian Partnership Against Cancer (CPAC) released the Pan-Canadian Cancer Data Strategy, which outlines identified priorities for action and investment to enhance data collection, integration and use with the ultimate aim of improving cancer care, 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 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.[55] 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.[57] CIHI has further developed their Measuring Health Inequalities Toolkit, which contains a variety of resources that help users understand the process of measuring and reporting on health inequalities.[58] Currently, data collection largely falls under the responsibilities of federal, provincial and territorial ministries of health and health authorities. Increasingly, First Nations, Inuit and Métis governments hold responsibility for Indigenous data collection. It is paramount that all data holders align and take action on these data efforts.

Jurisdictions across Canada have 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.[59,60] 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.[61] In these ways, the cancer control community is working together to address these important gaps in data so that inequities in access and outcomes can be better identified and addressed with increased attention and investment.

How statistics can help guide cancer control

The wide variation observed 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 4.6 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 4.6 aims to illustrate that, when assessed 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.

FIGURE 4.6 Summary of key cancer control and outcome characteristics by cancer type

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

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's 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 2025, 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 2025 (Table 1.2).

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

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 2025 (Table 2.2).

Preventability

The World Health Organization suggests that prevention offers the most cost-effective, long-term strategy for controlling cancer and other non-communicable diseases.[62] Research suggests that a large number of cancers can be prevented through reductions in exposure to adverse environmental, occupational, lifestyle and infectious factors.[63]

For example, an estimated 3,300 new cancer cases diagnosed in Canada in 2015 were due to alcohol consumption.[64–66] 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.[67] 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 effect on the future impact of cancer in Canada. For example, about 72% of lung cancer cases in Canada are due to smoking tobacco and about 3.5 million Canadians aged 15 years and older (11%) continue to smoke cigarettes on a daily basis, highlighting the need for continued efforts to control commercial tobacco use.[64–66,68] In collaboration with First Nations, Inuit and Métis partners, the Canadian Cancer Society and Canadian Partnership Against Cancer have launched a national smoking cessation initiative to support First Nations, Inuit, Métis and urban Indigenous people, who have significantly higher rates of smoking than non-Indigenous populations.[64–66] The rise of vaping or e-cigarette use among youth and young adults is also a growing health concern.[69–74] Among youth (15 to 19 years) and young adults (20 to 24 years) in 2022, the prevalence of vaping in the past 30 days was 14% and 20%, respectively.[75] Though definitive data are presently lacking, vaping or e-cigarette use may increase lung cancer risk,[76–78] as e-cigarette devices and vaping fluids contain definite and probable carcinogens.[76] Research shows that levels of fine particulate matter ($PM_{2.5}$), a well-established risk factor for lung cancer, produced during e-cigarette use are well above the World Health Organization's recommended threshold.[77,79]

Perspectives of people affected by cancer

After **Alyson Haiart** had her annual physical in 2014, she was diagnosed with stage III lung cancer. She now advocates for radon testing, as she tested her house and found very high radon levels.

"It is also very important to get the word out about radon. When our neighbours heard about our high radon levels, a few of them also tested. A lot were fine, but some had high levels, and we were able to tell them [about the] company we used to mitigate it."

The findings in this report also remind us of the importance of monitoring other known and emerging risk factors when considering the preventability of different cancers. For instance, lung cancer is the most commonly diagnosed cancer in Canada, so we need to pay particular attention to other risk factors for this disease.

Long-term exposure to environmental risk factors, including radon, asbestos, air pollution and arsenic in well water, has also been shown to increase the risk for lung cancer.[80–85] Processes and events driven by climate change are expected to further increase the prevalence of these environmental factors and, thus, exposure risk.[77,86–89] For example, thawing permafrost results in increased radon, wildfires result in increased particulate matter air pollution, and the combined effect of higher temperatures, droughts or flooding allows oxygen to enter the ground aquifers, which results in increased arsenic.[77, 86-89] In particular, radon—the second leading cause of lung cancer—can concentrate to high and cancer-causing levels in indoor air.[80,90–92] Long-term exposure to radon increases lung cancer risk by about 16% for every 100 Bq/m^3 and is known to elevate lung cancer risk even higher (i.e., have a synergistic effect) with other risk factors, including smoking and vaping.[77,92–95] Currently, about 18% of homes in Canada have radon levels at or above 200 Bq/m^3, which is Health Canada's upper threshold for indoor radon.[93,96] Testing for indoor radon and taking action to reduce high levels are important steps to lower exposure risk.[97,98] Health Canada recommends using long-term radon testing devices that have passed the Canadian National Radon Proficiency Program (C-NRPP).[97]

As noted in Chapter 1, cervical cancer incidence is no longer declining after a long period of significant progress. 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.[99] 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.[23,100] 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.[22] The Action Plan to Eliminate Cervical Cancer in Canada, 2020–2030, describes how a broad group of partners, our advisors, 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 positive screening results to reduce cervical cancer incidence.[23]

Detectability

Detecting cancer early (e.g., through screening tests or diagnostic follow-up of concerning 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. They have demonstrated that screening 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, and all provinces are planning to implement them in the coming years.[101]

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,[102] 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. Vigilance and continued effort are needed to increase equitable participation in screening programs to meet target screening rates across Canada.

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.[103,104] 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 the COVID-19 pandemic on cancer statistics

The COVID-19 pandemic impacted many aspects of cancer care and control efforts.

Drops in Cancer Diagnoses

Data suggest that there was a considerable decline in the number of cases diagnosed for many cancer types, and larger impacts were observed for cancer types with organized screening programs.[35] 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.[105]

International efforts also confirm that cancer diagnoses were reduced by 40% between March 9 and May 17, 2020, compared to diagnoses averaged over the same time periods in 2018 and 2019.[106] Recent reports from most Canadian provinces confirm the notable drops in registered cancer diagnoses. The first year of the pandemic saw significant underreporting of cancer diagnoses, with reductions of up to 15% in Quebec and 34% in Ontario during the early weeks of the pandemic.[107,108] Specific cancers, such as melanoma, cervical cancer and prostate cancer, saw the largest declines, indicating gaps in diagnostic services during this period.[107] The long-term impact of COVID-19 on cancer outcomes in Canada will not be known for several years, if not decades. What we do know is that additional efforts are needed to mitigate disruptions to services and delays in diagnoses. 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.[35]

Impact on equitable outcomes

Given the disproportionate impact the pandemic had on Black and racialized communities,[109,110] it is likely that individuals from these communities experienced greater challenges accessing care and adverse outcomes that will be observed in the years to come. Overall, COVID-19 impacted marginalized populations more than others and exacerbated the inequities faced by many, including First Nations, Inuit and Métis people, racialized communities, 2SLGBTQI+ people and others.[111] The pandemic created disparities in healthcare access, which were reflected in delayed screenings, postponed surgeries and underreported cases across various cancer types.[112,113] Long-term projections highlight the compounded impact that screening and treatment delays have on vulnerable populations, emphasizing the role that differences in socio-economic level and geographic location can have on health outcomes.[114]

Perspectives of people affected by cancer

The COVID-19 pandemic created unprecedented obstacles in accessing healthcare, as **Jill Wilden** found out when she tried to have her regular screening mammography. In the months after finally making her appointment, Jill felt a lump in her breast. She is now living with stage IV breast cancer.

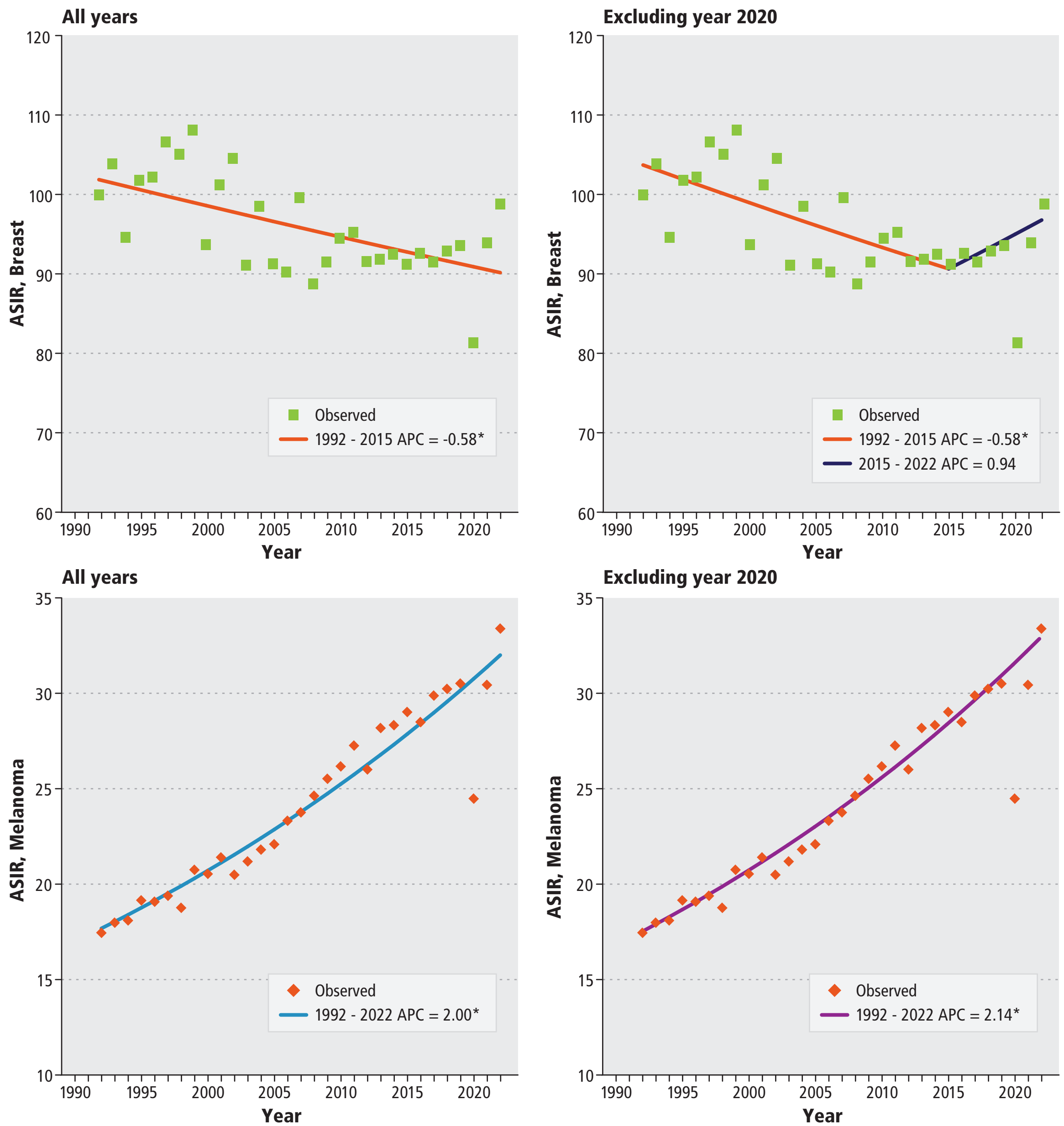
"I was two years overdue by the time things got back to normal. I knew something was up, but there is no cancer at all in my family, so it blindsided me."

Impact of COVID-19 on the analyses in this report

Mortality data for 2020, 2021 and 2022 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. Therefore, no major changes in overall cancer mortality have been observed. It is expected that interruptions to cancer control efforts will require a longer-term horizon to determine the impact that the widely reported diagnostic delays will have on cancer survival and mortality.[115] 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.

The incidence projections in this publication do not account for any changes in diagnosis or cancer control due to the COVID-19 pandemic because they are based on data up to 2019. Data from 2020 and 2021 were available at the time of analyses. However, through formal evaluation, it was observed that the inclusion of data from 2020 led to considerable variability and potential bias in trends. Given that the decline in reported diagnoses in 2020 reflects a temporary change in diagnosis and reporting rather than a true change in the expected underlying risk and presence of cancer, data from 2020 were excluded from trend analyses and data from 2020 and 2021 were excluded from the current projections. Figure 4.7 shows two examples of how including 2020 data can dramatically impact the reported trends in cancer incidence. These evaluations and

FIGURE 4.7 Trends in breast cancer (top) and melanoma (bottom) age-standardized incidence rates (ASIR) when 2020 data is included in or excluded from trends analyses, Canada (excluding Quebec and Nova Scotia), 1992-2021



* APC differs significantly from 0, p<0.05

Note: Quebec and Nova Scotia are excluded as data were not available for 2020 and 2021. Rates are age-standardized to the 2021 Canadian standard population.

Analyses by: Cancer Care Alberta, Alberta Health Services

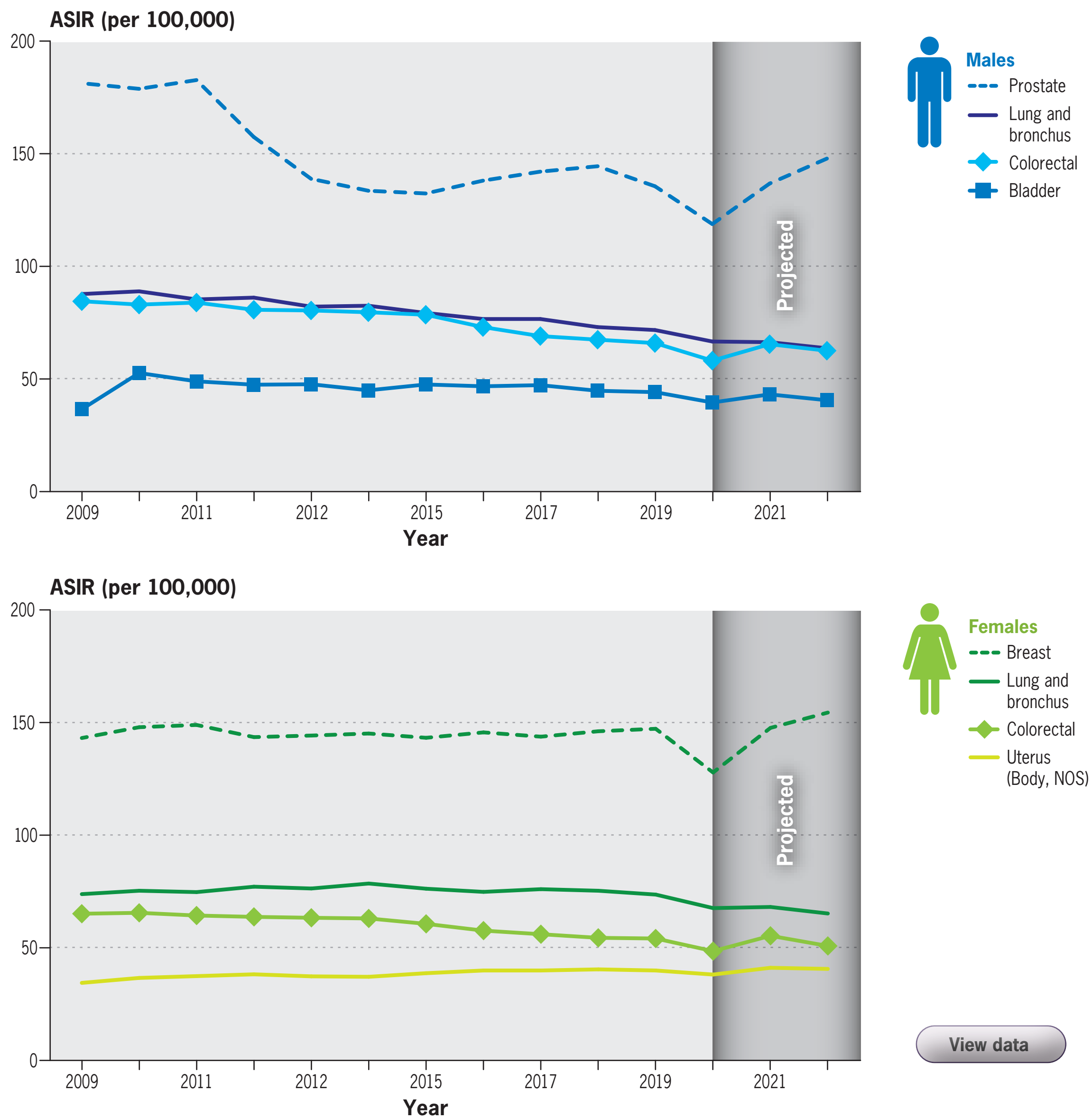
Data sources: Statistics Canada, Table 13-10-0111-01, Table 17-10-0005-01 approaches to exclude the 2020 data are in line with reports evaluating trends in SEER data from the US.[116] Figure 4.8 provides additional visual context of how the 2020 data influence trends and could bias 2025 projections due to the limitations of the types of models used to project cancer rates. As additional years of complete data become available, it will be possible to either remove 2020 as an outlier and use recent years of data for trends or use other smoothing approaches.

Cancer surveillance research groups, including the Canadian Cancer Statistics Advisory Committee, have been evaluating different approaches to model and project cancer data with the decline in diagnoses and reporting caused by the pandemic. Future iterations of this report will have further details and updates with additional years of data included and evaluated to optimize the accuracy of our short-term incidence projections.

Summary

The information contained in Figure 4.5 can help identify past success and focus future 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 the burden can be reduced through improved primary prevention, timely and effective early detection and screening, and evidence-based and person-centred diagnosis and treatment. Work is underway to advance these areas in an equitable way for people in Canada. Such comprehensive assessments can

FIGURE 4.8 Age-standardized incidence rates (ASIR) for selected cancers, males and females, with actual 2020 and 2021 data points included for visual context on likely projection accuracy, Canada (excluding Quebec and Nova Scotia), 2009–2025



View data

NOS=not otherwise specified

Note: Quebec and Nova Scotia are excluded as data were not available for 2020 and 2021. Rates are age-standardized to the 2021 Canadian standard population.

Analyses by: Cancer Care Alberta, Alberta Health Services

Data sources: Statistics Canada, Table 13-10-0111-01, Table 17-10-0005-01 help to contextualize the statistics reported in this publication by highlighting gaps and opportunities in population-based cancer control strategies. The estimates in this publication can guide 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

The data included in this publication are available in an online, interactive data dashboard. 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

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

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, age group 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 and age-standardized incidence rates (and 95% confidence intervals) for Canada, the provinces and the territories by cancer type, sex 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
13-10-0932-01	**Deaths and mortality rate (age-standardization using 2021 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 gender** 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 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 periods

can be accessed from the Statistics Canada website at https://www150.statcan.gc.ca/n1/en/type/data.

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

Which tables are relevant?

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.

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 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 periods
13-10-0963-01	**Predicted age-standardized and all ages five-year net survival estimates for selected primary types of cancer, by sex, 2019 to 2021** 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 2019 to 2021 period
13-10-0964-01	**Predicted age-specific five-year net survival estimates for selected primary types of cancer, by sex, 2019 to 2021** Provides estimates of age-specific five-year net survival (and 95% confidence intervals) for Canada (excluding Quebec) for selected cancers by sex for the 2019 to 2021 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

Provincial and Territorial Cancer Registries

Some provincial and territorial cancer registries release cancer incidence and mortality data for their jurisdictions online through data dashboards and other knowledge products:

Alberta

British Columbia

Manitoba

Ontario

Quebec

Yukon

Chronic disease surveillance

The Public Health Agency of Canada hosts a series of online interactive tools, including data tools, indicator frameworks and data blogs, on their Public Health Infobase, which allows users to access and view public health data. This includes the Canadian Cancer Data Tool (CCDT), which provides data on the incidence and mortality of cancer in Canada over time by age and sex for 22 different cancer types and all cancers combined. Other resources in the Public Health Infobase include the Canadian Chronic

Disease Surveillance System (CCDSS) Data Tool, which is a comprehensive pan-Canadian resource on the burden of chronic diseases and associated determinants, as well as the Canadian Chronic Disease Indicators (CCDI). Among other indicators, the CCDI provides the rate of cancer incidence, 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 C17 Council, the network of all 17 children's cancer hospitals across Canada. CYP-C products include the Cancer in Young People in Canada (CYP-C) Data Tool, a full report[1] and fact sheets. The CYP-C Data Tool, located on the Public Health Infobase, provides pan-Canadian surveillance data on children and youth with cancer to inform research and planning for cancer control efforts.

Cancer system performance

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

Cancer prevention

The Canadian Cancer Society maintains up-to-date, accurate information on cancer prevention. This includes It's My Life, which is an online, interactive tool designed to teach the public how different 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

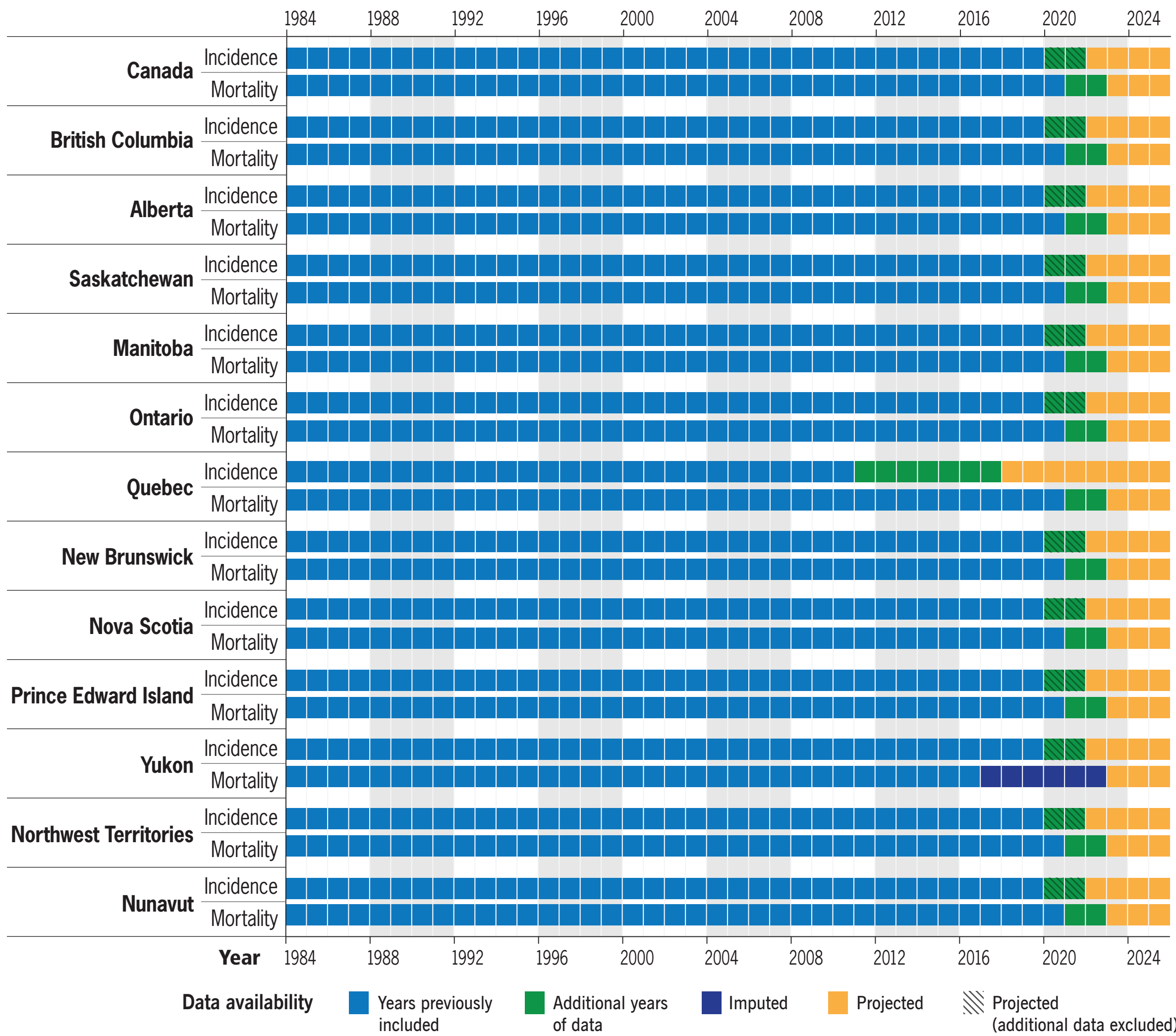
Who was involved?

The Centre for Population Health Data at Statistics Canada conducted all of the analyses that are presented in this publication, except for Figure 4.5, which was completed by the Centre for Surveillance and Applied Research at the Public Health Agency of Canada, and Figures 4.3, 4.7 and 4.8, which were completed by analysts at the University of Calgary. 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 2021 (except Quebec and Nova Scotia, for which data were available to 2017 and 2019, respectively). New cancer cases diagnosed in 2020 were excluded in analyses to minimize potential biases in estimation due to temporary anomalies in 2020 data. (see *Data and methods issues*).
- Actual cancer mortality data covered the period from 1984 to 2022. Yukon data from 2017 to 2022 were not available and were imputed.

FIGURE A2-1 Data available and used at the time of analysis by geographic region



- Cancer incidence and mortality projections up to 2025 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 cancer 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 2021 (except Quebec and Nova Scotia, for which data were available to 2017 and 2019, respectively). Data for 1992 to 2021 were obtained from the CCR Tabulation Master File,[5] released January 31, 2024 (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 2022 and were obtained from the Canadian Vital Statistics—Death database (CVSD).[9] Yukon data for 2017 to 2022 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 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 2023 were obtained from Statistics Canada.[11] These estimates are final intercensal up to 2020, final postcensal for 2021, updated postcensal for 2022 and preliminary postcensal for 2023.
- Projected population estimates are used for 2024 and 2025, 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 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.

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.
- For Figure 1.4, new cancers for children (aged 0–14 years) were classified and reported according to the Surveillance, Epidemiology and End Results Program (SEER) recent update[18] of the *International Classification of Childhood Cancer, Third Edition* (ICCC-3).[19] The update was in response to new morphology codes

2021 Canadian standard population

Age group	Population	Standard weight
0–4	1,902,883	0.049762
5–9	2,072,565	0.054199
10–14	2,114,016	0.055283
15–19	2,059,975	0.05387
20–24	2,404,398	0.062877
25–29	2,674,655	0.069944
30–34	2,704,004	0.070712
35–39	2,643,161	0.069121
40–44	2,505,252	0.065514
45–49	2,381,758	0.062285
50–54	2,427,770	0.063488
55–59	2,690,509	0.070359
60–64	2,612,928	0.06833
65–69	2,226,492	0.058224
70–74	1,845,779	0.048268
75–79	1,272,339	0.033273
80–84	841,433	0.022004
85–89	521,396	0.013635
90+	338,551	0.008853
Total	38,239,864	1.000000

Note: The Canadian population distribution is based on the final postcensal estimates of the July 1, 2021, Canadian population, adjusted for census undercoverage.

Data source: Census and Demographics Branch, Statistics Canada introduced by the World Health Organization.[20] This updated definition, however, does not apply to Table 3.3, which was not updated for this version of the publication (details on classification for Table 3.3 can be found in *Methods: Survival*). The childhood classification system is more appropriate for reporting cancers in children 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 2021 Canadian standard population (see table).

Figure 4.5 (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 4.5 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 2025

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 link 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 2025. The projected numbers of cancer cases and deaths in 2025 were calculated by multiplying these extrapolated rates by the sex-, age- and province-specific projected population figures for 2025.

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 data smoothing

Between 2011 and 2017, the Quebec Cancer Registry transitioned from exclusively using hospital discharge data to register cases to a more integrated central registry. As a result, there was an increase for some type-specific cancer counts during the early years of the transition (2011–2012). Locally estimated scatterplot smoothing (LOESS) was used to smooth cancer- and sex-specific age-standardized incidence rates (ASIR) for these years (2011 and 2012) using data from the 2006–2017 period (i.e., five years before and after the impacted years of 2011 and 2012). Details regarding the smoothing procedure, including smoothing factors used for various cancer types, can be found in Appendix 1 of *Projected estimates of cancer in Canada in 2024*.[21]

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 2025 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,[3,22] the annual percent change (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. An uncorrelated error model was selected for the autocorrelated errors option, and the Weighted Bayesian Information Criterion was used for model selection.[23] 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 2021 for incidence, with 2020 excluded as an outlier, and 1984 to 2022 for mortality) to determine years in which the APC changed significantly. Such years are referred to as changepoints. The COVID-19 pandemic may have influenced the registration of new cases diagnosed in 2020 and may bias the interpretation of trends. To minimize the impact of this temporary drop in cases, the 2020 data point is excluded from the Joinpoint incidence analysis as an outlier.
- 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 2018 onward had not been submitted to the CCR. Incidence data from Nova Scotia from 2020 onward were excluded because these cases had not been submitted to the CCR.
- Imputed mortality data for Yukon for 2017 to 2022 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 2016 to 2021 for incidence (where 2020 is excluded as an outlier), and 2018 to 2022 for mortality. A maximum of five joinpoints was allowed.
- 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 period (1984 to 2021 for incidence or 1984 to 2022 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 onward. 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.[24]

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 2021 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 2017 and 2019, 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 2022 were calculated using 20 age groups (0 to <1, 1–4, 5–9, 10–14, …, 85–89 and 90+ years). Imputed mortality data for Yukon for 2022 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 years for the years 2020 to 2022 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 diseases	Heart diseases	I00-I09, I11, I13, I20-I51
Suicide	Suicides and self-inflicted injuries	X60-X84, Y87.0
Respiratory diseases	Respiratory diseases	J00-J99
Cerebrovascular diseases	Cerebrovascular diseases	I60-I69
COVID-19	COVID-19	U07.1-U07.2, U10.9

Survival

Inclusions and exclusions

- New primary cancers diagnosed in individuals aged 15–99 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.[25]
- 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.[26–29]
- Childhood cancer survival analyses were conducted separately on new malignant primary cancers in children aged 0–14 years at diagnosis. Cases were classified according to the Surveillance, Epidemiology and End Results Program (SEER) update[30] of the *International Classification of Childhood Cancer, Third Edition* (ICCC-3).[31] 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[32] that has been augmented by Ron Dewar of the Nova Scotia Cancer Care Program (Dewar R, 2020, email communication, June 22nd) 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.[33] 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.[34–36] 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 55–59 and older age groups. Otherwise, national estimates were used.[37]

- Conditional five-year net survival[38,39] 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.[40] The period approach to survival analysis provides up-to-date predictions of cancer survival[41] because actual long-term survival estimates for those diagnosed in the most recent period derived using the cohort method will not be known for some time.
- The underlying methodology between the cohort and period approaches is essentially the same. The exception is that the follow-up information used in the period method necessarily does not relate to a fixed cohort of people. Rather, estimates of period survival are based on both persons diagnosed in the period of interest and persons diagnosed in prior years, provided they survive into the period of interest and contribute follow-up time to the relevant survival duration (e.g., five years). Period survival estimates 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.[41–43] When survival is generally increasing (or decreasing), a period estimate tends to be a conservative prediction of the survival that is eventually observed.[42,44]
- 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.[37] 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[45] 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.[46]
- 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.[46] 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 0–14 years 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 2018 onward as these cases had not been submitted to the CCR. Incidence data for Nova Scotia from 2020 onward 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 onward.
- In previous editions of this publication, it was noted that data from Newfoundland and Labrador (NL) were potentially affected by underreporting 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 underreported cases. As a result of the enhancements to the NL Cancer Registry, case ascertainment is improved in the 2006 data onward. However, underreporting 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.
- Between 2011 and 2013, the Quebec Cancer Registry modified the sources used to quantify the number of new cancer cases, which impacted data from the 2011 diagnosis year onward. Before 2011, underestimates are observed and are more pronounced for prostate cancer, bladder cancer and melanoma. Years 2011 and 2012 are considered transition years; therefore, this data should be interpreted with caution.
- At the time of publication, no death certificate only (DCO) cases had been reported to the CCR from Manitoba for 2013 to 2017 and 2021, from Ontario for 2021 and from Nova Scotia for 2019. DCO cases in Manitoba for 2013 to 2017 were imputed by randomly assigning the DCO cases diagnosed in 2008 to 2012 to these years. Similarly, DCO cases in Manitoba for 2021 were imputed by randomly assigning the DCO cases diagnosed in 2019 and 2020 to the period for 2021 and 2022 and retaining only the data for 2021. DCOs for Ontario were imputed by randomly assigning DCO cases diagnosed in 2018 to 2020 to the period for 2021 to 2023 and retaining only the data for 2021. DCOs for Nova Scotia were imputed by randomly assigning DCO cases diagnosed in 2016 to 2018 to the period for 2019 to 2021 and retaining only the data for 2019. 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, 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.
- In 2020 and 2021, the registration of new cancer cases in Canada may have been impacted by disruptions in screening and diagnostic services due to the COVID-19 pandemic. Therefore, these data should be interpreted with caution.

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.[47] 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[48] 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 2022 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 data years. This was accomplished by randomly assigning cancer deaths in this jurisdiction from the 2011 to 2016 period to the 2017 to 2022 period.
- 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 2022 by 33.4% 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.[25,49] It is also included in the presentation of liver cancer mortality statistics in the annual Cancer in North America (CINA) publication.[50] 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 (1992–2021)	Incidence (1984–1991)	Mortality (2000–2022)	Mortality (1984–1999)
	Type 8000 to 9049, 9056 to 9139, 9141 to 9589 unless otherwise specified			
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, C19.9, C20.9, 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, C55.9	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 and other nervous system	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 Type 9811-9819, 9823, 9827, 9837 all sites except C42.0, C42.1, C42.4	200, 202.0–202.2, 202.8, 202.9	C82–C86, C96.3	200, 202.0–202.2, 202.8, 202.9
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, 9877-9879, 9891, 9895-9898, 9910-9911, 9912, 9920, 9930-9931, 9940, 9945-9946, 9948, 9963-9964 Type 9811-9819, 9823, 9827, 9837 sites C42.0, C42.1, C42.4	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, 2061, 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
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

NOS=not otherwise specified

* For incidence, histology types 9590–9993 (leukemia, lymphoma and 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
Non-Hodgkin lymphoma*	Type 9811-9819, 9823, 9827, 9837 all sites except C42.0, C42.1, C42.4	2025	Type 9811-9818, 9823, 9827, 9837 all sites except C42.0, C42.1, C42.4
Leukemia*	Type 9733, 9742, 9800-9801, 9805-9809, 9820, 9826, 9831-9836, 9840, 9860-9861, 9863, 9865-9867, 9869-9876, 9877-9879, 9891, 9895-9898, 9910-9911, 9912, 9920, 9930-9931, 9940, 9945-9946, 9948, 9963-9964 Type 9811-9819, 9823, 9827, 9837 sites C42.0, C42.1, C42.4	2025	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 Type 9811-9818, 9823, 9827, 9837 sites C42.0, C42.1, C42.4

Note: Bladder, colorectal, kidney, lung and ovary cancers exclude histology types 9590–9993 (leukemia, lymphoma and myeloma), 9050–9055 (mesothelioma) and 9140 (Kaposi sarcoma). ICD-O-3 refers to the International Classification of Diseases for Oncology, Third Edition.[6]

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 were previously part of the “all other cancers” category) are now included in the modified category liver and intrahepatic bile duct 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)
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 were previously part of the “all other cancers” category) are now included in the modified category liver and intrahepatic bile duct 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

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

Statistics Canada

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

Canadian Council of Cancer Registries

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

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

Vital Statistics Council for Canada

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

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

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Canadian Cancer Society