CANADIAN PARTNERSHIP AGAINST CANCER
PARTENARIAT CANADIEN CONTRE LE CANCER

SYSTEM PERFORMANCE REPORTS

The 2016 Cancer System Performance Report

JULY 2016

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This document has been made possible through a financial contribution from Health Canada, through the Canadian Partnership Against Cancer. The views expressed herein represent the views of the Canadian Partnership Against Cancer.

Suggested citation:
Canadian Partnership Against Cancer. The 2016 Cancer System Performance Report. Toronto (ON): Canadian Partnership Against Cancer; 2016 Jul. 128 p.

Downloadable at:
systemperformance.ca

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Aussi offert en français sous le titre:
Rapport de 2016 sur le rendement du système de lutte contre le cancer

Acknowledgements

The production of this report was made possible through the dedicated efforts of the members of the **System Performance Steering Committee and Technical Working Group** and the data collection and analysis efforts of staff from the provincial cancer registries, agencies and programs. We would also like to acknowledge the **Canadian Institute for Health Information** for providing data and analysis on cancer surgery, particularly mastectomy rates for breast cancer; the **National Colorectal Cancer Screening Network** for data on colorectal diagnosis wait times; the **Pan-Canadian Cervical Screening Network** for data on human papillomavirus vaccination; the **Canadian Cancer Society** for providing incidence projections; **C^{17} Council** for providing data on pediatric clinical trial participation; and the **CONCORD-2 Programme at the London School of Hygiene & Tropical Medicine** for data on net survival by income. Finally, we acknowledge **Statistics Canada** for providing data, or access to Canadian Community Health Survey, Vital Statistics and Canadian Cancer Registry data, used for indicators in the Prevention, Screening, Appropriateness and Long-Term Outcomes sections of this report.

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Executive Summary

The burden of cancer is growing in Canada, with the average number of new cancer cases expected to increase by 40% in the next 15 years, largely as a result of the growing and aging of the Canadian population.[1] It is therefore of vital importance that coordinated system-level change focus on reducing the chance of being diagnosed with cancer, ultimately reducing the age-standardized incidence of cancer and improving the quality of life of those affected by cancer. To do this, cancer control efforts must be targeted along the full continuum—from prevention to treatment through to survivorship and end-of-life care.

The 2016 *Cancer System Performance Report* is our seventh report of indicators measuring cancer system performance across Canada. System Performance Reports provide a pan-Canadian cross-section of key performance indicators that allow for the interpretation of patterns and trends to inform opportunities for overall system improvements. This report includes updated findings and interpretation for 17 dashboard indicators, as well as an overview of key findings for additional indicators updated less frequently (with full results available at systemperformance.ca). Indicators are organized along the dimensions of the cancer control continuum: prevention, screening, diagnosis, treatment and person-centred perspective. Chapters on research, appropriateness (addressing the balance between quality and sustainability) and long-term outcomes are also included. Indicator results are generally compared by province or territory, age group and sex.

The report also highlights three topics of interest in cancer control in special features: smoking behaviours in cancer patients; the impact of regionalization of high-risk, resource-intensive surgeries on patient outcomes; and survival by patient income for select cancers.

As with past editions, the 2016 *Cancer System Performance Report* was produced in close collaboration with partners at the national and provincial/territorial levels. The content was further informed by consultations with subject matter experts and knowledge leaders from across the country. Provincial cancer agencies and programs provided the data needed to develop and calculate many of the indicators included in the report. At the national level, the Canadian Partnership Against Cancer (the Partnership) worked closely with Statistics Canada and the Canadian Institute for Health Information to compile information on specific indicators. Our work measuring cancer system performance in Canada would not be possible without this close collaboration with our partners.

Results Highlights

This section summarizes some of the notable trends and findings identified in the report in three categories: areas where the system has been doing well over time, areas with the greatest potential for improvement and areas where there is wide variation among provinces and territories.

Positive trends in cancer control

- The percentage of **colon resections with 12 or more lymph nodes removed and examined improved steadily** from 2009 to 2012. This practice is important for proper staging and subsequent treatment planning and has been associated with improved survival.
- The use of **breast-conserving surgery has increased** in six of 11 provinces/territories from 2008–10 to 2011–13. This is a positive trend because breast-conserving surgery (followed by radiation therapy) is less invasive than mastectomy and is associated with lower morbidity, improved cosmetic appearance and better psychological outcomes.
- Since 2007, there has been more than a threefold **increase** in the number of provinces reporting **province-wide implementation of standardized tools for screening for distress** in cancer centres. Screening for distress can be helpful in identifying cancer patients' psychological, social, spiritual, practical or physical concerns.
- **Clinical trial participation increased** in five of eight reporting provinces from 2013 to 2014. Clinical trials are an essential step in evaluating the safety and effectiveness of emerging cancer treatments. Trials are also useful for identifying new ways to detect, diagnose and reduce the risk of cancer.
- **Mortality rates have been decreasing** since the early 1990s for most of the cancers profiled in this report, including breast, lung (in men), colorectal, prostate and pancreatic cancers. Notably, the lung cancer mortality rate for women is beginning to level off, reflecting decreasing smoking rates in the last three decades.

Areas for continued improvement

- Though **smoking prevalence** continued to decline, from 23% in 2003 to 18% in 2014, prevalence in all provinces **remains higher than the national target of 12%** (set to align with the Federal Tobacco Control Strategy's target).[2] Achieving this target would result in a reduction of the burden of smoking-related cancers in the future.
- Because **colorectal cancer screening** is relatively new in Canada, testing rates (defined as having had a fecal test and/or colonoscopy/sigmoidoscopy for any reason) are **low across the country**. However, there has been an increase in the uptake of colorectal cancer screening/testing since 2008 and this increase is expected to continue as the implementation of colorectal cancer screening programs expands.
- While **wait times from an abnormal fecal test** result to follow-up colonoscopy have been decreasing since 2011, **no province has yet achieved 90th percentile wait times within the 60-day target**.

Areas of substantial variation

- Collecting consistently defined, nationally comparable data on human papillomavirus (HPV) vaccination remains a challenge. Existing data indicate that **HPV vaccination uptake varies considerably across the country**.
- Although the **percentage of mastectomies done as day surgeries** has increased over time in most provinces, there was still a **38 percentage point difference** between the provinces with the lowest and highest percentages.

As our system of working together to measure cancer system performance matures, we will continue to be able to collect consistent data across the country and study key questions in cancer control. This work enables us to celebrate progress and focus on areas requiring improvement, with the ultimate goal of reducing the burden of cancer and improving quality of life for Canadians living with cancer.

What's Next in System Performance?

The Partnership's System Performance Initiative will continue to work on a number of products and activities to enhance knowledge and data availability related to Canada's cancer control system. The quality of person-centred care throughout patients' cancer journey is under-measured and under-reported. The System Performance Initiative is therefore working with cancer control partners to develop a common, systematic way to collect and report on both patient-reported outcomes and patient-reported experiences, to develop quality indicators for palliative care and to study how people with cancer transition back to primary health care after cancer treatment. Additionally, presenting system performance online via the System Performance Web Application (systemperformance.ca), which now includes the ability to view data organized by province and territory, serves as a first step in increasing the impact of system performance products.

About This Publication

The 2016 Cancer System Performance Report *is the Partnership's seventh report on indicators measuring cancer system performance across Canada. The system performance reports provide a pan-Canadian cross-section of key performance indicators that span the continuum of cancer control: prevention, screening, diagnosis, treatment and person-centred perspective. Also included are chapters covering research, appropriateness and long-term outcomes.*

Why report on Canada's cancer control system performance?

While each province and territory is largely responsible for planning and funding cancer service delivery within its own jurisdiction, national comparisons of standardized performance indicators have allowed for knowledge exchange and uptake of best practices across jurisdictions. Such comparisons have informed opportunities for system improvements in cancer control at the national, provincial and regional levels; they have also helped identify areas of the system that are unmeasured or under-measured. Furthermore, interprovincial measurement and comparison enable key collaborations and partnerships and allow for well-informed decision making aimed at improving cancer control in Canada.

New for this report

- Redesigned format with less text and more visuals
- Overview of key findings for additional system performance indicators beyond the 17 indicators that are reported on an annual basis (detailed information about these indicators is available at systemperformance.ca)
- Long-term outcome indicators for ovarian cancer
- A shift from examining screening in asymptomatic individuals to looking at mammography and colorectal cancer screening/testing done for any reason
- **Special features on**
  - smoking behaviours in cancer patients
  - the impact of regionalization of high-risk, resource-intensive surgeries on patient outcomes
  - survival by income quintile for select cancers

Detailed calculation methodology for each indicator is contained in the Technical Appendix available at systemperformance.ca.

Data tables (including confidence intervals) for all indicators are also available at systemperformance.ca.

Data availability

The latest available data for each indicator have been included in this report. The most recent data years range from 2009 to 2015, depending on the data source. For more detailed information, please see the Technical Appendix at systemperformance.ca.

About the Canadian Partnership Against Cancer

The *Canadian Partnership Against Cancer* (the Partnership) was created in 2007 by the federal government with funding through Health Canada. Since then, our primary mandate has been to move Canada's cancer control strategy into action and to help it succeed through coordinated system-level change across the full cancer care continuum—from prevention and treatment through survivorship and palliative care.

The Partnership achieves outcomes by working closely with national, provincial and territorial partners. This collaboration stimulates and supports the generation of knowledge about cancer and cancer control and promotes the exchange and uptake of best practices across the country to help those most affected by cancer. The outcomes we work toward are fewer cases of cancer, fewer Canadians dying from cancer and a better quality of life for those affected by cancer.

1. Prevention

1. Prevention

Prevention is an essential long-term strategy for reducing the burden of cancer in Canada. Understanding the role of risk factors and their prevalence in the population can guide efforts to prevent cancers before they occur.

Up to two-thirds of cancers can be prevented through a combination of not smoking, improving nutrition, limiting alcohol consumption, participating in regular physical activity and maintaining a healthy body weight.[3] Other factors that can increase a person's risk of developing cancer include infections (e.g., human papillomavirus), environmental factors (e.g., second-hand smoke exposure, exposure to ultraviolet radiation) and occupational factors (e.g., nightshift work).[4]

This chapter presents information on the two Prevention indicators that are reported on an annual basis—smoking prevalence and human papillomavirus (HPV) vaccination—and includes a special feature on smoking behaviours in cancer patients.

Key findings related to the following Prevention indicators are also included in this chapter: smoking cessation, second-hand smoke exposure, obesity and alcohol consumption. Full information on these additional indicators can be found at systemperformance.ca.

Indicator	Summary of results
Smoking prevalence	• Smoking prevalence (daily or occasional smoking) declined from 23% in 2003 to 18% in 2014. • Smoking prevalence ranged from 14% in British Columbia to 62% in Nunavut. Prevalence was highest in the 3 territories. As of 2014, no province or territory had achieved the 12% target set for this indicator. • Males were more likely than females to report being daily, occasional or former smokers. More females than males reported never having smoked.
HPV vaccination	• HPV vaccination uptake (full course of vaccination) through organized immunization programs varied considerably by province and territory. • Vaccination uptake ranged from 39% in the Northwest Territories to 89% in Newfoundland and Labrador.

Smoking Prevalence

Key Message

In 2014, 18% of Canadians aged 12 years or older reported smoking daily or occasionally, compared with 23% in 2003. There is some variation across provinces/territories.

Indicator Definition

The percentage of the population aged 12 or older who reported smoking daily or occasionally in the previous year. Results are presented by province/territory and by sex using data from the 2014 Canadian Community Health Survey.

Target

12%, established to align with the Federal Tobacco Control Strategy's target.[2]

Measured Since

The 2009 *Cancer System Performance Report*.

18%

of the Canadian population smoked daily or occasionally

14–62%

range of provincial/ territorial results for smoking prevalence

13%

of people in Sweden smoked daily or occasionally, according to the OECD

0 of 13

provinces/territories had smoking rates lower than the target of 12%

Why measure this?

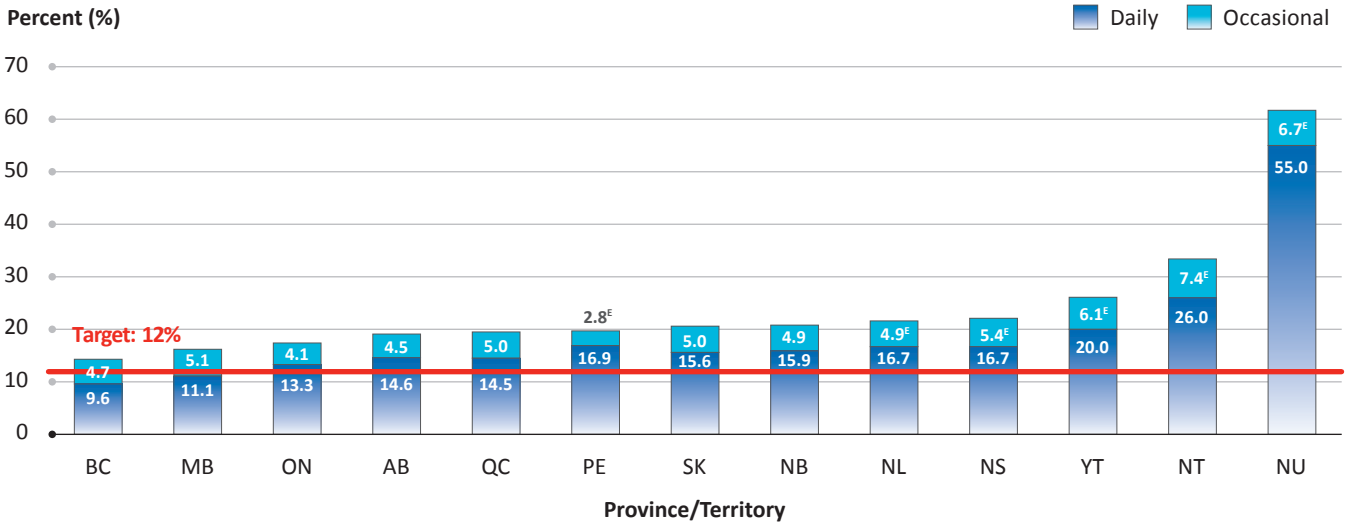
Smoking remains the most preventable cause of disease and premature death in Canada. It is estimated that smoking causes 30% of all cancer deaths.[1,5] Additionally, smoking causes up to 85% of lung cancer cases and increases the risk of developing a number of other cancers, such as cancers of the mouth and throat, bladder, cervix, colorectum, esophagus, kidney, larynx, pancreas, stomach, nasal cavity, liver and ovary.[1,5] Because of the high risks associated with smoking, tobacco control is a key cancer prevention mechanism. Reporting on tobacco use at the population level allows for the assessment of pan-Canadian prevention and cessation strategies.

What are the key findings?

- Current smoking (daily and occasional) prevalence declined from 23.0% in 2003 to 18.1% in 2014 (data not shown).
- Smoking prevalence ranged from 14.3% in British Columbia to 61.7% in Nunavut in 2014. The highest smoking rates were in Canada's three territories (Figure 1.1).
- No province or territory has yet achieved the 12% target (originally set by the Federal Tobacco Control Strategy) (Figure 1.1).
- Males were more likely to report being daily, occasional or former smokers. Females were more likely to report having never smoked (Figure 1.2).

FIGURE 1.1

Percentage of population (aged ≥ 12) reporting daily or occasional smoking, by province/territory — 2014 reporting year

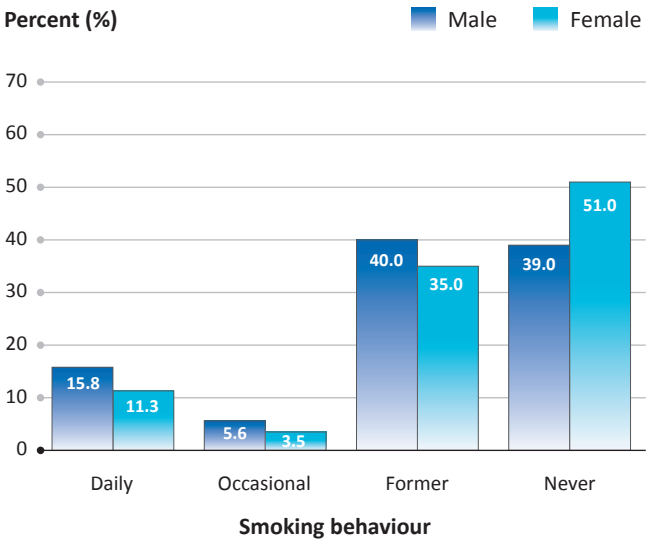


E Interpret with caution owing to large variability in the estimate.

Data source: Statistics Canada, Canadian Community Health Survey.

FIGURE 1.2

Percentage of population (aged ≥ 12) by smoking behaviour and sex, Canada — 2014 reporting year



Data source: Statistics Canada, Canadian Community Health Survey.

Why do these findings matter?

Because approximately one in five Canadians aged 12 or older continue to report daily or occasional smoking, prevention and cessation efforts are critical for ongoing reductions in smoking prevalence. Reducing prevalence will in turn reduce the burden of smoking-associated cancers in Canada. The 2007 Federal Tobacco Control Strategy set a goal of reducing overall smoking prevalence to 12% by 2011;[2] the Partnership's national system performance target was set to align with this goal. As of 2014, no province or territory had met this target, meaning it continues to serve as an aspirational goal to motivate smoking reduction efforts across the country. For the target to be met, the absolute smoking prevalence reduction in the provinces or territories would range from 2.3 percentage points in British Columbia to 10.1 in Nova Scotia and 49.7 in Nunavut—large drops that would undoubtedly result in a reduction of the burden of cancer across Canada in years to come.

Flavoured tobacco (including menthol) has been banned in Alberta, New Brunswick and Nova Scotia and will soon be banned in Ontario and Quebec as well.[6] Because flavoured tobacco use is common in teens, banning these products can potentially prevent smoking initiation and help to reduce smoking prevalence as this age group matures.

How does Canada stack up internationally?

It is difficult to compare smoking rates internationally because there is limited standardization in the measurement of smoking habits in different countries. The Organisation for Economic Co-operation and Development (OECD) measures and compares smoking rates in member countries; however, the OECD's definition differs from the System Performance definition (the OECD measures the proportion of daily smokers aged 15 or older, while the results in this report are for daily and occasional smokers aged 12 or older). Using the OECD definition, Canada is below the OECD average of 20.9% (data published in 2014). However, lessons could be learned from countries with lower smoking rates, such as Sweden and Iceland, which had the lowest rates.[7]

Special Feature: Smoking behaviours in cancer patients

Key Message

One in five cancer patients reported daily or occasional smoking, highlighting the need to integrate smoking cessation counselling and interventions into cancer care.

Background

It is known that smoking is a risk factor for many types of cancer (see the Smoking Prevalence section for more details). Less commonly known, however, is the fact that cancer patients who continue smoking after diagnosis can have worse outcomes than non-smoking patients.

While a cancer diagnosis often motivates smokers to quit, some cancer patients may continue to smoke after their diagnosis, which can negatively affect their treatment outcomes and survival.[8] Patients who quit smoking at the time of their diagnosis are more likely to recover from their cancer than those who do not.[9] This is because smoking reduces the effectiveness of treatment, particularly radiation therapy and chemotherapy, and increases the risk of side effects and complications of treatment.[8-11] Smoking also increases the risk of developing a second primary cancer (i.e., a type of cancer different from the original diagnosis) or having the cancer recur.[8,9,12,13] Quitting smoking can ultimately help to improve a patient's prognosis and influence their quality of life.[9,14]

Through System Performance reporting, smoking prevalence and other smoking indicators have been reported for many years, with a focus on reducing the incidence of cancers caused by tobacco use. This special feature expands on that work by looking at smoking behaviour after a cancer diagnosis. This perspective provides insight that can help clinicians and policy makers to develop, discuss and promote cessation activities specific to cancer patients to lessen or minimize poorer outcomes.

Methods

Self-reported data from the Canadian Community Health Survey (CCHS) were used to generate descriptive statistics on smoking behaviours in current cancer patients compared with those who do not currently have cancer (the non-cancer-patient population). Cancer patients were those who reported in the 2011–14 surveys that they currently have cancer. Multiple years of data were combined to increase the sample size of respondents who were cancer patients and thus reduce the variability of the estimate. The non-cancer-patient population comprises those who reported that they did not currently have cancer. Smoking status was derived from the subset of these respondents who answered questions relating to smoking cigarettes. Respondents aged 12 or older were included in the results. Estimates were age-standardized to the 2011 Canadian population to account for differences in age distribution across the cancer patient population compared with the non-cancer-patient population.

The results focus on the smoking status of cancer patients at the time of the survey only. We were unable to identify patients who no longer smoked but did when they were first diagnosed with and treated for cancer or who were smokers earlier in their lives. The results also do not differentiate types of cancer.

Results

Capturing cancer cases in the Canadian Community Health Survey

The Canadian Cancer Society reports the prevalence of cancer in the Canadian population as approximately 2.4%, representing just over 800,000 Canadians living with a cancer diagnosed in the past 10 years.[1] In the 2011–14 CCHS, 2% of respondents reported that they currently had cancer.

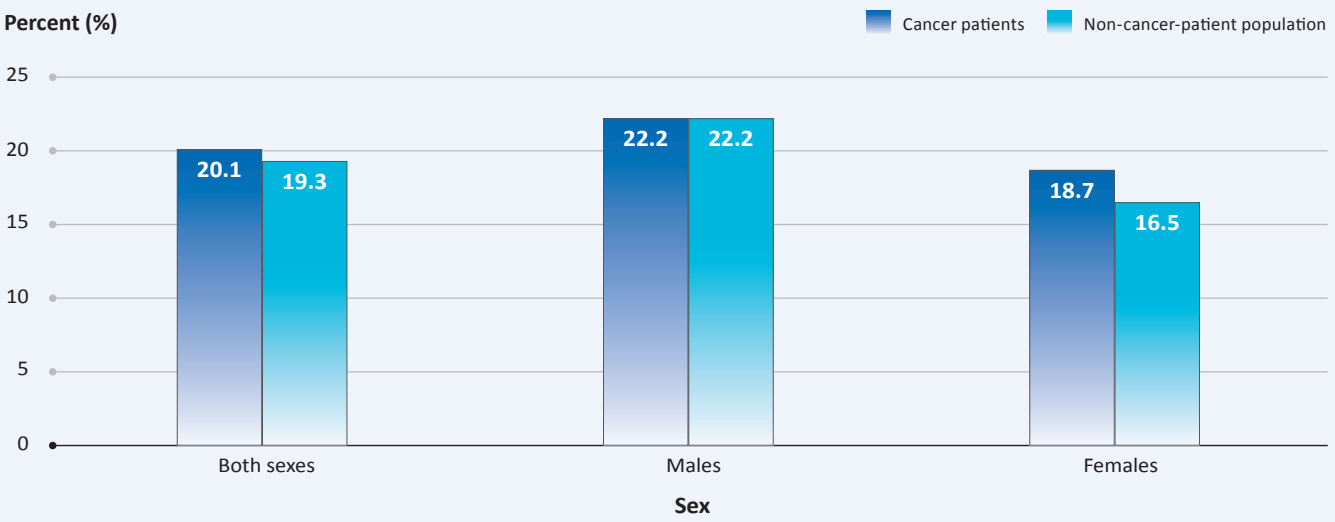
Smoking behaviours

About one in five cancer patients (20.1%) reported daily or occasional smoking (2011–14 data). This rate was not statistically different from the non-cancer-patient population—19.3% of respondents in this category reported smoking daily or occasionally (Figure 1.i).

Male cancer patients were more likely to report daily or occasional smoking than female cancer patients (22.2% vs. 18.7%), though this difference was not significant (Figure 1.i).

FIGURE 1.i

Percentage of individuals (aged ≥ 12) reporting daily or occasional smoking, by cancer status and sex, Canada, age-standardized to the 2011 Canadian population — 2011–14 reporting years combined



Data source: Statistics Canada, Canadian Community Health Survey.

Conclusions

The data suggest that a surprisingly high percentage of cancer patients in Canada continue to smoke after their diagnosis, which is a concerning finding. Our findings align with the results of other research, which have shown that 20–30% of patients continued to smoke after their diagnosis.[14-16]

It is possible that cancer patients who continue to smoke after diagnosis either try to quit and fail to do so or believe that quitting will not help them (i.e., they already have cancer so quitting will not make a difference).[10] It is also possible that the type of cancer a patient is diagnosed with may influence their smoking choices. For instance, studies have shown that patients with lung, head or neck cancers are more likely to quit smoking after their diagnosis.[10,15] This could be because physicians are more likely to discuss smoking with patients who develop these types of cancer or because patients can draw a clear causal link between their diagnosis and their smoking dependence.[10] Patients with other types of cancer (e.g., colorectal, breast or prostate) may not associate their diagnosis with their smoking habits and thus may not be driven to quit.[10,15]

Given the risk of increased morbidity, poor treatment outcomes and mortality associated with continued smoking, smoking cessation interventions are crucial for cancer patients who smoke. Many patients are not able to quit without support,[17] meaning that health care professionals should offer cessation counselling to smokers at the time of diagnosis or when a malignancy is suspected, regardless of whether or not it is a smoking-related cancer. The sooner cessation treatment is offered after diagnosis the higher the likelihood that abstinence from smoking will continue.[10]

Human Papillomavirus Vaccination

Key Message

Collecting consistently defined data to enable reporting of comparable pan-Canadian indicators of human papillomavirus (HPV) vaccination remains a challenge. The available data suggest there is considerable variation in HPV vaccination uptake across Canada.

Indicator Definition

The percentage of girls in the age group (or school grades) targeted for immunization who have completed the HPV vaccine series based on the provincially/territorially recommended vaccination schedule.[a]

Measured Since

The 2011 *Cancer System Performance Report.*

In 2016, the Partnership changed the indicator definition reported in the Cancer System Performance Reports from first dose to completion of the HPV vaccine series, as defined in provincial/territorial vaccination schedules. This was the first year all reporting provinces/territories were able to provide this information.

39–89%

range of provincial/territorial results for HPV vaccination uptake

Why measure this?

HPV is a common sexually transmitted infection. Approximately 75% of sexually active people acquire an HPV infection at some point in their lives, though most people clear the infection within two years.[18-20] As of July 2015, three HPV vaccines are currently approved for use in Canada.[21] All protect against high-risk HPV types 16 and 18, which are responsible for over 70% of cervical cancer cases, 92% of anal cancers, 63% of penile cancers and 89% of oral cavity and oropharyngeal cancers.[22-24] As of 2010, all provinces and territories had implemented organized school-based HPV immunization programs. Measuring and reporting on HPV vaccination uptake helps to inform opportunities for increased efforts in prevention activities.

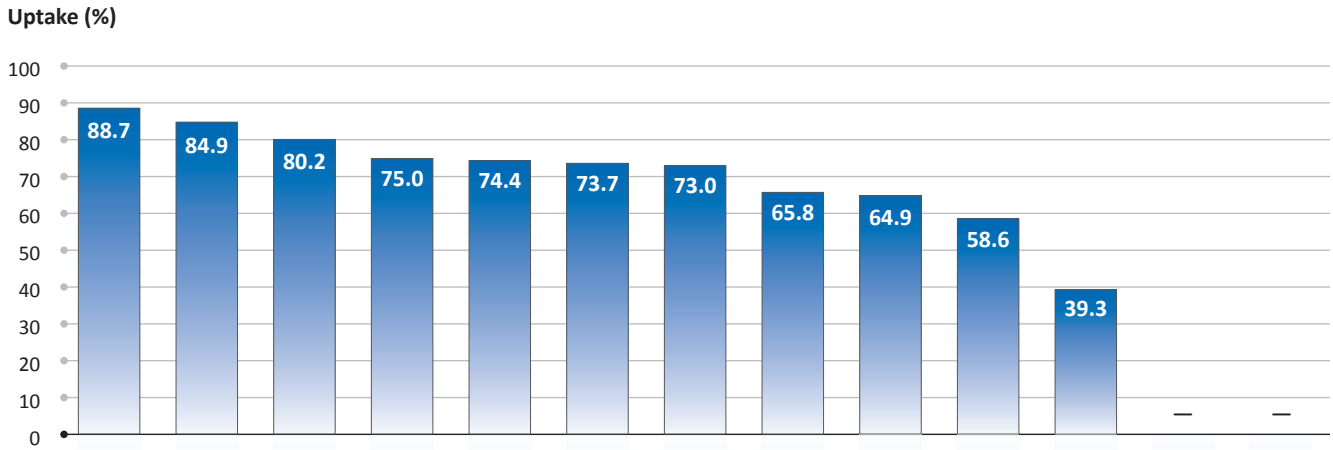
[a] Two doses of HPV vaccine in BC and QC, three doses in all other provinces/territories at the time data were collected.

What are the key findings?

- HPV vaccination uptake (full course of vaccination) ranged from 39.3% in the Northwest Territories to 88.7% in Newfoundland and Labrador (Figure 1.3).
- Vaccination uptake through organized HPV immunization programs varied considerably by province and territory, both in terms of uptake and target populations (i.e., age/grade of girls being vaccinated).

FIGURE 1.3

Percentage of girls in immunizing grade who completed human papillomavirus vaccine series based on provincially/territorially recommended vaccination schedules,† by province/territory — most recent vaccination year



	NL	PE	ON	NS	QC	SK	NB	BC	AB	MB	NT	YT	NU
School year	2013/14	2013/14	2012/13	2013/14	2014/15	2012/13	2014/15	2013/14	2013/14	2014/15	2013/14	—	—
Grade	6	6	Age 13	7	4	Age 13	7	6	5	6	7	—	—
First dose uptake (%)	92.8	90.6	—	88.8	78.2	80.3	>73.0	—	74.2	70.1	46.7	—	—
Second dose uptake (%)	93.7	88.7	—	84.5	74.4	78.4	>73.0	65.8	—	65.8	44.2	—	—

Province/Territory

† Full course of vaccination is two doses in BC and QC and three doses in all other provinces/territories.

"—" Data not available.

NT: Vaccination occurs in grades 4–6. Vaccination uptake listed is for grade 7 girls.

SK, ON: Vaccination occurs in grade 6 and grade 8, respectively, but immunization information is not recorded by grade. Vaccination uptake is therefore assessed at age 13.

Data source: Cervical Cancer Screening Guidelines Across Canada: Environmental Scan, July 2015;[25] Canadian Partnership Against Cancer HPV Immunization Survey, July 2015; BC Centre for Disease Control; PEI Chief Public Health Office.

Why do these findings matter?

There is clear evidence that infection with high-risk strains of HPV will influence the burden of several cancers in the future. Given that, there is critical value in continued persistent efforts to optimize vaccine uptake across Canada. Several countries have already begun to show the benefit of national HPV vaccination programs. The United States, the United Kingdom and Australia have experienced a substantial decrease in the prevalence of vaccine-type HPV infections in girls and women as a result of their programs.[26-29]

Some of the variation in HPV vaccination uptake across the country could be a result of differing immunization program start dates and health promotion practices in different provinces/territories. It is important to note, however, that it is currently challenging to gather consistent, standardized data on HPV vaccination across Canada because provinces and territories collect and report data on uptake differently. In the future, standardized data collection and reporting on HPV vaccination could result in more comparable uptake rates and the ability to more accurately assess prevention and health promotion efforts and the impact of vaccination on subsequent cancer outcomes.

There are two current developments in Canada related to HPV vaccination—vaccinating males and moving to a two-dose vaccination schedule.[30] These changes could help to reduce infections caused by HPV and the subsequent risk of cervical, oropharyngeal, penile and anal cancers.

Additional Indicators Available on systemperformance.ca

Behaviours we want to promote

18%
of recent Canadian smokers reported quitting smoking in the past 2 years

Smoking cessation
- Smoking cessation rates ranged from 13.0% in Yukon to 23.0% in British Columbia in 2014.
- Cessation rates were slightly higher in females and were highest among individuals aged 20–34 and aged 65 or older.

20%
of Canadian adults reported abstaining from alcohol in the past year

Alcohol consumption
- The percentage of adults who reported drinking no alcohol in the past year ranged from 15.9% in Quebec to 36.0% in Nunavut in 2014.
- The percentage of adults who reported exceeding the World Cancer Research Fund (WCRF) guidelines[b] ranged from 3.6% in Nunavut to 9.3% in Quebec.

40%
of Canadian adults consumed fruits and vegetables 5 or more times a day

Fruit and vegetable consumption
- The percentage of adults who reported consuming fruits and vegetables five or more times per day ranged from 24.0% in Nunavut to 46.0% in Quebec.

Risk factors and exposures we want to minimize

14%
of Canadians reported second-hand smoke exposure in public, which has increased over time

Second-hand smoke exposure
- Second-hand smoke exposure rates in 2014:
  - At home: between 2.1% in British Columbia and 5.8% in the Northwest Territories
  - In vehicles: between 3.5% in Manitoba and 11.7% in the Northwest Territories
  - In public: between 6.7% in Yukon and 15.7% in Alberta
- Exposure was highest among individuals aged 16–19 in all categories (public, vehicle and home exposure).

53%
of Canadian adults were classified as overweight or obese

Adult overweight and obesity
- The percentage of adults classified as overweight or obese ranged from 48.0% in British Columbia to 67.0% in Newfoundland and Labrador in 2014.
- Men were more likely to be overweight or obese than women.

Data source: 2014 Canadian Community Health Survey.

To learn more about policies relevant to these indicators, please visit the Partnership's Prevention Policies Directory (cancerview.ca/preventionpolicies). The Directory is a freely accessible online database of policies relating to cancer and chronic disease prevention. It allows users to search by risk factor, jurisdiction, location and document type, providing summaries and direct access to policy documents.

[b] The WCRF's recommended drinking guidelines are no more than two drinks per day for men and no more than one drink per day for women.[31]

2. Screening

2. Screening

Of an estimated 196,900 new cancer cases diagnosed in Canada in 2015, one-quarter (26.3%) were breast, colorectal or cervical cancers[1]—cancers for which organized screening programs are in place in Canada.

Regular screening has been shown to reduce both incidence and mortality rates for cervical[32,33] and colorectal cancers (some screening modalities),[34,35] as well as mortality from breast cancer.[36-39] Screening can reduce mortality by detecting cancers early when treatment is most effective and can also reduce incidence by detecting pre-cancer (i.e., an abnormal growth of cells that has the potential to become malignant). For these outcomes to be fully realized, however, a large proportion of the population needs to access high-quality screening.

This chapter presents information on three Screening indicators that are reported on an annual basis: self-reported rates for Pap testing, mammography and colorectal cancer screening/testing.

New for this report

As of 2016, the definition for the breast and colorectal cancer indicators in this chapter has changed. These indicators are now defined as mammography or colorectal cancer screening/testing (fecal test and/or colonoscopy or sigmoidoscopy) done for any reason, rather than only for asymptomatic reasons.

This definition identifies the proportion of the population who have had a test that identifies the presence of these cancers within the recommended screening interval. This enables assessment of population-level cancer risk.

Indicator	Summary of results
Cervical cancer screening	• Self-reported Pap testing rates (in women aged 25–69) ranged from 72% in Quebec to 89% in Prince Edward Island in 2012. • The Pap testing participation rate target is 80%. In 2012, 10 provinces/territories had Pap testing rates that exceeded this target.
Breast cancer screening	• Self-reported mammography rates (in women aged 50–69) ranged from 61% in Prince Edward Island and Yukon to 74% in Quebec in 2012. • The breast screening participation rate target is 70%. In 2012, 6 provinces/territories had mammography rates that exceeded this target.
Colorectal cancer screening	• Self-reported colorectal cancer screening/testing rates (using fecal test and/or endoscopy in individuals aged 50–74) ranged from 22% in Nunavut to 65% in Manitoba in 2012. • The fecal testing participation rate target is 60%. Fecal testing rates in all provinces/territories were below this target.

Cervical Cancer Screening

Key Message

Self-reported Pap testing rates are high across Canada.

Indicator Definition

The percentage of women aged 25–69 who reported being up to date on cervical cancer screening, defined as having had at least one Pap test in the previous three years. Results are presented by province/territory using data from the 2012 Canadian Community Health Survey.

Target

80% of women participating in Pap testing. Applied to system performance reporting as of 2015 to align with the Pan-Canadian Cervical Screening Network's programmatic participation target.

Measured Since

The 2009 *Cancer System Performance Report.*

The indicator definition was revised in 2016 to better reflect the guidelines of the Canadian Task Force on Preventive Health Care (CTFPHC), which indicate screening should begin at age 25.[40]

72–89%

range of provincial/ territorial results for Pap testing rates

10 of 13

provinces/territories met or exceeded the 80% participation target

Why measure this?

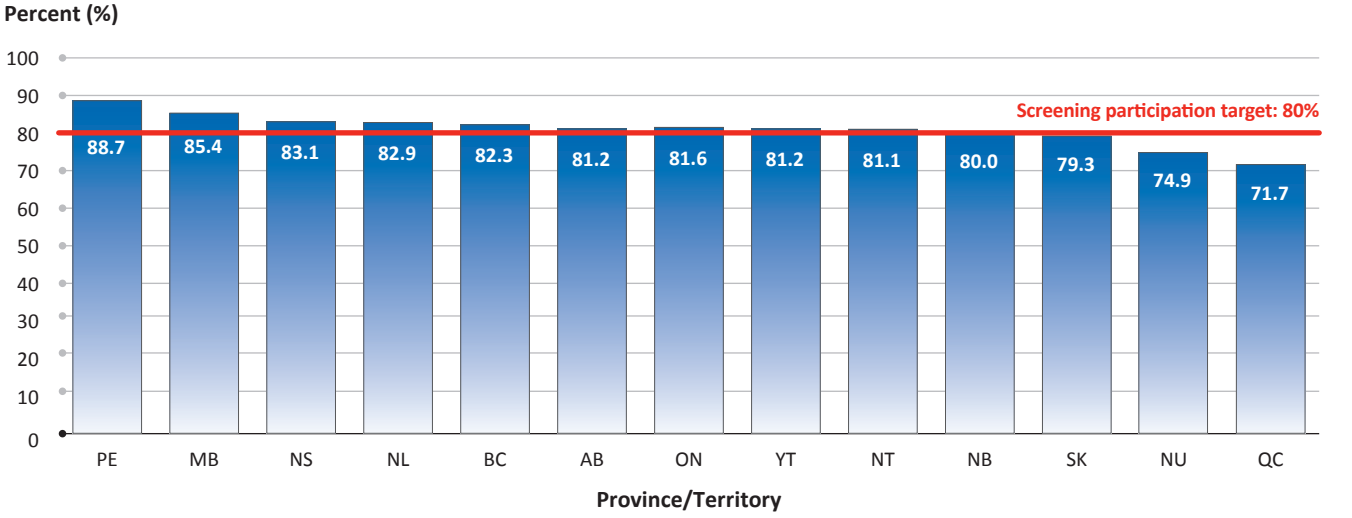
Cervical cancer screening guidelines from the CTFPHC recommend routine screening every three years starting at age 25 for asymptomatic women who have ever been sexually active.[40] While most provincial screening programs begin cervical cancer screening at age 21, this indicator was defined to show the proportion of the population protected against cervical cancer as prescribed by the CTFPHC guidelines. These recommendations balance the benefits of cervical cancer screening (i.e., reductions in cervical cancer incidence and mortality) with its associated harms (e.g., false positives).

What are the key findings?

- Self-reported Pap testing rates for women aged 25–69 ranged from 71.7% in Quebec to 88.7% in Prince Edward Island in 2012 (Figure 2.1).
- Ten provinces/territories (British Columbia, Alberta, Manitoba, Ontario, New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador, Yukon and the Northwest Territories) had Pap testing rates that met or exceeded the 80% participation target in 2012 (Figure 2.1). When taking into account statistical margin of error, only Quebec did not reach the target.[c]

FIGURE 2.1

Percentage of women (aged 25–69) who reported having had at least one Pap test in the past three years, by province/territory, age-standardized to the 2011 Canadian population — 2012 reporting year



Data source: Statistics Canada, Canadian Community Health Survey.

Why do these findings matter?

Self-reported participation in cervical cancer screening was found to be high across Canada, with most provinces and territories achieving the 80% participation target in 2012. This target is being compared with self-reported screening rates for the purposes of system performance reporting, which includes all screening activity, both programmatic and non-programmatic (unlike the program target, which includes only programmatic screening). As of July 2015, women can access screening through organized cervical cancer screening programs, which exist in all Canadian provinces except Quebec and Prince Edward Island,[25] or opportunistically (without going through an organized screening program).[41] Monitoring cervical cancer screening participation rates at the system level facilitates evaluation of practices across the country, identifies what proportion of women are protected against this screenable cancer and can help to identify targeted interventions that will increase the proportion of the population accessing screening and receiving treatment when it is most effective.

[c] For confidence intervals, visit systemperformance.ca.

Breast Cancer Screening

Key Message

Self-reported mammography rates vary from the low-60%s to the mid-70%s across provinces and territories.

Indicator Definition

The percentage of women aged 50–69 who reported being up to date on breast cancer screening, defined as having had a mammogram for any reason in the previous two years. Results are presented by province/territory using data from the 2012 Canadian Community Health Survey.

Target

There is no target for overall mammography rates (mammography for any reason). The Canadian Breast Cancer Screening Network's programmatic screening participation target (70% of average-risk women participating in breast cancer screening) has been applied to overall mammography rates in this report to provide context for an approximation of how much of the population should be undergoing mammography. The target was applied to system performance reporting as of 2015.

Measured Since

The 2009 *Cancer System Performance Report*.

This indicator definition was revised in 2016 to report on mammograms done for any reason, rather than mammograms done only in asymptomatic women.

61–74%

range of provincial/territorial mammography rates

6 of 13

provinces/territories exceeded the 70% screening mammography participation target

Why measure this?

Breast cancer screening guidelines from the Canadian Task Force on Preventive Health Care recommend that women aged 50–69 years at average risk for breast cancer be routinely screened using mammography every two to three years,[42] balancing the mortality benefits that result from screening with the harms that can be associated with it (e.g., false positives, over-diagnosis).

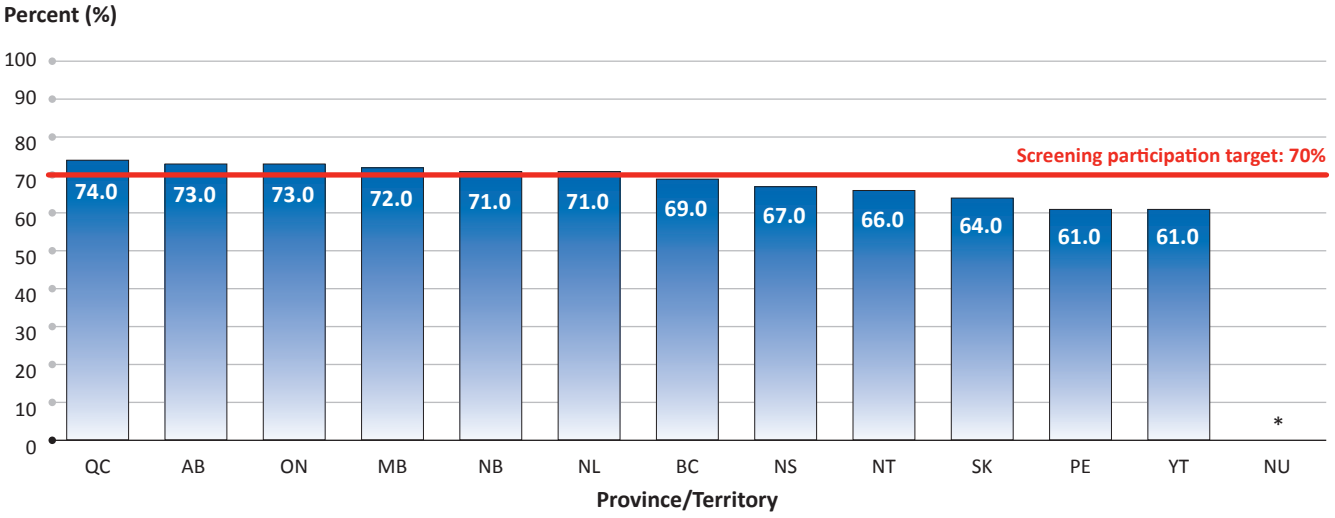
Monitoring and reporting on mammograms performed for any reason (rather than only those done for asymptomatic reasons) provides a snapshot of the proportion of women who have had the test that identifies breast cancer within the recommended screening interval, enabling assessment of population-level breast cancer risk. Mammograms for any reason were included because women who have diagnostic mammograms are ineligible for screening in several programs but are still considered to be protected from a population-level risk perspective.

What are the key findings?

- Rates of self-reported mammography (done for any reason) for women aged 50–69 ranged from 61.0% in Prince Edward Island and Yukon to 74.0% in Quebec in 2012 (Figure 2.2).
- Of the 13 reporting provinces/territories, six (Alberta, Manitoba, Ontario, Quebec, New Brunswick and Newfoundland and Labrador) had mammography rates that exceeded the 70% participation target in 2012 (Figure 2.2). When taking into account statistical margin of error, only Saskatchewan did not reach the target.[d]
- Rates for mammograms done for any reason were within 0.6 to 3.6 percentage points of rates for mammograms done on asymptomatic women only (data not shown; see the 2015 *Cancer System Performance Report* for information on screening in asymptomatic women).

FIGURE 2.2

Percentage of women (aged 50–69) who reported having had a mammogram for any reason[†] in the past two years, by province/territory — 2012 reporting year



[†] Any reason includes family history of breast cancer, regular check-up/routine screening, age, previously detected lump, follow-up of breast cancer treatment, current use of hormone replacement therapy, breast problem or other.

* Suppressed owing to small numbers.

Data source: Statistics Canada, Canadian Community Health Survey.

Why do these findings matter?

Self-reported mammography rates were generally high across the country, though some variation did exist. Women can access mammography in multiple ways, which may contribute to some of the observed variation. Asymptomatic women can access screening mammography through organized breast cancer screening programs, which exist in all provinces and territories except Nunavut.[43] All women can also access mammography opportunistically (e.g., by self-referral or through physician referral for a screening appointment at a hospital or physician's office)[41] for any reason.

The screening participation target is being compared with self-reported mammography rates for the purposes of system performance reporting, which includes all mammograms conducted for any reason (unlike the program target, which includes only programmatic screening activity). Monitoring mammography rates at the system level facilitates evaluation of practices across the country to determine what proportion of the population is protected against this screenable cancer at a given time. Monitoring helps to identify interventions that will increase the proportion of the population protected and receiving treatment when it is most effective—for instance, by targeting low-income or immigrant women.

[d] For confidence intervals, visit systemperformance.ca.

Colorectal Cancer Screening

Key Message

While self-reported colorectal cancer screening/testing rates are low across provinces and territories, rates have been increasing since 2008.

Indicator Definition

The percentage of the population aged 50–74 who reported being up to date on colorectal cancer screening/testing, defined as having had a fecal test in the previous two years and/or having undergone a colonoscopy or sigmoidoscopy in the previous five years for any reason.[e] Results are presented by province/territory using data from the 2012 Canadian Community Health Survey.

Target

There is no overall target for being up to date on colorectal cancer screening/testing. The National Colorectal Cancer Screening Network's programmatic participation target (60% of adults of average risk, aged 50–74, being screened using a fecal test) is being applied to fecal testing rates in this report to provide context for an approximation of how much of the population should be undergoing fecal testing. The target was applied to system performance reporting as of 2015.

Measured Since

The 2009 *Cancer System Performance Report.*

This indicator definition was revised in 2016 to report on colorectal cancer screening/testing done for any reason, rather than screening of only asymptomatic individuals.

31 to 48%

colorectal cancer screening/testing rates increased between 2008 and 2014

22–65%

range of provincial/territorial results for colorectal cancer screening/testing rates

0 of 13

provinces/territories achieved the 60% fecal testing participation target

Why measure this?

Colorectal cancer screening guidelines from the Canadian Task Force on Preventive Health Care recommend that asymptomatic individuals over age 50 get screened for colorectal cancer using a fecal test every two years or flexible sigmoidoscopy every 10 years.[45,46] Regular screening using a fecal test among those aged 50 or older, followed by a colonoscopy for those with an abnormal result, can reduce colorectal cancer mortality.[34]

Monitoring and reporting on colorectal cancer screening/testing performed for any reason (rather than only for asymptomatic reasons) provides a snapshot of the proportion of the population who have had a test that identifies colorectal cancer within the recommended screening interval, enabling assessment of population-level colorectal cancer risk.

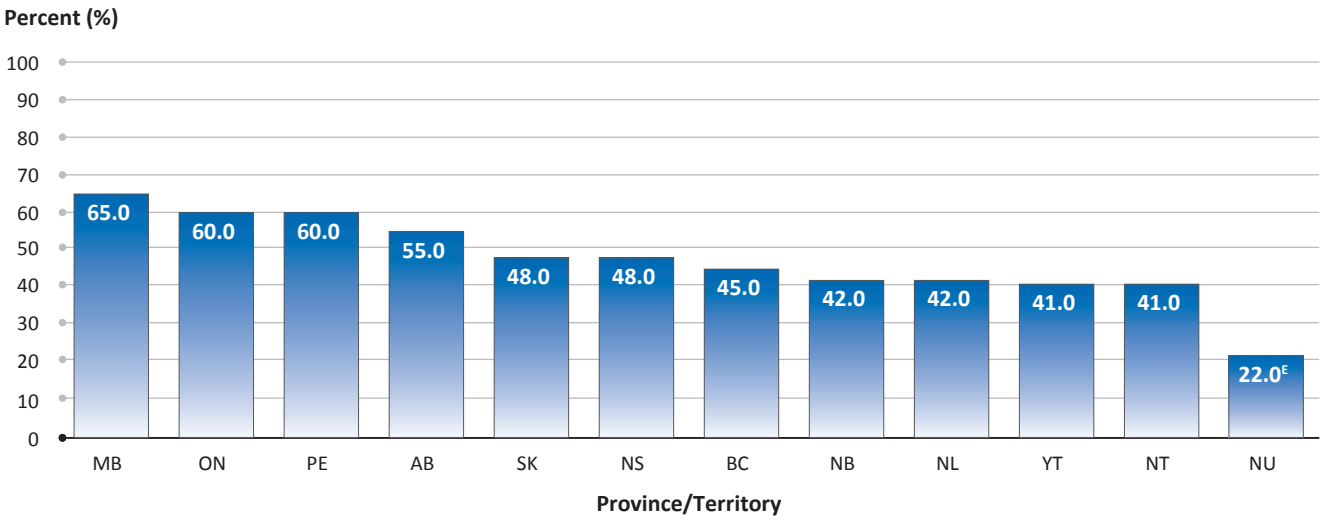
[e] A fecal occult blood test can be either a guaiac test (gFOBT) or an immunochemical test (FIT). In 2012, the period the data apply to, the recommended screening interval was five years for sigmoidoscopy and 10 years for colonoscopy.[44] Since the Canadian Community Health Survey does not distinguish between the two modalities (sigmoidoscopy and colonoscopy), the five-year timeframe was used for both.

What are the key findings?

- Self-reported colorectal cancer screening/testing rates (fecal test and/or sigmoidoscopy/colonoscopy for any reason) ranged from 22.0% in Nunavut to 65.0% in Manitoba in 2012 (Figure 2.3).
- Colorectal cancer screening/testing increased from 31.0% in 2008 to 48.0% in 2014, based on data from seven jurisdictions (Figure 2.4).
- Self-reported fecal testing rates ranged from 14.5% in Quebec to 52.0% in Manitoba in 2012. Fecal testing rates in all provinces/territories were below the 60% participation target (Figure 2.5).
- Colorectal cancer screening/testing rates (fecal test and/or sigmoidoscopy/colonoscopy done for any reason) are higher by 5–10 percentage points when screening/testing is done for any reason (vs. asymptomatic reasons only). For fecal testing, rates are again generally higher when the test is done for any reason, by 0.5–4 percentage points (data not shown; see the 2015 *Cancer System Performance Report* for information on screening in asymptomatic individuals).

FIGURE 2.3

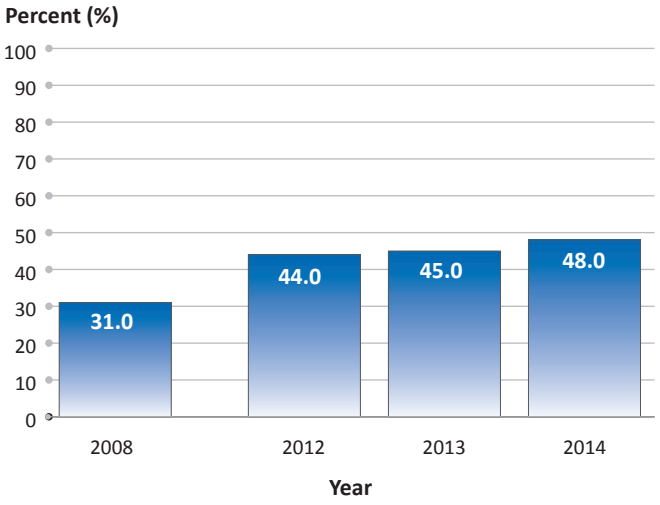
Percentage of population (aged 50–74) who reported having had a fecal test in the past two years and/or a sigmoidoscopy/colonoscopy in the past five years for any reason,[†] by province/territory — 2012 reporting year



[†] Any reason includes family history of colorectal cancer, regular check-up/routine screening, age, race, follow-up of problem, follow-up of colorectal cancer treatment or other.
[E] Interpret with caution owing to large variability in the estimate.
Data source: Statistics Canada, Canadian Community Health Survey.

FIGURE 2.4

Percentage of population (aged 50–74) who reported having had a fecal test in the past two years and/or a sigmoidoscopy/colonoscopy in the past five years for any reason,† Canada — 2008 to 2014 reporting years



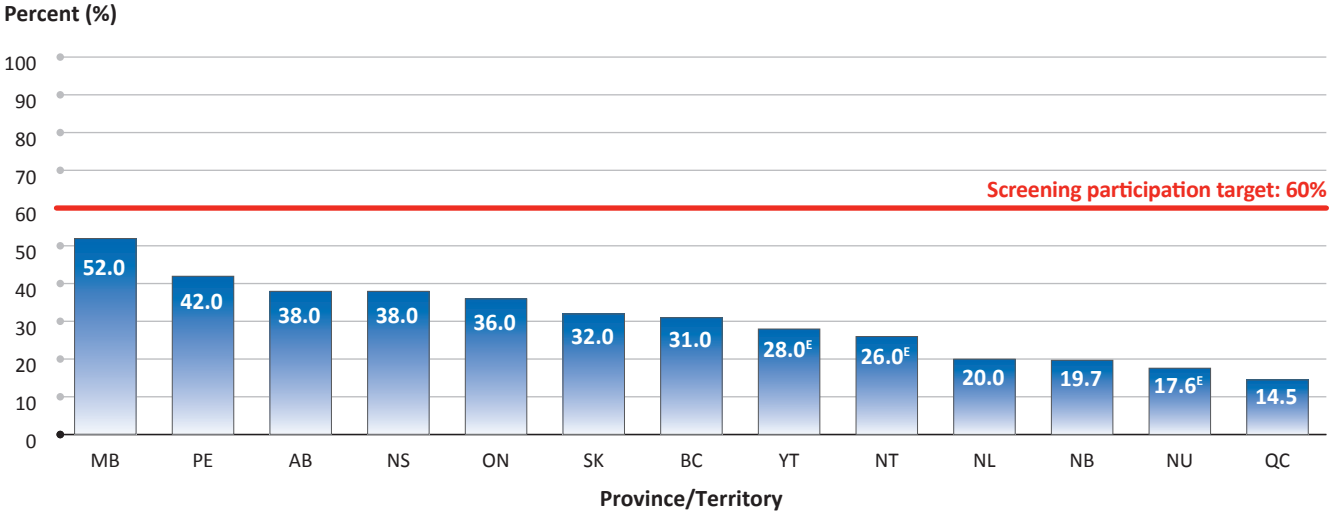
† Any reason includes family history of colorectal cancer, regular check-up/routine screening, age, race, follow-up of problem, follow-up of colorectal cancer treatment or other.

Figure includes jurisdictions that provided data for all four years: AB, MB, QC, NB, PE, NL and NT.

Data source: Statistics Canada, Canadian Community Health Survey.

FIGURE 2.5

Percentage of population (aged 50–74) who reported having had a fecal test in the past two years for any reason,† by province/territory — 2012 reporting year



† Any reason includes family history of colorectal cancer, regular check-up/routine screening, age, race, follow-up of problem, follow-up of colorectal cancer treatment or other.

E Interpret with caution owing to large variability in the estimate.

Data source: Statistics Canada, Canadian Community Health Survey.

Why do these findings matter?

Self-reported colorectal cancer screening/testing rates were lower than rates for breast and cervical cancer. This is not surprising, given that screening programs for colorectal cancer have been in place for a much shorter time than programs for breast and cervical cancer. While many colorectal cancer screening programs were either not started or in their infancy in 2012, as of the summer of 2015, all 10 provinces had organized programs in place (though programs in Quebec and New Brunswick were not yet province-wide). No screening programs were in place in the territories.[47] Variations in colorectal cancer screening/testing across the country may partly reflect different stages of screening program announcement and roll-out in different provinces/territories. Variations may also reflect the various primary care initiatives (e.g., physician referral) adopted in some jurisdictions to increase opportunistic colorectal cancer screening, as well as different population characteristics that may drive colorectal cancer screening/testing beyond asymptomatic screening.

Provinces/territories will likely move toward the 60% participation rate target for fecal testing as programs ramp up across the country, as targeted efforts are put in place to increase uptake and as more current data become available. Monitoring colorectal cancer screening/testing participation rates at the system level facilitates evaluation of practices across the country (including program roll-out and implementation, as well as opportunistic screening) and reveals what proportion of the population is protected against this screenable cancer at a given time. Monitoring can help to identify where there are gaps in coverage (e.g., underserved populations).

3. Diagnosis

3. Diagnosis

A timely and effective diagnostic process can lead to improved outcomes: prompt relief for people who turn out not to have cancer and timely, effective treatment for those who do. Measures that contribute to improving the efficiency and timeliness of the diagnostic process also benefit patients by enabling more appropriate disease management and by reducing the anxiety of patients and families during their experience with cancer.

This chapter presents two Diagnosis indicators that measure timely access to the diagnostic process and are reported on an annual basis: breast cancer diagnosis wait times and colorectal cancer diagnosis wait times.

Key findings related to the following Diagnosis indicators that are reported on periodically are also included in this chapter: capture of stage and stage distribution. Full information on these additional indicators can be found at systemperformance.ca.

Indicator	Summary of results
Breast cancer diagnosis wait times	• In 2013, 90th percentile wait times for resolution of an abnormal breast screen for women not requiring a tissue biopsy ranged from 4 weeks in Alberta to 8 weeks in British Columbia and Newfoundland and Labrador (9 provinces submitted data); 3 of the 9 provinces achieved the 5-week target. • For women who required a tissue biopsy, the 90th percentile wait times ranged from 11 weeks in Prince Edward Island to 15 weeks in Newfoundland and Labrador. None of the 9 reporting provinces achieved the 7-week target. • Overall, wait times have not improved substantially in the 5 years during which they have been measured.
Colorectal cancer diagnosis wait times	• In 2013 and 2014, 90th percentile wait times from an abnormal fecal test to follow-up colonoscopy ranged from 104 days in Newfoundland and Labrador to 151 days in Prince Edward Island (7 provinces submitted data). None of the provinces had 90th percentile wait times below the 60-day target. • Not enough historical data are available yet to discern meaningful trends, although early indications point to a decrease in wait times.

Breast Cancer Diagnosis Wait Times

Key Message

Three of nine provinces achieved the five-week wait time target for women not requiring a biopsy for resolution. None of the provinces achieved the seven-week target set for women who require a biopsy for resolution.

Indicator Definition

The median and 90th percentile wait times between an abnormal breast screen result and resolution, with or without biopsy, for asymptomatic women aged 50–69 screened by provincial breast screening programs in 2013. Results are reported by province and year.

Target

90% of women should achieve resolution of an abnormal breast screen within five weeks for those not requiring a biopsy and within seven weeks for those requiring a biopsy, established by the Canadian Breast Cancer Screening Network.[48]

Measured Since

The 2009 *Cancer System Performance Report.*

3 of 9
provinces achieved the 5-week wait time target (no biopsy required)

0 of 9
provinces achieved the 7-week wait time target (biopsy required)

Depending on the province, 90% of women who did not require a biopsy received a diagnosis (cancer or benign) within **4–8 weeks**

Wait times are longer for women who required a biopsy: 90% of these women received a diagnosis within **11–15 weeks**

Why measure this?

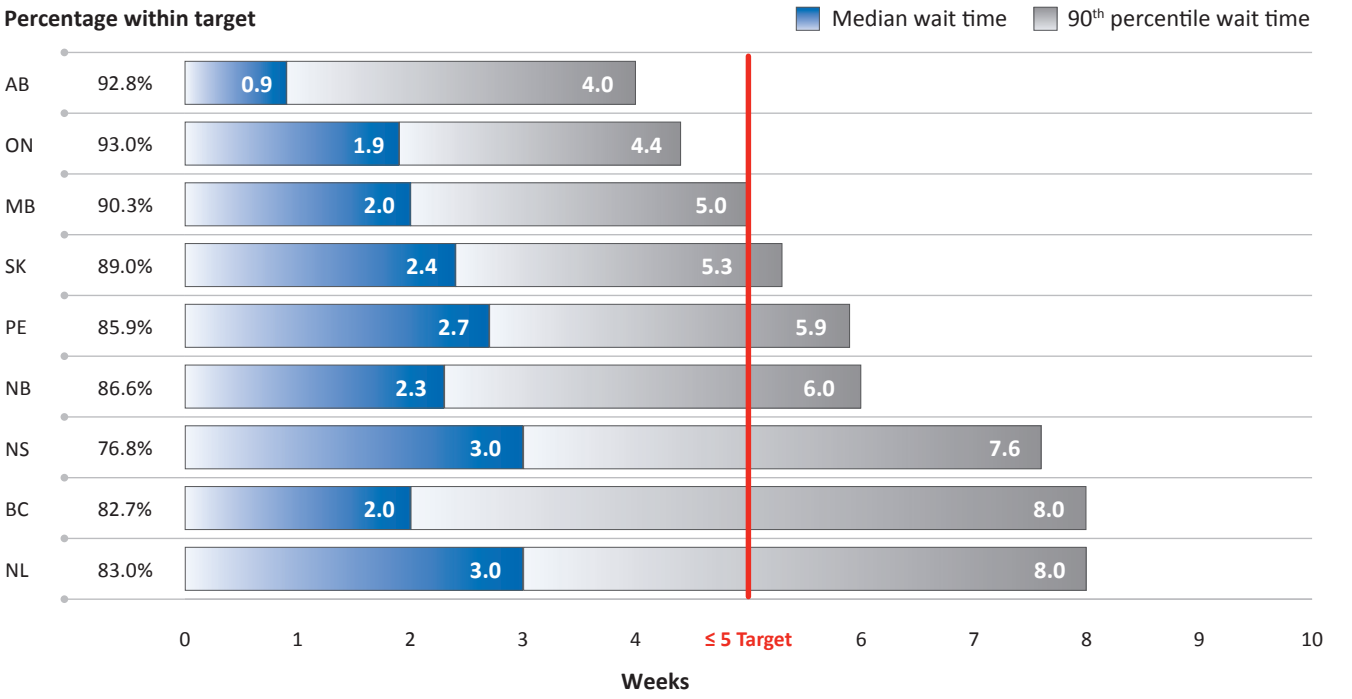
Timely resolution of an abnormal breast screen result through clinical investigation and a definitive biopsy (if required) can reduce unnecessary stress and anxiety for patients and their families (e.g., by reducing the time women wait for results of a breast biopsy) and may even improve patient outcomes (e.g., by promptly initiating treatment for women with a diagnosis of breast cancer).[49] Understanding variations in breast cancer diagnosis wait times across Canada can help to reveal where efforts need to be targeted to improve how various parts of the system involved in screening and diagnosing breast cancer work together to ensure prompt resolution of abnormal results.

What are the key findings?

- In 2013, 90th percentile wait times for resolution of an abnormal breast screen for women not requiring a tissue biopsy ranged from 4.0 weeks in Alberta to 8.0 weeks in both British Columbia and Newfoundland and Labrador (nine provinces submitted data) (Figure 3.1). Three provinces—Alberta, Manitoba and Ontario—achieved the five-week target. In 2012, Alberta, Ontario and New Brunswick achieved the five-week target (data not shown).
- The 90th percentile wait times for resolution of an abnormal breast screen for women who required a tissue biopsy ranged from 10.6 weeks in Prince Edward Island to 15.0 weeks in Newfoundland and Labrador (Figure 3.2). None of the nine reporting provinces achieved the seven-week target.

FIGURE 3.1

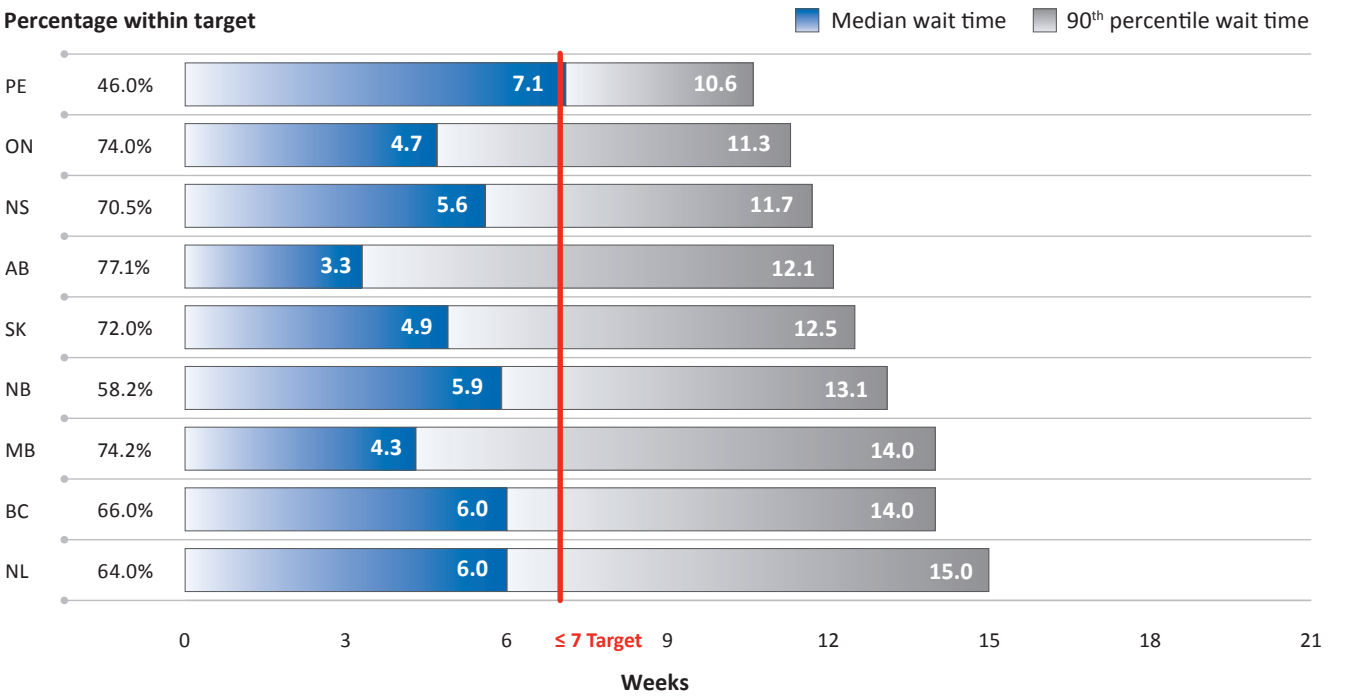
Median and 90th percentile wait times for resolution of abnormal breast screen without tissue biopsy for asymptomatic women (aged 50–69), by province — 2013 screening year



Cases where resolution of an abnormal screen took more than six months were excluded.
ON: Women with final result unknown/lost to follow-up were excluded.
Data source: Provincial breast cancer screening programs.

FIGURE 3.2

Median and 90th percentile wait times for resolution of abnormal breast screen with tissue biopsy for asymptomatic women (aged 50–69), by province — 2013 screening year



Cases where resolution of an abnormal screen took more than six months were excluded.
ON: Women with final result unknown/lost to follow-up were excluded.
Data source: Provincial breast cancer screening programs.

Why do these findings matter?

Women with abnormal breast screens continue to wait many weeks for a diagnosis (cancer or benign), especially when a tissue biopsy is required for diagnosis. Waiting for a diagnosis can be a stressful time for patients and their families. Even though diagnostic intervals of a few weeks are unlikely to affect patient outcomes (e.g., survival), efforts to reduce wait times can have positive implications for patient experience (e.g., reduced stress and anxiety).[50] Breast cancer diagnosis wait times may be affected by

- system-level factors (e.g., lack of access to primary care, variable access to and process for surgical referrals, variable navigation services for patients, lack of centralized triage and booking, and limited integration among health care providers involved in screening and diagnosis, among others)
- physician-driven factors (e.g., physicians may expedite investigations for women with a high suspicion of cancer)[50]
- patient-driven factors (e.g., women may postpone follow-up until it is convenient for them)

The many parts of the system involved in screening and diagnosing breast cancer need to work together at multiple levels to address these factors and to drive for efficient processes and reduced wait times.

Colorectal Cancer Diagnosis Wait Times

Key Message

Wait times from an abnormal fecal test result to follow-up colonoscopy are decreasing, but no provinces have achieved 90th percentile wait times within the 60 day target.

Indicator Definition

The median and 90th percentile wait time between an abnormal fecal test result and a follow-up colonoscopy required to resolve the diagnosis among people screened by provincial colorectal cancer screening programs in 2013 and 2014. The results are reported by province.

Target

60 days from an abnormal fecal test result to follow-up colonoscopy, recommended by the Canadian Association of Gastroenterology.[51]

Measured Since

The 2012 *Cancer System Performance Report*.

Why measure this?

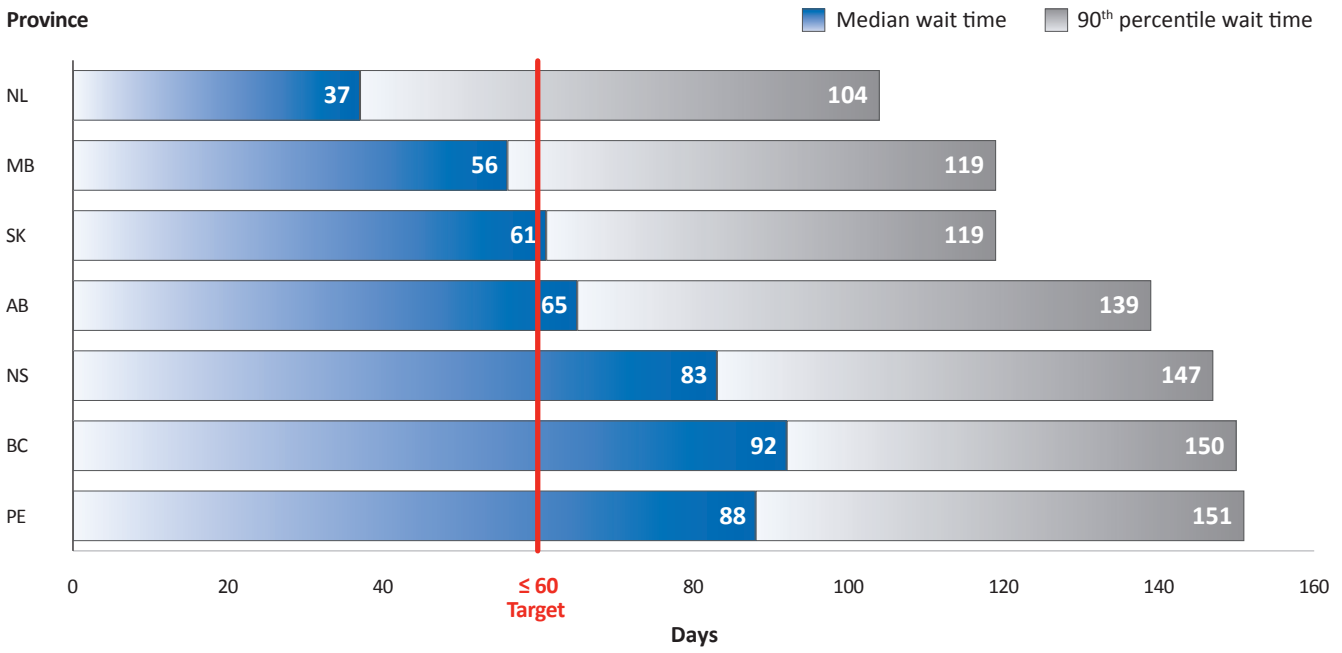
Timely resolution of an abnormal fecal test result leads to a shortened period of uncertainty and less anxiety for people who turn out to have a negative diagnosis (no cancer) and to earlier detection and prompt initiation of treatment for people with a positive diagnosis (cancer), which could improve treatment outcomes. For example, early detection of colorectal cancers through screening using the guaiac fecal occult blood test and removal of polyps during follow-up colonoscopy—the recommended diagnostic test for follow-up of an abnormal fecal test result—has been shown to reduce colorectal cancer mortality.[34] As a result, a wait time target based on pan-Canadian consensus on the medically acceptable wait time from abnormal fecal test to follow-up colonoscopy has been set.[51]

What are the key findings?

- In 2013 and 2014, 90th percentile wait times from an abnormal fecal test result to follow-up colonoscopy ranged from 104 days in Newfoundland and Labrador to 151 days in Prince Edward Island (seven provinces submitted data) (Figure 3.3). None of the provinces had 90th percentile wait times below the 60-day target.
- From 2011–12 to 2013–14, 90th percentile wait times decreased for all provinces (Saskatchewan, Manitoba, Prince Edward Island and Newfoundland and Labrador) that reported data for the two time periods; the decrease ranged from four days in Prince Edward Island to 55 days in Newfoundland and Labrador (data not shown).

FIGURE 3.3

Median and 90th percentile wait times from abnormal fecal test result to follow-up colonoscopy, by province — first-round screening tests conducted in 2013 and 2014



Data include colonoscopies performed within 180 days of abnormal fecal test results.
Target: The Canadian Association of Gastroenterology recommends that a colonoscopy be completed within 60 days of an abnormal fecal test.
Data source: National Colorectal Cancer Screening Network.

Why do these findings matter?

Although wait times are decreasing, many people with an abnormal fecal test result continue to wait several months for a follow-up colonoscopy needed to resolve the diagnosis. Timely resolution of an abnormal fecal test result can reduce the stress and anxiety patients and their families experience. As of 2012, all provinces had developed or were developing organized colorectal cancer screening programs. It is important to note, however, that colorectal cancer screening programs are still in the early stages of implementation in some provinces. Improvements may be seen as the programs mature. Improving colorectal cancer diagnosis wait times requires that many parts of the system involved in screening for and diagnosing colorectal cancer work together at multiple levels to drive for efficient processes and minimize wait times.

Additional Indicators Available on systemperformance.ca

Capture of stage

Over 92%
of patients diagnosed with one of the 4 most common cancers had stage data collected in provincial registries

- For the 2013 diagnosis year, the percentage of cases for which stage data were available in provincial cancer registries for the four most common cancers ranged from 92.0% in Ontario to 100% in British Columbia, Manitoba, Nova Scotia, Prince Edward Island and Newfoundland and Labrador, of the nine reporting provinces. All reporting provinces achieved the 90% target.
- The percentage of all cancer cases for which stage data were available in registries ranged from 73.2% in Ontario to 100% in Manitoba, Nova Scotia and Prince Edward Island of six reporting provinces.

Stage distribution

70%
of patients with breast cancer were diagnosed with Stage I or II disease

- For breast cancer, the majority (69.6%) of patients were diagnosed with Stage I or II disease in 2013. Patients were most commonly diagnosed with Stage I disease (39.9%), followed by Stage II disease (29.7%).

39%
of patients with colorectal cancer were diagnosed with Stage I or II disease

- For colorectal cancer, 39.2% of patients were diagnosed with Stage I or II disease. Patients were most commonly diagnosed with Stage II disease (21.4%), followed by Stage I disease (17.8%).

70%
of patients with prostate cancer were diagnosed with Stage I or II disease

- For prostate cancer, the majority (70.0%) of men were diagnosed with Stage I or II disease. Men were most commonly diagnosed with Stage II disease (50.4%), followed by Stage I disease (19.6%).

66 and 92%
of patients with NSCLC and SCLC, respectively, were diagnosed with Stage III or IV disease

- For non-small cell lung cancer (NSCLC), two-thirds (65.7%) of patients were diagnosed with Stage III or IV disease. Patients were most commonly diagnosed with Stage IV disease (47.3%).
- For small cell lung cancer (SCLC), 92.4% of patients were diagnosed with Stage III or IV disease. Patients were most commonly diagnosed with Stage IV disease (69.2%).

65%
of patients with ovarian cancer were diagnosed with Stage III or IV disease

- For ovarian cancer, 64.9% of patients were diagnosed with Stage III or IV disease. Women were most commonly diagnosed with Stage IIIC disease (31.1%) followed by Stage IV disease (18.6%).

Data source: Provincial cancer agencies and programs.

4. Treatment

4. Treatment

People with cancer have several life-saving and/or life-prolonging treatment options available to them, including radiation, systemic therapies and surgical interventions. The goals of treatment can include cure, disease control and symptom management. Factors influencing treatment goals include the type of cancer and stage at diagnosis, patient characteristics (e.g., comorbidities) and patient preferences and quality of life considerations.

This chapter presents five Treatment indicators that are reported on an annual basis: removal and examination of 12 or more lymph nodes in colon resections, use of breast-conserving surgery versus mastectomy, radiation therapy wait time, pre-operative radiation therapy for patients with Stage II or III rectal cancer, and post-operative chemotherapy for patients with Stage II or IIIA non-small cell lung cancer (NSCLC).

This section also includes a special feature, "High-risk, resource-intensive surgeries for esophageal, pancreatic, liver, lung and ovarian cancers in Canada."

Key findings related to the following Treatment indicators that are reported on periodically are also included in this chapter: resection rates for rectal, colon and NSCLC; post-operative radiation therapy for Stage I or II breast cancer; and post-operative chemotherapy for Stage III colon cancer. Full information on these additional indicators can be found at systemperformance.ca.

Indicator	Summary of results
Surgery	
Removal and examination of 12 or more lymph nodes in colon resections	• In the 2012 diagnosis year, the percentage of colon resections with 12 or more lymph nodes removed and examined ranged from 71% in Prince Edward Island to 83% in Alberta. • The percentage of colon resections with 12 or more lymph nodes examined increased in all reporting provinces from 2009 to 2012. • There were no substantial differences in treatment patterns by age group or sex.
Use of Breast-Conserving Surgery versus Mastectomy for Breast Cancer Resections	• For the 2009/10 to 2013/14 fiscal years combined, the use of breast-conserving surgery ranged from 31% in Newfoundland and Labrador to 75% in Quebec. • The use of breast-conserving surgery appears to have increased in six provinces (British Columbia, Alberta, Ontario, Quebec, New Brunswick and Nova Scotia) from 2008/09–2010/11 to 2011/12–2013/14.

Indicator	Summary of results
Radiation therapy	
Radiation therapy wait times	• In the 2014 treatment year, the 90th percentile radiation therapy wait times ranged from 19 days in New Brunswick to 27 days in Prince Edward Island. All 8 reporting provinces achieved the target of 90% of patients treated within 28 days of being ready to treat. • Of the 4 most common disease sites—breast, colorectal, lung and prostate cancers—prostate cancer had the longest 90th percentile wait times, ranging from 24 days in Alberta to 30 days in New Brunswick.
Pre-operative radiation therapy for Stage II or III rectal cancer patients	• In the 2012 diagnosis year, the percentage of patients with Stage II or III rectal cancer who received guideline-concordant pre-operative radiation therapy ranged from 42% in Nova Scotia to 50% in Manitoba, with 5 provinces reporting. • Use of pre-operative radiation therapy for rectal cancer decreased with age; 53% of rectal cancer patients aged 18–59 received pre-operative radiation compared with 30% of those aged 80 or older.
Systemic therapy	
Post-operative chemotherapy for Stage II or IIIA NSCLC patients	• In the 2012 diagnosis year, of the 4 reporting provinces, the percentage of patients with Stage II or IIIA NSCLC who received post-operative chemotherapy ranged from 41% in Alberta to 56% in Ontario. • Use of post-operative chemotherapy decreased with age: 64% of NSCLC patients aged 18–59 received post-operative chemotherapy compared with 30% of those aged 70–79.

Surgery

Removal and Examination of 12 or More Lymph Nodes in Colon Resections

Key Message

There have been steady improvements in the percentage of colon resections with 12 or more lymph nodes removed and examined from 2009 to 2012—this suggests greater adherence to evidence-based guidelines.

Indicator Definition

The percentage of colon resections with 12 or more lymph nodes removed and examined for cases diagnosed from 2009 to 2012. Results are presented by province, age group and sex.

Target

90%, established in 2014 by the Partnership's System Performance Targets and Benchmarks Working Group.

Measured Since

The 2010 *Cancer System Performance Report*.

0 of 7

reporting provinces achieved the 90% target

71–83%

range across provinces of colon resections with 12 or more lymph nodes examined, as recommended by guidelines

Why measure this?

The removal and examination of 12 or more lymph nodes is important for proper staging and subsequent treatment planning and has been associated with improved survival.[52–54] Most clinical guidelines recommend that a minimum of 12 lymph nodes be removed and then examined by a pathologist to more definitively establish a cancer's nodal status—an indication of the extent of cancer spread to the lymph nodes.[55, 56]

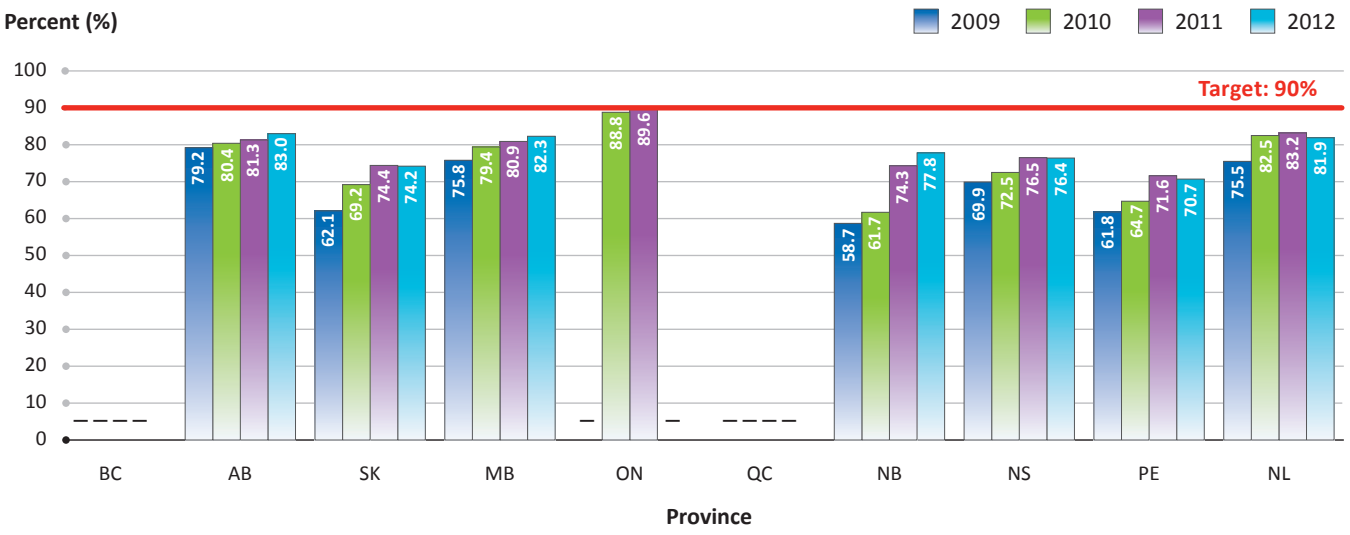
The recommendation is based on the fact that the chance of false negative nodal staging (i.e., the test fails to demonstrate that the cancer has in fact spread) is reduced to acceptable levels when a minimum of 12 lymph nodes are examined. Measuring provincial treatment patterns relative to this guideline can help identify variations and inform opportunities for quality improvement at the provincial level.

What are the key findings?

- In the 2012 diagnosis year, the percentage of colon resections with 12 or more lymph nodes removed and examined ranged from 70.7% in Prince Edward Island to 83.0% in Alberta; none of the reporting provinces achieved the target of 90% of colon resections with a minimum of 12 lymph nodes examined (Figure 4.1).
- Ontario achieved the target in 2011, but did not provide data for 2012 (Figure 4.1).
- The percentage of colon resections with a minimum of 12 lymph nodes examined was slightly higher for women aged 18–69 than for men in the same age group (83.1% vs. 78.9%), and also slightly higher for women aged 70 or older than for men in the same age group (81.3% vs. 76.6%) (data not shown).
- The percentage of colon resections with 12 or more lymph nodes examined increased in all reporting provinces from 2009 to 2012 (Figure 4.1).

FIGURE 4.1

Percentage of colon resections with 12 or more lymph nodes removed and examined, by province — from 2009 to 2012 diagnosis years



"—" Data not available

AB: All Alberta Cancer Registry coded surgeries (if there was no more definitive surgery as part of initial treatment, polypectomy might be included) were included as complete colon resection. C18.1 Appendix was excluded in 2012.

ON: Data represent colon cases with 12 or more nodes examined rather than cases diagnosed in corresponding year.

NS: Collaborative stage variables were used to identify resections. Resection dates were manually retrieved through chart review.

NL: Did not include out-of-province treatment for provincial residents.

Data source: Provincial cancer agencies and programs.

Why do these findings matter?

There have been steady improvements across all provinces with respect to the percentage of colon resections with 12 or more lymph nodes removed and examined as per evidence-based guidelines. This pattern has positive implications for patients, such as better cancer staging and subsequent treatment planning, which has been associated with improved survival.[52–54]

Several factors may have influenced the increasing trend, such as published evidence-based guidelines, public reporting and the implementation of quality improvement initiatives. One pan-Canadian quality improvement initiative is the Electronic Synoptic Pathology Reporting Initiative, which has participation from British Columbia, Manitoba, Ontario, New Brunswick, Nova Scotia and Prince Edward Island. The initiative will facilitate the implementation of electronic synoptic pathology reporting for several cancers, including colorectal cancer, to improve the quality of reporting. High-quality pathology reporting has the potential to lead to improved alignment with evidence-based guidelines (e.g., removal and examination of at least 12 lymph nodes), better care planning and improved patient outcomes.

Use of Breast-Conserving Surgery versus Mastectomy for Breast Cancer Resections

Key Message

The use of breast-conserving surgery appears to have increased in six provinces from 2008/09–2010/11 to 2011/12–2013/14.

Indicator Definition

The percentage of women receiving a breast cancer resection for whom breast-conserving surgery (BCS) was their final procedure (i.e., where BCS was their first surgery or where a wider excision in the context of BCS was performed within one year of their first surgery). The data include women with unilateral invasive breast cancer whose surgery occurred between April 2008 and March 2014. Results are presented by province and year.

Measured Since

The 2012 *Cancer System Performance Report*.

31–75%

range across provinces of the percentage of breast cancer resections that were breast-conserving surgeries as opposed to mastectomies

Why measure this?

Most women diagnosed with non-metastatic breast cancer are candidates for surgery, either mastectomy or BCS[f] followed by whole-breast radiation therapy (breast-conservation therapy).[57] Breast-conservation therapy is less invasive than mastectomy and is associated with lower morbidity, improved cosmetic appearance and better psychological outcomes. In addition, mastectomy and breast-conservation therapy yield comparable survival outcomes.[58-62] Since both procedures provide comparable outcomes, the choice between mastectomy and breast-conservation therapy should be made by the patient based on a clear understanding of the risks, benefits and quality of life considerations associated with each choice.

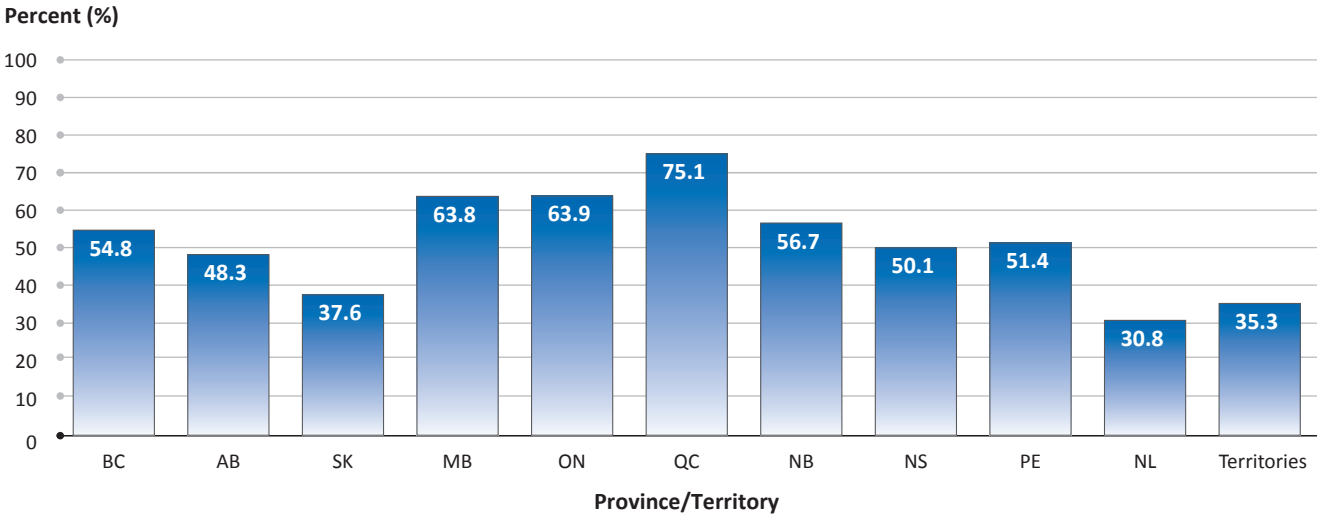
[f] Mastectomy is surgery to remove the entire breast. BCS involves complete removal of the tumour along with a margin of non-cancerous breast tissue.

What are the key findings?

- The use of BCS ranged from 30.8% in Newfoundland and Labrador to 75.1% in Quebec (Figure 4.2).
- The use of BCS appears to have increased in six provinces (British Columbia, Alberta, Ontario, Quebec, New Brunswick and Nova Scotia) from 2008/09–2010/11 to 2011/12–2013/14[g] (Figure 4.3).

FIGURE 4.2

Percentage of breast cancer resections that were breast-conserving surgeries, by province/territory — 2009/10 to 2013/14 fiscal years combined



Breast-conserving surgery (BCS) data shown include only women who underwent BCS as a final procedure.

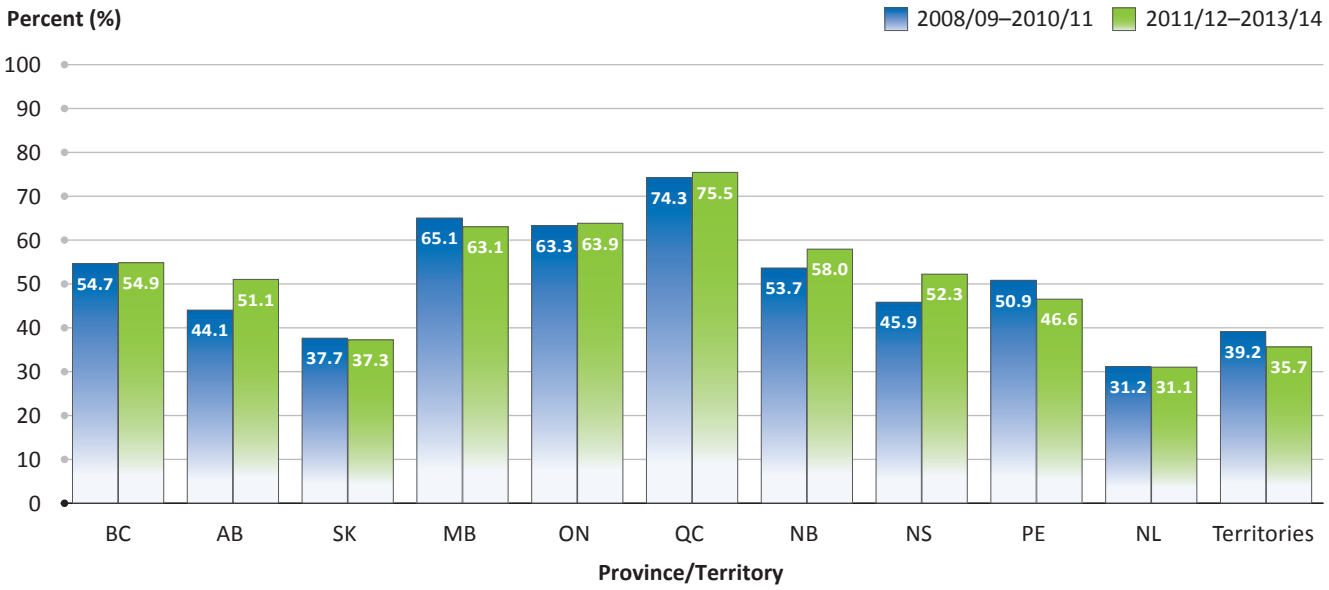
Territories include Yukon, Northwest Territories and Nunavut.

Data source: Canadian Institute for Health Information, Hospital Morbidity Database, National Ambulatory Care Reporting System; Alberta Health and Wellness, Alberta Ambulatory Care Reporting System.

[g] The period 2008/09–2010/11 refers to April 2008 to March 2011. The period 2011/12–2013/14 refers to April 2011 to March 2014.

FIGURE 4.3

Percentage of breast cancer resections that were breast-conserving surgeries, by province/territory — 2008/09–2010/11 vs. 2011/12–2013/14 fiscal years combined



Breast-conserving surgery (BCS) data shown include only women who underwent BCS as a final procedure.

Territories include Yukon, Northwest Territories and Nunavut.

Data source: Canadian Institute for Health Information, Hospital Morbidity Database, National Ambulatory Care Reporting System; Alberta Health and Wellness, Alberta Ambulatory Care Reporting System.

Why do these findings matter?

Across Canada, the use of BCS as a final procedure has increased in six provinces. This finding could indicate that more women are receiving BCS. Mastectomy and BCS followed by radiation therapy yield comparable survival outcomes.[58-62] The interprovincial differences shown here therefore do not necessarily reflect differences in the quality of care. The choice between BCS followed by radiation therapy and mastectomy should be made by the patient based on a clear understanding of the benefits, risks and quality of life considerations associated with each treatment option.

There is evidence that distance from a radiation treatment centre influences BCS rates. Patients who live far from the nearest radiation treatment centre may be less likely to undergo BCS because of the challenges of travelling post-operatively to a radiation treatment facility for several weeks of treatment. The choice of treatment may also be influenced by access to breast reconstruction, clinical factors (e.g., gene mutations that may predispose a woman to developing breast cancer, which can influence women to choose prophylactic removal of one or both breasts), surgeon preferences and training, and patient preferences.

Radiation Therapy

Radiation Therapy Wait Times

Key Message

Over 90% of cancer patients started radiation therapy within the national wait time target of 28 days from ready-to-treat.

Indicator Definition

The median and 90th percentile radiation therapy wait times from ready-to-treat to start of radiation for patients treated for all types of cancer and for the four most common cancers in 2014. Results are presented by province and disease site.

Target

The national wait time target is that 90% of patients should receive radiation therapy within 28 days of being ready to treat.

The Canadian Association of Radiation Oncologists (CARO) wait time target is that patients should receive radiation therapy within 14 days of being ready to treat.

Measured Since

The 2009 *Cancer System Performance Report*.

100%

of reporting provinces achieved the 28-day wait time target

Depending on the province, 90% of patients received radiation therapy within

19–27 days

Why measure this?

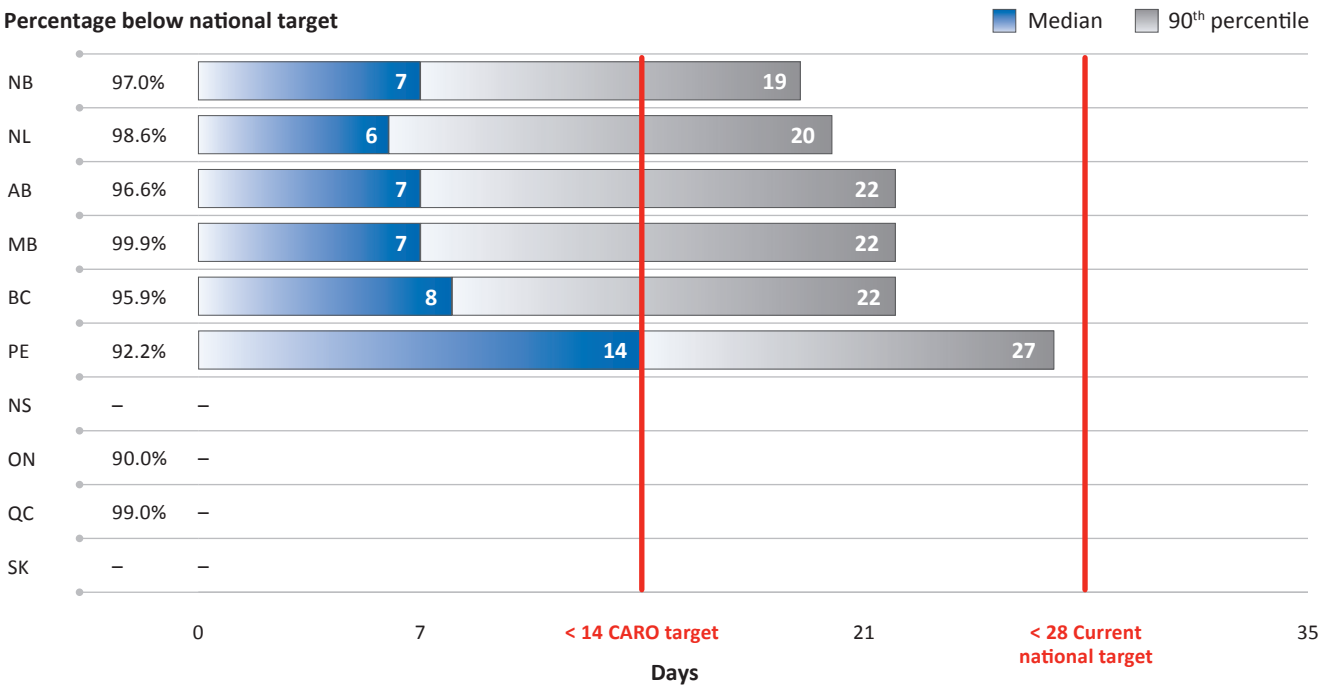
Timely access to radiation therapy is a key component of a high-quality cancer control system; it can reduce anxiety for patients and their families and ensure prompt treatment for patients who need it. Reducing radiation therapy wait times is a national health care priority.[63] A national wait time target has been set and provincial initiatives have been implemented to reduce wait times. Reporting on radiation therapy wait times is an important step to understanding the health care system's ability to meet the needs of patients with cancer.

What are the key findings?

- In the 2014 treatment year, 90th percentile radiation therapy wait times ranged from 19 days in New Brunswick to 27 days in Prince Edward Island. All six reporting provinces achieved the target of 90% of patients treated within 28 days of being ready to treat (Figure 4.4).
- The percentage of cancer patients treated within the national wait time target ranged from 90.0% in Ontario to 99.9% in Manitoba (Figure 4.4).
- The 90th percentile wait time decreased slightly in four of the six reporting provinces (British Columbia, New Brunswick, Prince Edward Island and Newfoundland and Labrador) from 2013 to 2014 (data not shown).
- Of the four most common disease sites—breast, colorectal, lung and prostate—prostate cancer patients continue to have the longest 90th percentile radiation therapy wait times, ranging from 24 days in Alberta to 30 days in New Brunswick (Figure 4.5). However, compared with 2013, radiation therapy wait times for prostate cancer are improving in four of the five provinces that reported data (data not shown).

FIGURE 4.4

Median and 90th percentile wait times for radiation therapy, all cancers, by province — 2014 treatment year



"—" Data not available.

BC, AB: Brachytherapy was not included for the 2014 treatment year but was included in previous years.

ON: Data include percentage of patients treated with radiation therapy within 14 days (CARO target), February–December 2014.

Current national target is that 90% of patients receive radiation therapy within 28 days of being ready to treat.

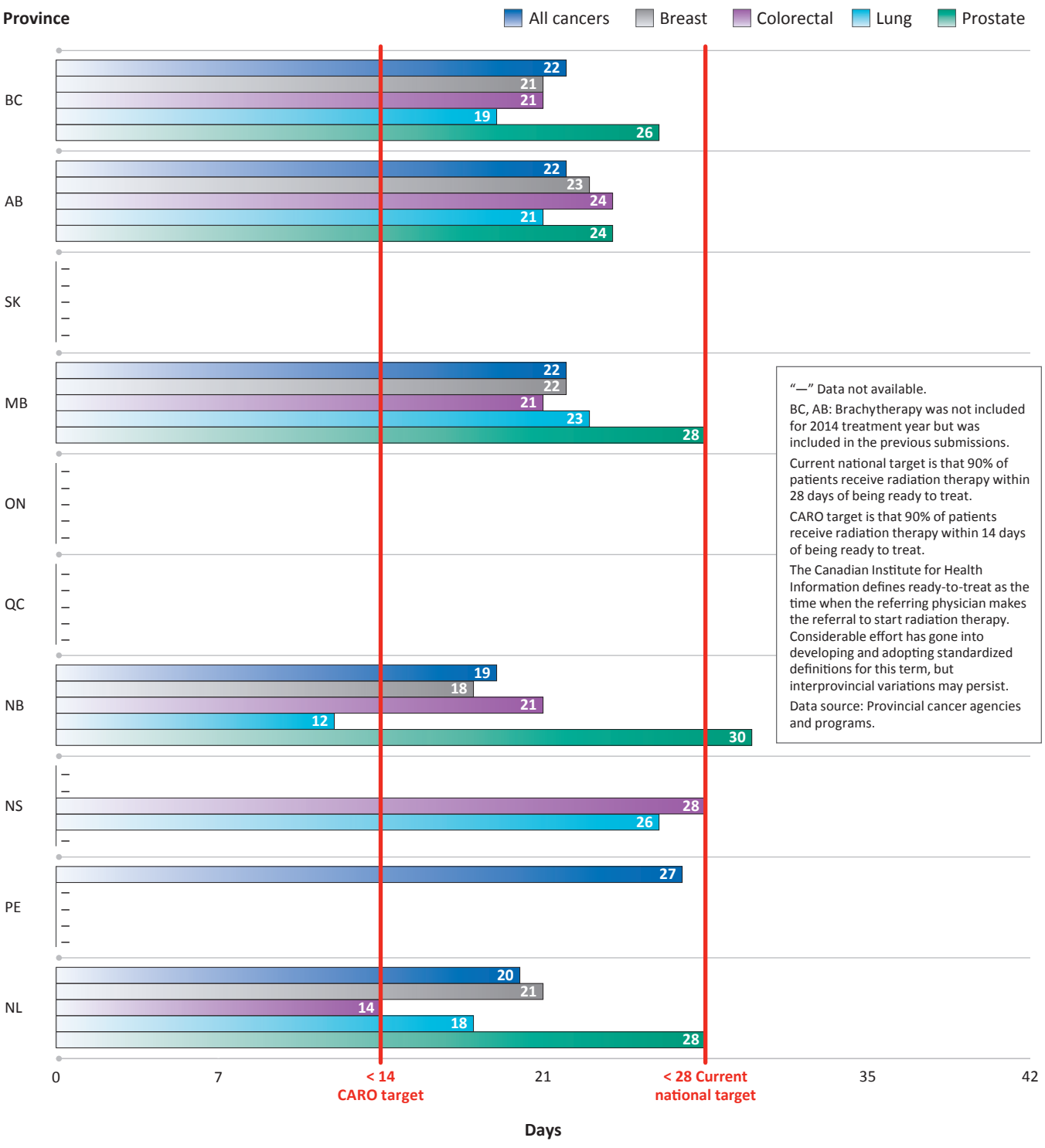
Canadian Association of Radiation Oncologists (CARO) target is that 90% of patients receive radiation therapy within 14 days of being ready to treat.

The Canadian Institute for Health Information defines ready-to-treat as the time when the referring physician makes the referral to start radiation therapy. Considerable effort has gone into developing and adopting standardized definitions for this term, but interprovincial variations may persist.

Data source: Provincial cancer agencies and programs.

FIGURE 4.5

90th percentile wait times for radiation therapy, by disease site and by province — 2014 treatment year



Why do these findings matter?

All reporting provinces achieved the national target of 90% of patients receiving radiation therapy within 28 days of being ready to treat. Ensuring patients receive timely access to radiation therapy has positive implications for patient experience, such as reduced anxiety. Patients with prostate cancer continue to wait slightly longer for radiation therapy than patients with breast, colorectal or lung cancer. It is important to note that longer wait times for prostate cancer may be expected given the nature of the disease. Many prostate cancers are slow growing, so treatment may be considered less urgent for prostate cancer than for other cancers.

Pre-operative Radiation Therapy for Patients with Stage II or III Rectal Cancer

Key Message

The use of guideline-concordant pre-operative radiation therapy for rectal cancer was relatively consistent among the reporting provinces.

Indicator Definition

The percentage of patients diagnosed with Stage II or III rectal cancer from 2009 to 2012 who received pre-operative radiation therapy. The results are presented by province, age group and sex.

Measured Since

The 2010 *Cancer System Performance Report*.

42–50%

range across provinces of the percentage of patients with Stage II or III rectal cancer who received guideline-concordant pre-operative radiation therapy

53% vs 30%

of Stage II or III rectal cancer patients under 60 vs. over 80 receiving pre-operative radiation therapy for rectal cancer

Why measure this?

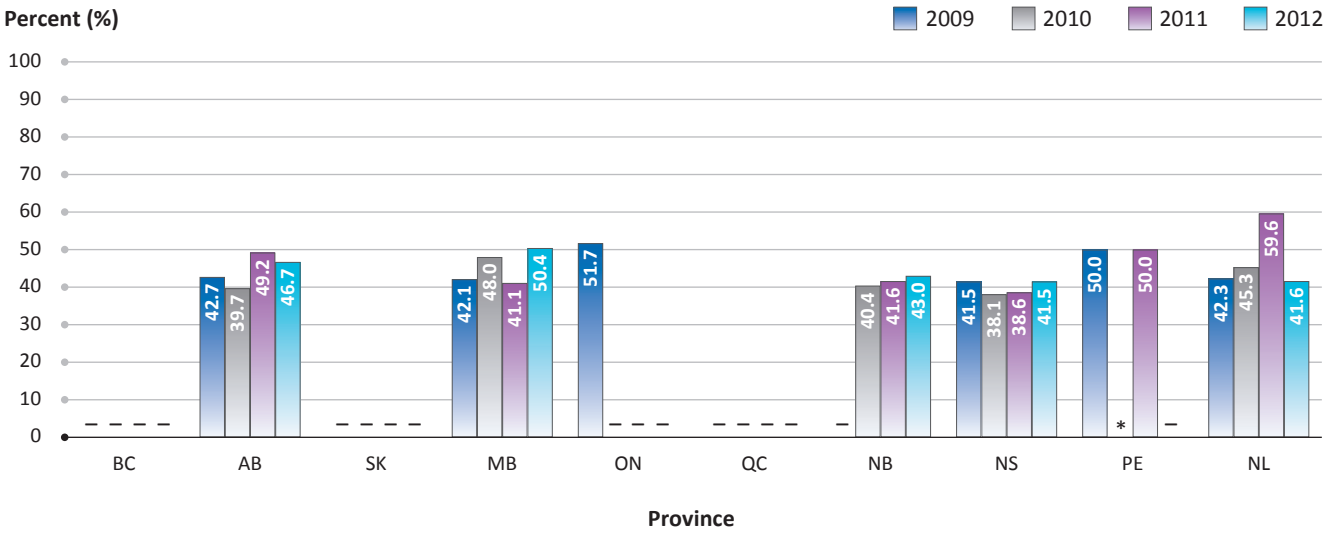
The delivery of radiation therapy (along with chemotherapy) prior to surgical resection for Stage II or III rectal cancer has been shown to improve local disease control (i.e., decrease the incidence of local recurrence) compared with surgery alone or post-operative radiation therapy.[64-66] In addition, pre-operative radiation has been associated with a reduction in treatment-related toxicity compared with post-operative radiation therapy.[64] Clinical practice guidelines therefore recommend pre-operative radiation therapy (combined with chemotherapy) for patients with Stage II or III rectal cancer.[67] Measuring concordance with clinical practice guidelines can identify variations in clinical practice across the country.

What are the key findings?

- In the 2012 diagnosis year, the percentage of patients with Stage II or III rectal cancer who received guideline-concordant pre-operative radiation therapy ranged from 41.5% in Nova Scotia to 50.4% in Manitoba (Figure 4.6). It is important to note, however, that this indicator includes cancers of the rectum and recto-sigmoid junction. Pre-operative radiation therapy is guideline-recommended only for patients with cancers of the rectum; guideline concordance may therefore be higher than reported (see **Box 1.0** for pre-operative radiation therapy use in provinces that were able to exclude tumours of the recto-sigmoid junction).
- Generally, the use of pre-operative radiation therapy for rectal cancer decreased with age (Figure 4.7): 52.6% of rectal cancer patients aged 18–59 received pre-operative radiation compared with 29.6% of those aged 80 or older.
- There were no notable sex-related differences (data not shown).

FIGURE 4.6

Percentage of Stage II or III rectal cancer patients who received radiation therapy before surgery, by province — from 2009 to 2012 diagnosis years



"—" Data not available.

* Suppressed owing to small numbers.

AB: All Alberta Cancer Registry coded surgeries were included for complete rectum resection.

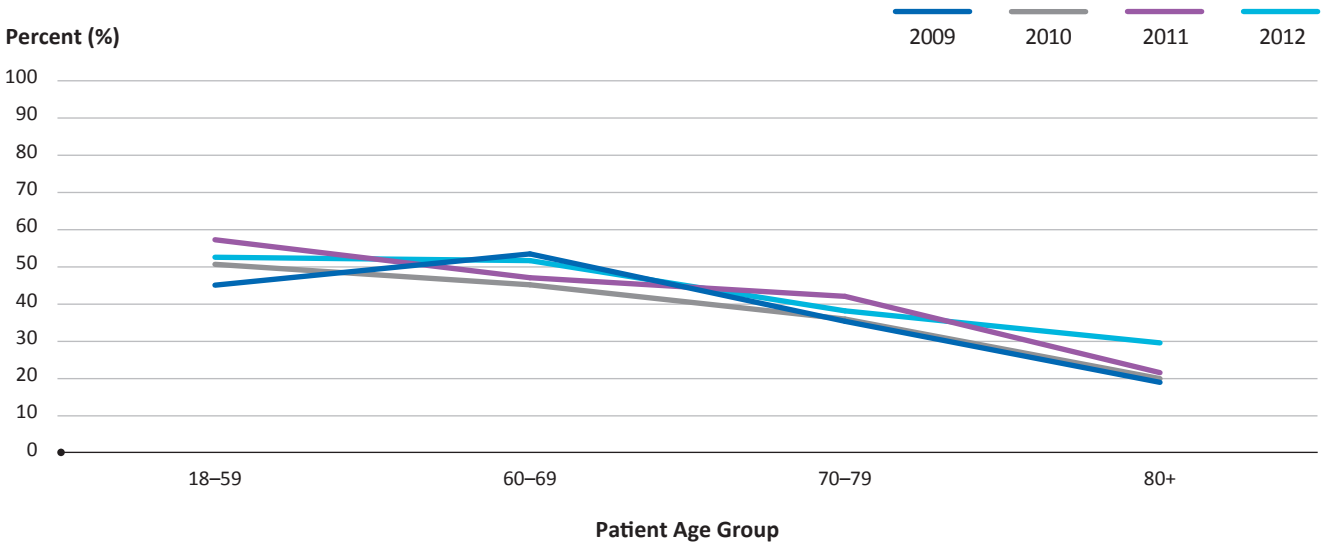
Inclusion criteria for 2009 were slightly different from those of other years. Refer to the Technical Appendix for details.

Data include radiation therapy started up to 120 days before resection.

Data source: Provincial cancer agencies and programs.

FIGURE 4.7

Percentage of Stage II or III rectal cancer patients who received radiation therapy before surgery, by age group — from 2009 to 2012 diagnosis years



Data include AB, MB, NS and NL (provinces that submitted comparable data for all four years).
Data include radiation therapy started up to 120 days prior to surgery.
Inclusion criteria for 2009 were slightly different from those of other years. Refer to the Technical Appendix for details.
Data source: Provincial cancer agencies and programs.

BOX 1.0

Pre-operative radiation therapy use for patients with Stage II or III rectal cancer, excluding tumours of the recto-sigmoid junction

Why measure this?

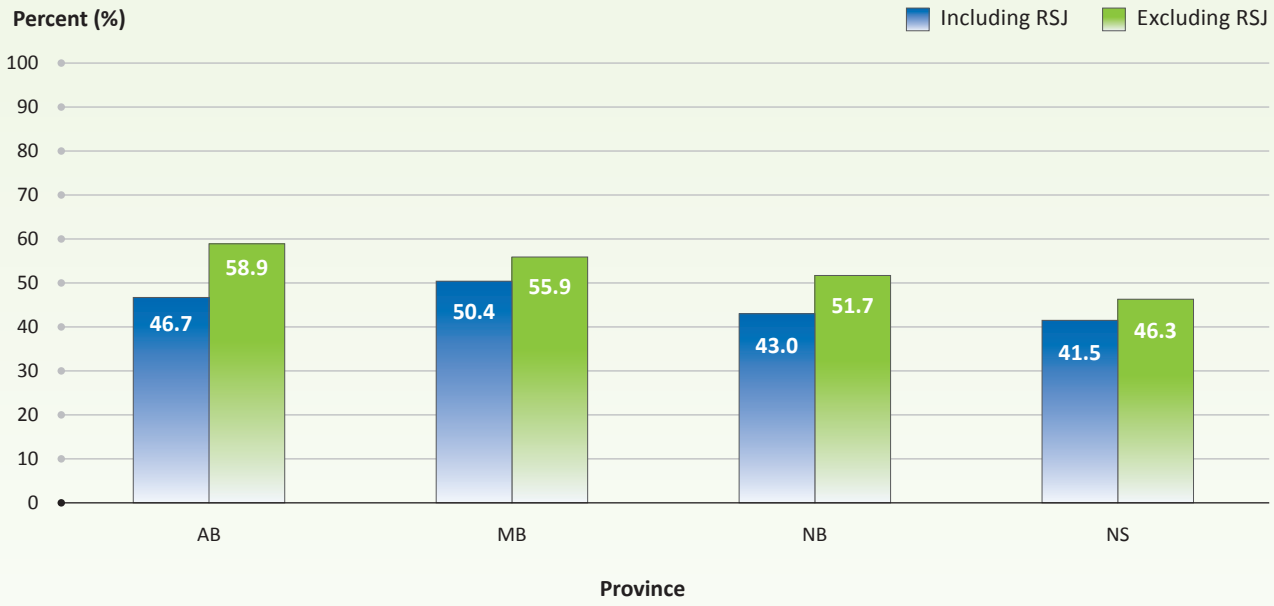
The benefit of pre-operative radiation therapy for patients with tumours of the recto-sigmoid junction is not clear, but there is a generally held perception that it is not appropriate.[68] We therefore examined the use of pre-operative radiation therapy for Stage II or III rectal cancer, excluding tumours of the recto-sigmoid junction.

What are the key findings?

- The use of pre-operative radiation therapy for patients with Stage II or III rectal cancer, excluding tumours of the recto-sigmoid junction, ranged from 46.3% in Nova Scotia to 58.9% in Alberta, of the four reporting provinces (Figure 4.8).
- The use of pre-operative radiation therapy increased in all reporting provinces when cancers of the recto-sigmoid junction were excluded; Alberta had the greatest change, with a 12 percentage point increase in the use of guideline-concordant pre-operative radiation therapy (Figure 4.8).

FIGURE 4.8

Impact of including or excluding recto-sigmoid junction cancers: Percentage of patients with Stage II or III rectal cancer who received radiation therapy before surgery, by province — 2012 diagnosis year



RSJ = recto-sigmoid junction.
Data source: Provincial cancer agencies and programs.

Given the lack of clear evidence of the benefit of pre-operative radiation therapy for tumours of the recto-sigmoid junction, future reporting on this indicator will include cancers of the rectum only.

Why do these findings matter?

The use of guideline-concordant pre-operative radiation therapy for rectal cancer was relatively consistent among the reporting provinces. Providing patients with early-stage rectal cancer with pre-operative radiation may have positive implications for patient outcomes, such as improved local disease control and reduced treatment-related toxicity.[64-66]

It is important to note that evidence is emerging that pre-operative chemo-radiation can be safely omitted in some patients with Stage II rectal cancer.[69] The results of subsequent randomized trials in this area will be important to better refine the role of pre-operative radiation in rectal cancer.

Systemic Therapy

Post-Operative Chemotherapy for Patients with Stage II or IIIA Non-small Cell Lung Cancer

Key Message

Patients with Stage II or IIIA NSCLC aged 18–59 were twice as likely as patients aged 70–79 to receive guideline-concordant post-operative chemotherapy.

Indicator Definition

The percentage of patients diagnosed with Stage II or IIIA non-small cell lung cancer (NSCLC) in 2010, 2011 and 2012 who received post-operative chemotherapy. Results are presented by province, age group and sex.

Measured Since

The 2011 *Cancer System Performance Report*.

41–56%

range across provinces of percentage of patients with Stage II or IIIA NSCLC who received guideline-concordant post-operative chemotherapy

64% vs 30%

of Stage II or IIIA NSCLC patients under 60 vs. in their 70s received post-operative chemotherapy

Why measure this?

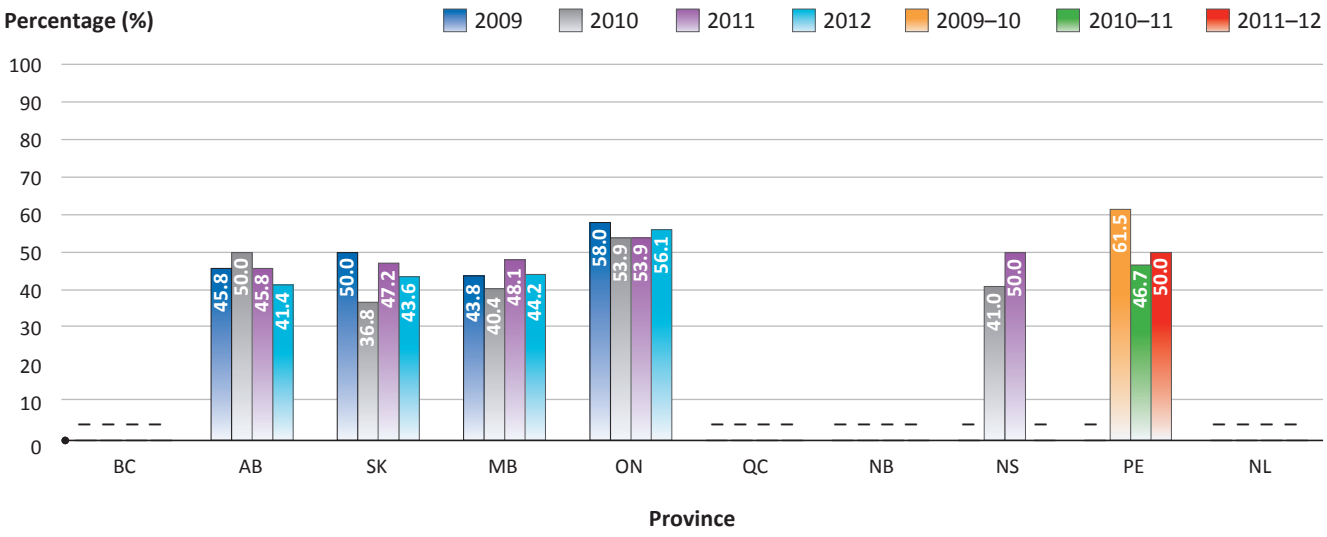
The delivery of chemotherapy following resection has been shown to improve outcomes (i.e., disease-free and overall survival) and prevent recurrences in patients with Stage II or IIIA NSCLC, compared with surgery alone.[70-73] Clinical practice guidelines therefore recommend post-operative chemotherapy for patients with Stage II or IIIA NSCLC.[74] Measuring national practice patterns relative to this evidence-based guideline can help to identify variations, which could be addressed through quality improvement initiatives.

What are the key findings?

- In the 2012 diagnosis year, the percentage of patients with Stage II or IIIA NSCLC who received post-operative chemotherapy ranged from 41.4% in Alberta to 56.1% in Ontario, of the five reporting provinces (Figure 4.9).
- Use of post-operative chemotherapy decreased with age: 63.8% of NSCLC patients aged 18–59 received post-operative chemotherapy, compared with 29.9% of those aged 70–79 (Figure 4.10).
- There were no notable sex-related differences (data not shown).

FIGURE 4.9

Percentage of Stage II or IIIA non-small cell lung cancer patients who received chemotherapy following surgical resection, by province — from 2009 to 2012 diagnosis years



"—" Data not available.

AB: All Alberta Cancer Registry coded surgeries were included for complete lung resection.

MB: Oral chemotherapy included if available but may not be complete.

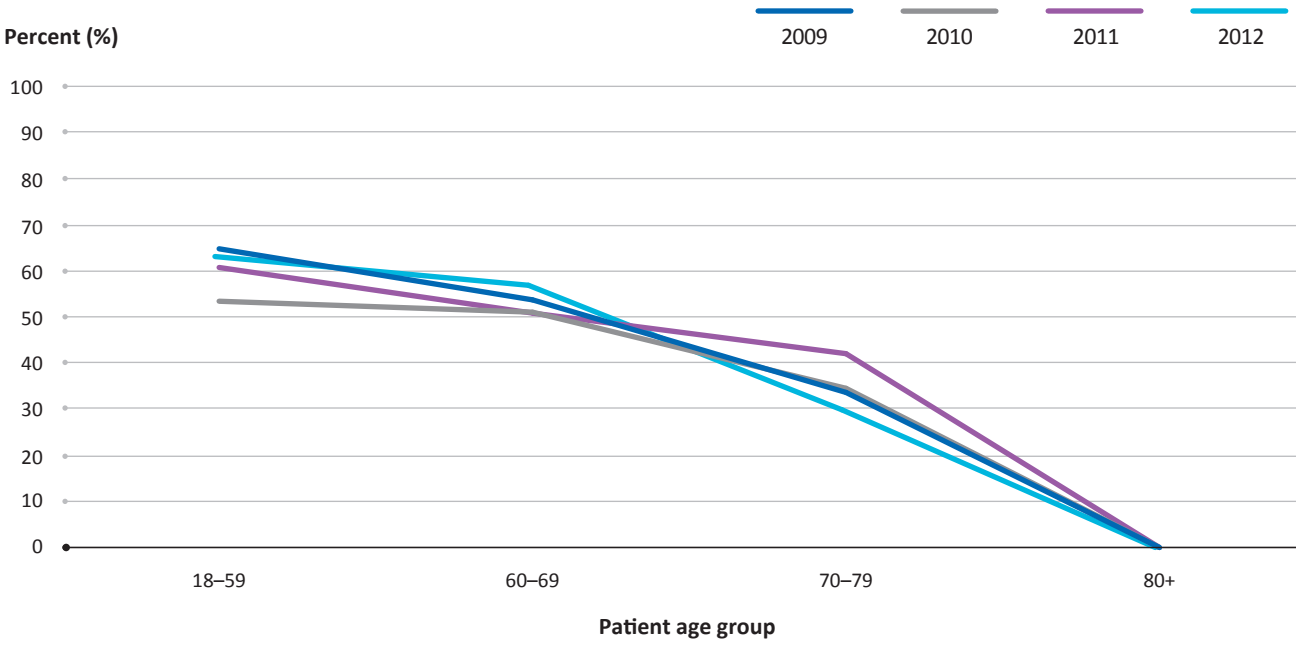
PE: Data for 2010 represent 2009–10 combined. Data for 2011 represent 2010–11 combined. Data for 2012 represent 2011–12 combined.

Data include chemotherapy started within 120 days following surgery.

Data source: Provincial cancer agencies and programs.

FIGURE 4.10

Percentage of Stage II or IIIA non-small cell lung cancer patients who received chemotherapy following surgical resection, by age group — from 2009 to 2012 diagnosis years



Data included AB, SK, MB and PE (provinces submitted comparable data for all four years).
AB: All coded surgeries were included for complete lung resection.
MB: Oral chemotherapy included if available but may not be complete.
Data included chemotherapy started within 120 days following surgery.
Data source: Provincial cancer agencies and programs.

Why do these findings matter?

The data suggest that the use of post-operative chemotherapy for Stage II or IIIA NSCLC is relatively consistent among the reporting provinces, but is not consistent across age groups. Patients aged 18–59 with Stage II or IIIA NSCLC are much more likely to receive post-operative chemotherapy than are patients aged 70–79. While older patients are more likely to have conditions that reduce their ability to tolerate chemotherapy, evidence does suggest that use of post-operative chemotherapy can improve survival for patients up to age 80.[75-77] Given that, it is important to understand why treatment practices may vary based on patient age. Factors that may influence use of post-operative chemotherapy in patients with Stage II or IIIA NSCLC include medical conditions that preclude its use, refusal of treatment after being referred to a medical oncologist and lack of referral to a medical oncologist.

Special Feature: High-risk, resource-intensive cancer surgeries in Canada

Key Message

If surgeries for esophageal, pancreatic, liver, lung and ovarian cancers were performed only in high-volume hospitals, a total of 4,775 hospital days and 391 lives could be saved annually.

Background

Surgery is often a part of treatment for patients with esophageal, pancreatic, liver, lung or ovarian cancer. While many patients fare well after surgery, some experience adverse outcomes given that these cancer surgeries are complex and require a high level of specialized knowledge and experience. There is evidence that regionalization of complex surgical procedures can lead to improved patient outcomes. Regionalization is defined as "the deliberate reorientation of cancer surgical procedures, based on explicit and planned processes and structures, with the intent of improving the quality of care."[78] This special feature highlights the number of cancer resections as well as the association between hospital volume and outcomes of interest—in-hospital mortality, number of hospital days saved and number of lives saved—for esophageal, pancreatic, liver, ovarian and lung cancers across Canada.

This special feature provides a snapshot of some key findings from the report *Approaches to High-Risk, Resource Intensive Cancer Surgical Care in Canada* by Finley et al. The pan-Canadian report provides analysis and discussion of the approaches to high-risk, resource-intensive surgical procedures for esophageal, pancreatic, liver, ovarian and lung cancers and provides actionable recommendations to optimize patient care.

Methods

Hospital data on inpatient admissions in nine provinces (all except Quebec) were extracted from the Canadian Institute for Health Information Discharge Abstract Database. Cases with primary cancers and associated surgical procedures from 2004 to 2012 were included; only 2010–12 data are reported here. To calculate age-standardized resection rates, the 1991 Canadian population structure was used as the reference population. Multivariate regression analyses were performed to examine the association between hospital volume and the outcomes of interest—in-hospital mortality, number of hospital days saved and number of lives saved—controlling for patient, institutional and surgeon factors. A detailed description of methodology can be found in the full report.

Results

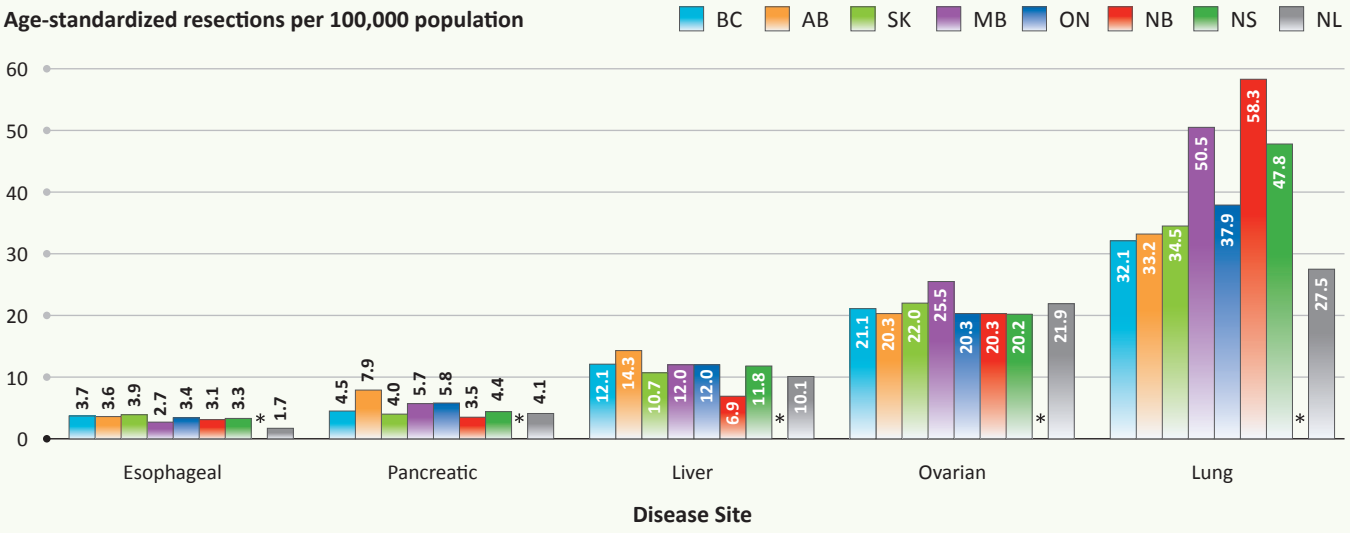
High-risk, resource-intensive cancer resections in Canada

There were substantial variations in the age-standardized per capita number of resections for esophageal, lung, liver and pancreatic cancer in Canada. For these cancers, patients residing in the province with the highest number of resections per capita were twice as likely to receive potentially curative surgery as patients residing in the province with the lowest number of resections (Figure 4.i).

Of the five cancers, the numbers of resections for esophageal, pancreatic and liver cancer were relatively low in all reporting provinces compared with the number of ovarian or lung cancer resections (Figure 4.i). Cancer incidence and clinical indication may be the primary drivers of the observed differences in the number of resections performed.

FIGURE 4.i

Number of resections per 100,000 population for esophageal, liver, pancreatic, lung and ovarian cancer, by province — 2010–12 fiscal years combined



* PE data suppressed owing to small numbers.
Data source: Canadian Institute for Health Information.

Some notable provincial trends emerged with respect to the number of cancer resections performed (Table 4.i). Of the eight reporting provinces, New Brunswick and Newfoundland and Labrador generally had among the lowest numbers of resections (per 100,000) across cancer sites. In contrast, British Columbia generally fell mid-range or had among the highest numbers of resections (per 100,000) across cancer sites.

TABLE 4.i

Rankings for the number of resections per 100,000 population for esophageal, liver, pancreatic, lung and ovarian cancer, by province — 2010–12 fiscal years combined

Disease site	BC	AB	SK	MB	ON	NB	NS	NL
Esophageal	3.7	3.6	3.9	2.7	3.4	3.1	3.3	1.7
Pancreatic	4.5	7.9	4.0	5.7	5.8	3.5	4.4	4.1
Liver	12.1	14.3	10.7	12.0	12.0	6.9	11.8	10.1
Ovarian	21.1	20.3	22.0	25.5	20.3	20.3	20.2	21.9
Lung	32.1	33.2	34.5	50.5	37.9	58.3	47.8	27.5

First tertile (fewest resections per 100,000)
Second tertile
Third tertile (most resections per 100,000)

Data source: Canadian Institute for Health Information.

Extent of regionalization for high-risk, resource-intensive cancer surgeries in Canada

The volume of resections performed in hospitals varied by cancer site (Table 4.ii). Of the five cancers, lung cancer had the greatest regionalization of surgical procedures. In contrast to lung cancer, there were nearly half as many resections for ovarian cancer, but the resections were performed in three times as many hospitals, with many reporting small annual case volumes.

TABLE 4.ii

Number of resections and hospitals performing resections for esophageal, liver, pancreatic, lung and ovarian cancer, Canada — 2012 treatment year

Disease site	Number of hospitals performing resections	Number of resections
Esophagus	38	334
Pancreas	39	599
Liver	41	1,265
Ovary	147	2,030
Lung	43	3,795

Data source: Canadian Institute for Health Information.

Impact of hospital volume on patient outcomes

An increase in hospital volume for pancreatic, esophageal, lung and ovarian cancer resections was significantly associated with a reduced risk of in-hospital mortality (Table 4.iii). An increase in hospital volume was predicted to have the greatest effect on in-hospital mortality for pancreatic and esophageal cancers, where every 10-case increase in volume predicted a 22% and 21% decreased risk of in-hospital mortality, respectively.

If surgeries for pancreatic, esophageal, liver, ovarian and lung cancers were performed only in high-volume hospitals[h] (assuming the quality of care and outcomes are the same across all high-volume hospitals), a total of 4,775 hospital days could be saved annually. Lung cancer was predicted to have the greatest potential number of hospital days saved annually, at 3,335 (Table 4.iii). In addition, 391 lives could be saved through consolidation of cancer resections in high-volume hospitals. The greatest effect was observed for consolidating lung cancer resections, with a predicted 209 lives potentially saved (Table 4.iii).

[h] A high-volume hospital is defined as a hospital in the highest-volume tertile.

TABLE 4.iii

Impact of hospital volume on outcomes for esophageal, liver, pancreatic, lung and ovarian cancer surgeries, Canada

Disease site	Decrease in risk of in-hospital mortality[†]	Number of hospital days potentially saved[‡]	Number of lives potentially saved[*]
Pancreas	22%	725	89
Esophagus	21%	407	30
Liver	—	308	15
Ovary	7%	—	48
Lung	3%	3,335	209

[†] Decrease in risk of in-hospital mortality for every 10-case increase in hospital volume.

[‡] Number of hospital days potentially saved annually if cancer surgeries were performed in hospitals in the highest-volume tertile.

* Number of lives potentially saved if cancer surgeries performed from 2004–12 were instead performed in hospitals in the highest-volume tertile.

"—" No statistically significant association.

Conclusions

The regionalization of complex surgical procedures has the potential to improve patient outcomes and quality of life. Given the association between hospital volume and outcomes, the current state of ovarian cancer surgical care may be in need of a regionalization effort. The findings presented here and in the full report are intended to inform administrators, health care planners and policy makers about the current state of surgical care and outcomes for high-risk, resource-intensive surgeries; to highlight areas for potential improvement; and to provide recommendations to optimize quality of care.

For the full *Approaches to High-Risk, Resource Intensive Cancer Surgical Care in Canada* report by Finley et al., please visit http://www.cancerview.ca/cv/portal/Home/QualityAndPlanning/QPProfessionals/SystemPlanning/QualityInitiatives/AccessAndQualityCancerSurgery.

Additional Indicators Available on systemperformance.ca

Resection rates for rectal, colon and non-small cell lung cancer

Over 81%
of patients with Stage II or III rectal cancer had a surgical resection

- In the 2012 diagnosis year, the percentage of patients with Stage II or III rectal cancer who had a surgical resection ranged from 81.1% in Newfoundland and Labrador to 100% in New Brunswick, of the five reporting provinces.

Over 85%
of patients with Stage III colon cancer had a surgical resection

- In the 2012 diagnosis year, the percentage of patients with Stage III colon cancer who had a surgical resection ranged from 85.7% in Saskatchewan to 100% in Prince Edward Island, of the five reporting provinces.

Over 33%
of patients with Stage II or IIIA NSCLC had a surgical resection

- In the 2012 diagnosis year, the percentage of patients with Stage II or IIIA non-small cell lung cancer (NSCLC) who had a surgical resection ranged from 33.1% in Saskatchewan to 41.6% in Manitoba and New Brunswick, of the five reporting provinces.

Post-operative radiation therapy for Stage I or II breast cancer

Over 71%
of patients with Stage I or II breast cancer received radiation therapy following breast-conserving surgery

- In the 2012 diagnosis year, the percentage of patients with Stage I or II breast cancer who received radiation therapy following breast-conserving surgery (BCS) ranged from 71.5% in Saskatchewan to 89.3% in Newfoundland and Labrador, of the six reporting provinces.
- Patients aged 18–69 were almost twice as likely to receive radiation following BCS than were patients aged 80 or older.

Post-operative chemotherapy for Stage III colon cancer patients

Over 57%
of Stage III colon cancer patients received chemotherapy following surgical resection

- In the 2012 diagnosis year, the percentage of patients with Stage III colon cancer who received chemotherapy following surgical resection ranged from 57.5% in Manitoba to 65.6% in Saskatchewan, of the four reporting provinces.
- Patients aged 18–59 were more than three times more likely to receive post-operative chemotherapy than were patients aged 80 or older.

Data source: Provincial cancer agencies and programs.

5. Person-Centred Perspective

5. Person-Centred Perspective

In recent years, there has been an emphasis on transforming the health system from delivering disease-centred care to a more person-centred model.[79] The core components of person-centred care are dignity, respect, communication and information sharing, collaboration and participation.[80] As it is currently defined within the health care system, person-centred care is driven by the individual needs, values and priorities of those receiving the care and their families/caregivers, within the parameters of clinical evidence and quality. Embedding the person-centred perspective into cancer care involves intentional planning and delivery of care based on the experiences and perspectives of people affected by cancer.

Although progress has been made, the person-centred perspective is an emerging and thus under-measured area of research and practice. For the purposes of this report, and based on information available at the provincial level, we focus on the following indicator, which is reported on an annual basis: the use of a standardized "screening for distress" tool. The introduction of this measurement tool is the initial step in identifying distress and implementing an appropriate response to the distress scores. This type of program reflects efforts within provinces to achieve more person-centred cancer care.

The Partnership is working with cancer control partners to develop a common, systematic way to collect and report on both patient-reported outcomes and patient-reported experiences, to develop quality indicators for palliative care and to study how people with cancer transition back to primary health care after cancer treatment. It is anticipated that as indicators are developed and used, the data will be reported across the country.

Key findings related to the following Person-Centred Perspective indicator that is reported on periodically are also included in this chapter: place of death. Full information on this additional indicator can be found at systemperformance.ca.

Indicator	Summary of results
Screening for distress	• In 2015, seven of the 10 reporting provinces had implemented province-wide, provincially coordinated standardized tools to screen for distress in cancer centres, with findings reported centrally. In 2007, only 2 provinces reported province-wide implementation.

Screening for Distress

Key Message

There was more than a threefold increase in the number of provinces reporting province-wide implementation of standardized screening for distress tools in cancer centres from 2007 to 2015.

Indicator Definition

The extent to which provincial cancer agencies and programs have implemented standardized tools to screen for distress as of 2015. The results are reported by province.

Measured Since

The 2009 *Cancer System Performance Report*.

7 of 10

provinces have implemented province-wide, provincially coordinated, standardized screening for distress tools in cancer centres

Why measure this?

In people with cancer, distress is generally defined as an unpleasant emotional experience or experiences. It is related to psychological, social, spiritual, practical or physical concerns that may negatively affect a person's ability to cope with cancer and its treatment.[81] Late identification of distress in cancer patients has been associated with negative outcomes, including poorer adherence to treatment recommendations, lower levels of satisfaction with care and poorer self-reported quality of life.[82-85] Screening for distress at various points in the patient journey can be useful in customizing interventions that address patients' changing needs, which may improve quality of life.

What are the key findings?

- In 2015, seven of the 10 reporting provinces had implemented province-wide, provincially coordinated, standardized screening for distress tools in cancer centres, with findings reported centrally (Table 5.1). In 2007, only two provinces reported province-wide implementation (data not shown).
- In 2014, Newfoundland and Labrador had not implemented provincially coordinated, standardized screening for distress (data not shown). In 2015, however, the province had partially implemented standardized screening for distress that is provincially coordinated (Table 5.1).

TABLE 5.1

Level of implementation of standardized screening for distress tools, by province — 2015

Province	Province-wide implementation (provincially coordinated and centrally reported)	Partial implementation (provincially coordinated)	Not provincially coordinated (some local use possible)
British Columbia	✓		
Alberta	✓		
Saskatchewan	✓		
Manitoba	✓		
Ontario	✓		
Quebec		✓	
New Brunswick			✓
Nova Scotia	✓		
Prince Edward Island	✓		
Newfoundland and Labrador		✓	

Table reflects the level of standardized screening for distress across the country. It does not reflect the number of cancer patients actually screened for distress or the proportion of patients screened in each province.

Data source: Provincial cancer agencies and programs.

Why do these findings matter?

Routine screening for distress can help identify cancer patients' psychological, social, spiritual, practical or physical concerns. The Edmonton Symptom Assessment System (ESAS) is the most frequently used self-report screening instrument in Canada. It measures nine commonly reported symptoms (pain, tiredness, nausea, depression, anxiety, drowsiness, appetite, lack of well-being and shortness of breath).[86] Another tool in common use to screen for problems or concerns of cancer patients is the Canadian Problem Checklist.[86]

Routine screening alone, however, is not sufficient for addressing the needs of cancer patients. To have a positive impact on patient well-being, screening must be accompanied by adequate follow-up and intervention as required (e.g., further assessment, change in care plans, physical and psychosocial intervention, referral to another practitioner and ongoing monitoring of symptoms).[81,87] It is also important to evaluate the effectiveness of these programs within specific clinical settings, as well as their impact on identifying patient needs. Future measurement efforts will focus on the percentage of patients using the tools, the results of the assessments and the extent to which patient-reported symptoms are reduced as a result of management efforts by providers.

Additional Indicator Available on systemperformance.ca

Place of death

50–89%

of cancer patients died in hospital

- For cancer patients who died in 2011, between 49.8% (British Columbia) and 89.4% (Manitoba) died in hospital.
- The percentage of cancer patients who died in hospital decreased from 71.5% in 2007 to 67.9% in 2011.

Data source: Statistics Canada, Vital Statistics Death Database.

6. Research

6. Research

Patients who take part in clinical trials are contributing to the development and evolution of evidence-based cancer care. Clinical trials are essential for evaluating the safety and efficacy of new therapies. Over time, this research could lead to better options for screening, diagnosis, treatment and after-care, as well as improved outcomes for those affected by cancer today and in the future.

This chapter presents a Research indicator that is a proxy measure of clinical research activity and is reported on an annual basis: the adult clinical trial participation ratio.

Key findings related to the following Research indicators that are reported on periodically are also included in this chapter: pediatric clinical trial participation and cancer research investment. Full information on these additional indicators can be found at systemperformance.ca.

Indicator	Summary of results
Adult clinical trial participation	• In the 2014 enrolment year, the clinical trial participation ratio ranged from 0.002 (interpretable as 0.2% of cancer patients enrolled in trials) in Newfoundland and Labrador to 0.066 (6.6%) in Alberta. Compared with 2013, the clinical trial participation ratio increased in five of eight reporting provinces—British Columbia, Alberta, Saskatchewan, Manitoba and Ontario. • The clinical trial participation ratios for the four most common disease sites ranged from 0.011 (interpretable as 1.1% of cancer patients enrolled in trials) for lung cancer to 0.041 (4.1%) for breast cancer. Compared with 2013, the clinical trial participation ratios have decreased for breast, prostate and lung cancers and remained the same for colorectal cancer.

Adult Clinical Trial Participation

Key Message

Clinical trial participation increased in five of eight reporting provinces from 2013 to 2014.

Indicator Definition

The ratio of cancer patients aged 19 years or older who were newly enrolled in Phase 1 to 4 clinical trials[i] (e.g., cancer-related therapeutic clinical trials or clinical research studies) at provincial cancer centres in 2014 to the estimated number of new cancer cases in 2014. Results are reported by province and disease site.

Measured Since

The 2010 *Cancer System Performance Report*.

0.2–7%

range across provinces of adult clinical trial participation

1% vs 4%

of lung cancer vs. breast cancer patients participated in clinical trials

14%

of adult cancer patients participated in clinical trials in the United Kingdom

Why measure this?

Patients who are treated in cancer centres with active clinical trial programs tend to have better health outcomes (e.g., improved survival and quality of life) than those treated in centres that do not participate in clinical trials. This finding is likely due to better processes and delivery of care, including treatment guideline concordance.[90-93]

The cancer clinical trials system in Canada is facing difficulties for several reasons. These factors include increasing clinical trial complexity, a more onerous regulatory environment and increasing workloads for research ethics boards.[94] In addition, although the number of cancer clinical trials opened per year remained the same or grew from 2000 to 2010, patient enrolment per year has plateaued or decreased.[94] Comparing clinical trial participation across the country can identify opportunities for action.

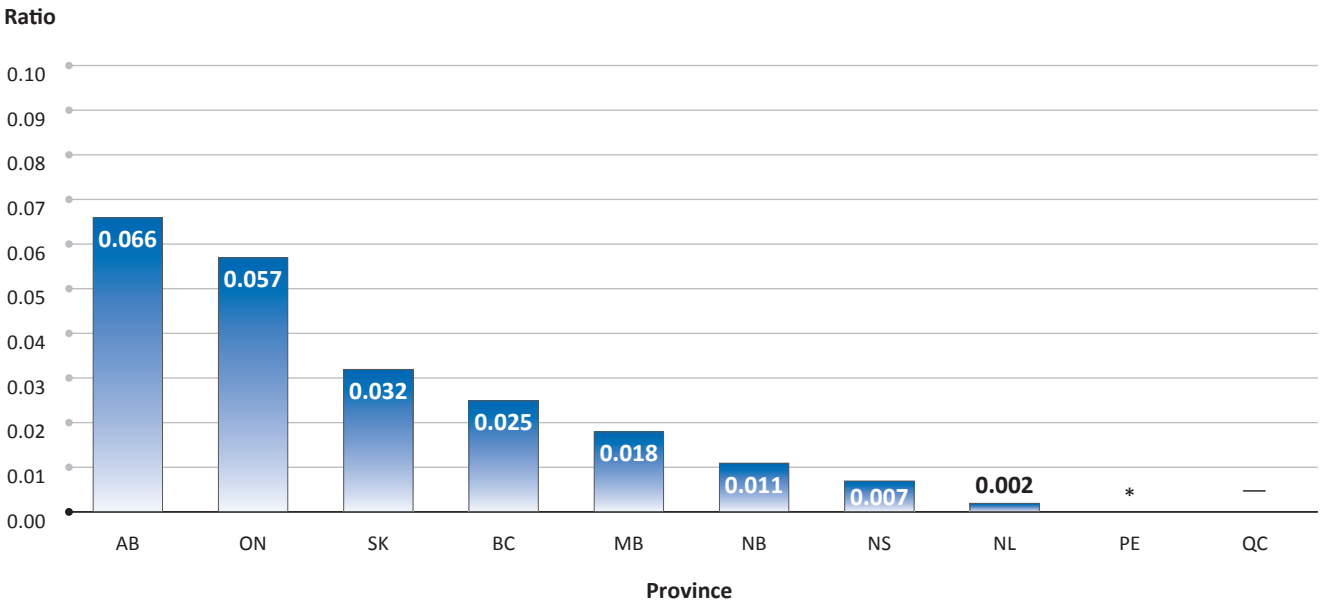
[i] Phase 1 trials are intended to measure safety and adverse effects of new drugs or treatments. Phase 2 trials continue to measure safety and further evaluate the effectiveness of drugs or treatments. Phase 3 and 4 trials are key to improving the health outcomes of enrolled patients. They are intended to evaluate side effects and associated long-term outcomes.[88,89]

What are the key findings?

- In the 2014 enrolment year, the clinical trial participation ratio ranged from 0.002 (interpretable as 0.2%[j]) in Newfoundland and Labrador to 0.066 (6.6%) in Alberta (Figure 6.1). Compared with 2013, the clinical trial participation ratio increased in five of eight reporting provinces—British Columbia, Alberta, Saskatchewan, Manitoba and Ontario (data not shown).
- The clinical trial participation ratios for the four most common disease sites ranged from 0.011 (1.1%) for lung cancer to 0.041 (4.1%) for breast cancer (Figure 6.2). Compared with 2013, the clinical trial participation ratios have decreased for breast, prostate and lung cancers and remained the same for colorectal cancer (data not shown).

FIGURE 6.1

Ratio of adult patients enrolled in clinical trials to number of incident cases, by province, all cancers — 2014 enrolment year



* Suppressed owing to small numbers.

"—" Data not available.

The Canadian Cancer Society's (CCS) projected 2014 cancer incident cases were used for this indicator. CCS projections are derived from statistical models incorporating data obtained from the Canadian Cancer Registry, National Cancer Incidence Reporting System, Canadian Vital Statistics' Death Database, and population life tables, censuses and forecasts.

The indicator is a ratio, not a rate. As such, the numerator is not a complete subset of the denominator. Cases included in the numerator could have been diagnosed in previous years or could be recurrent cases.

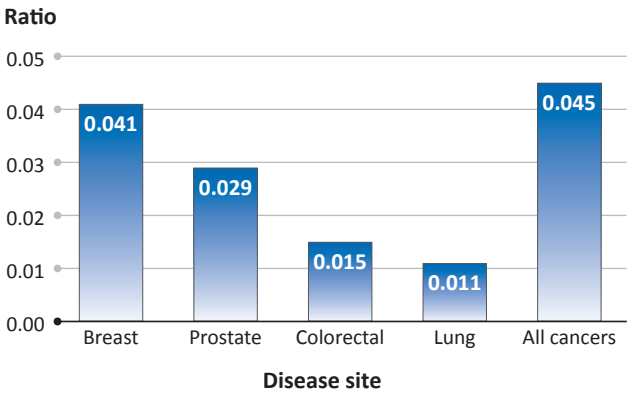
AB: Includes non-intervention cases.

Data source: Provincial cancer agencies and programs; Canadian Cancer Society, Canadian Cancer Statistics.

[j] As a proxy for the actual clinical trial participation rate, the results of this indicator can (for convenience only) be interpreted as percentages (e.g., 0.05 = 5%).

FIGURE 6.2

Ratio of adult patients enrolled in clinical trials to number of incident cases, by disease site, four most common cancers and all cancers combined — 2014 enrolment year



Data for four most common cancers are from BC, AB, SK, MB, NB, NS and NL.

Data for all cancers are from BC, AB, SK, MB, ON, NB, NS and NL.

The Canadian Cancer Society's (CCS) projected 2014 cancer incident cases were used for this indicator. CCS projections are derived from statistical models incorporating data obtained from the Canadian Cancer Registry, National Cancer Incidence Reporting System, Canadian Vital Statistics' Death Database, and population life tables, censuses and forecasts.

The indicator is a ratio, not a rate. As such, the numerator is not a complete subset of the denominator. Cases included in the numerator could have been diagnosed in previous years or could be recurrent cases.

Data source: Provincial cancer agencies and programs; Canadian Cancer Society, Canadian Cancer Statistics.

Why do these findings matter?

Clinical trials are an essential step in evaluating the safety and effectiveness of emerging cancer treatments. They are also useful for identifying new ways to detect, diagnose and reduce the risk of cancer. Patients who take part in clinical trials contribute to the development and evolution of evidence-based cancer care. This research could lead to more and better options for screening, diagnosis, treatment and after-care, as well as improved outcomes for those affected by cancer.

Evidence suggests that cancer centres with active clinical trial programs have better patient outcomes, such as improved survival.[90-93] However, participant enrolment is the biggest barrier to completing clinical trials.[95] The results presented here show that less than 7% of adults take part in clinical trials in Canada, which is similar to other countries, such as the United States.[96] Comparing clinical trial participation across the country may be helpful in identifying opportunities for action. For example, provinces with higher clinical trial participation could share their experiences with improving accrual into cancer clinical trials.

How does Canada stack up internationally?

In the United States, the National Cancer Institute has estimated that fewer than 5% of adult cancer patients participate in clinical trials.[96] In contrast, the United Kingdom had the highest rate of cancer clinical trial participation worldwide. The National Cancer Research Network was established in the United Kingdom in 2001 to enhance recruitment to trials and to other patient-centred research; its creation produced a doubling in clinical trial participation.[97] In 2006, approximately 14% of adults diagnosed with cancer in the United Kingdom participated in cancer trials.

In Canada, the Canadian Cancer Clinical Trials Network (3CTN) was founded in 2013 to coordinate clinical trial centres. The goal of the initiative is to improve patient access to academic clinical trials, to improve the environment for the conduct of academic clinical trials through collaboration and facilitation of important national trial initiatives, and to demonstrate the impact of the Network and academic trials on the Canadian health system.[98]

Additional Indicators Available on systemperformance.ca

Pediatric clinical trial participation

19–57%

range across provinces of pediatric clinical trial participation

- In the 2014 enrolment year, the ratio of pediatric patients enrolled in clinical trials to newly registered cancer centre patients ranged from 0.191 (interpretable as 19.1%) in British Columbia to 0.571 (57.1%) in Manitoba.
- Pediatric clinical trial participation decreased in five of eight reporting provinces from 2011 to 2014.

Data source: C[17] Council of Canadian Pediatric Oncology Programs.

Cancer research investment

51%

of cancer research investment went to the four most common cancers: breast, prostate, colorectal and lung

- In 2013, half (50.8%) of cancer research investment was allocated to breast, prostate, lung and colorectal cancers; the percentage of cancer research investment ranged from 5.9% for lung cancer to 25.7% for breast cancer.
- Of the four most common cancers, breast cancer had the second lowest mortality rate but the greatest research investment. In contrast, lung cancer had the highest mortality rate but the smallest research investment.

Data source: Canadian Cancer Research Alliance.

7. Appropriateness

7. Appropriateness

As with health care in general, decisions on the delivery of cancer control services should be based on providing value-based care, which can help improve quality while contributing to the sustainability of health care. High-value care is care that provides the best outcomes (e.g., patients receive care that is supported by evidence, is truly necessary and is guided by patient preferences) with the appropriate level of resource use. This concept is especially important given that many patients are receiving medical tests, treatments and procedures that are of low value and are potentially harmful, and that the growing and aging population and rising costs of cancer therapies are putting increasing pressure on the sustainability of the health care system.

This chapter presents information on two Appropriateness indicators that are reported on an annual basis: breast cancer screening outside of guidelines and breast cancer mastectomies done as day surgery.

Key findings related to the following Appropriateness indicator that is reported on periodically are also included in this chapter: intensive care unit use in the last two weeks of life. Full information on this additional indicator can be found at systemperformance.ca.

Indicator	Summary of results
Breast cancer screening outside of guidelines	• Between 14% (Yukon) and 38% (Northwest Territories) of self-reported screening mammograms performed in the previous 2 years were on women outside the guideline-recommended age range of 50–74 years (2012 data).
Breast cancer mastectomies done as day surgery	• Between April 2009 and March 2014, between 1% (Alberta) and 39% (New Brunswick) of mastectomies were performed as day surgery. • In 8 of 9 reporting provinces, the percentage of mastectomies performed as day surgery increased from 2008/09-2010/11 to 2011/12-2013/14.

Breast Cancer Screening Outside of Guidelines

Key Message

A considerable proportion of screening mammograms were performed in women outside of the target age range recommended in the CTFPHC guidelines (age 50–74).

Indicator Definition

The percentage of self-reported screening mammograms performed on women within and outside of the target age range recommended in the Canadian Task Force on Preventive Health Care (CTFPHC) guidelines (ages 50–74).[k] The indicator includes mammograms performed in the previous two years on asymptomatic women. Results are presented by province/territory using data from the 2012 Canadian Community Health Survey.

Measured Since

The 2014 *Cancer System Performance Report*.

The indicator definition was changed in 2015 to include women younger than 50 or older than 75 (rather than women aged 75 or older only), thus looking at all breast cancer screening outside of the guideline-recommended age range.

25%

of screening mammograms were performed outside of the guideline-recommended age range

14–38%

range of provincial/ territorial results for the percentage of screening mammograms performed outside of the guideline-recommended age range

Why measure this?

Screening mammography has been shown to reduce breast cancer mortality and morbidity associated with advanced cancer, but the evidence of benefit is strongest for women between the ages of 50 and 74.[99] While there is evidence of the benefit of screening on breast cancer mortality, it is essential to balance this benefit with potential harms, namely false positive results, over-diagnosis, over-treatment and financial costs to both the system and the patient.[42,99,100] Guidelines from the CTFPHC recommend that women aged 50–74 years at average risk for breast cancer be routinely screened using mammography every two to three years.[42] Adherence to evidence-informed screening guidelines maximizes the benefits of screening while offsetting the harms caused by unnecessary interventions.

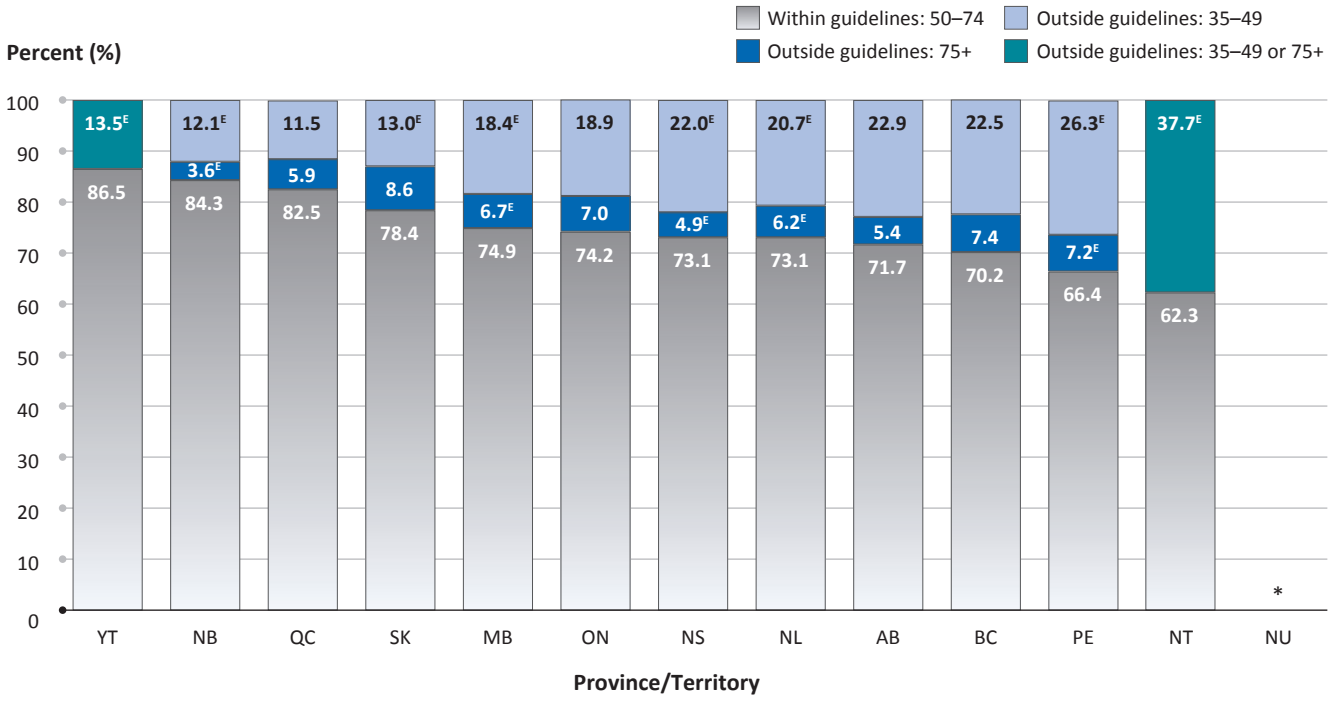
[k] This indicator does not distinguish between women at higher-than-average risk and women of average risk. Because of this, for some women captured in these results, screening may be appropriate.

What are the key findings?

- The percentage of self-reported screening mammograms performed in the previous two years on women outside the guideline-recommended age range (ages 50–74) varied widely, from 13.5% in Yukon to 37.7% in the Northwest Territories (2012 data) (Figure 7.1).
- More screening mammograms were performed in women aged 35–49 than in women aged 75 or older (from 11.5% in Quebec to 26.3% in Prince Edward Island and from 3.6% in New Brunswick to 8.6% in Saskatchewan, respectively) (Figure 7.1).

FIGURE 7.1

Percentage of self-reported screening mammograms performed in asymptomatic† women within and outside the recommended target age range for screening in the past two years, by province/territory — 2012 reporting year



† An asymptomatic woman is deemed to have had screening mammography if her reason for undergoing a mammogram was one of the following: family history of breast cancer, regular check-up/routine screening, age or current use of hormone replacement therapy.

E Interpret with caution owing to large variability in the estimate.

* Suppressed owing to small numbers.

Data source: Statistics Canada, Canadian Community Health Survey.

Why do these findings matter?

A considerable proportion of screening mammograms were performed on women outside the guideline-recommended age range of 50–74 years in some provinces/territories, though there is large variability across the country. While organized breast cancer screening programs, which exist in all Canadian provinces and territories except Nunavut, invite women of average risk aged 50–69 years to undergo breast cancer screening by mammography every two years, program guidelines vary in their acceptance and screening of women who are in their 40s or over age 75.[43] Women may also access mammographic screening without going through a provincial program (also known as opportunistic screening), which means that they may not be subject to the same guidelines and eligibility that govern provincial programs and may differ in their characteristics. This practice may contribute to some variability.

The goal is not to eliminate all screening outside of the 50–74 age group, particularly in women aged 40–49, but to ensure that mammography resources are being targeted to those who truly need them–that is, women at high risk of developing breast cancer. Understanding interprovincial/territorial differences in the use of screening mammography outside guideline-recommended age groups may identify ways to streamline screening practices across the country to better align with guidelines and provide opportunities for balancing resource allocation in some provinces/territories, while also reducing unnecessary and potentially harmful interventions that could cause women emotional distress.

While adherence to guidelines is important from a population health and systems planning perspective, it is important that individual women have the appropriate information to enable them to decide whether or not to undergo screening mammography, particularly if they are outside the age range where benefits are clear and are judged to outweigh the potential harms of screening. Women can be given this information through an informed decision-making approach, wherein women and their doctors discuss the harms and benefits of screening, as well as patient preferences.[42]

Breast Cancer Mastectomies Done as Day Surgery

Key Message

Substantial variations exist, with a 38 percentage point difference between the provinces with the lowest and highest percentages of mastectomies performed as day surgery. However, the percentage of same-day mastectomy has increased over time in most provinces.

Indicator Definition

The percentage of mastectomies for breast cancer tumour resection that were done as day surgery. The data include women with unilateral invasive breast cancer whose surgery occurred between April 2008 and March 2014 and are reported by province.

Measured Since

The 2014 *Cancer System Performance Report*.

1–39%

range across provinces of the percentage of mastectomies performed as day surgery

8 of 9

provinces increased the percentage of mastectomies performed as day surgery

Why measure this?

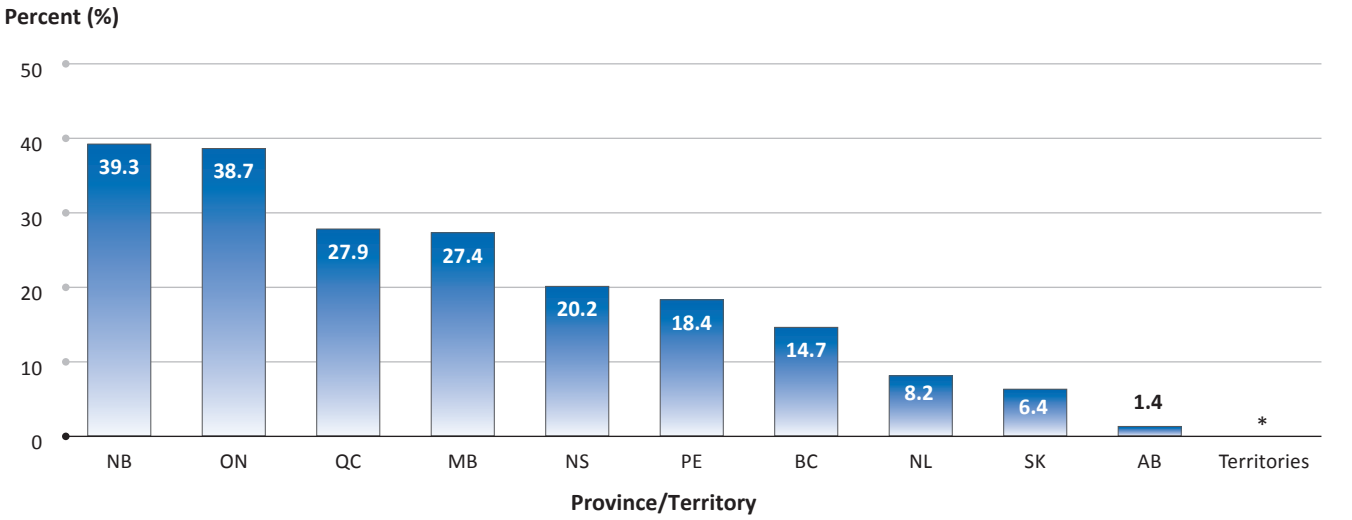
Mastectomy is one of the standard curative treatments for women with resectable breast cancer. Although this procedure is relatively invasive, mastectomy can now be safely performed in an outpatient setting as same-day surgery.[101] Outpatient mastectomy has been associated with high patient satisfaction and psychological well-being.[102] In addition, shifting from inpatient to outpatient surgery for women undergoing mastectomy would yield a reduction in system costs and free up inpatient capacity. Measuring the percentage of mastectomies being performed as day surgery across provinces allows us to detect variations in practice, which could help identify opportunities for improving patient experience and reducing system costs by avoiding inpatient stays for patients who could safely recover at home.

What are the key findings?

- Between April 2009 and March 2014, between 1.4% (Alberta) and 39.3% (New Brunswick) of mastectomies were performed as day surgery (Figure 7.2).
- In eight of the nine reporting provinces, the percentage of mastectomies performed as day surgery increased from 2008/09–2010/11 to 2011/12–2013/14[I] (Figure 7.3).
- The percentage of day surgery for mastectomy increased from 29.6% in 2008/09–2010/11 to 46.9% in 2011/12–2013/14 in New Brunswick—the greatest increase among reporting provinces (Figure 7.3).

FIGURE 7.2

Percentage of breast cancer mastectomies done as day surgery, by province/territory — from 2009/10 to 2013/14 fiscal years combined



* Suppressed owing to small numbers.

SK: Data are for 2010/11–2013/14. Data for 2009/10 are suppressed owing to small numbers and could not be used for calculation.

PE: Data are for 2013/14. Data for 2009/10–2012/13 are suppressed owing to small numbers and could not be used for calculation.

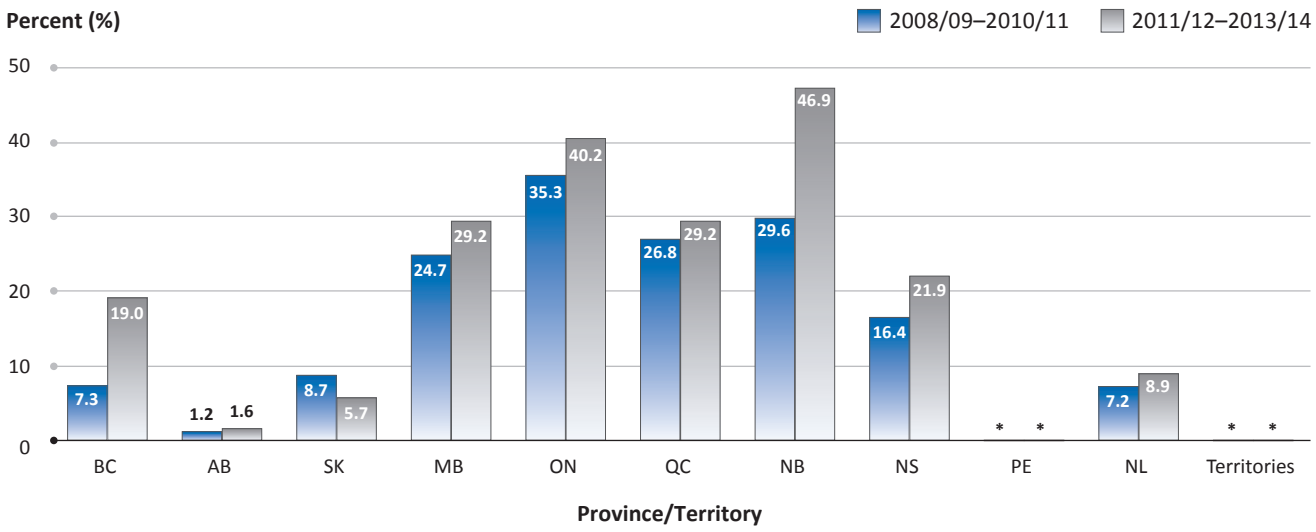
Territories include Yukon, Northwest Territories and Nunavut.

Data source: Canadian Institute for Health Information, Hospital Morbidity Database, National Ambulatory Care Reporting System; Alberta Health and Wellness, Alberta Ambulatory Care Reporting System.

[I] The period 2008/09–2010/11 refers to April 2008 to March 2011. The period 2011/12–2013/14 refers to April 2011 to March 2014.

FIGURE 7.3

Percentage of breast cancer mastectomies done as day surgery, by province/territory — 2008/09–2010/11 vs. 2011/12–2013/14 fiscal years combined



* Suppressed owing to small numbers.

SK: Data for 2008/09–2010/11 include only 2010. Data for 2008/09 and 2009/10 were suppressed owing to small numbers and could not be used for the calculation.

Territories include Yukon, Northwest Territories and Nunavut.

Data source: Canadian Institute for Health Information, Hospital Morbidity Database, National Ambulatory Care Reporting System; Alberta Health and Wellness, Alberta Ambulatory Care Reporting System.

Why do these findings matter?

There was a 38 percentage point difference between the provinces with the lowest and highest reported use of mastectomies as day surgery. Although both inpatient and outpatient mastectomies can be appropriate, same-day surgeries may have important implications for patient experience and resource use. Studies have shown that women who undergo mastectomy as day surgery likely have better physical and psychological recovery post surgery.[102] This may be because many patients prefer to recover at home and benefit from the psychological boost of early discharge.[103] Same-day surgery for breast cancer has also been linked to better satisfaction with care because of the perceived better continuity of care.[104]

There may also be a lower risk of exposure to hospital-acquired infection since the patient spends less time in the hospital. In addition, as long as similar or better patient outcomes are obtained, providing same-day surgeries could free up capacity for inpatient care.

It is important to note that not all mastectomies can be done as day surgery. The presence of comorbid conditions, post-surgical complications or lack of support for recovery at home may make mastectomies performed in an inpatient setting more appropriate for some patients.

Additional Indicator Available on systemperformance.ca

Intensive care use in the last two weeks of life

6–16%

of cancer patients were admitted to an ICU in the last 2 weeks of their life

- From April 2011 to March 2015, between 5.8% (Nova Scotia) and 15.9% (territories) of cancer patients received care in an intensive care unit (ICU) in the last two weeks of life.
- Of cancer patients admitted to an ICU, between 3.7% (Nova Scotia) and 12.4% (territories) also died in the ICU.

Data source: Canadian Institute for Health Information, Discharge Abstract Database.

8. Long-Term Outcomes

8. Long-Term Outcomes

Cancer control efforts are focused on a number of key outcomes: reducing the number of people diagnosed with cancer (incidence), lowering the number of deaths from cancer (mortality) and extending the length of time people live after a cancer diagnosis (survival), as well as improving the quality of life for those affected by cancer.

In this chapter, data on incidence (including incidence rates by stage) and mortality are presented for the five highest-mortality cancers: breast, lung, colorectal, prostate and pancreatic. Ovarian cancer has been added as an additional indicator for 2016. Also included in this chapter is a special feature presenting a look at survival by income in Canada for select cancers.

Indicator	Summary of results
Breast cancer	• While ASIRs remained stable, mortality rates have decreased steadily since the early 1990s. • Breast cancer was most commonly diagnosed at Stage I or II. • The lowest ASMRs for breast cancer were in British Columbia; the highest were in Newfoundland and Labrador.
Lung cancer	• ASIRs and ASMRs for lung cancer have decreased for men since the early 1990s. • The previously increasing trend in incidence for women appears to be levelling off in recent years, signalling a future downturn in lung cancer burden in women. • Lung cancer was most commonly diagnosed at Stage IV. • The lowest ASMRs for lung cancer were in British Columbia; the highest were in Quebec.
Colorectal cancer	• ASIRs and ASMRs for colorectal cancer have decreased for both men and women since the early 1990s. • Colorectal cancer was most commonly diagnosed at Stage III. • The lowest ASMRs for colorectal cancer were in Alberta; the highest were in Newfoundland and Labrador.
Prostate cancer	• ASIRs and ASMRs for prostate cancer have decreased since the early 1990s. • Prostate cancer was most commonly diagnosed at Stage II. • The lowest ASMRs for prostate cancer were in Quebec; the highest were in Saskatchewan.
Pancreatic cancer	• ASMRs for pancreatic cancer have decreased since the early 1990s for both men and women; however, a significant decreasing trend in incidence rates was seen only among men. • The lowest ASMRs for pancreatic cancer were in Newfoundland and Labrador; the highest were in New Brunswick.
Ovarian cancer	• ASIRs for ovarian cancer have decreased since the early 1990s, while mortality rates have remained relatively stable. • Ovarian cancer was most commonly diagnosed at Stage III. • The lowest ASMRs for ovarian cancer were in Prince Edward Island; the highest were in Nova Scotia.

ASIR = age-standardized incidence rate; ASMR = age-standardized mortality rate

Breast Cancer

Key Message

Breast cancer incidence rates have been stable in Canada since 1992, though mortality due to breast cancer has been declining.

Indicator Definition

Measures:

1) Age-standardized incidence rates
2) Stage-specific incidence rates
3) Age-standardized mortality rates

Results are presented over time and by province.

Measured Since

Breast cancer incidence and mortality rates have been measured since the 2009 *Cancer System Performance Report*. Stage-specific incidence has been measured since the 2015 *Cancer System Performance Report.*

14%

fewer breast cancer cases in Newfoundland and Labrador than Prince Edward Island

34%

fewer breast cancer deaths in British Columbia than Newfoundland and Labrador

40%

of breast cancer cases diagnosed at Stage I

Why measure this?

Breast cancer is currently the most common cancer diagnosed in Canadian women, representing 26% of new cancer cases in females in 2015. It is the second leading cause of death due to cancer in women. The burden of female breast cancer is projected to grow from 25,000 cases in 2015 to 31,255 cases by 2028–32, a relative increase of 25%.[1]

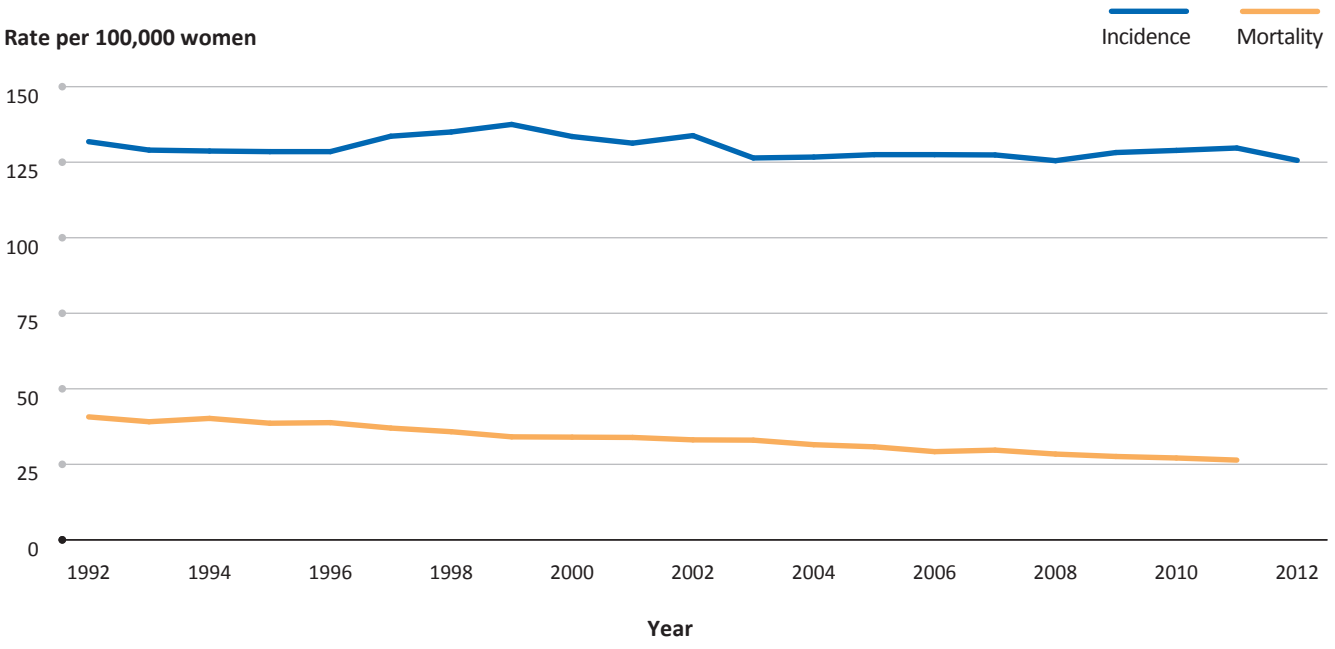
What are the key findings?

- The age-standardized incidence rate (ASIR) for breast cancer in Canada remained relatively stable from 1992 to 2012 at around 130 cases per 100,000 females (annual percent change [APC] = −0.2%; overall relative change = −4.7%). The age-standardized mortality rate (ASMR) declined significantly from 1992 to 2011, from 40.7 deaths per 100,000 females to 26.4 deaths per 100,000 females (APC = −2.3%; overall relative change = −35.1%) (Figure 8.1).

- The relative difference between the lowest and highest provincial ASIRs was 14.1% (2010–12 combined). ASIRs ranged from 120.6 cases per 100,000 females in Newfoundland and Labrador to 137.6 cases per 100,000 females in Prince Edward Island (Figure 8.2).
- ASMRs ranged from 23.9 deaths per 100,000 females in British Columbia to 31.9 deaths per 100,000 females in Newfoundland and Labrador for 2009–11 combined, a 33.5% relative difference (Figure 8.3).
- The ASIRs for Stage I and II breast cancer were higher than those for Stage III and IV in all provinces (2011–13 combined). Stage I incidence ranged from 72.0 cases per 100,000 females in New Brunswick to 87.0 cases per 100,000 females in Prince Edward Island, a 20.8% relative difference. Stage IV incidence ranged from 8.0 cases per 100,000 females in British Columbia and New Brunswick to 11.0 cases per 100,000 females in Saskatchewan, Manitoba, Nova Scotia and Prince Edward Island, a 37.5% relative difference (Figure 8.4).

FIGURE 8.1

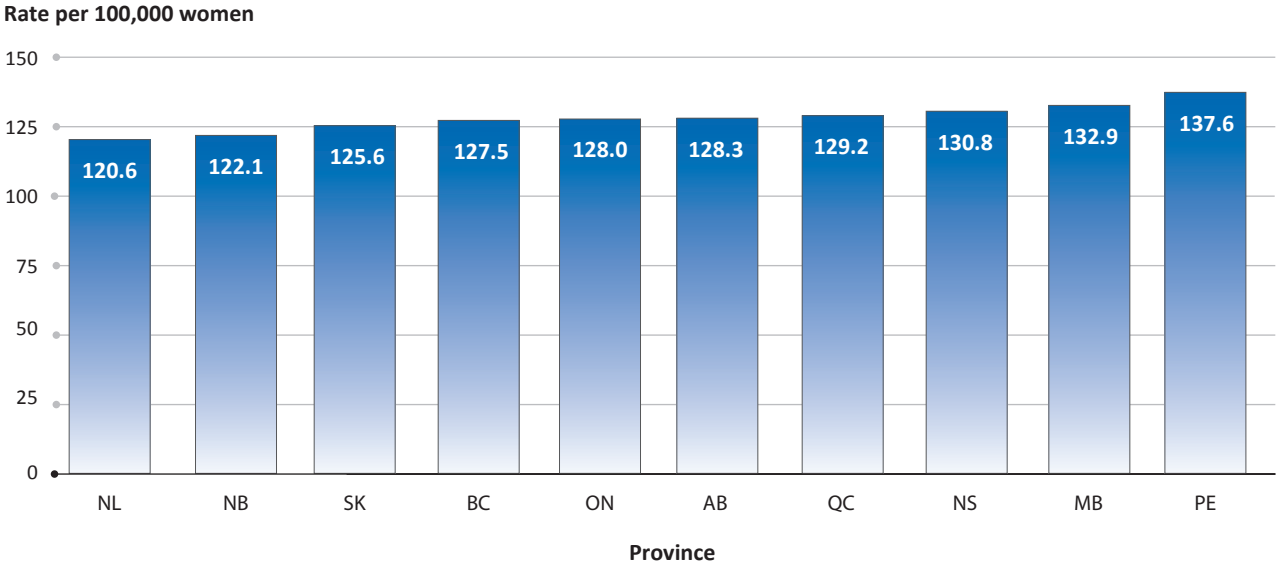
Incidence and mortality rates for breast cancer in women, Canada, age-standardized to the 2011 Canadian population — from 1992 to 2012



Data source: Statistics Canada, Canadian Cancer Registry and Vital Statistics Death Database.

FIGURE 8.2

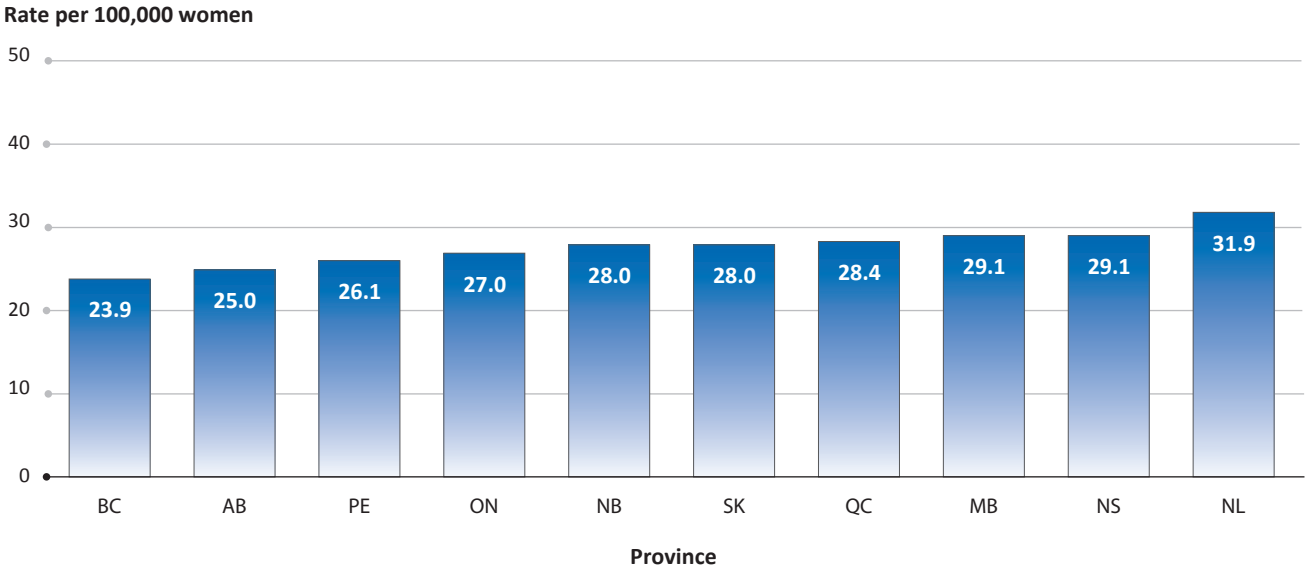
Incidence rates for breast cancer in women, by province, age-standardized to the 2011 Canadian population — 2010–12 combined



Data source: Statistics Canada, Canadian Cancer Registry.

FIGURE 8.3

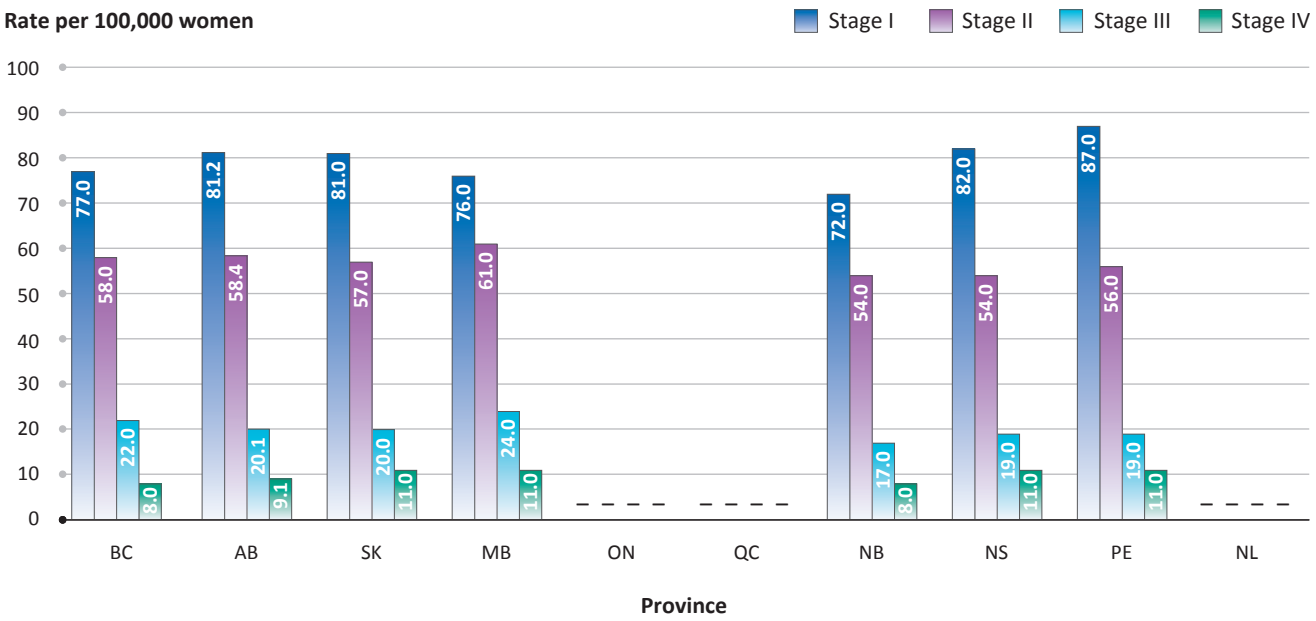
Mortality rates for breast cancer in women, by province, age-standardized to the 2011 Canadian population — 2009–11 combined



Data source: Statistics Canada, Vital Statistics Death Database.

FIGURE 8.4

Incidence rates for breast cancer in women, by stage at diagnosis and province, age-standardized to the 2011 Canadian population — 2011–13 diagnosis years combined



"—" Data not available.
Data source: Provincial cancer agencies and programs.

Why do these findings matter?

Despite a declining mortality rate, breast cancer remains a major burden and significant cause of death for Canadian women. It is likely that improvements in uptake of screening mammography across Canada, as well as more effective treatment, have contributed to the significant decline in mortality that occurred between 1992 and 2011. Effective screening and treatment practices will continue to play a role in the future, as the number of breast cancer cases is projected to increase as a result of the aging of the Canadian population.[1]

Lung Cancer

Key Message

Lung cancer mortality has been declining in men since 1992 but continues to increase in women.

Indicator Definition

Measures:

1) Age-standardized incidence rates
2) Stage-specific incidence rates
3) Age-standardized mortality rates

Results are presented over time and by province.

Measured Since

Lung cancer incidence and mortality rates have been measured since the 2009 *Cancer System Performance Report*. Stage-specific incidence has been measured since the 2015 *Cancer System Performance Report*.

59%
fewer lung cancer cases for males in British Columbia than Quebec

42%
fewer lung cancer cases for females in Newfoundland and Labrador than Nova Scotia

43%
fewer lung cancer deaths in British Columbia than Quebec

50%
of lung cancer cases diagnosed at Stage IV

Why measure this?

Lung cancer is the most commonly diagnosed cancer in Canada. It is the leading cause of death due to cancer in both men and women. Even though incidence rates are declining, the burden of lung cancer is projected to grow from 26,600 new cases in 2015 to 32,365 new cases by 2028–32, a relative increase of 22%.[1]

What are the key findings?

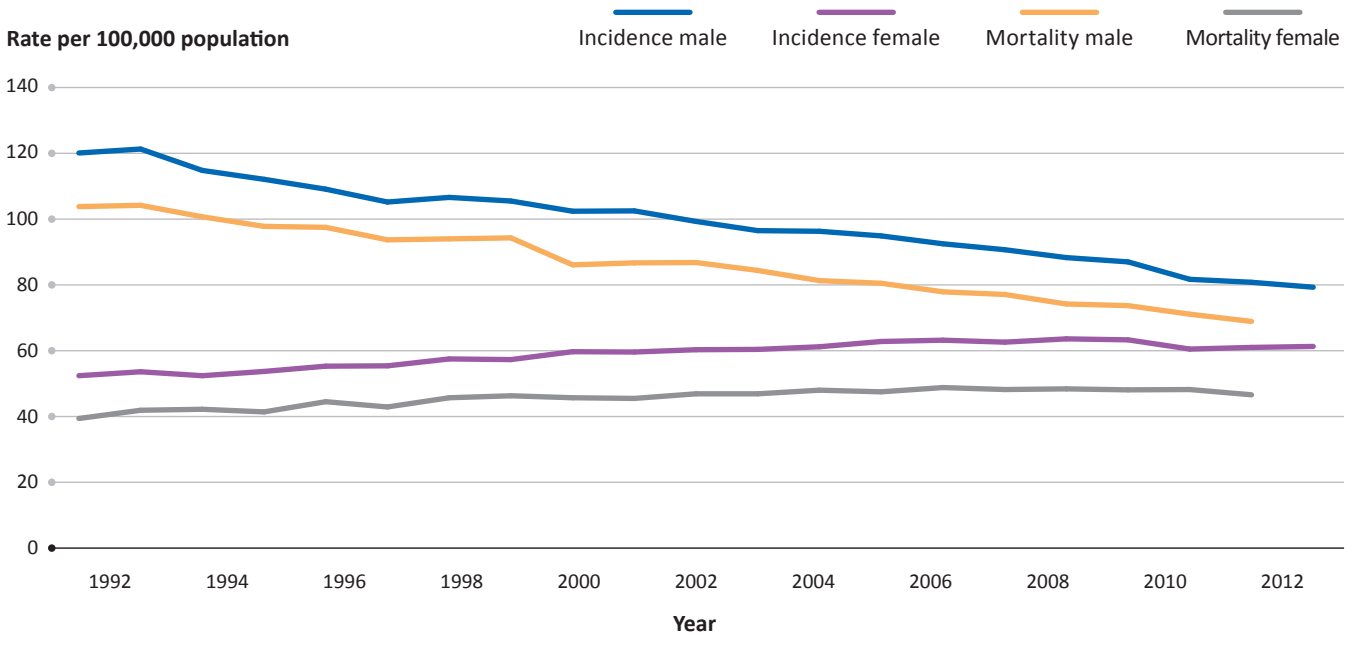
- In Canada, the age-standardized incidence rate (ASIR) for lung cancer decreased significantly among men, from approximately 120.1 cases per 100,000 males in 1992 to 79.3 cases per 100,000 males in 2012 (annual percent change [APC] = −2.0%; overall relative change = −34.0%). The age-standardized mortality rate (ASMR) decreased significantly among men, from 103.8 deaths per 100,000 males in 1992 to 68.9 deaths per 100,000 males in 2011 (APC = −1.9%; overall relative change = −33.6%) (Figure 8.5).
- By contrast, the ASIR increased significantly among women, from 52.4 cases per 100,000 females in 1992 to 63.2 cases per 100,000 females in 2006. The ASIR declined significantly after 2006, to 61.3 cases per 100,000 females in 2012 (APC = 1.4% and −0.7%, respectively; overall relative change = 16.7%). The ASMR for women increased significantly, from 39.4 deaths per 100,000 females in

1992 to 46.6 deaths per 100,000 females in 2011 (APC = 0.9%; overall relative change = 18.3%) (Figure 8.5).

- Across all provinces, the ASIR for men was higher than it was for women (2010–12 combined). Among men, lung cancer incidence rates ranged from 65.7 cases per 100,000 males in British Columbia to 104.2 cases per 100,000 males in Quebec, a relative difference of 58.6%. Incidence rates for women ranged from 54.0 cases per 100,000 females in Newfoundland and Labrador to 76.8 cases per 100,000 females in Nova Scotia, a relative difference of 42.2% (Figure 8.6).
- ASMRs ranged from 49.8 deaths per 100,000 people in British Columbia to 71.4 deaths per 100,000 people in Quebec, a 43.4% relative difference (2009–11 combined) (Figure 8.7).
- Stage IV lung cancer had the highest ASIRs (2011–13 combined). The incidence of Stage I lung cancer ranged from 13.0 cases per 100,000 people in British Columbia and Saskatchewan to 23.0 cases per 100,000 people in New Brunswick, a 76.9% relative difference. The incidence of Stage IV lung cancer ranged from 37.0 cases per 100,000 people in British Columbia to 57.0 cases per 100,000 people in Nova Scotia, a 54.1% relative difference (Figure 8.8).

FIGURE 8.5

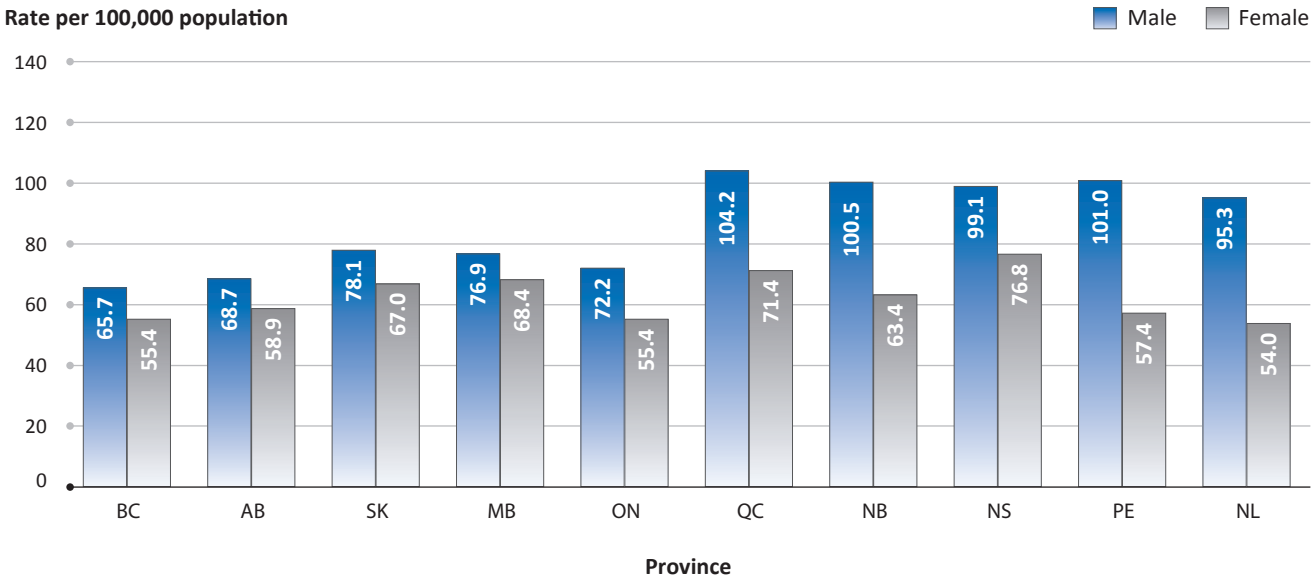
Incidence and mortality rates for lung cancer, by sex, Canada, age-standardized to the 2011 Canadian population — from 1992 to 2012



Data source: Statistics Canada, Canadian Cancer Registry and Vital Statistics Death Database.

FIGURE 8.6

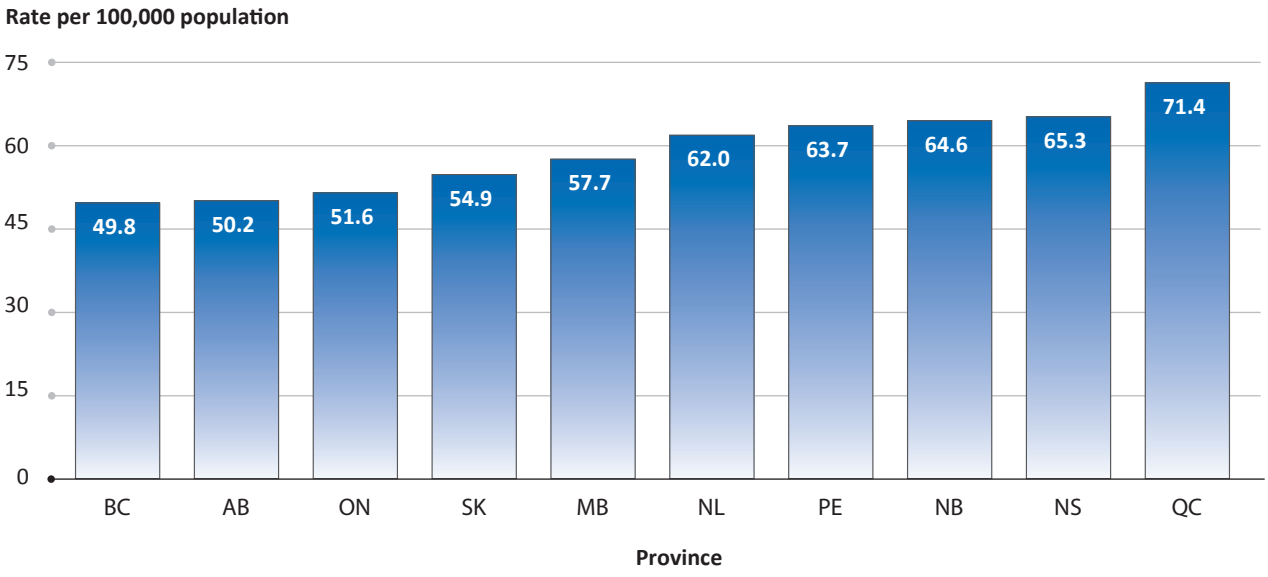
Incidence rates for lung cancer, by sex and province, age-standardized to the 2011 Canadian population — 2010–12 combined



Data source: Statistics Canada, Canadian Cancer Registry.

FIGURE 8.7

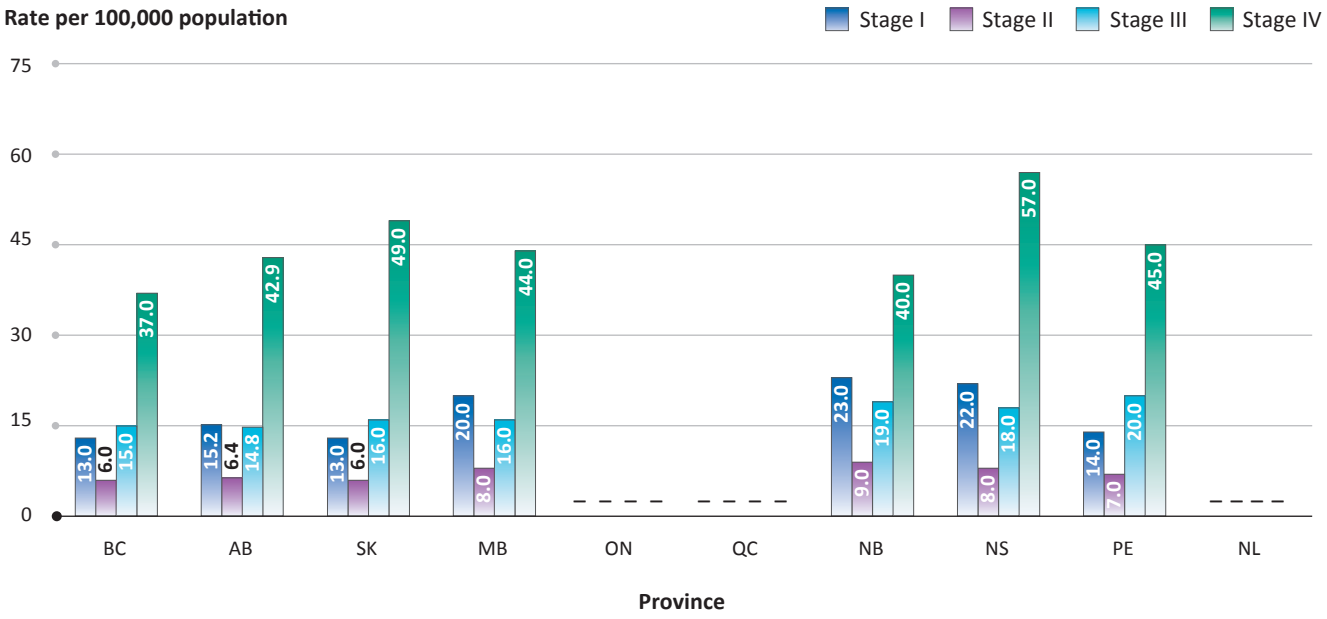
Mortality rates for lung cancer, by province, age-standardized to the 2011 Canadian population — 2009–11 combined



Data source: Statistics Canada, Vital Statistics Death Database.

FIGURE 8.8

Incidence rates for lung cancer, by stage at diagnosis and province, age-standardized to the 2011 Canadian population — 2011–13 diagnosis years combined



"—" Data not available.

Data source: Provincial cancer agencies and programs.

Why do these findings matter?

Lung cancer is a major burden in Canada and it is a significant cause of death for Canadians. Two of the major factors causing these high rates are exposure to risk factors (e.g., smoking) and the stage at which most lung cancers are diagnosed.

Current trends in lung cancer incidence and mortality reflect historical cigarette smoking prevalence, which peaked earlier and at a higher level in males than in females. Because of the earlier peak, lung cancer incidence and mortality have been declining for men; a similar decline is expected among women in the future.[1] The results show a slight inflection point in lung cancer incidence for women after 2006, which could signal the start of the expected decline in lung cancer burden in women. Lung cancer patterns reflect provincial variations in tobacco use.

Quebec and the Atlantic provinces have traditionally had higher smoking prevalence rates than central and western Canada,[105] which largely explains the higher lung cancer burden in the eastern provinces. Lung cancer incidence and mortality data provide a solid rationale for the continued importance of efforts to reduce smoking across the country.

Lung cancer is rarely detected before progressing to a late stage—it is most often diagnosed at Stage IV, as seen in the stage-specific incidence data presented. Improving early diagnosis practices, particularly in high-risk populations as recommended by the Canadian Task Force on Preventive Health Care,[106] and beginning treatment at a stage when it is more effective could have a positive impact on both mortality and survival. This change would be reflected in data measured over time.

Colorectal Cancer

Key Message

Colorectal cancer mortality has been declining in both men and women since the early 1990s.

Indicator Definition

Measures:

1) Age-standardized incidence rates
2) Stage-specific incidence rates
3) Age-standardized mortality rates

Results are presented over time and by province.

Measured Since

Colorectal cancer incidence and mortality rates have been measured since the 2009 *Cancer System Performance Report*. Stage-specific incidence has been measured since the 2015 *Cancer System Performance Report*.

64%

fewer colorectal cancer cases for males in Ontario than Newfoundland and Labrador

61%

fewer colorectal cancer cases for females in Ontario than Newfoundland and Labrador

73%

fewer colorectal cancer deaths in Alberta than Newfoundland and Labrador

24%

of colorectal cancer cases diagnosed at Stage III

Why measure this?

Colorectal cancer is the third most commonly diagnosed cancer in Canada. It is the second leading cause of cancer death in men and the third most common cause in women. The burden of colorectal cancer is projected to grow from 25,100 cases in 2015 to 35,075 cases in 2028–32, a relative increase of 40%.[1]

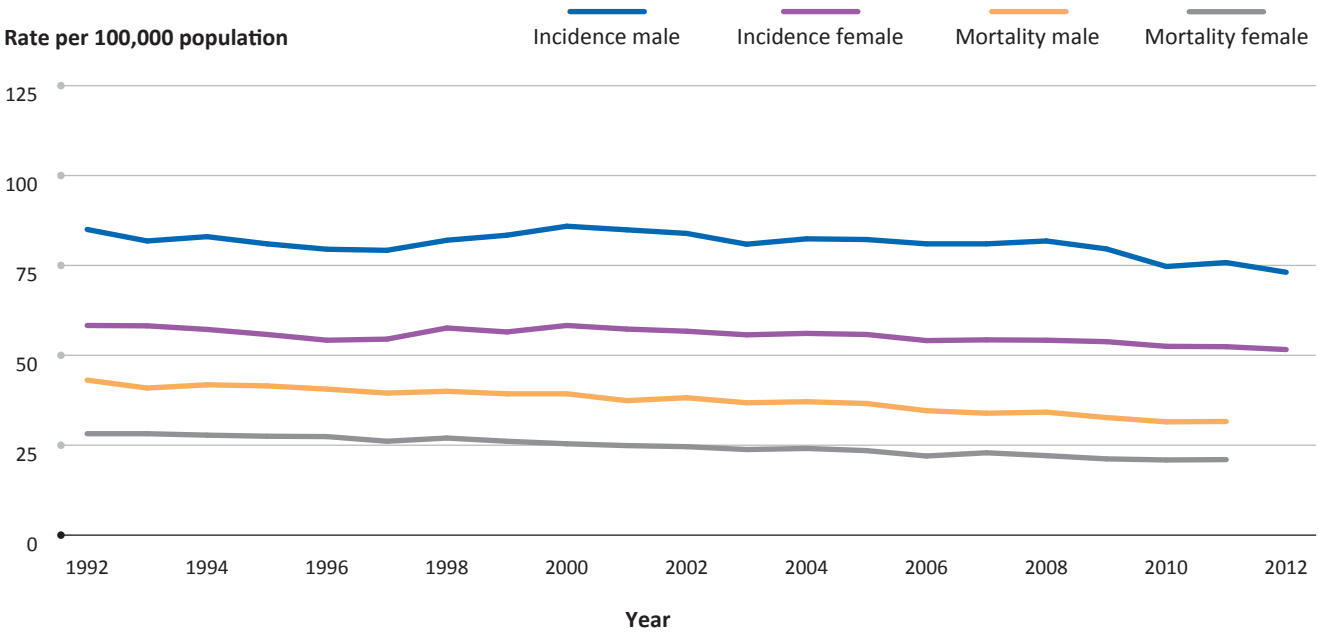
What are the key findings?

- The age-standardized incidence rate (ASIR) for colorectal cancer in Canada remained relatively stable for men between 1992 and 2008, hovering at approximately 80 cases per 100,000 males, but declined significantly to 73.1 cases per 100,000 males in 2012 (annual percent change [APC] = −2.4; overall relative change = −14.0). The age-standardized mortality rate (ASMR) for men also declined significantly, from 43.1 deaths per 100,000 males in 1992 to 31.6 deaths per 100,000 males in 2011 (APC = −1.6%; overall relative change = −26.7%) (Figure 8.9).
- In women, the ASIR decreased significantly, from 58.3 cases per 100,000 females in 1992 to 51.6 cases per 100,000 females in 2012 (annual percent change [APC] = −0.5%; overall relative change = −11.5%). The ASMR for women declined from 28.2 deaths per 100,000 females in 1992 to 21.0 deaths per 100,000 females in 2011 (APC = −1.7%; overall relative change = −25.5%) (Figure 8.9).

- In all provinces, the ASIR was higher for men, with rates ranging from 68.0 cases per 100,000 males in Ontario to 111.3 cases per 100,000 males in Newfoundland and Labrador, a relative difference of 63.7%. Incidence rates for women ranged from 48.7 cases per 100,000 females in Ontario to 78.4 cases per 100,000 females in Newfoundland and Labrador, a relative difference of 61.0% (2010–12 combined) (Figure 8.10).
- The ASMR for colorectal cancer ranged from 23.1 deaths per 100,000 people in Alberta to 40.0 deaths per 100,000 people in Newfoundland and Labrador, a 73.2% relative difference (2009–11 combined) (Figure 8.11).
- Colorectal cancer was most commonly diagnosed at Stage II or III (2011–13 combined). The incidence of Stage II colorectal cancer ranged from 17.5 cases per 100,000 people in Alberta to 26.0 cases per 100,000 people in Prince Edward Island, a 48.6% relative difference. The incidence of Stage III colorectal cancer ranged from 18.0 cases per 100,000 people in New Brunswick to 26.0 cases per 100,000 people in Manitoba and Nova Scotia, a 44.4% relative difference (Figure 8.12).

FIGURE 8.9

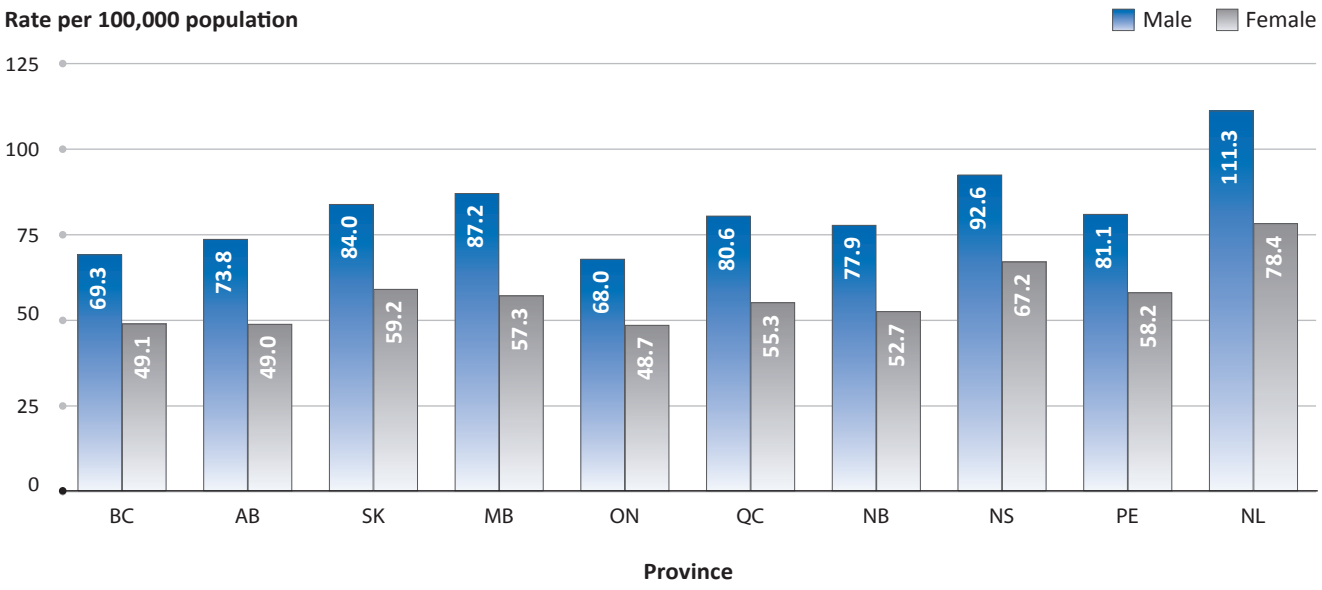
Incidence and mortality rates for colorectal cancer, by sex, Canada, age-standardized to the 2011 Canadian population — from 1992 to 2012



Data source: Statistics Canada, Canadian Cancer Registry and Vital Statistics Death Database.

FIGURE 8.10

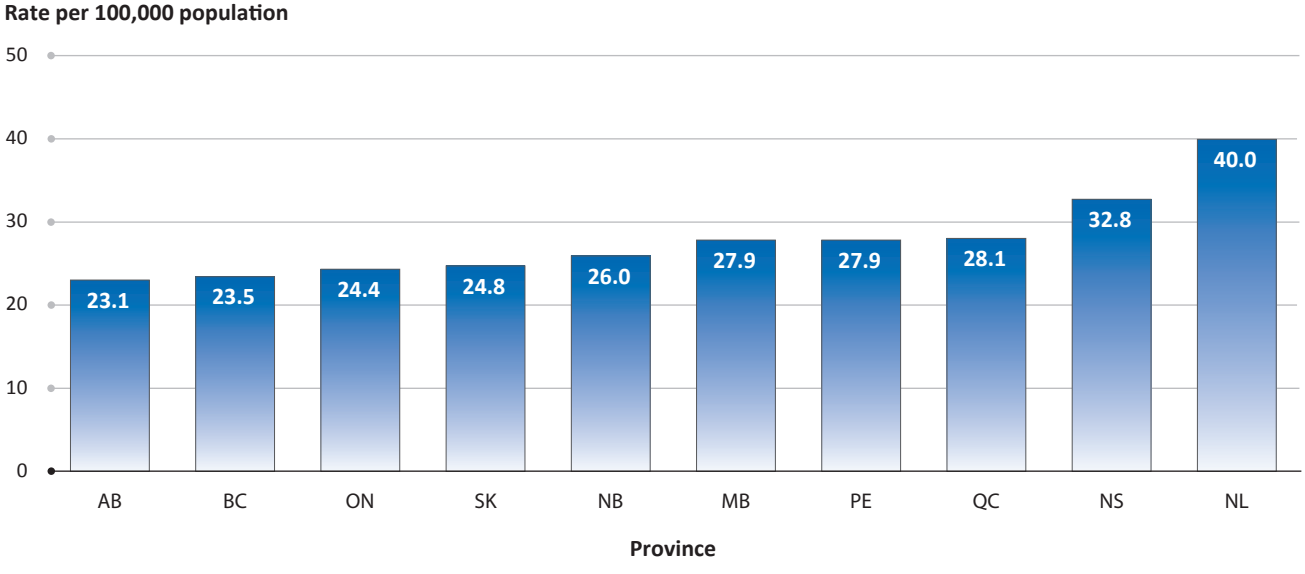
Incidence rates for colorectal cancer, by sex and province, age-standardized to the 2011 Canadian population — 2010–12 combined



Data source: Statistics Canada, Canadian Cancer Registry.

FIGURE 8.11

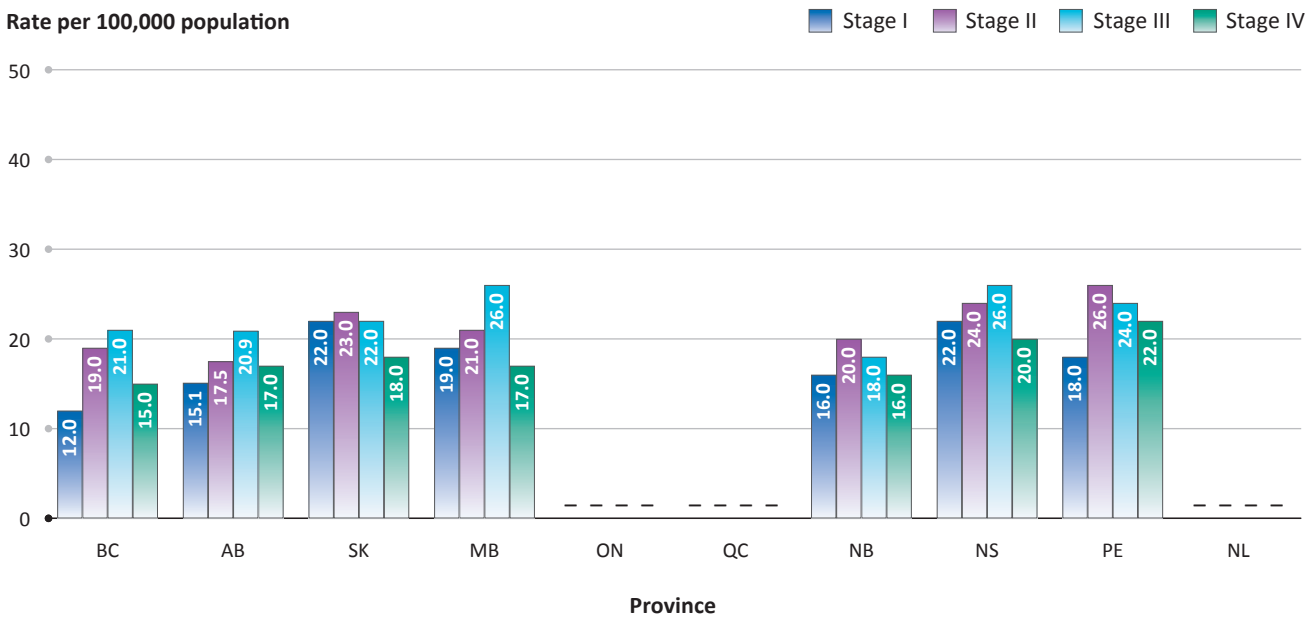
Mortality rates for colorectal cancer, by province, age-standardized to the 2011 Canadian population — 2009–11 combined



Data source: Statistics Canada, Vital Statistics Death Database.

FIGURE 8.12

Incidence rates for colorectal cancer,† by stage at diagnosis and province, age-standardized to the 2011 Canadian population — 2011–13 diagnosis years combined



† Appendix (C18.1) was excluded.

"—" Data not available.

Data source: Provincial cancer agencies and programs.

Why do these findings matter?

It is likely that the burden of colorectal cancer will begin to change over time, largely owing to the fact that colorectal cancer screening is still in the early stages and screening programs are in varying phases of implementation (see the Screening chapter for more details). It is not yet possible to assess the impact of screening on reductions in incidence and mortality but by continually monitoring colorectal cancer outcomes, these effects will begin to present themselves. It is expected that the incidence of colorectal cancer will begin to decline once screening becomes better established in Canada.[1] This reduction in incidence due to screening has already occurred—or is predicted to occur—in some European countries and the United States.[107-110]

Additionally, it is expected that the distribution of colorectal stage-specific incidence rates will change over time as screening and early detection result in a reduction in late-stage cancers. This reduction will influence—and hopefully reduce—mortality due to colorectal cancer, as early detection increases the likelihood of prompt delivery of more effective treatments. The observed decreases in mortality, as well as further reductions in the future, are also the result of improved treatment options. Over time, the influence of improved screening and treatment practices on colorectal cancer outcomes can be evaluated.

Prostate Cancer

Key Message

Prostate cancer mortality has been declining in Canada since the early 1990s.

Indicator Definition

Measures:

1) Age-standardized incidence rates
2) Stage-specific incidence rates
3) Age-standardized mortality rates

Results are presented over time and by province.

Measured Since

Prostate cancer incidence and mortality rates have been measured since the 2009 *Cancer System Performance Report*. Stage-specific incidence has been measured since the 2015 *Cancer System Performance Report*.

68%
fewer prostate cancer cases in Quebec than Prince Edward Island

41%
fewer prostate cancer deaths in Quebec than Saskatchewan

50%
of prostate cancer cases diagnosed at Stage II

Why measure this?

Prostate cancer is the most common cancer affecting Canadian men, representing 24% of new cancer cases in males in 2015. It is the third leading cause of cancer death in Canadian men. The burden of prostate cancer is projected to grow from 24,000 cases in 2015 to 42,225 cases in 2028–32, a relative increase of 76%.[1]

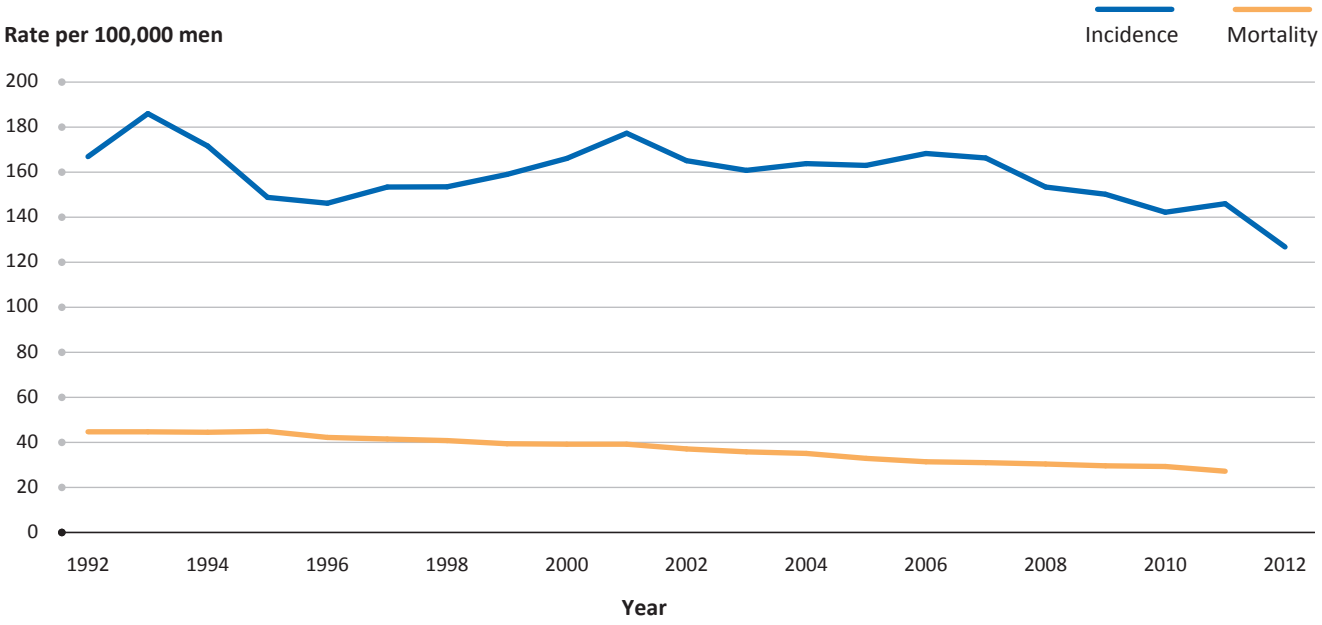
What are the key findings?

- There was a slight but significant decrease in the age-standardized incidence rate (ASIR) for prostate cancer in Canadian men, from 166.9 cases per 100,000 males in 1992 to 126.8 cases per 100,000 males in 2012 (annual percent change [APC] = −0.7%; overall relative change = −24.0%), with peaks in 1993 (186.0 cases per 100,000 males) and again in 2001 (177.3 cases per 100,000 males). The age-standardized mortality rate (ASMR) for prostate cancer decreased significantly, from 44.7 deaths per 100,000 males in 1992 to 27.2 deaths per 100,000 males in 2011 (APC = −2.7%, overall relative change = −39.1%) (Figure 8.13).

- The relative difference between the lowest and highest provincial ASIRs was 67.8% (2010–12 combined). ASIRs ranged from 113.6 cases per 100,000 males in Quebec to 190.5 cases per 100,000 males in Prince Edward Island (Figure 8.14).
- ASMRs ranged from 26.0 deaths per 100,000 males in Quebec to 36.6 deaths per 100,000 males in Saskatchewan (2009–11 combined), a 40.8% relative difference (2009–11 combined) (Figure 8.15).
- Stage II prostate cancer had the highest ASIRs in all provinces except Prince Edward Island, where Stage I ASIR was highest (2011–13 combined). The incidence of Stage II prostate cancer ranged from 78.0 cases per 100,000 males in Manitoba to 99.7 cases per 100,000 males in Alberta, a 27.8% relative difference. The incidence of Stage IV prostate cancer in Manitoba was double the incidence in New Brunswick (24.0 cases per 100,000 males vs. 12.0 cases per 100,000 males, respectively) (Figure 8.16).

FIGURE 8.13

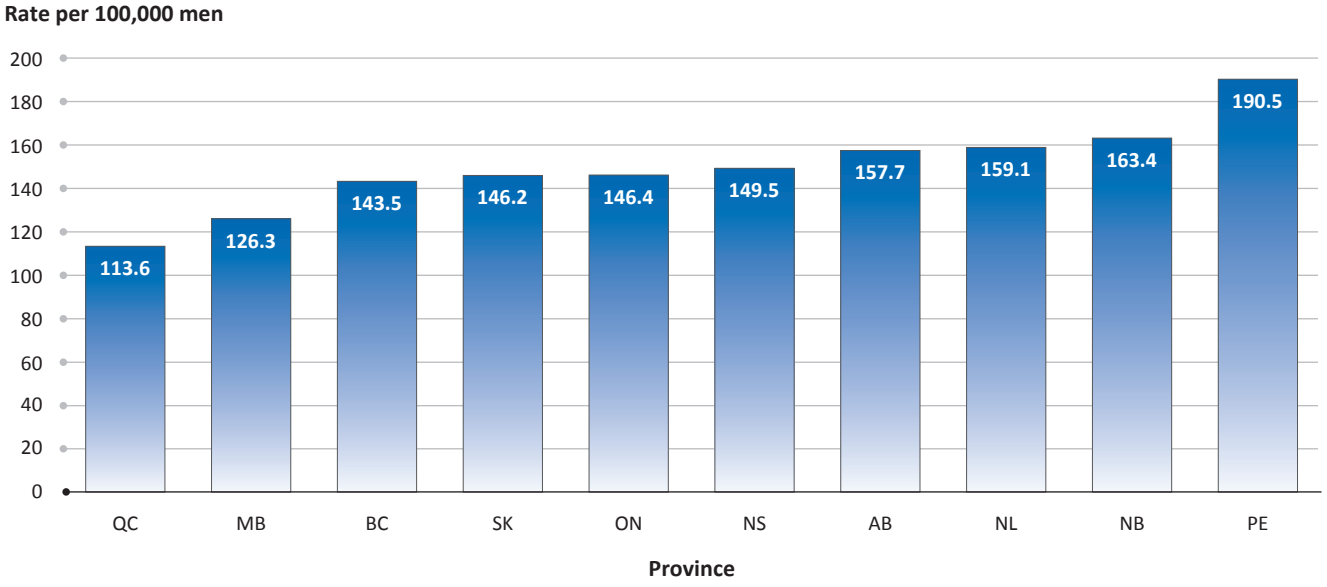
Incidence and mortality rates for prostate cancer, Canada, age-standardized to the 2011 Canadian population — from 1992 to 2012



Data source: Statistics Canada, Canadian Cancer Registry and Vital Statistics Death Database.

FIGURE 8.14

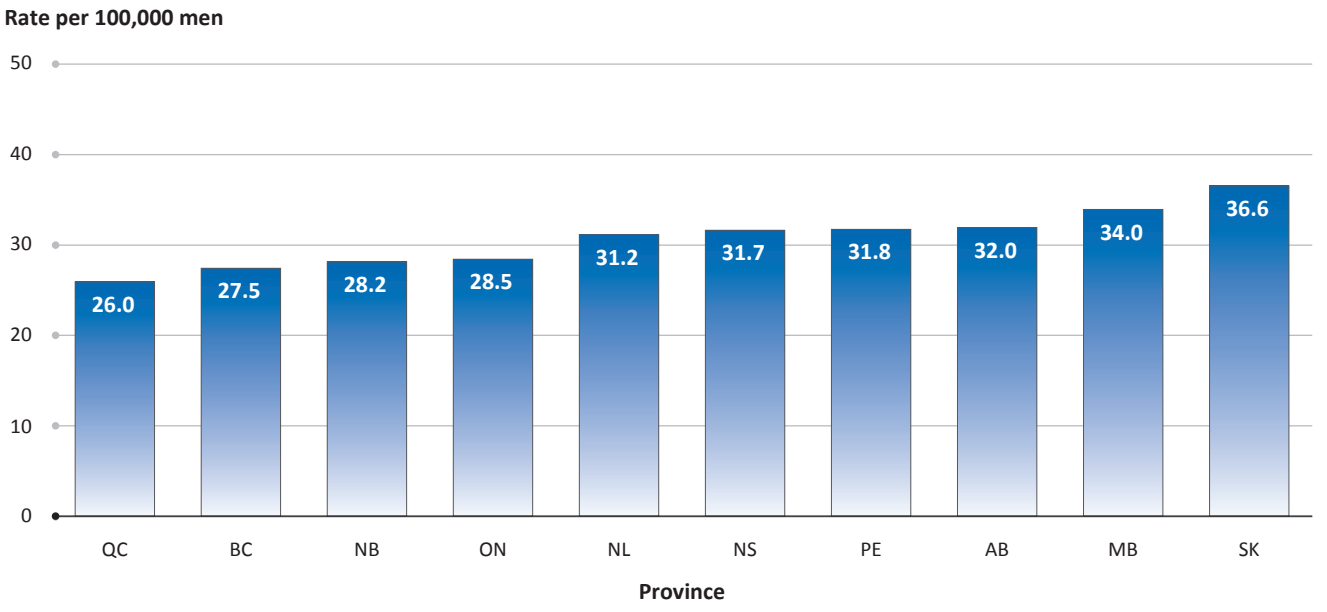
Incidence rates for prostate cancer, by province, age-standardized to the 2011 Canadian population — 2010–12 combined



Data source: Statistics Canada, Canadian Cancer Registry.

FIGURE 8.15

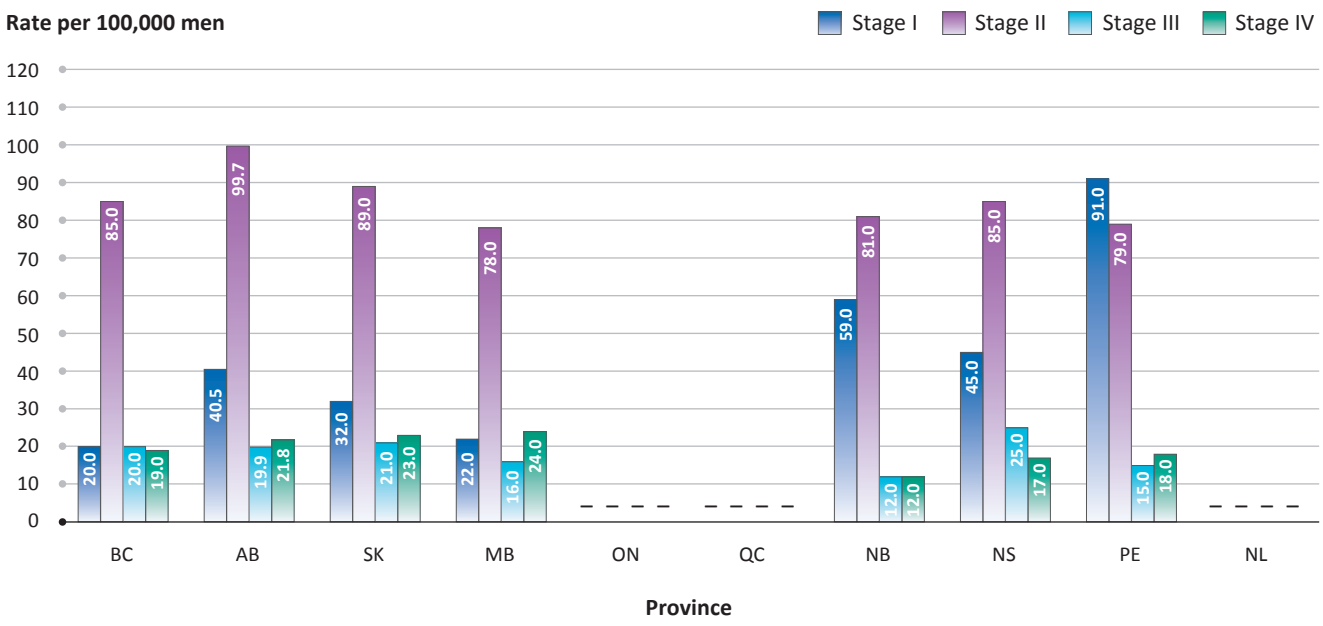
Mortality rates for prostate cancer, by province, age-standardized to the 2011 Canadian population — 2009–11 combined



Data source: Statistics Canada, Vital Statistics Death Database.

FIGURE 8.16

Incidence rates for prostate cancer, by stage at diagnosis and province, age-standardized to the 2011 Canadian population — 2011–13 diagnosis years combined



"—" Data not available.
Data source: Provincial cancer agencies and programs.

Why do these findings matter?

Though prostate cancer presents a major burden in terms of incidence, men diagnosed with prostate cancer generally have a good prognosis, largely because prostate cancer is often a slow-growing cancer that may not become symptomatic—studies show that many men die with prostate cancer, not from it.[111-113] In addition to this, improvements in the treatment of prostate cancer have likely helped to reduce mortality to low levels.

Pancreatic Cancer

Key Message

Pancreatic cancer mortality has decreased in both men and women since the early 1990s.

Indicator Definition

Measures:

1) Age-standardized incidence rates
2) Age-standardized mortality rates

Results are presented over time and by province.

Measured Since

The 2012 *Cancer System Performance Report*.

56%
fewer pancreatic cancer cases for males in Newfoundland and Labrador than Manitoba

32%
fewer pancreatic cancer cases for females in Newfoundland and Labrador than Alberta and Manitoba

14%
fewer pancreatic cancer deaths in Newfoundland and Labrador than New Brunswick

Why measure this?

Although pancreatic cancer is the tenth most common cancer in Canada, it is the fourth leading cause of cancer death (behind lung, colorectal and breast cancer) owing to its low survival rate. The burden of pancreatic cancer is projected to grow from 4,800 cases in 2015 to 7,365 cases in 2028–32, a relative increase of 53%.[1]

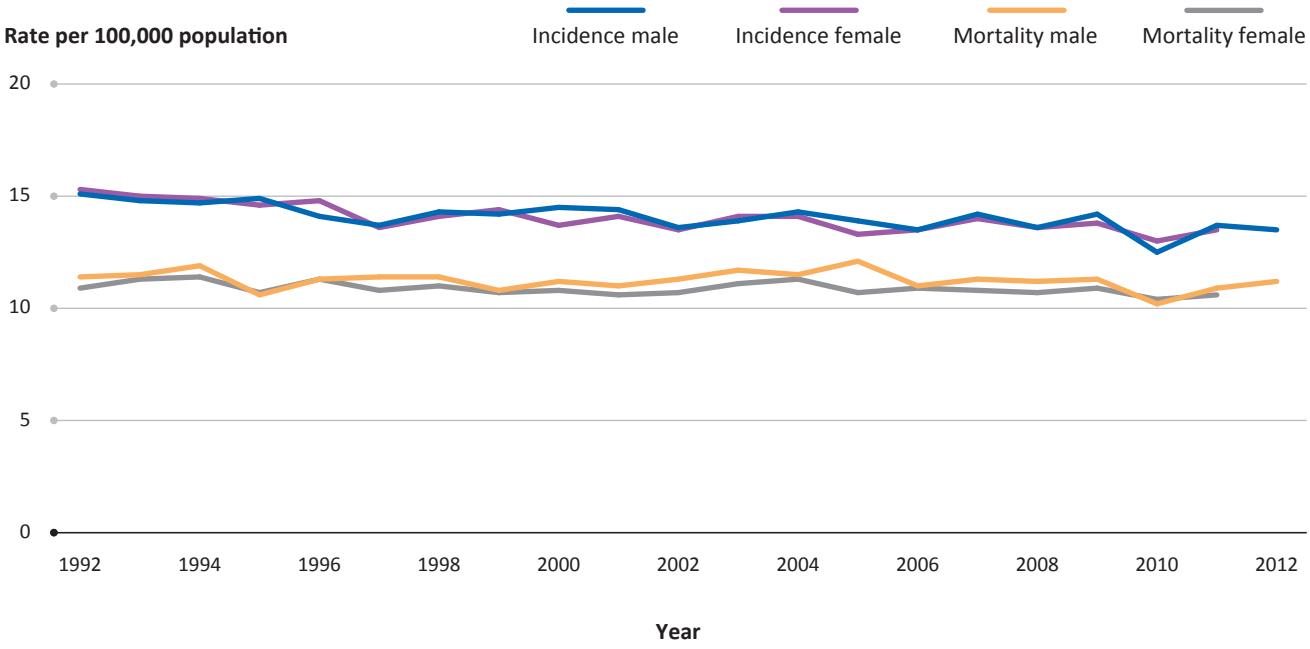
What are the key findings?

- The age-standardized incidence rate (ASIR) for pancreatic cancer decreased significantly among men, from 15.1 cases per 100,000 males in 1992 to 13.5 cases per 100,000 males in 2012 (annual percent change [APC] = −0.5%; overall percent change = −10.6%). The age-standardized mortality rate (ASMR) for men also decreased significantly, from 15.3 deaths per 100,000 males in 1992 to 13.5 deaths per 100,000 males in 2011 (APC = −0.5%; overall relative change = −10.6%) (Figure 8.17).
- The ASIR for women remained relatively stable between 1992 and 2012 (APC = −0.2%; overall relative change = −1.8%); however, the ASMR for women declined from 10.9 deaths per 100,000 females in 1992 to 10.6 deaths per 100,000 females in 2011 (APC = −0.2%; overall percent change = −2.8%) (Figure 8.17).

- In all provinces, the ASIR was higher for men, with rates ranging from 11.0 cases per 100,000 males in Newfoundland and Labrador to 17.1 cases per 100,000 males in Manitoba, a relative difference of 55.5%. Incidence rates for women ranged from 9.3 cases per 100,000 females in Newfoundland and Labrador to 12.3 cases per 100,000 females in Alberta and Manitoba, a relative difference of 32.2% (2010–12 combined) (Figure 8.18).
- ASMRs ranged from 11.2 deaths per 100,000 people in Newfoundland and Labrador to 12.8 deaths per 100,000 people in New Brunswick, a 14.3% relative difference (2009–11 combined) (Figure 8.19).

FIGURE 8.17

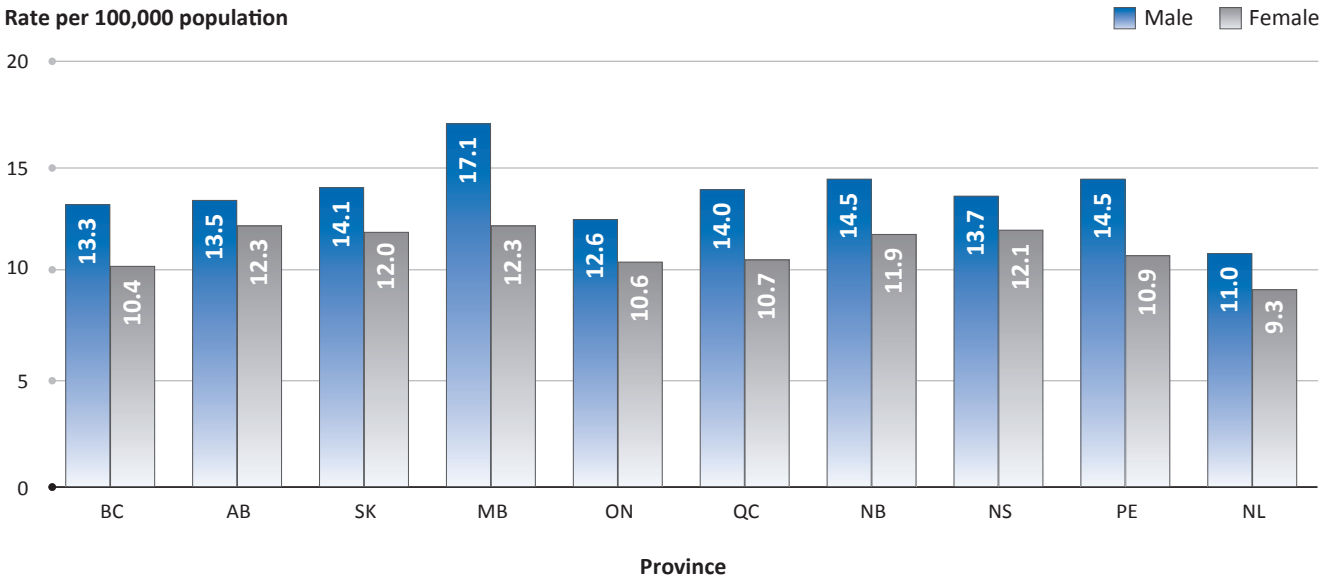
Incidence and mortality rates for pancreatic cancer, by sex, Canada, age-standardized to the 2011 Canadian population — from 1992 to 2012



Data source: Statistics Canada, Canadian Cancer Registry and Vital Statistics Death Database.

FIGURE 8.18

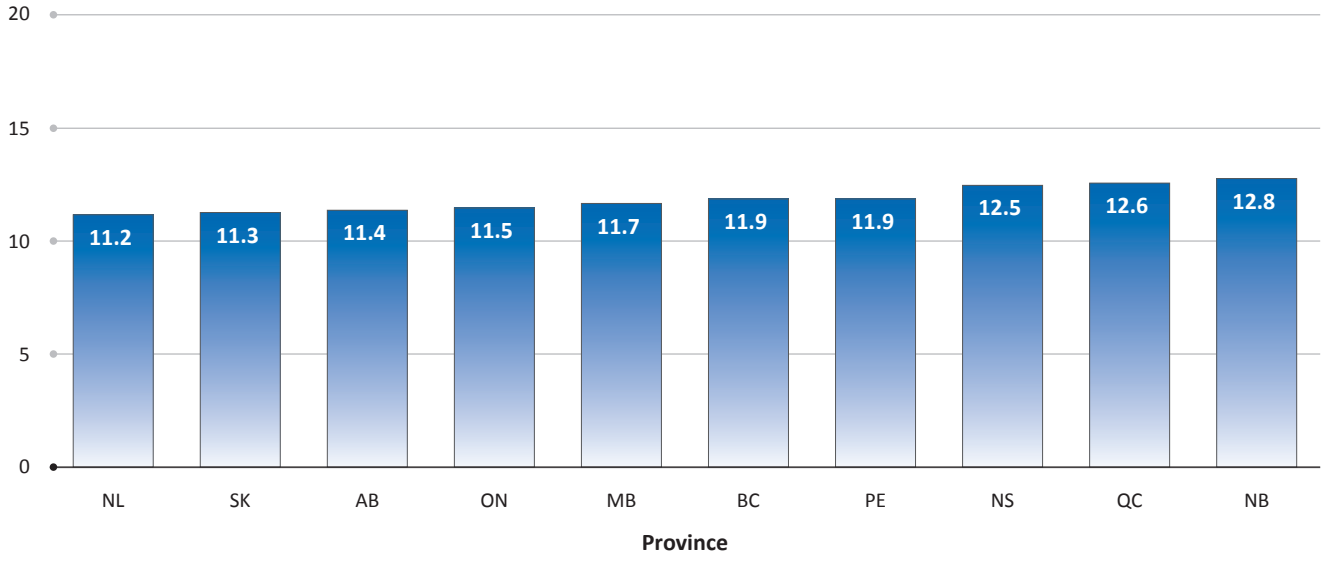
Incidence rates for pancreatic cancer, by sex and province, age-standardized to the 2011 Canadian population — 2010–12 combined



Data source: Statistics Canada, Canadian Cancer Registry.

FIGURE 8.19

Mortality rates for pancreatic cancer, by province, age-standardized to the 2011 Canadian population — 2009–11 combined



Data source: Statistics Canada, Vital Statistics Death Database.

Why do these findings matter?

Although the incidence of pancreatic cancer is lower than for many other cancers in Canada, the disease is highly fatal, surpassing prostate cancer to become the fourth leading cause of cancer death in the country in 2015. ASIRs are projected to remain stable between 2015 and 2030,[1] yet pancreatic cancer will likely continue to result in a high number of cancer deaths, due in part to the fact that pancreatic cancer is often diagnosed at a late stage. Patients diagnosed at a later stage are unlikely to survive, even with treatment. For this reason, pancreatic cancer is extremely challenging from a cancer control perspective and further research is needed to improve outcomes.

Ovarian Cancer

Key Message

Ovarian cancer incidence has declined since the early 1990s, while mortality rates have remained stable.

Indicator Definition

Measures:

1) Age-standardized incidence rates
2) Stage-specific incidence rates
3) Age-standardized mortality rates

Results are presented over time and by province.

Measured Since

Included as an additional indicator for 2016.

33%
fewer ovarian cancer cases in Alberta than Ontario

21%
fewer ovarian cancer deaths in Prince Edward Island than Nova Scotia

46%
of ovarian cancer cases diagnosed at Stage III

Why measure this?

Ovarian cancer is the eighth most common cancer affecting Canadian women but is the fifth leading cause of cancer death in women (behind lung, colorectal, breast and pancreatic cancers). The burden of ovarian cancer is projected to grow from 2,800 cases in 2015 to 3,650 cases in 2028–32, a relative increase of 30%.[1] Ovarian cancer is included in this report as part of the practice of featuring disease sites beyond the top five cancers (breast, colorectal, lung, prostate and pancreatic) in each *Cancer System Performance Report* to share knowledge of the burden of different cancers in Canada.

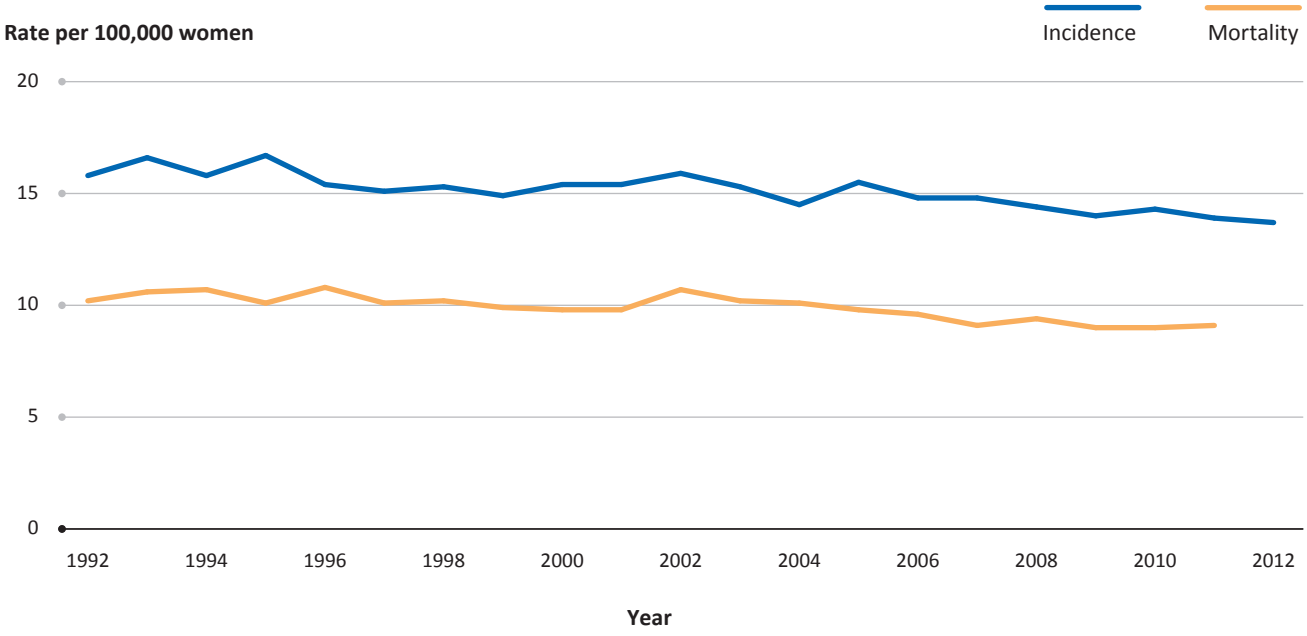
What are the key findings?

- The age-standardized incidence rate (ASIR) for ovarian cancer in Canada decreased significantly from 15.8 cases per 100,000 females in 1992 to 13.7 cases per 100,000 females in 2012 (annual percent change [APC] = −0.7%; overall relative change = −13.3%), while the age-standardized mortality rate (ASMR) declined significantly from 10.2 deaths per 100,000 females in 1992 to 9.1 deaths per 100,000 females in 2011 (APC = −0.9%; overall relative change = −10.8%) (Figure 8.20).

- The relative difference between the lowest and highest provincial ASIRs was 32.7% (2010–12 combined). ASIRs ranged from 11.3 cases per 100,000 females in Alberta to 15.0 cases per 100,000 females in Ontario (Figure 8.21).
- ASMRs ranged from 8.2 deaths per 100,000 females in Prince Edward Island to 9.9 deaths per 100,000 females in Nova Scotia, a 20.7% relative difference (2009–11 combined) (Figure 8.22).
- Only four provinces were able to provide stage-specific incidence rates for ovarian cancer (2011–13 combined). In these provinces, ovarian cancer was most commonly diagnosed at Stage III. Stage III incidence ranged from 6.7 cases per 100,000 females in Alberta to 8.0 cases per 100,000 females in Manitoba and Nova Scotia, a 33.3% relative difference (Figure 8.23).

FIGURE 8.20

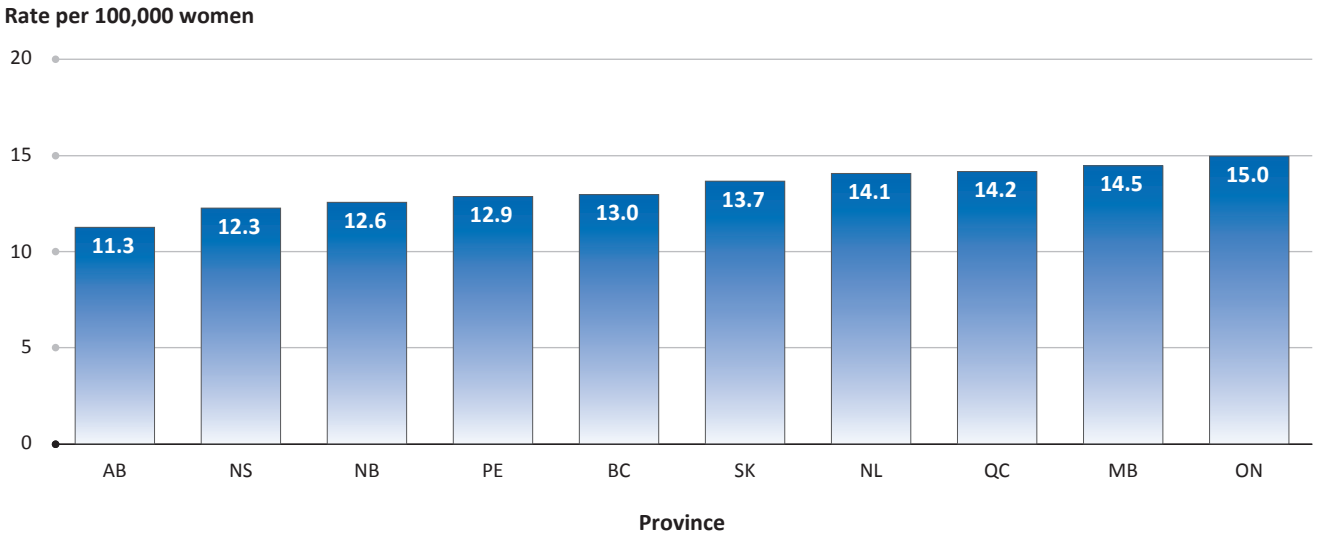
Incidence and mortality rates for ovarian cancer, Canada, age-standardized to the 2011 Canadian population — from 1992 to 2012



Data source: Statistics Canada, Canadian Cancer Registry and Vital Statistics Death Database.

FIGURE 8.21

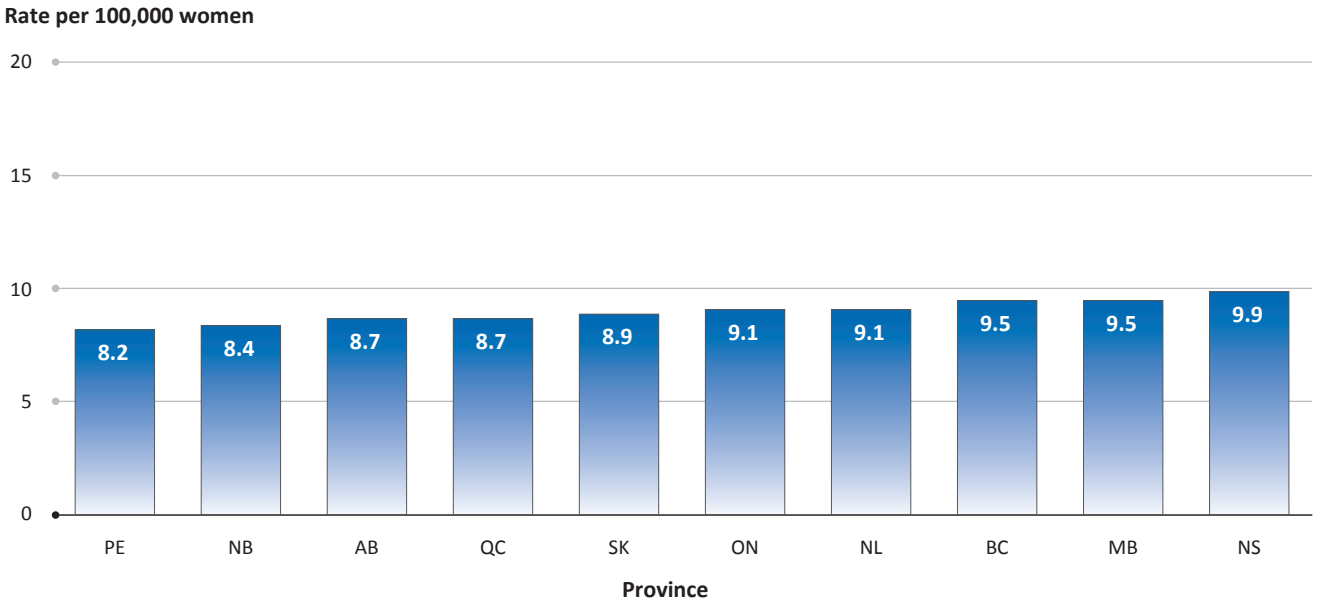
Incidence rates for ovarian cancer, by province, age-standardized to the 2011 Canadian population — 2010–12 combined



Data source: Statistics Canada, Canadian Cancer Registry.

FIGURE 8.22

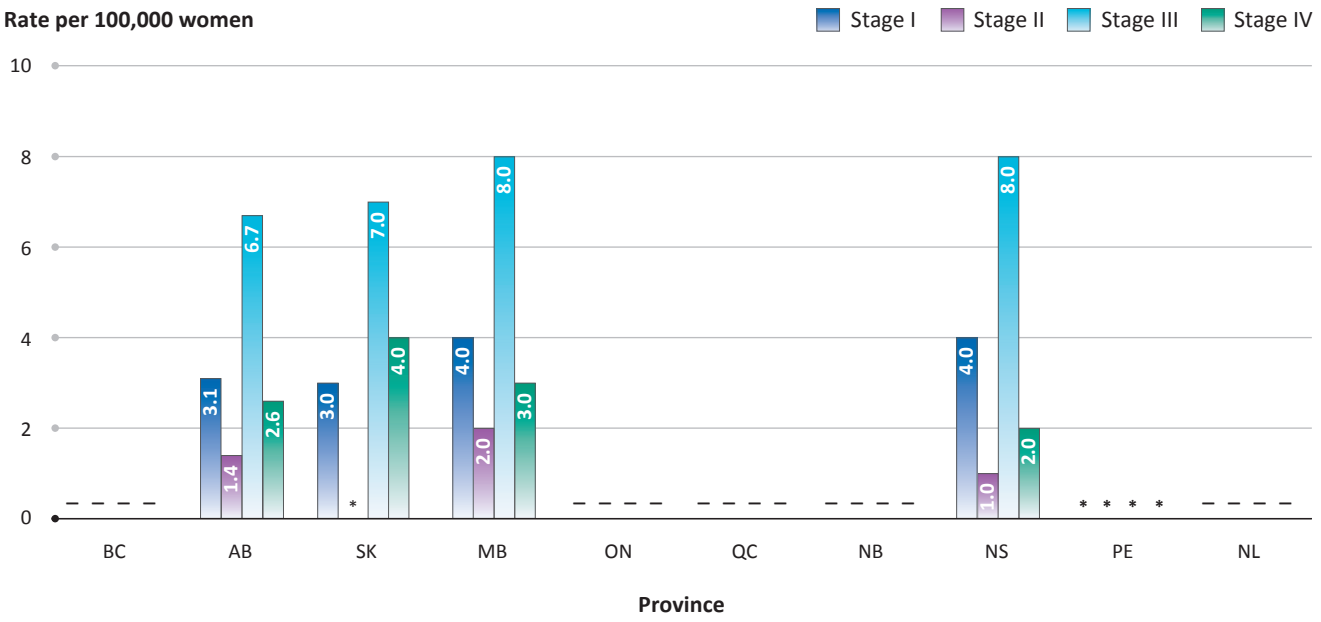
Mortality rates for ovarian cancer, by province, age-standardized to the 2011 Canadian population — 2009–11 combined



Data source: Statistics Canada, Vital Statistics Death Database.

FIGURE 8.23

Incidence rates for ovarian cancer, by stage at diagnosis and province, age-standardized to the 2011 Canadian population — 2011–13 diagnosis years combined



"—" Data not available.

* Suppressed owing to small numbers.

Data source: Provincial cancer agencies and programs.

Why do these findings matter?

Ovarian cancer has a poorer prognosis than many cancers. Data from the CONCORD-2 study indicate that five-year net survival for ovarian cancer in Canada is low, at 37.5%, as it is in other countries, including the United States.[114] This low rate could be due to the fact that ovarian cancer tends to be diagnosed at a late stage,[115] as the results show. While treatment is generally effective and prognosis good for early-stage ovarian cancer, this is not the case for late-stage disease.

Unfortunately, research shows that screening for ovarian cancer does not decrease mortality and may cause significant harms at a population level.[115-117] This finding suggests that unless new screening tests are developed, improvements in ovarian cancer mortality and survival will likely be due to improvements in treatment. Because ovarian cancer outcomes (including incidence and mortality) have not yet been examined through system performance reporting, doing so now facilitates understanding of the burden of this particular cancer in Canada and will allow us to monitor trends over time to gain a deeper understanding of the factors influencing these outcomes.

Special Feature: Five-year survival by income for select cancers in Canada

Key Message

Inequalities exist in cancer survival when examined by income quintile. Lower-income populations were shown to have poorer survival for breast, colorectal, lung and prostate cancers.

Background

Monitoring and reporting on cancer survival provides a mechanism for understanding the effectiveness of Canada's cancer care system. Many factors can influence the likelihood of surviving cancer, including adequate access to effective screening, timely diagnosis and effective treatment. There is substantial evidence that cancer survival varies by socioeconomic status (SES), possibly because of disparities in access to high-quality care in low-income populations.[118]

This special feature provides an overview of net survival by SES (measured by the average income of the patient's neighbourhood relative to the overall population) for several cancers in adults aged 15–99 at diagnosis, including breast, lung, colon and rectum (combined), prostate and stomach, as well as acute lymphoblastic leukemia in children (aged up to 14 years). The aim is to identify survival disparities among different income groups so that cancer control strategies can be targeted to reach populations at risk of poorer outcomes.

What we know about disparities in cancer control in Canada: A look at previous work

The influence of income (among other socio-demographic factors) on access to cancer control services was examined in both the 2014 *Examining Disparities in Cancer Control: A System Performance Special Focus Report* and the 2015 *Cancer System Performance Report*, produced by the Canadian Partnership Against Cancer (the Partnership). Key findings include the following:

- **Screening.** Self-reported screening participation rates for breast, cervical and colorectal cancers were highest in high-income populations.[119]
- **Stage-specific incidence.** Women with higher incomes were more likely than lower-income women to have their cancer diagnosed at an early or intermediate stage.[120]
- **Wait times.** Low-income populations generally had longer wait times for resolution of an abnormal breast screening result.[120]
- **Treatment.** There was no definitive difference by income in access to or use of radiation therapy (as measured by radiation therapy wait times and radiation therapy utilization), but there were differences in breast cancer treatment patterns by income (as measured by mastectomy rates).[120]

Information on net survival by SES adds to the evidence on disparities in cancer control in Canada. It allows us to examine the extent to which variations in cancer control activities affect survival in different population groups (defined in this case by income).

Methods

Five-year net survival was estimated for Canadian adults (aged 15–99) diagnosed with one of nine cancers (breast, lung, colon and rectum combined, prostate, liver, ovary, cervix, stomach and leukemia) and for children (aged up to 14 years) diagnosed with acute lymphoblastic leukemia between 2004 and 2009. Estimation was done as a sub-analysis of the CONCORD-2 study, conducted specifically for Canada and funded by the Partnership. The CONCORD-2 study is the most comprehensive study to date on international comparisons of population-based cancer survival.[114]

In this study, SES was defined by average neighbourhood income and was derived from PCCF+ version 5K, based on the 2006 census, using patients' full postal codes. Income quintiles were obtained by ranking the average household-size adjusted measure of household income per dissemination area. These quintiles were community-specific.

Net survival was estimated at one, three and five years after diagnosis, by income quintile and overall. The International Cancer Survival Standard age groups and weights were applied for the adult malignancies. For childhood leukemia, equal weights were applied to each of the three age groups (0–4, 5–9 and 10–14 years). Provincial life tables specific for each sex, income quintile and calendar year were used to control for background mortality. Net survival for cancer patients was controlled for the widely different levels of background mortality by age and sex in the general population within each income quintile in each province. Therefore, variations by income in mortality not related to cancer (such as cardiovascular disease) were already factored into the baseline survival and would, therefore, not skew the net cancer survival rates.

Data were contributed by 10 provincial cancer registries, each of which covers the entire population of the province. Income quintile data were not available for Newfoundland and Labrador at the time of this analysis, meaning that survival could not be estimated by SES for this province. Populations were too small in the Northwest Territories, Nunavut and Yukon to enable accurate estimation of life tables and net survival by SES.

In this special feature, five-year net survival by income quintile is presented for the four most common cancers in Canada: breast, lung, colorectal and prostate cancers, as well as for stomach cancer and childhood leukemia.

Results

Five-year net survival for adults was highest in high-income populations (Q5) for breast, colorectal, lung and prostate cancers (Figure 8.i). The same survival gradient by income existed for cancers of the liver and ovary, as well as for leukemia in adults (data not shown).

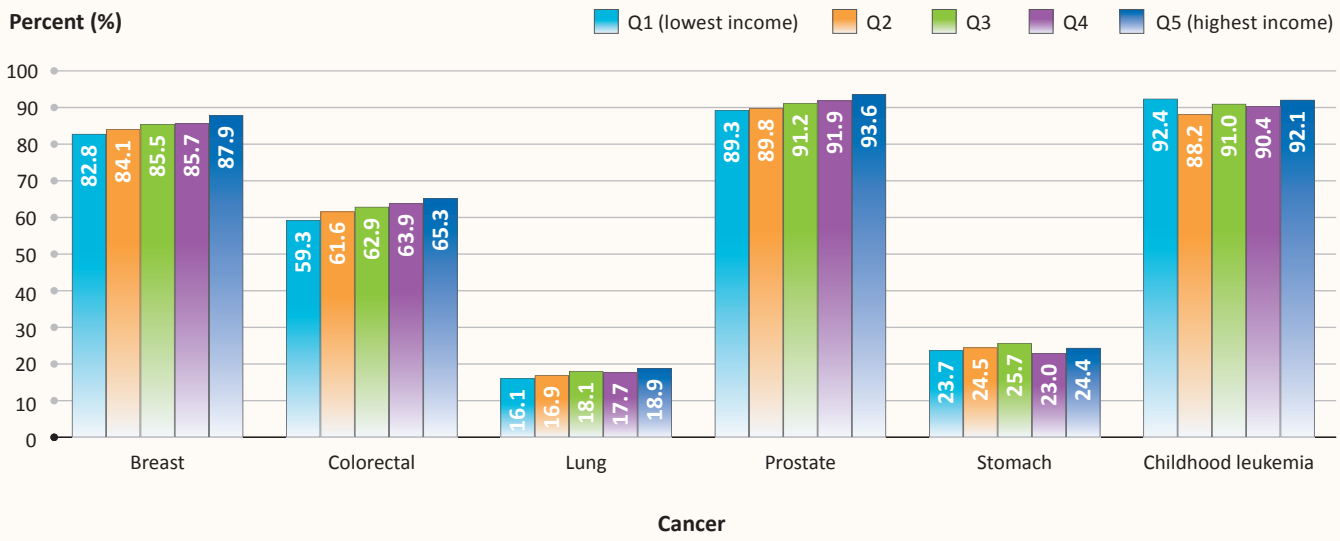
By contrast, five-year net survival for stomach cancer and childhood leukemia did not exhibit a strong gradient by income—survival was similar across quintiles (Figure 8.i)

Upcoming publication of data from CONCORD-2 on survival by socioeconomic status

Detailed results for each of the 10 cancers studied were provided by the CONCORD Central Analytic Team to the Partnership; further exploration into survival disparities by income in Canada are underway. Future publications will include examination of the survival gradient by income provincially and by age group for all 10 cancers, as well as identification of the influence of factors such as stage at diagnosis.

FIGURE 8.i

Five-year net survival by patient income quintile for six cancers, age-standardized† — 2004–09 diagnosis years



† Age-standardized using the International Cancer Survival Standard weights.
Newfoundland and Labrador, the Northwest Territories, Nunavut and Yukon were not included in analysis by income quintile (see Methods).
Childhood leukemia: ages 0–14 years. All other cancers: ages 15–99 years.
Data source: Provincial cancer agencies and programs.

Conclusions

Lower-income populations were shown to have poorer survival for most of the cancers reported here. There is evidence in the literature that lower-income patients are less likely to have their symptoms recognized and investigated early, resulting in a more advanced stage at diagnosis, when treatment is less effective, and, ultimately, in a poorer prognosis.[121-123] Additionally, poorer access to screening or early detection and treatment, both in terms of timeliness and quality of care (i.e., lower-income populations may be receiving poorer-quality, less timely care) may affect survival outcomes.[118,124] For instance, low-income cancer patients often have longer wait times between an abnormal screening result or the detection of symptoms and receipt of follow-up care or treatment, both in Canada and the United States.[120,121] The extent to which these differences in survival are influenced by differences in screening and early detection (or early presentation) and/or treatment effectiveness could be explored in the future by examining stage-specific survival separately in each income quintile.

Survival for stomach cancer and childhood leukemia does not conform to this pattern: there appears to be no clear relationship between income and survival. Survival for both stomach cancer and childhood leukemia has been shown to be associated with SES in other research.[125-129] The fact that this association does not appear to be the case in Canada should be celebrated, particularly in the case of childhood leukemia, and potentially merits further exploration into possible factors that may be yielding more equitable access to care and relatively comparable survival among income quintiles for these two cancers that could be applied to others.

Identifying both the existence of disparities and the magnitude of the survival gap for different cancers is the first step toward addressing the inequality in cancer survival seen across the country. Targeted cancer control strategies could then be developed to promote knowledge and to improve access to timely and effective care for patients across the socio-demographic spectrum, leading to more equitable outcomes.

Summary of Indicator Results

Indicator	Where to find it	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Data source
Prevention															
Smoking prevalence (%)	Page 13	14.3	19.1	20.6	16.2	17.4	19.5	20.8	22.1	19.7	21.6	26.1	33.4	61.7	CCHS
Smoking cessation (%)	Online†	23.0	18.8	18.5	21.0	16.3	18.6	19.1	17.3	19.7	16.8	13.0	18.4	*	CCHS
Second-hand smoke exposure—public (%)	Online†	12.6	15.7	11.3	15.3	15.1	11.5	9.6	11.0	10.2	9.1	6.7	15.2	14.1	CCHS
Alcohol consumption—none in the past 12 months (%)	Online†	21.0	22.0	19.4	23.0	22.0	15.9	22.0	21.0	23.0	22.0	18.5	23.0	36.0	CCHS
Adult overweight & obesity (%)	Online†	48.0	55.0	58.0	62.0	54.0	51.2	64.0	63.0	61.0	67.0	57.0	65.0	50.0	CCHS
Fruit & vegetable consumption (%)	Online†	40.0	39.0	36.0	31.0	38.0	46.0	34.0	31.0	31.0	26.0	41.0	32.0	24.0	CCHS
Human papillomavirus vaccination (%)	Page 19	65.8	64.9	73.7	58.6	80.2	74.4	73.0	75.0	84.9	88.7	—	39.3	—	PCCSN, Partnership, BC CDC, PE CPHO

Top third
Middle third
Bottom third
"—" Data not available.
* Suppressed owing to small numbers.
† Visit systemperformance.ca for information on this indicator.

Data sources:
CCHS: Statistics Canada, Canadian Community Health Survey
PCCSN: Pan-Canadian Cervical Cancer Screening Network
Partnership: Canadian Partnership Against Cancer's HPV Immunization Survey
BC CDC: British Columbia Centre for Disease Control
PE CPHO: Prince Edward Island Chief Public Health Office

Indicator	Where to find it	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Data source
Screening															
Cervical cancer screening (%)	Page 25	82.3	81.2	79.3	85.4	81.6	71.7	80.0	83.1	88.7	82.9	81.2	81.1	74.9	CCHS
Breast cancer screening (%)	Page 27	69.0	73.0	64.0	72.0	73.0	74.0	71.0	67.0	61.0	71.0	61.0	66.0	*	CCHS
Colorectal cancer screening (%)	Page 29	45.0	55.0	48.0	65.0	60.0	38.0	42.0	48.0	60.0	42.0	41.0	41.0	22.0	CCHS
Diagnosis															
Breast cancer diagnosis wait time (no biopsy)—90th percentile (weeks)	Page 36	8.0	4.0	5.3	5.0	4.4	—	6.0	7.6	5.9	8.0	—	—	—	BCSP
Breast cancer diagnosis wait time (biopsy)—90th percentile (weeks)	Page 37	14.0	12.1	12.5	14.0	11.3	—	13.1	11.7	10.6	15.0	—	—	—	BCSP
Colorectal cancer diagnosis wait time— 90th percentile (days)	Page 38	150	139	119	119	—	—	—	147	151	104	—	—	—	NCCSN
Capture of stage—4 most common cancers (%)‡	Online†	100	99.9	99.9	100	92.0	—	99.9	100	100	100	—	—	—	PCA
Stage distribution	Online†	Data not reported provincially.													PCA

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Middle third
Bottom third

"—" Data not available.

* Suppressed owing to small numbers.

† Visit systemperformance.ca for information on this indicator.

‡ Due to the number of values that are the same and the small sample size, this indicator can only be categorized into two groups.

Data sources:
CCHS: Statistics Canada, Canadian Community Health Survey
BCSP: Provincial breast cancer screening programs
NCCSN: National Colorectal Cancer Screening Network
PCA: Provincial cancer agencies and programs

Indicator	Where to find it	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Data source
Treatment															
Removal and examination of 12 or more lymph nodes in colon resections (%)	Page 44	—	83.0	74.2	82.3	—	—	77.8	76.4	70.7	81.9	—			PCA
Breast cancer resections that are breast-conserving surgeries (%)	Page 46	54.8	48.3	37.6	63.8	63.9	75.1	56.7	50.1	51.4	30.8	35.3			CIHI
Radiation therapy wait time—90th percentile (days)	Page 49	22	22	—	22	—	—	19	–	27	20	—			PCA
Pre-operative radiation therapy for Stage II or III rectal cancer (%)	Page 53	—	46.7	—	50.4	—	—	43.0	41.5	–	41.6	—			PCA
Post-operative chemotherapy for Stage II or IIIA non-small cell lung cancer (%)	Page 57	—	41.4	43.6	44.2	56.1	—	—	—	50.0	—	—			PCA
Resections for Stage II or III rectal cancer (%)	Online†	—	92.6	—	86.0	—	—	100	86.0	—	81.1	—			PCA
Resections for Stage III colon cancer (%)	Online†	—	97.3	85.7	89.0	—	—	88.0	—	100	—	—			PCA
Resections for Stage II or IIIA non-small cell lung cancer (%)	Online†	—	38.1	33.1	41.6	—	—	41.6	—	36.8	—	—			PCA
Post-operative radiation therapy for Stage I or II breast cancer (%)	Online†	—	88.5	71.5	81.2	—	—	77.1	81.2	87.8	89.3	—			PCA
Post-operative chemotherapy for Stage III colon cancer (%)	Online†	—	60.3	65.6	57.5	—	—	—	—	60.9	—	—			PCA

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Middle third
Bottom third
"—" Data not available.
† Visit systemperformance.ca for information on this indicator.

Data sources:
PCA: Provincial cancer agencies and programs
CIHI: Canadian Institute for Health Information

Indicator	Where to find it	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Data source
Person-Centred Perspective															
Screening for distress	Page 67	See Person-Centred Perspective chapter for details.													PCA
Place of death—hospital (%)	Online†	49.8	63.6	69.5	89.4	64.2	77.8	75.6	70.0	62.6	78.1	—	—	—	VSD
Research															
Adult clinical trial participation ratio	Page 72	0.025	0.066	0.032	0.018	0.057	—	0.011	0.007	*	0.002	—	—	—	PCA, CCS
Pediatric clinical trial participation ratio	Online†	0.191	0.199	0.375	0.571	0.263	0.307	—	0.283	—	0.429	—	—	—	C^{17}
Clinical research investment	Online†	Data not reported provincially.													CCRA
Appropriateness															
Breast cancer screening outside of guidelines (%)	Page 78	29.8	28.3	21.6	25.1	25.9	17.4	15.7	26.9	33.5	26.9	13.5	37.7	*	CCHS
Breast cancer mastectomies as day surgery (%)	Page 81	14.7	1.4	6.4	27.4	38.7	27.9	39.3	20.2	18.4	8.2	*	*	*	CIHI
Intensive care use in the last 2 weeks of life—admissions (%)	Online†	8.4	9.4	9.8	7.1	14.3	—	6.9	5.8	9.5	9.0	15.9			CIHI

Top third
Middle third
Bottom third
"—" Data not available.
* Suppressed owing to small numbers.
† Visit systemperformance.ca for information on this indicator.

Data sources:
PCA: Provincial cancer agencies and programs
VSD: Statistics Canada, Vital Statistics Death Database
CCS: Canadian Cancer Society, Canadian Cancer Statistics
C^{17}: C^{17} Council of pediatric oncology programs
CCRA: Canadian Cancer Research Alliance
CCHS: Statistics Canada, Canadian Community Health Survey
CIHI: Canadian Institute for Health Information

Indicator	Where to find it	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Data source
Long-Term Outcomes															
Breast cancer incidence (per 100,000 women)	Page 89	127.5	128.3	125.6	132.9	128.0	129.2	122.1	130.8	137.6	120.6	—	—	—	CCR
Stage IV breast cancer incidence (per 100,000 women)‡	Page 90	8.0	9.1	11.0	11.0	—	—	8.0	11.0	11.0	—	—	—	—	PCA
Breast cancer mortality (per 100,000 women)	Page 89	23.9	25.0	28.0	29.1	27.0	28.4	28.0	29.1	26.1	31.9	—	—	—	VSD
Lung cancer incidence—males (per 100,000)	Page 93	65.7	68.7	78.1	76.9	72.2	104.2	100.5	99.1	101.0	95.3	—	—	—	CCR
Lung cancer incidence—females (per 100,000)	Page 93	55.4	58.9	67.0	68.4	55.4	71.4	63.4	76.8	57.4	54.0	—	—	—	CCR
Stage IV lung cancer incidence (per 100,000)	Page 94	37.0	42.9	49.0	44.0	—	—	40.0	57.0	45.0	—	—	—	—	PCA
Lung cancer mortality (per 100,000)	Page 93	49.8	50.2	54.9	57.7	51.6	71.4	64.6	65.3	63.7	62.0	—	—	—	VSD
Colorectal cancer incidence—males (per 100,000)	Page 97	69.3	73.8	84.0	87.2	68.0	80.6	77.9	92.6	81.1	111.3	—	—	—	CCR
Colorectal cancer incidence—females (per 100,000)	Page 97	49.1	49.0	59.2	57.3	48.7	55.3	52.7	67.2	58.2	78.4	—	—	—	CCR
Stage IV colorectal cancer incidence (per 100,000)	Page 98	15.0	17.0	18.0	17.0	—	—	16.0	20.0	22.0	—	—	—	—	PCA
Colorectal cancer mortality (per 100,000)	Page 97	23.5	23.1	24.8	27.9	24.4	28.1	26.0	32.8	27.9	40.0	—	—	—	VSD

Top third
Middle third
Bottom third
"—" Data not available.
‡ Due to the number of values that are the same and the small sample size, this indicator can only be categorized into two groups.

Data sources:
CCR: Statistics Canada, Canadian Cancer Registry
PCA: Provincial cancer agencies and programs
VSD: Statistics Canada, Vital Statistics Death Database

Indicator	Where to find it	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NT	NU	Data source
Long-Term Outcomes															
Prostate cancer incidence (per 100,000 men)	Page 101	143.5	157.7	146.2	126.3	146.4	113.6	163.4	149.5	190.5	159.1	—	—	—	CCR
Stage IV prostate cancer incidence (per 100,000 men)	Page 102	19.0	21.8	23.0	24.0	—	—	12.0	17.0	18.0	—	—	—	—	PCA
Prostate cancer mortality (per 100,000 men)	Page 101	27.5	32.0	36.6	34.3	28.5	26.0	28.2	31.7	31.8	31.2	—	—	—	VSD
Pancreatic cancer incidence—males (per 100,000)	Page 105	13.3	13.5	14.1	17.1	12.6	14.0	14.5	13.7	14.5	11.0	—	—	—	CCR
Pancreatic cancer incidence—females (per 100,000)	Page 105	10.4	12.3	12.0	12.3	10.6	10.7	11.9	12.1	10.9	9.3	—	—	—	CCR
Pancreatic cancer mortality (per 100,000)	Page 105	11.9	11.4	11.3	11.7	11.5	12.6	12.8	12.5	11.9	11.2	—	—	—	VSD
Ovarian cancer incidence (per 100,000 women)	Page 109	13.0	11.3	13.7	14.5	15.0	14.2	12.6	12.3	12.9	14.1	—	—	—	CCR
Stage IV ovarian cancer incidence (per 100,000 women)	Page 110	—	2.6	4.0	3.0	—	—	—	2.0	*	—	—	—	—	PCA
Ovarian cancer mortality (per 100,000 women)	Page 109	9.5	8.7	8.9	9.5	9.1	8.7	8.4	9.9	8.2	9.1	—	—	—	VSD

Top third
Middle third
Bottom third
"—" Data not available.
* Suppressed owing to small numbers.

Data sources:
CCR: Statistics Canada, Canadian Cancer Registry
PCA: Provincial cancer agencies and programs
VSD: Statistics Canada, Vital Statistics Death Database

What's Next in System Performance?

Advances in cancer control in Canada have been achieved through the sustained efforts and collaboration of national, provincial and territorial partners. But there is still work to be done—cancer continues to pose a significant burden: two in five Canadians will develop cancer in their lifetime and one in four will die of it.[1]

The Canadian Partnership Against Cancer (the Partnership) will continue to play its unique role: working with the cancer community and with health system partners across the country toward reducing the incidence of cancer, lessening the likelihood of people dying from cancer and enhancing the quality of life of those affected by cancer. This work includes ongoing efforts to report on system performance measurements to inform cancer control planning optimization, drive improvements in quality of practice and promote the exchange and uptake of best practices across the country.

To this end, the Partnership's System Performance Initiative, in collaboration with provincial cancer agencies and programs as well as national partners, will work to enhance knowledge and data availability related to key areas of Canada's cancer control system over the next year:

- **The quality of person-centred care** throughout patients' cancer journey is under-measured and under-reported. To address this gap, a spotlight report on person-centred care is in development, with indicators on palliative and end-of-life care, patient-reported outcomes and experiences, and the cancer journey in the adolescent and young adult population. Additionally, the Experiences of Cancer Patients in Transition study will help to explain how the health care system could better meet the needs of cancer patients as they transition from treatment to follow-up and survivorship care. Findings from these efforts will inform strategies for integrated, patient-centred care, ultimately improving patient experience and outcomes.
- **Enhancing the reach and impact of System Performance products** is also a key priority being met through the System Performance Web Application (systemperformance.ca). The application is an interactive tool for viewing and using system performance data. As a result of stakeholder feedback on how the application could best address needs in the system, the application now offers the ability to view data organized by province and territory. Discussions on future directions for the System Performance Web Application are underway to further enhance user experience.

With these and other efforts, the Partnership, through its System Performance Initiative, will continue to work closely with organizations across the country to shed light on opportunities for continuous system improvements.

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Report production and dissemination were led by the System Performance team at the Canadian Partnership Against Cancer (the Partnership), which included **Dr. Heather Bryant**, Vice-President, Cancer Control; **Rami Rahal**, Director; **Jose Hernandez**, Program Manager; **Jennifer Chadder**, Program Manager and Content Lead for this report; Specialists **Kim Tran**, **Kristen DeCaria** and **Carolyn Sandoval**; **Alexander Lim**, Delivery Manager; and **Jenna Berndt**, Administrative Assistant.

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Valuable contributions to the report in the form of content knowledge and expert input were also provided by Cancer Control portfolios within the Partnership, including **Deb Keen** and **Dr. David Mowat** in Prevention; **Pam Tobin**, **Dr. Verna Mai**, **Candice Anderson** and **Anna Crosskill** in Screening and Early Detection; **Dr. Mary Argent-Katwala** in Diagnosis and Clinical Care; **Esther Green**, **Dr. Deborah Dudgeon** and **Dr. Margaret Fitch** in Person-Centred Perspective; and **Kim Badovinac** in Research.

Media and outreach engagement for the report were led by **Kari Kerr**, **Lesley Frey** and **Karen Palmer** on the Communications team; knowledge and exchange strategies were led by **Annemarie Edwards**, **Louise Zitzelsberger, Pierre Lachaine, Kirsten Jordan** and **Mandy Sangha** on the Knowledge Mobilization team; and policy and government relations were led by **Andrea Reed**, **Lalaine Lacuesta Manaois** and **Colin LeFevre** on the Strategy team; report distribution was coordinated by **Debra Adair**, **Suzanne Cherry** and **Victoria Faric**.

We would also like to acknowledge **Shelly Jamieson**, Chief Executive Officer, and **Nicole Beben**, Vice-President, Strategy, for their review and input throughout the production of the report.

About the System Performance Initiative

The **Partnership's System Performance Initiative** is a national effort to identify aspects of the cancer control system that need to be measured or are under-measured, to define performance indicators, to collect valid and comparable data, and to report findings in an integrated manner that allows for synthesis of results and interpretation of patterns.

Findings are published in a series of reports targeted at the cancer control community, especially provincial cancer agencies, departments or ministries of health, clinicians, researchers, and cancer patients and their families. Peer-reviewed articles, presentations and workshops at conferences and, most recently, a web application also enable the dissemination of pan-Canadian system performance information. Such knowledge is intended to aid policy makers, health planners, researchers and clinicians in identifying best practices and opportunities for quality improvements in cancer control across Canada.System Performance information, including previous reports, can be accessed at systemperformance.ca.

Notes

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EMBARGOED UNTIL PUBLIC RELEASE ON JULY 12, 2016

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ISSN 2369-2480 (Print)
ISSN 2369-2499 (Online)

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in cancer control