

The 2015 Cancer System Performance Report

JUNE 2015

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Executive Summary

The 2015 Cancer System Performance Report is our sixth annual report of indicators measuring cancer system performance across Canada. As distinct from our *spotlight reports* that provide in-depth analyses on specific topics, the annual system performance reports provide a pan-Canadian cross-section of key performance indicators. These span the continuum of cancer control—from prevention to long-term outcomes and survivorship.

In consultation with advisors and representatives from all 10 provinces it was agreed that starting in 2015, the Canadian Partnership Against Cancer’s annual system performance reports would focus on a group of 17 “dashboard” indicators. Other indicators would be reported on periodically or online via the System Performance web application (systemperformance.ca).

Dashboard indicators are a group of well-established metrics with a strong evidence base that address important aspects of key cancer control domains—for example, prevention, screening, treatment and long-term outcomes. These indicators can help determine clear pathways for reducing the burden of disease and improving care for Canadians. Plans are underway to establish performance targets for all dashboard indicators and to report on progress across the country.

As in previous editions, this report is organized along the dimensions of the cancer control continuum: prevention, screening, diagnosis, treatment and person-centred perspective. Also

included are chapters covering research, appropriateness (formerly system efficiency) and long-term outcomes.

The current report includes four new targets in the prevention and screening domains. It also includes three special features on: active transportation rates in Canada, measuring the extent to which people walk or cycle to and from school or work; an update on rates of self-reported cancer screening in underserved populations; and an examination of how positron emission tomography (PET) scans are used in the management of non-small cell lung cancer in Canada.

As in past editions, the 2015 annual cancer system performance report was produced in close collaboration with partners at the national, provincial and 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 Partnership worked closely with Statistics Canada and the Canadian Institute for Health Information to populate specific indicators.

Indicator results are generally compared by province or territory, age group and sex. Where appropriate, comparisons with international jurisdictions are discussed, highlighting potential best practices and benchmarks. Commentary on emerging evidence or studies—either national or international—is also included where relevant.

Results Highlights

Prevention

Dashboard Indicators

- Smoking prevalence
- Human papillomavirus (HPV) vaccination

Analysis of smoking prevalence has shown that in 2013, 19.3% of Canadians aged 12 or older reported smoking daily or occasionally in the previous year. The lowest smoking prevalence was 16.2% in British Columbia; the highest was 59.0% in Nunavut. This year a target of 12% has been introduced for this indicator (based on the *Federal Tobacco Control Strategy* target) in order to motivate smoking reduction efforts across the country and to assess progress in preventive efforts. As of 2013, no province or territory had achieved this target.

As of 2010, all provinces and territories had implemented organized school-based HPV vaccination programs. For those provinces reporting immunization with the first dose of the vaccine, uptake ranged from 47.0% in the Northwest Territories to 93.8% in Newfoundland and Labrador. The findings show that there was large variation in uptake of HPV vaccination across the country. Monitoring uptake will help to identify performance gaps and inform opportunities for increased efforts in prevention activities.

This year a special feature on active transportation is included in the report. Active transportation—defined as walking or cycling to and from work or school—is a practical and effective way to increase physical activity levels. This in turn can positively impact health and potentially protect against several types of cancer. Participation in active transportation by Canadian adults was low across the country, at around 22%.

Screening

Dashboard Indicators

- Self-reported screening rates for breast, cervical and colorectal cancers

This year, targets were set for the range of screening indicators—by province, household income and immigrant status. The goal is to evaluate screening coverage at the population level and to highlight the importance of screening a large proportion of the target population. This in turn can yield reductions in incidence and/or mortality. The targets were: 80% self-reported screening for cervical cancer; 70% for breast cancer screening; and 60% for colorectal cancer screening using a fecal test. These targets align with those developed by the national screening networks for the three screening programs.

Self-reported cervical cancer screening rates in 2012 ranged from 70.3% in Quebec to 87.3% in Prince Edward Island. The 80% target for cervical cancer screening was achieved by five of 13 provinces/territories. Self-reported screening mammography rates for 2012 varied by province and territory, ranging from 57.4% in Yukon to 74.9% in Quebec. The 70% target for breast cancer screening was achieved by seven of 13 provinces/territories. In 2012, the percentage of Canadians who were up-to-date on colorectal cancer screening (based on self-reported data) ranged from 28.3% in Quebec to 59.2% in Manitoba. The 60% target for colorectal cancer screening using a fecal test has yet to be achieved by any province/territory.

Data from 2013 were only available for a small number of provinces for these three indicators. For those provinces that did report, the minimal data made it difficult to discern a trend.

A special feature on cervical, breast and colorectal cancer screening in underserved populations is included in the current report. The goal is to highlight the disparities in cancer screening that continue to exist across the country.

Our analysis found that in 2012, low-income and recent immigrant populations were less likely to report having undergone screening for cervical, breast and colorectal cancers than their higher-income or Canadian-born counterparts. The exception was breast cancer screening among immigrant women, where no real differences were observed. For both breast and cervical cancer, the screening targets described above were applied to household income quintiles and immigrant status. Screening rates for women in all income quintiles except Q1 and Q2 (the lowest quintiles) and for Canadian-born women met the 80% cervical cancer screening target; screening rates for all women, except those in the lowest income quintile (Q1), met the 70% breast cancer screening target.

Diagnosis

Dashboard Indicators

- Wait times from abnormal screen to resolution by secondary biopsy/exam for breast and colorectal cancers

In 2012, Alberta, Saskatchewan, Ontario, New Brunswick and Nova Scotia achieved or were close to achieving the wait time target of 90% of women waiting five weeks or less (without biopsy) between an abnormal breast screen result and resolution. Trends suggest improvements in wait times in several provinces. However, none of the reporting provinces met the wait time target of seven weeks or less for women requiring a biopsy.

Median wait times from abnormal fecal test result to follow-up colonoscopy among those screened through organized colorectal cancer

screening programs (between 2011 and 2012) ranged from 63 days in Nova Scotia to 105 days in Newfoundland and Labrador. None of the five reporting provinces had median or 90th percentile wait times below the 60-day target.

Timely resolution of an abnormal cancer screening result leads to a shortened period of uncertainty and anxiety for people who turn out to have a negative diagnosis (no cancer) and to earlier detection and potentially improved treatment outcomes for people with a positive diagnosis (cancer).

Treatment

SURGERY

Dashboard Indicators

- Removal and examination of 12 or more lymph nodes in colon resections
- Breast cancer resections that are mastectomies

From 2008 to 2011, the percentage of colon cancer resection surgeries with 12 or more lymph nodes examined continued to increase steadily across all provinces. In 2011, one of eight reporting provinces (Ontario) was close to meeting the target of 90%; Alberta, Manitoba and Newfoundland and Labrador reached levels above 80%. There were no notable differences in treatment patterns by patient age group or by sex. The recommendation that a minimum of 12 nodes be removed and then examined is based on the fact that false negative nodal staging (i.e., the test fails to demonstrate that the cancer has in fact spread) is reduced to acceptable levels when 12 or more nodes are removed and examined.

There was substantial interprovincial variation in the percentage of breast cancer resections done by mastectomy based on data from 2008/2009 to 2012/2013. The percentage of women who were treated by mastectomy (either as their first

surgery or within one year of breast-conserving surgery) ranged from 25.9% in Quebec to 68.8% in Newfoundland and Labrador. Breast-conserving therapy (i.e., 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. Evidence shows that mortality from non-metastatic breast cancer is equal across both procedures.

RADIATION THERAPY

Dashboard Indicators

- Radiation therapy wait time from ready-to-treat to start of treatment
- Pre-operative radiation therapy for Stage II or III rectal cancer patients

In 2013, eight of nine provinces with available data had achieved the target—90% of patients treated within the national wait time target of 28 days from ready-to-treat to start of treatment. The shortest median wait times (for all cancers combined) were in Ontario (14 days) and Saskatchewan (15 days). Timely access to radiation therapy is a key component of a high-quality cancer control system. Reducing radiation therapy wait times for cancer patients is a national health-care priority.

The percentage of Stage II or III rectal cancer cases undergoing pre-operative radiation therapy has increased over time; however, none of the six reporting provinces met the 70% target. The province with the highest treatment rate for 2011 was Newfoundland and Labrador at 59.6%. The treatment rate varied by patient age: around 58% of patients under age 60 with rectal cancer underwent pre-operative radiation therapy compared to 22% of those over age 80. The delivery of pre-operative radiation therapy (often combined with chemotherapy) has been shown to improve outcomes and local control, and to reduce acute and long-term toxicity for patients with Stage II or III rectal cancer.

SYSTEMIC THERAPY

Dashboard Indicator

- Post-operative chemotherapy for Stage II or IIIA non-small cell lung cancer patients

The percentage of patients diagnosed in 2011 with Stage II or IIIA non-small cell lung cancer (NSCLC) who received adjuvant chemotherapy ranged from 45.8% in Alberta to 50.0% in Nova Scotia. Rates were almost 20 percentage points lower for patients aged 70 or older compared to rates for those under age 60. The treatment rate for patients aged 70-79 was close to the 45% target. The delivery of chemotherapy following resection has been shown to improve disease-free five-year survival and overall five-year survival for patients with Stage II or IIIA NSCLC when compared to surgery alone.

Person-Centred Perspective

Dashboard Indicator

- Use of standardized screening for distress tools

The use of a standardized tool aimed at screening people with cancer for distress varied across the country. In 2014, eight out of ten provinces used such a standardized tool for at least some patients who were being treated at provincial cancer centres; this compares with just four out of ten provinces which were using such a tool in 2007.

Late identification of distress in cancer patients has been associated with negative outcomes, including poorer adherence to treatment, lower levels of satisfaction with care and lower levels of satisfaction with care recommendations. Screening helps to identify problems early on, so that appropriate follow-up assessment, intervention and referrals for support services can be offered to address patients' specific needs.

Research

Dashboard Indicator

- Clinical trial participation ratio for adult cancer patients

The ratio of adult patients enrolled in clinical trials to cancer incident cases ranged from 0.004 to 0.058 (interpretable as 0.4% to 5.8%) across reporting provinces in 2013. For the four most common disease sites, the ratio ranged from 0.012 (1.2%) for lung cancer to 0.050 (5%) for breast cancer. A number of studies have shown that patients who were treated in cancer centres with active clinical trial programs tended to have better health outcomes (such as increased length of survival and better quality of life) compared to those treated in centres that did not participate in clinical trials. One explanation for this may be a correlation between high levels of clinical trial activity and adherence to evidence-based treatment guidelines that yields better outcomes.

Appropriateness

Dashboard Indicators

- Screening mammograms done outside of the recommended guidelines
- Breast cancer mastectomies done as day surgery

According to breast cancer screening guidelines published by the Canadian Task Force for Preventive Health Care, regular screening mammograms are recommended for women aged 50-74 years.¹ But some Canadian women are being screened outside this recommendation. Data from 2012 showed that between 13.5% (reported in the Yukon) and 37.7% of screening mammograms (reported in the Northwest Territories) done in the previous two years were performed on women outside of the

recommended age range. It is important to monitor breast cancer screening that occurs outside evidence-based guidelines: not only are mammograms performed outside these guidelines resource-intensive, they can result in unnecessary and potentially harmful interventions.

The percentage of mastectomies done as day surgery between 2007/2008 and 2011/2012 was highest in Ontario at 34%; it was less than 10% in four provinces (British Columbia, Alberta, Saskatchewan and Newfoundland and Labrador). The finding is important, since same-day surgery is usually less resource-intensive than inpatient surgery and, with proper aftercare, yields comparable outcomes.

Long-Term Outcomes

Dashboard Indicators

- Stage-specific incidence for breast, lung, colorectal and prostate cancers
- Overall age-standardized incidence, mortality and relative survival for breast, lung, colorectal, prostate and pancreatic cancers

For the first time, we are reporting stage-specific incidence rates of the four most common cancers by province. This provides new opportunities for monitoring cancer trends and evaluating the impact of early detection and screening on patient outcomes across the country.

Breast cancer was most commonly diagnosed at Stage I or II; lung cancer at Stage IV, colorectal cancer at Stage III (though differences in stage-specific incidence were modest in some provinces); and prostate cancer at Stage II. The chapter also reports on incidence, mortality and five-year relative survival for breast, lung, colorectal, prostate and pancreatic cancers.

Looking Ahead

The Canadian Partnership Against Cancer (the Partnership) will continue to play its unique role in collaborating with national, provincial and territorial partners towards advancing on the objectives of the Canadian Cancer Control Strategy. To support this effort, the System Performance initiative will continue to develop and disseminate data and analyses to inform opportunities for pan-Canadian system improvements, and to promote the exchange and uptake of best practices across the country.

- New data on relative survival-by-stage for lung and colorectal cancer across Canada will be released later in 2015. This will provide the first-ever comprehensive look at the relationship between the stage at which cancers are first diagnosed and patient outcomes at a population level.
- In Fall 2015, a spotlight report on prostate cancer will be released. The report will include findings on indicators across the continuum of care, from prevention to end-of-life care and survivorship. It will also contain a special feature offering perspectives from prostate cancer patients and survivors across the country on their experiences navigating the health care system following a diagnosis of prostate cancer.
- Early in 2016, the Partnership will release another spotlight report on the “appropriateness” of clinical cancer interventions. The report will feature baseline indicator results for a number of the *Choosing Wisely Canada* oncology interventions.
- An in-depth study launched in early 2015 will continue through 2017. The study is exploring the experiences of cancer patients as they transition from end of curative treatment (such as chemotherapy, radiation treatment and surgery) to follow-up care and support services (such as primary care and community care).
- The System Performance web application, launched in 2014, will continue to be

enhanced in terms of content and functionality. The web app was developed to provide broad access to the latest available data and analysis measuring the quality of cancer control across Canada. This includes giving users the ability to download graphs and data for own analysis. The web app can be accessed at systemperformance.ca.

- Finally, the Partnership’s System Performance Initiative recently conducted an “impact” evaluation study of its body of work to date. Findings from the study will inform a knowledge translation and exchange (KTE) plan for more focused efforts towards the dissemination, reach and uptake of system performance knowledge across the country. The KTE plan will begin implementation in Fall 2015.

Combined with other cancer system performance written publications and KTE tools, these efforts will provide health system decision-makers, practitioners and researchers with detailed system performance knowledge that can be used to inform advances in cancer control across the country.

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 towards are: fewer cases of cancer, fewer Canadians dying from cancer and a better quality of life for those affected by cancer.

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. This work is accomplished in close collaboration with national, provincial and territorial partners.

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.

About This Publication

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About This Publication

The 2015 Cancer System Performance Report is our sixth annual report of indicators measuring cancer system performance across Canada. As distinct from our spotlight reports that provide in-depth analyses on specific topics, the annual system performance reports provide a pan-Canadian cross-section of key performance indicators. These span the continuum of cancer control—from prevention to long-term outcomes and survivorship.

In consultation with advisors and representatives from all 10 provinces, it was agreed that starting in 2015, the Canadian Partnership Against Cancer’s annual system performance reports would focus on a group of 17 “dashboard” indicators. Other indicators would be reported on periodically or online via the System Performance web application (systemperformance.ca).

Dashboard indicators were chosen because they meet at least several of the following criteria:

- They are well-established metrics that address important aspects of cancer control and have a strong evidence base.
- They have the greatest potential for informing action that leads to reducing the burden of cancer for Canadians.
- They represent areas of significant variation among provinces or changes over time, and/or highlight a significant gap between current results and desired targets.
- They have established national targets or lend themselves to the development of targets.
- They address a current national priority area or topic in cancer control.

Dashboard indicators will be updated annually, and targets will be set for each in the future. All other indicators previously reported on will be available through the Canadian Partnership Against Cancer’s System Performance web application and updated on a periodic basis. Detailed information on data specifications and calculation methodology for each indicator are also available on systemperformance.ca

This 2015 edition includes four new targets developed by a panel of national experts—one for prevention (smoking prevalence) and three for screening (cervical, breast and colorectal screening). The report also includes three special features: a look at “active transportation” in Canada — the extent to which people walk or cycle to school or work; an update on rates of self-reported screening in underserved populations; and an examination of how positron emission tomography (PET) scans are used in the management of non-small cell lung cancer in Canada.

Indicator results are generally compared by province or territory, age group and sex. Where appropriate, comparisons with international jurisdictions are discussed, highlighting potential best practices and benchmarks. Commentary on emerging evidence or studies—either national or

international—is also provided where relevant. As in previous editions, the 2015 report is organized along the dimensions of the cancer control continuum: prevention, screening,

diagnosis, treatment and person-centred perspective. Also included are chapters covering research, appropriateness (formerly system efficiency) 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 support the development and adoption of national performance targets and benchmarks.

For interprovincial system performance comparisons to be meaningful, a coordinated approach is required to ensure standardized definitions, methodologies and interpretations.

Detailed data specifications and calculation methodologies are developed by the Canadian Partnership Against Cancer in close collaboration with provincial cancer agencies and programs. These are used in the collection and analysis of data at the provincial cancer agency level to ensure consistency and comparability across provinces.

Reporting on system performance is not an end in itself, but a key mechanism in stimulating action. It helps promote a “continuous improvement” feedback loop by shedding light on areas where further attention and action are required; by pointing towards key collaborations and partnerships; and by allowing for well-informed decision-making towards improving cancer control in Canada. Pan-Canadian system performance measurement also allows for international comparisons and “know-how” transfer from international benchmarks.

How the Report Was Informed

As in past editions, the **2015 Cancer System Performance Report** was produced in close collaboration with partners at the national, provincial and territorial levels. It was further informed by consultations with subject matter experts and knowledge leaders from across the country.

At the provincial level, the Steering Committee and Technical Working Group for System Performance, each comprising locally-appointed representatives from all 10 Canadian provinces, guided the planning and development of the report. Provincial cancer agencies and programs provided data from each of their jurisdictions

which were needed to calculate and develop most indicators in the report—particularly in the domains of diagnosis, treatment, research and person-centred perspective. Detailed data specifications and calculation methodologies were developed and used in the collection and analysis of data at the provincial cancer agency level to ensure consistency and comparability across provinces.

At the national level, the Canadian Partnership Against Cancer worked closely with Statistics Canada as the survey administrator and data steward for the Canadian Community Health Survey (CCHS). The report used CCHS information on health status, health-care

utilization and health determinants for the Canadian population; these data informed indicators reported on in the domains of prevention, screening and appropriateness. Statistics Canada also houses the Canadian Cancer Registry and Vital Statistics Database; their data were used to generate key measures of long-term outcomes such as cancer incidence, mortality and survival. Canadian cancer statistics from the Canadian Cancer Society were also used for adult clinical trial participation rates, while data from the Canadian Institute for Health Information was used for indicators related to cancer surgery, particularly resection rates for breast cancer.

How the Report is Organized

The report is organized along the dimensions of the cancer control continuum: prevention, screening, diagnosis, treatment and person-centred perspective. Also included are chapters covering research, appropriateness (formerly system efficiency) and long-term outcomes.

An introduction prefaces each chapter, providing background on the cancer control dimension being measured and data sources used, along with any other relevant information. The introduction is followed by a detailed explanatory description and interpretation of results for each indicator, organized as follows:

- **What are we measuring and why?** This section describes the indicator and provides the rationale reporting on it, along with relevant contextual information such as burden of disease or implications on cancer control activities, where appropriate. Detailed information on data specifications and calculation methodology for each indicator is available at systemperformance.ca.
- **What are the results?** This section provides a narrative description of the results, highlighting

notable patterns and trends. It also provides any methodological considerations that should be taken into account when interpreting figures and tables.

- **What do the results mean?** This section provides some interpretation of results, drawing comparisons with international jurisdictions where applicable, and highlighting potential implications to health outcomes. It also discusses available or planned targets for the indicator.
- **What are some examples of efforts in this area?** This section highlights some examples of activities planned or currently underway by the Canadian Partnership Against Cancer and/or national or international jurisdictions where applicable. Examples include efforts to improve the ability to measure performance, influence practice, raise awareness and other knowledge transfer and exchange activity.
- **What else do we know?** For some indicators, commentary on emerging evidence or studies either nationally or internationally is provided.

Summary of Indicators

Cancer control domain	Indicator	Data source
Prevention	Smoking prevalence	Statistics Canada, Canadian Community Health Survey
	Human papillomavirus (HPV) vaccination	Pan-Canadian Cervical Screening Network Prince Edward Island Chief Public Health Office
Screening	Cervical cancer screening	Statistics Canada, Canadian Community Health Survey
	Breast cancer screening	Statistics Canada, Canadian Community Health Survey
	Colorectal cancer screening	Statistics Canada, Canadian Community Health Survey
Diagnosis	Colorectal cancer diagnosis wait time: from abnormal fecal test to colonoscopy	National Colorectal Cancer Screening Network
	Breast cancer diagnosis wait time: from abnormal breast screen to resolution	Provincial Breast Cancer Screening Programs
Treatment	Surgery	
	Removal and examination of 12 or more lymph nodes in colon resections	Provincial Cancer Agencies
	Breast cancer resections that are mastectomies	Canadian Institute for Health Information
	Radiation Therapy	
	Radiation therapy wait time: from ready-to-treat to start of treatment	Provincial Cancer Agencies
	Pre-operative radiation therapy for Stage II or III rectal cancer patients	Provincial Cancer Agencies
	Systemic Therapy	
	Post-operative chemotherapy for Stage II or IIIA non-small cell lung cancer patients	Provincial Cancer Agencies

Cancer control domain	Indicator	Data source
Person-Centred Perspective	Screening for distress	Provincial Cancer Agencies and Programs
Research	Adult clinical trial participation	Provincial Cancer Agencies Canadian Cancer Society, Canadian Cancer Statistics
Appropriateness	Breast cancer screening outside recommended guidelines	Statistics Canada, Canadian Community Health Survey
	Breast cancer mastectomies done as day surgery	Canadian Institute for Health Information
Long-Term Outcomes	Incidence, Mortality and Relative Survival	
	Breast cancer	Statistics Canada, Canadian Cancer Registry and Vital Statistics Database Provincial Cancer Agencies Canadian Cancer Society, Canadian Cancer Statistics
	Lung cancer	Statistics Canada, Canadian Cancer Registry and Vital Statistics Database Provincial Cancer Agencies Canadian Cancer Society, Canadian Cancer Statistics
	Colorectal cancer	Statistics Canada, Canadian Cancer Registry and Vital Statistics Database Provincial Cancer Agencies Canadian Cancer Society, Canadian Cancer Statistics
	Prostate cancer	Statistics Canada, Canadian Cancer Registry and Vital Statistics Database Provincial Cancer Agencies Canadian Cancer Society, Canadian Cancer Statistics
	Pancreatic cancer	Statistics Canada, Canadian Cancer Registry and Vital Statistics Database Provincial Cancer Agencies Canadian Cancer Society, Canadian Cancer Statistics

1. Prevention

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1. Prevention

Prevention is an effective long-term strategy for reducing the burden of cancer and is a key element in cancer control. The World Cancer Research Fund estimates that approximately one-third of cancers could be prevented if people did not smoke.² As much as another third could be prevented through a combination of better nutrition; limiting alcohol consumption; participating in regular physical activity; and maintaining a healthy body weight.² Research has also shown that, in addition to the behavioural risk factors described above, certain environmental factors (e.g., second-hand smoke exposure) and occupational factors (e.g., nightshift work) can also increase a person's risk of developing cancer.³

Understanding the role of behavioural, environmental and occupational risk factors and their prevalence in the population can help guide prevention efforts. Many risk factors can be modified by adjusting health behaviours (e.g., quitting smoking) or through clinical interventions such as immunization with the human papillomavirus (HPV) vaccine, which can protect women from most types of cervical cancer. Some risk factors, like second-hand smoke exposure or barriers to walking or biking to school and/or work, are strongly impacted by policies made at municipal, provincial or federal levels of government or in the private sector (e.g., providing financial incentives for using public transportation).

Other risk factors, such as advancing age and gender, cannot be modified.

This year's report presents two indicators for cancer prevention (reported on annually): smoking prevalence and HPV vaccination. This chapter also contains a special feature on active transportation which is defined as walking or bicycling to and from school or work.

A more comprehensive presentation of prevention indicators including smoking cessation, obesity, and physical activity can be found in the 2014 System Performance Report; current plans are to provide an update on the full range of prevention indicators in 2016.

Indicator	Summary of results
Smoking prevalence	<p>In 2013, one in five Canadians were still smoking; 19.3% of those aged 12 years or older reported smoking daily or occasionally, with the highest rates reported by residents of Canada's three territories. Males were more likely than females to report being daily, occasional or former smokers. More females than males reported never having smoked.</p> <p>The System Performance target for this indicator, originally set by Health Canada's <i>Federal Tobacco Control Strategy</i>, is 12%. As of 2013, no province had achieved this target; British Columbia was closest at 16.2%.</p>
Human papillomavirus (HPV) vaccination	<p>As of 2010, all provinces and territories had implemented organized school-based HPV vaccination programs. Substantial differences existed in HPV vaccination uptake among the reporting provinces and territories. Depending on the province, anywhere from 47.0% (estimated) to 93.8% of girls in the target age group had received the first doses of the HPV vaccine, based on the latest available data.</p>
Active transportation	<p>Only around one in five Canadian adults bike or walk to get to and from work or school. The percentage of adults reporting engagement in active transportation has remained relatively unchanged over the past seven years, at approximately 22.0%. Active transportation participation in adults was highest in Canada's three territories in 2013. Children (ages 12-17) were substantially more likely to engage in active transportation than adults.</p>

Smoking Prevalence

What are we measuring and why?

This indicator examines the percentage of the population aged 12 and older who reported smoking daily or occasionally in the previous year. The findings are based on data from the 2013 Canadian Community Health Survey (CCHS).

- Smoking remains the most preventable cause of disease and premature death in Canada, making tobacco control a key cancer prevention mechanism.⁴ Smoking causes an estimated 30% of all cancer deaths in Canada and an estimated 85% of lung cancer deaths. Risk increases with the quantity of tobacco used and the duration of smoking.^{5,6}
- Reporting on tobacco use patterns at a population level allows for monitoring of tobacco use and assessing progress in prevention efforts. It also informs opportunities for pan-Canadian smoking cessation strategies. As of October 2014, this type of reporting was undertaken by 179 countries around the world in accordance with

the World Health Organization's Framework Convention for Tobacco Control.⁷

- In 2015, the Canadian Partnership Against Cancer's System Performance Targets and Benchmarks Working Group established 12% as the national target for smoking prevalence in adults aged 12 and older (see *What do the results mean?* for more information on this target).

What are the results?

- In 2013, 19.3% of Canadians aged 12 years or older reported smoking daily or occasionally (data not shown). Provincial smoking rates ranged from 16.2% in British Columbia to 22.7% in Saskatchewan. The highest smoking rates were in Canada's three territories, with Nunavut reporting the highest rate of 59.0%. As of 2013, no province or territory had achieved the 12% target set for this indicator (Figure 1.1).

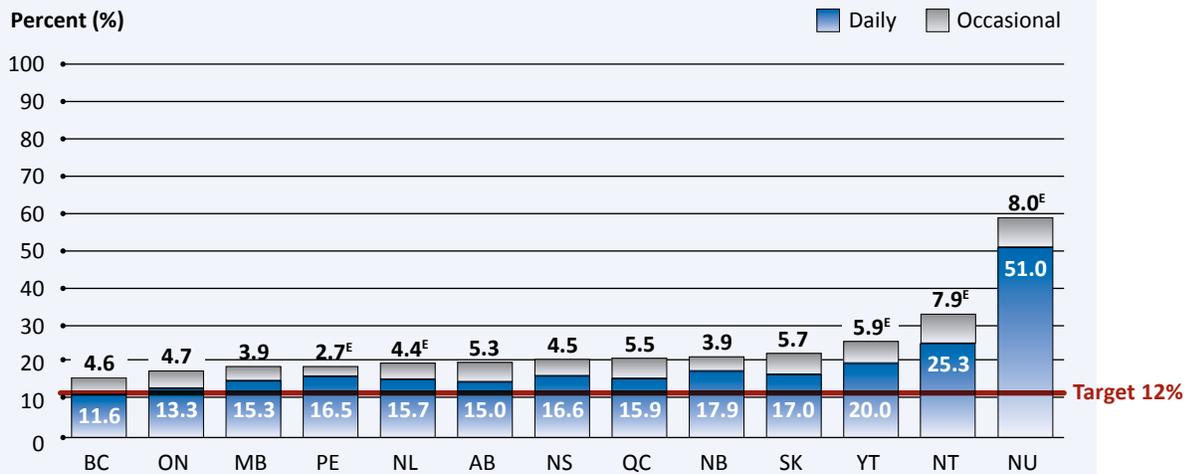
- Males were more likely than females to report being daily smokers (16.3% versus 12.5%), occasional smokers (5.8% versus 4.1%) or former smokers (41.1% versus 33.9%). Females were more likely than males to report having never smoked (49.6% vs. 36.8%) (Figure 1.2).

Data and measurement considerations

- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 1.1

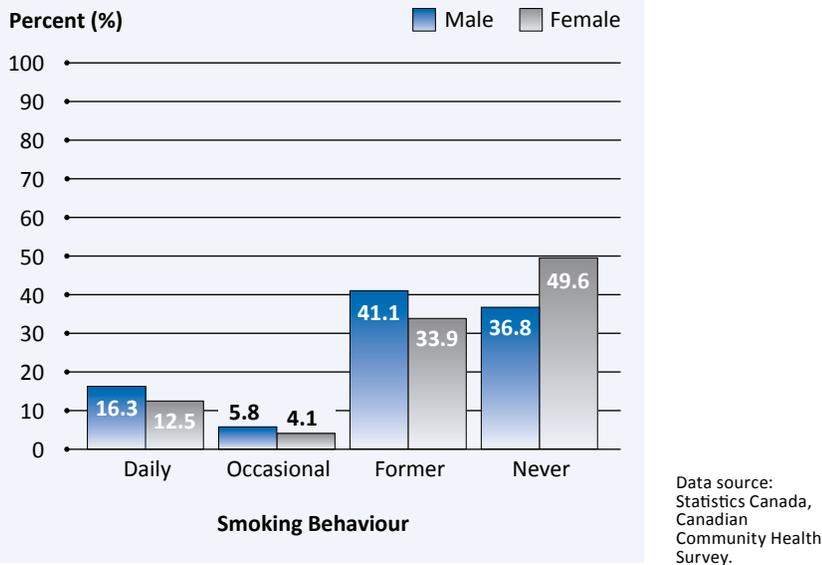
Percentage of population (aged ≥ 12) reporting daily or occasional smoking, by province/territory – 2013 reporting year



^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, by sex, Canada – 2013 reporting year



What do the results mean?

- Around one in five Canadians aged 12 and older reported daily or occasional smoking in 2013. The wide variation in smoking rates across the country suggests the potential value of persistent prevention and cessation efforts towards ongoing reductions in smoking prevalence.
- In 2015, for the first time, a Canadian Partnership Against Cancer system performance target was set for the smoking prevalence indicator. The target was established by experts from the Partnership's System Performance Targets and Benchmarks Working Group, which recommended alignment with the 2006 *Federal Tobacco Control Strategy's* target of reducing overall smoking prevalence to 12% by 2011.⁴ This target has yet to be achieved by any province or territory and provides an aspirational goal to motivate smoking reduction efforts across the country. The potential smoking prevalence reduction in the provinces or territories would range from 4.2 percentage points in British Columbia to 9.8 in New Brunswick to 47.0 in Nunavut.
- Canada's smoking rate of 19.3% (current daily or occasional smokers) is within the range of smoking rates reported internationally, including in the United States, the United Kingdom and Australia. Based on slightly different adult age cut-offs, reported smoking rates in these three countries were 18.1%, 18.7% and 16.0%, respectively. Reported smoking rates have declined in all three countries over time; rates were higher among men compared to women.⁸⁻¹⁰

What are some examples of efforts in this area?

- Health Canada's *Federal Tobacco Control Strategy*, aimed at reducing tobacco-related disease and death through smoking prevention and cessation, was renewed in 2012. The new phase of the strategy (2012-2017) focuses on groups with higher smoking rates: young adults and on-reserve First Nations and Inuit communities.¹¹
- The Propel Centre for Population Health Impact conducts and disseminates research on tobacco policy, smoking cessation and surveillance and monitoring with the goal of reducing the burden of tobacco use in Canada. Propel's products include an annual report on patterns and trends in tobacco use in Canada, as well as work related to the sale and use of flavoured tobacco; it also addresses policies around smoke-free multi-unit dwellings that are aimed at reducing exposure to second-hand smoke.¹²
- Having annual data on smoking prevalence in Canada has enabled the evaluation of smoking prevention and cessation program outcomes; these data are also being used to inform future programs. For example, the Coalitions Linking Action and Science for Prevention (CLASP) initiative is aimed at bringing together multi-sector organizations from across provinces and territories to form coalitions and integrate cancer prevention strategies. Three CLASP projects address tobacco prevention, smoking cessation and/or awareness, including:
 - the Building on Existing Tools to Improve Chronic Disease Prevention and Screening in Family Practice (BETTER) Project (funded until September 2014)
 - the Working on Wellness in Strategic Populations Project
 - the ACCELERATION (Activity, Smoking, Cessation, Healthy Eating & Alcohol intervention & motivation) Program
- The Canadian Partnership Against Cancer has established the *Prevention Policies Directory* (www.cancerview.ca/preventionpolicies), a free and accessible online tool that contains up-to-date information on Canadian policies related to cancer and chronic disease prevention. The *Directory* includes policies relevant to tobacco control at federal, provincial/territorial and municipal levels. Direct access to policy documents and legal instruments related to modifiable risk factors for cancer and chronic diseases are available through the online tool.
- The Partnership has also established a new initiative focused on accelerating evidence-informed action on tobacco via improved integration of cancer control and tobacco control in provinces and territories. The initial focus of this work will be on evidence-based tobacco cessation among Canadian cancer patients who are known to be smoking at the time of diagnosis and treatment.

What else do we know?

- A recent study found that 16.1% of Canadian youth and young adults had tried electronic cigarettes (e-cigarettes); 5.7% reported current use (within 30 days of the study).¹³ There is concern that e-cigarettes may increase the risk of nicotine poisoning and addiction in children and may also contribute to renormalization of cigarette use. E-cigarettes are non-combustible, battery-operated devices that mimic the use, and often the appearance and taste, of conventional cigarettes. They do not contain tobacco. While e-cigarettes that do not contain nicotine are authorized for import, sale or advertisement in Canada, those that do contain nicotine or that make health claims (i.e., using them can aid smoking cessation) are not authorized. Nicotine-containing e-cigarettes are regulated under the federal *Food and Drugs Act*. Despite this, illegal nicotine-containing e-cigarettes are widely available in Canada in retail stores and through online retailers. They are also available from the United States.¹⁴
- Nova Scotia was the first province to introduce e-cigarette legislation which came into force on May 31, 2015.¹⁵ Ontario has also proposed e-cigarette legislation, which received second reading in December 2014 and March 2015.¹⁶ British Columbia introduced legislation in Spring 2015, with the implementation date to be announced.¹⁷ Several other provinces, including New Brunswick and Quebec, are considering legislation. Federally, the Standing Committee on Health began studying the risks and benefits of e-cigarettes in the fall of 2014.¹⁸

Human Papillomavirus (HPV) Vaccination

What are we measuring and why?

This indicator measures the proportion of girls in a targeted cohort who received the first dose of the human papillomavirus (HPV) vaccine. The targeted cohort includes girls from schools (and in specific grades or age groups) where provincial HPV vaccination programs are offered.

- HPV is one of the most common sexually transmitted infections. Approximately 75% of sexually active people acquire HPV infection at some point in their lives; however, the majority of infections are transient and cleared by the body's own immune system within one to two years.¹⁹⁻²¹
- HPV infections account for virtually all cervical cancers. Two HPV vaccines are currently approved for use in Canada. Both protect against high-risk HPV types 16 and 18, which are responsible for over 70% of cervical cancer cases.^{22,23}
- HPV has been associated with a subset of head and neck cancers, including oral and oropharyngeal cancers; the virus is also implicated in anal-genital cancers. Of all HPV-related cancers in men, HPV types 16 and 18 account for 92% of anal cancers, 63% of penile cancers and 89% of oropharyngeal cancers.²³
- In 2007, Canada's National Advisory Committee on Immunization (NACI) released recommendations for the HPV vaccine, which included immunization of females aged nine to 26.²⁴ Federal funding was announced later that year for provincial and territorial implementation of HPV immunization programs in females.

1. Prevention

- NACI recommends three doses of the HPV vaccine be delivered. Recently, both British Columbia and Quebec have moved to a two-dose HPV vaccination schedule (see *What do the results mean?* for more information).
- Measuring and reporting on HPV vaccination program uptake helps identify performance gaps and informs opportunities for increased efforts in prevention activities.

What are the results?

- By 2010, all provinces and territories had implemented school-based HPV vaccination programs for girls. Ontario, Nova Scotia, Prince Edward Island and Newfoundland and Labrador were first to implement school-based programs, with roll-outs beginning in 2007 (Table 1.1).
- Immunization uptake through organized HPV vaccination programs varied by province and territory. Of the provinces and territories able to report, eight provided data on uptake rates for the first dose; seven were able to report on uptake for the third dose.
- The percentage of the target population that received the first dose of vaccine through vaccination programs ranged from 47.0% (estimated) in the Northwest Territories to 93.8% in Newfoundland and Labrador. (Note: The school year reported on varied by province and territory.) Because the Northwest Territories rate is an estimate of vaccination uptake, it should be interpreted with caution. If the Northwest Territories is excluded from analysis, first dose uptake ranged from 68.8% in Manitoba to 93.8% in Newfoundland and Labrador, a narrower range (Table 1.1).
- Target populations for the vaccination programs varied by province and territory: the youngest were girls in Grade 4 (about eight to 10 years old), while the oldest were those in Grade 8 (about 13-15 years old) (Table 1.1).

Data and measurement considerations

- The HPV vaccine is given in a series of three single doses over a six-month period. This indicator shows the percentage of the target population to receive the first of three doses (unless otherwise specified).
- Ontario, New Brunswick and Prince Edward Island data indicate the percentage of the target population to receive all three doses in a series of vaccinations. It is expected that their results for the first dose would be higher than currently shown.
- It was not possible to collect standardized data from all provinces and territories. Provincial and territorial programs have different target populations, implementation plans and phases for vaccination. With better collection of standardized data and continued roll-out of HPV vaccination, it is expected that the percentages will increase and interprovincial/territorial variation will decrease.
- The denominator for rates reported here is the number of girls within the target grades where the provincial HPV vaccination program was being offered. It does not necessarily represent the entire female population within the target age range for the province.

TABLE 1.1

Implementation and immunization uptake of organized human papillomavirus (HPV) vaccination programs for girls, by province/territory

Province/ territory	Date of first implementation	Routine Schedule (0, 2, 6 months)				
		School grade	School year	Immunization uptake		
				1 st dose	2 nd dose	3 rd dose
British Columbia	September 2008	Grade 6	2012-2013	69.1%		
Alberta	September 2008	Grade 5	2013-2014	74.2%		64.9%
Saskatchewan	September 2008	Grade 6	Not available	73.0%		
Manitoba	September 2008	Grade 6	2013-2014	68.8%	65.8%	58.2%
Ontario	September 2007	Grade 8	2012-2013			80.2%
Quebec	September 2008	Grade 4 (Pr.3)	2013-2014	81.0%	77.0%	
New Brunswick	September 2008	Grade 7	2013-2014			73.0%
Nova Scotia	September 2007	Grade 7	2012-2013	87.8%	84.5%	77.3%
Prince Edward Island	September 2007	Grade 6	2012-2013			87.3%
Newfoundland and Labrador	September 2007	Grade 6	2012- 2013	93.8%	94.0%	88.2%
Northwest Territories	September 2009	Grade 7*	2013-2014	47.0% (est.)		
Yukon	September 2009	Grade 6	Information not currently available			
Nunavut	March 2010	Grade 6 or ≥ 9 years old	Information not currently available			

* NT vaccinates in multiple grades (4-6). The vaccination rate listed is for Grade 7 girls.

Data source: Pan-Canadian Cervical Screening Network; Prince Edward Island Chief Public Health Office.

What do the results mean?

- There were significant differences in HPV vaccination uptake in girls among provinces and territories. This could be a result of differing implementation start dates and promotion strategies.
- As expected, HPV vaccination uptake dropped with each required dose. This drop-off was greater between the second and third dose than between the first two doses (where data were available). Recently, there has been movement towards a two-dose vaccination schedule. While NACI continues to recommend girls receive three doses of the HPV vaccination, the World Health Organization's newest guidelines on cervical cancer control support a shift to a two-dose vaccination schedule for girls aged nine to 13.²⁵ Research shows that the immune response from two doses of the HPV vaccine in these girls was similar to the response among those who received three doses.^{26, 27} By reducing the number of doses girls receive, it is possible that more of them will complete a sufficient course to ensure immunity. Both Quebec and British Columbia recently transitioned to a two-dose HPV vaccination schedule for girls in this age group (in 2013 and 2014, respectively).
- Vaccination uptake in England and Australia is generally high (90.9% and 82.0% of eligible girls received at least the first dose, respectively).^{28, 29} In contrast, vaccination rates were lower in the United States (57.3% of eligible girls received at least the first dose of vaccine) than in most Canadian provinces and territories (where 47.0% to 93.8% received at least the first dose).^{30, 31}

What are some examples of efforts in this area?

- Catch-up cohorts (i.e., programs offering the vaccine to older age groups) existed in nine of 13 provinces and territories.³² Catch-up cohorts are typically one to four grades ahead of the target population. Provincial and territorial programs continue to be rolled out, allowing for more girls in the target age range to be offered vaccination through organized programs; this will ultimately minimize the need for a catch-up cohort, as fewer girls will be unvaccinated at the older ages covered by these cohorts.
- In 2012, NACI recommendations were expanded to include vaccinating males between the ages of nine and 26 years.²³ Prince Edward Island was the first province to extend its publicly-funded HPV vaccination program to school-aged boys (2013), followed by Alberta (Fall 2014).^{32, 33}
- In 2013, the Canadian National HPV vaccination program expanded its goal to "reducing vaccine preventable HPV-related morbidity and mortality in the Canadian population." This was done to reflect the burden of disease from HPV that is unrelated to cancer and to include consideration of immunization for males.²³

What else do we know?

- Recent statistical modelling work by the Canadian Partnership Against Cancer projected the impact of several HPV vaccination strategies on future cervical cancer incidence and mortality. Assuming a 70% cancer screening participation rate (Pap testing every three years) in women aged 21-69 years and a 70% vaccination rate, both cervical cancer incidence and mortality were projected to be lower in the vaccinated group. The difference in cervical cancer incidence and mortality between vaccinated and unvaccinated women was projected to increase over time (e.g., in 2049, incidence could be 4.6 per 100,000 in vaccinated women compared to 7.1 per 100,000 in unvaccinated women; mortality could be 1.9 per 100,000 in vaccinated women vs. 3.1 per 100,000 people in unvaccinated women). When vaccination rates were increased to 90%, there was little difference in projected mortality rates (compared to using the 70% vaccination rate), since herd immunity was in effect. These calculations were done using the Cancer Risk Management Model (CRMM).³⁴
- The Partnership's CRMM also projected a sharp decline in HPV 16 and 18 prevalence with 70% vaccination among girls and women.³⁴ This decline is already being seen in other countries, including the United States, the United Kingdom and Australia, where national HPV vaccination programs have resulted in a substantial decrease in the prevalence of vaccine-type HPV infections in girls and women.³⁵⁻³⁷

Special Feature: Active Transportation

What are we measuring and why?

This indicator reports on the percentage of the population who engaged in active transportation in the past three months, over time, by age group and by province. For the purposes of this report, active transportation is defined as walking or bicycling to and from school or work, though some groups include the use of public transportation in their definition.

- There is growing evidence that engaging in regular physical activity can protect people from developing several types of cancer, in addition to providing more general health benefits. The 2007 report of the World Cancer Research Fund (WCRF) concluded that physical activity is protective against colon cancer and potentially protective against post-menopausal breast cancer and endometrial cancers.²
- Physical activity is an important factor in maintaining a healthy weight and preventing obesity. Overweight and obesity are risk factors for several cancers, including those of the colon, rectum, breast (post-menopausal), endometrium, pancreas and kidney.²
- The Canadian Healthy Living Strategy has set a target of increasing the proportion of Canadians who participate in regular physical activity (defined as 30 minutes per day of moderate-to-vigorous activity). The goal is a 20% increase by 2015 (using 2003 data as a baseline). If this is achieved, 60.5% of people would be engaging in regular physical activity.³⁸
- Active transportation is a practical and effective way to increase activity levels and produce a positive impact on health. For example, walking or cycling to work or school can be incorporated into regular daily activities and routines, which would improve overall

health.^{39,40} Taking part in active transportation may prove to be a more sustainable behaviour for most people than recreational forms of physical activity such as going to the gym.⁴⁰

- Increased reliance on and accessibility of motorized vehicles for daily transportation has reduced physical activity levels in Canada.⁴¹ By increasing the number of trips made on foot or by bicycle (either entirely for short commutes or partially, combined with other transportation methods, for longer commutes), increasing daily physical activity levels may be more easily achieved.⁴² While active transportation is a relatively easy form of exercise to integrate into daily routines, engaging in other physical activity is also important for health and well-being.

What are the results?

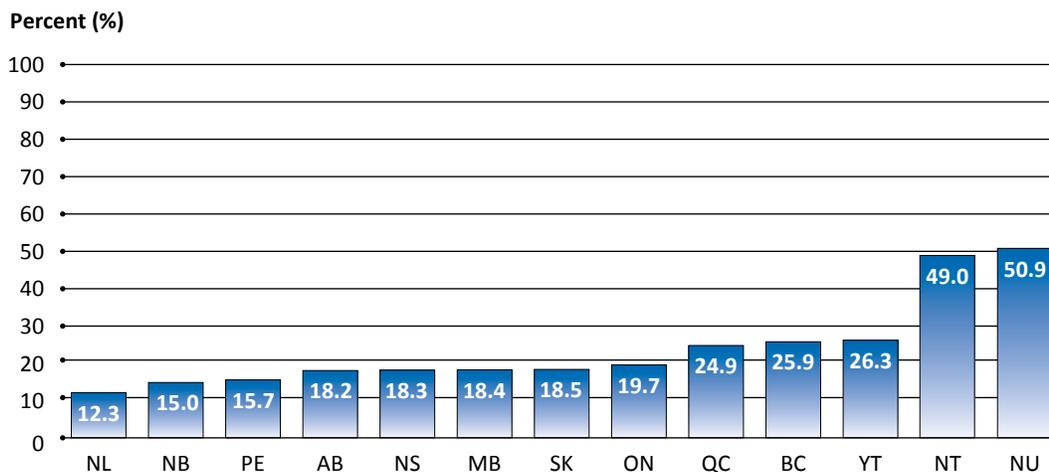
- Participation in active transportation varied among provinces and territories. The percentage of adults who reported engaging in active transportation ranged from 12.3% in Newfoundland and Labrador to 50.9% in Nunavut. Active transportation was highest in Canada's three territories (Figure 1.i).
- Participation in active transportation was most common among school-aged youth, aged 12 to 17 years (54.3%). It was least common among those aged 65 and older (10.1%) (Figure 1.ii).
- The percentage of those taking part in active transportation—around 22.0% of Canadian adults—has remained largely unchanged since 2007 (data not shown).

Data and measurement considerations

- Data reported for this indicator include self-reported participation in active transportation activities within the previous three months. This does not account for the amount of time engaged in active transportation, frequency of participation or use of multi-modal active transportation. These additional components of active transportation could be areas of consideration for future work and exploration.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 1.i

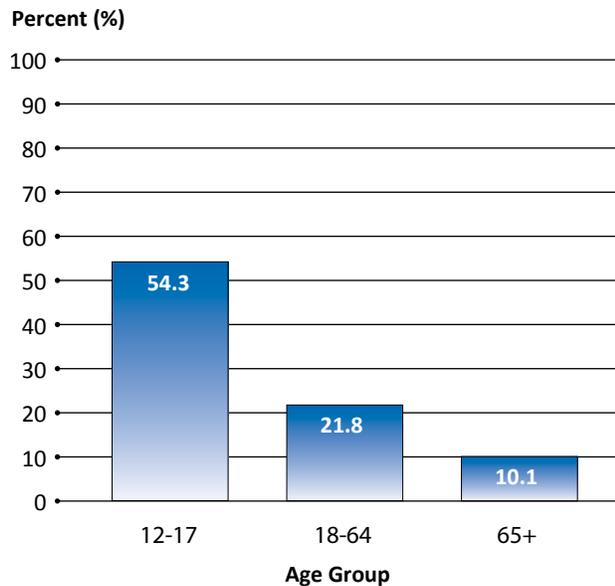
Percentage of adults (aged ≥ 18) who reported engaging in active transportation in the past three months, by province/territory – 2013 reporting year



Data source: Statistics Canada, Canadian Community Health Survey.

FIGURE 1.ii

Percentage of population who reported engaging in active transportation in the past three months, by age group – 2013 reporting year



Data source:
Statistics Canada,
Canadian
Community Health
Survey.

What do the results mean?

- Based on the data available in the Canadian Community Health Survey (CCHS), this indicator presents a best estimate of active transportation in Canada. However, because the indicator only includes walking or cycling to and from work or school, it is likely an underestimate, as many people may use active transportation in other areas of their lives (e.g., walking/cycling to the grocery store, to social events, etc.). Additionally, it is important to note that active transportation is only one form of physical activity; in the *2011 Cancer System Performance Report*, 26% of Canadian adults reported being active during their leisure time.⁴³
- Levels of active transportation among Canadian adults have remained low and have not changed between 2007 and 2013. There is untapped potential for policy reforms that would encourage more Canadians to walk and cycle more regularly, which could have significant health benefits—including reducing the risk for certain cancers.
- Variations among provinces could be explained by geographical differences and/or how active transportation among adults is promoted and supported in different jurisdictions. For instance, active transportation is much higher in the territories (particularly in Nunavut and the Northwest Territories), possibly because most of the population lives in urban areas (where infrastructure that supports active transportation may exist) or because lack of roads forces people to travel by foot or bicycle. There may also be differences in provincial and municipal level urban planning policies (e.g., those related to supportive infrastructure, such as the availability of bike lanes), snow removal, pedestrian and cyclist safety, awareness of the benefits of/options for active transportation,

and funding available to support active transportation and the built environment.⁴¹

- The low level of active transportation reported by Canadians over age 65 is not surprising, since the survey question asked specifically about walking or cycling to and from work or school. Since older adults are less likely to work or attend school, they would be less likely to report participation in active transportation for these purposes compared to people under age 65.
- Canadian children and youth were more likely to engage in active transportation than adults. This could be due to recent attempts to promote physical activity in these age groups. For example, school-based travel planning programs (e.g., “walking” school buses, safe routes to school, walk-to-school days) have been developed to promote increased physical activity levels in children and youth.^{44, 45} Also children who live close to their schools (which is more common than adults living close to their place of work) are more likely to engage in active transportation,⁴⁶ as are those who live in an urban area (where supportive infrastructure may exist) and those from low-income families.
- While engagement in active transportation is higher among children and youth compared to adults, it remains at inadequate levels. The *2014 Active Healthy Kids Canada Report Card on Physical Activity for Children and Youth* gave Canada a D rating for active transportation. The reasons were the low percentage of children and youth using active transportation to travel to/from school and the decline in active transportation among children and youth over the past decade.⁴⁶
- Rates of active transportation vary internationally. Canada’s active transportation levels are low, as are those in Australia and the

United States, where fewer than 15% of daily trips to work were made on foot or by bicycle. Canada could leverage lessons learned in European countries which have found that increasing levels of active transportation boosted overall physical activity levels among their citizens. For example, over half of daily trips made in the Netherlands were by cycling or walking (it should be noted that this included trips for any purpose; rates might have been slightly lower if they had only included trips to or from work).⁴⁷

What are some examples of efforts in this area?

- In 2009, the Canadian Medical Association (CMA) issued a recommendation calling for all sectors (government, business and the public) to work together to create a culture that supports and encourages active transportation. The CMA believes this can be achieved through increased public awareness, incorporating active transportation and the built environment into infrastructure development and renewal, and evaluating the impact of interventions and transportation decisions on health.⁴⁰
- The Coalitions Linking Action and Science for Prevention (CLASP) initiative is aimed at bringing together multi-sector organizations from across provinces and territories to form coalitions and integrate cancer prevention strategies. *Healthy Canada by Design*, a CLASP initiative, worked to integrate health considerations into community planning policy and practice in order to support physical activity and active transportation, through the development of a national framework. This initiative was funded until September 2014.
- The Partnership has established the *Prevention Policies Directory* (www.cancerview.ca/preventionpolicies), a free and accessible

online tool that contains up-to-date information on Canadian policies related to cancer and chronic disease prevention. The *Directory* includes policies relevant to physical activity (453 policies) and the built environment (554 policies), including active transportation (268 policies), at federal, provincial/territorial and municipal levels. These policies include Acts, regulations, bylaws, strategic plans and operational plans, among others. Direct access to policy documents and legal instruments related to modifiable risk factors for cancer and chronic diseases is available through the online tool.

- The Partnership has developed two interactive maps that allow users to explore active transportation policy work done across the country (www.cancerview.ca/preventionpolicies). The maps present policies that currently exist at provincial/territorial and municipal levels. While content for both maps is linked to the *Prevention Policies Directory*, users are able to submit policy information to the municipal map that may not already be captured in the *Directory*.
- The Partnership has produced a series of case studies to promote knowledge transfer related to active transportation (www.cancerview.ca/preventionpolicies). Active transportation policy work undertaken by three Canadian municipalities—Vancouver, British Columbia; Red Deer, Alberta; and Hamilton, Ontario—is profiled in these case studies.

What else do we know?

- A viable strategy for increasing active transportation is integration with public transportation (modal sharing). For example, installing bike racks on buses, allowing bike parking at transit stops and encouraging pedestrian connections to transit stations and services could expand active transportation networks in urban areas.⁴¹
- Active transportation is a highly feasible option for those living in urban areas and for people with shorter commute distances. It is more difficult to engage in active transportation in rural areas where trip lengths make walking or cycling unrealistic. In these areas, active transportation could be promoted for part of the journey.⁴²
- *Complete Streets* policies are being adopted across Canada and the United States. *Complete Streets* are designed to accommodate all road users—from pedestrians and bicyclists to motorists and users of public transit—regardless of age and ability. Such streets are designed to be context-specific; for instance, *Complete Streets* in rural communities would be designed differently than those in urban areas. The availability of *Complete Streets* would improve safety and accessibility, provide options for transportation and encourage people to incorporate walking or cycling in their commutes to and from school or work (either the entire way or part way through modal sharing). This would in turn increase physical activity levels and potentially benefit health. *Complete Streets* require municipal and provincial/territorial motivation. In Canada, the cities of Calgary and Edmonton (Alberta); and Waterloo, Ajax and Ottawa (Ontario) all currently have *Complete Streets* policies in place.^{48, 49}

2. Screening

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**Special Feature: Screening in
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2. Screening

This chapter presents self-reported screening rates for cervical, breast and colorectal cancers in asymptomatic people using data from the Canadian Community Health Survey (CCHS). It also includes a special feature on cervical, breast and colorectal cancer screening rates by household income and by length of time in Canada (i.e., comparing screening rates among new immigrants vs. those who were born in Canada).

Of an estimated 191,300 new cancer cases diagnosed in Canada in 2014, one-quarter (26.3%) were breast, colorectal or cervical cancers.⁵⁰ These are the only three cancers for which organized population-based screening programs exist across Canada. Screening may take place within these programs (called *programmatically screening*) or outside of programs (called *non-programmatic* or *opportunistic screening*).

Regular screening has been shown to reduce both incidence and mortality rates for cervical^{51, 52} and colorectal cancer (some screening modalities),⁵³⁻⁵⁵ as well as mortality from breast cancer.⁵⁶⁻⁵⁸ Screening can reduce mortality by detecting

cancers before they advance beyond curable stages. Screening can also reduce incidence by detecting pre-cancer (i.e., an abnormal growth of cells which has the potential to become malignant). For these outcomes to be fully realized, a large proportion of the target population needs to access high-quality screening.

While the data presented for this section are based on self-reported survey results, a previous study on breast cancer screening in Canada showed that self-reported screening rates are comparable to actual utilization rates gleaned from administrative data.⁵⁹

Indicator	Summary of results
Cervical cancer screening	<p>In 2012, the percentage of women aged 18-69 who reported receiving a Pap test within the previous three years ranged from 70.3% in Quebec to 87.3% in Prince Edward Island. Data were only available for six provinces/territories in 2013; screening rates in these provinces/territories were fairly stable compared those reported in 2012.</p> <p>The target for this indicator is 80%. In 2012, five provinces/territories achieved this target, eight did not; of the six provinces that reported in 2013, one achieved the 80% target.</p>
Breast cancer screening	<p>Data from 2012 showed variation across the country in self-reported breast cancer screening rates, ranging from 57.4% in Yukon to 74.9% in Quebec. In the four provinces/territories for which 2013 data were available, screening rates decreased in three and increased in one (compared to 2012).</p> <p>The target for this indicator is 70%. In 2012, seven provinces/territories achieved this target while six did not; of the four provinces/territories which reported in 2013, one achieved the 70% target.</p>

Indicator	Summary of results
Colorectal cancer screening	<p>Based on 2012 data, there was variability across the country in self-reported colorectal cancer screening (“up-to-date on screening”), ranging from 28.3% in Quebec to 59.2% in Manitoba. Data were only available for eight provinces/territories in 2013; screening rates in these provinces/territories were fairly stable compared to 2012.</p> <p>The target for this indicator is 60% of people reporting receiving a colorectal cancer screening fecal test. In 2012 and 2013, no provinces/territories achieved this target.</p>
Screening in underserved populations	<p>In 2012, low-income and recent immigrant populations were less likely to report having undergone screening for cervical, breast and colorectal cancers than their higher-income or Canadian-born counterparts. The exception was breast cancer screening among immigrant women, where no real differences were observed between them and their Canadian-born counterparts.</p> <p>The target for cervical cancer screening by household income and by immigrant status was 80% of women. Screening rates for women in all income quintiles, except those in Q1 and Q2 (the lowest quintiles), met this target. Screening rates only met this target for Canadian-born women. For breast cancer screening, the target by household income and by immigrant status was 70% of women. Screening rates for women in all income quintiles (except those in Q1, which is the lowest) and of all immigrant statuses met this target.</p>

Cervical Cancer Screening

What are we measuring and why?

This indicator measures the percentage of women aged 18-69 who reported having had at least one Pap test in the previous three years. The indicator is presented for both 2012 (nationally) and 2013 (for participating provinces and territories) using data from the Canadian Community Health Survey (CCHS).

- An estimated 1,465 women were diagnosed with cervical cancer in Canada in 2014.⁵⁰ Infection with high-risk types of human papillomavirus (HPV) causes almost all cases of cervical cancer; approximately 70% of these cancer cases are linked to infection with HPV types 16 and 18.^{22, 23}
- The incidence of and mortality from cervical cancer has declined in Canada and other developed countries, largely as a result of screening using cervical cytology (the Pap test).^{60, 61} Pap tests can detect abnormal changes in cells lining the cervix, allowing for intervention before invasive cancer develops.

- The Canadian Partnership Against Cancer’s System Performance Targets and Benchmarks Working Group recently established a national target of 80% of women reporting at least one Pap test in the last three years (see *What do the results mean?* for more information on this target).

What are the results?

- Data from 2012 show that cervical cancer screening rates for women aged 18-69 ranged from 70.3% in Quebec to 87.3% in Prince Edward Island. Five provinces/territories (Manitoba, Prince Edward Island, Newfoundland and Labrador, Yukon and the Northwest Territories) achieved the 80.0% target set for this indicator; the remaining eight did not (Figure 2.1).
- For the 2013 survey, data were available from only six provinces/territories. Screening rates for these provinces/territories were fairly

stable compared to those from 2012; they increased in one jurisdiction (New Brunswick) and decreased in others (Prince Edward Island, Newfoundland and Labrador, the Yukon, the

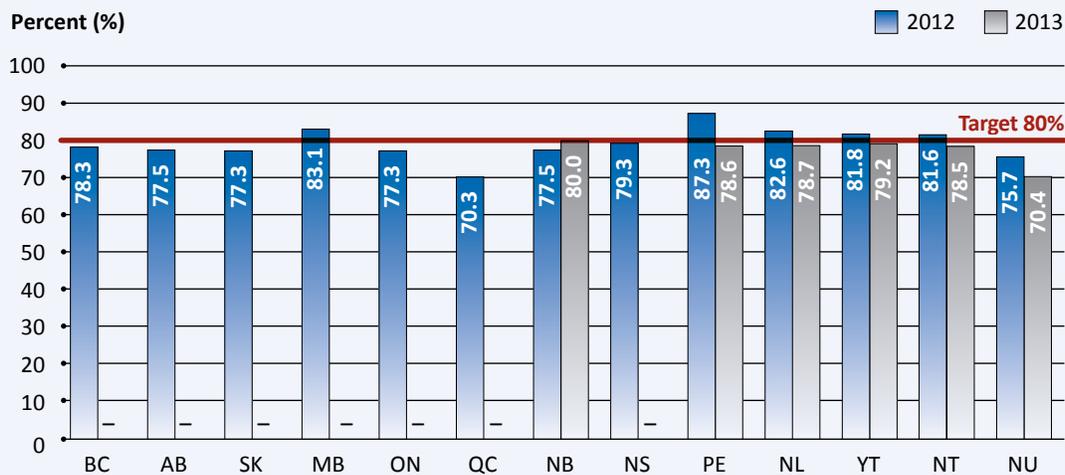
Northwest Territories and Nunavut). Of the six provinces/territories that provided 2013 data, only New Brunswick achieved the 80.0% target set for this indicator (Figure 2.1).

Data and measurement considerations

- In 2013, questions on Pap testing included in the Canadian Community Health Survey (CCHS) were “optional” (i.e., content was selected by health authorities to address regional or provincial priorities). For this reason, not all provinces collected data on Pap testing in 2013.
- The CCHS corrects for women who have had a hysterectomy. Programmatic screening rates do not always correct for hysterectomies.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 2.1

Percentage[†] of women (aged 18 to 69) reporting at least one Pap test in the last three years, by province/territory – 2012 and 2013 reporting years



“-” Data not available.

[†] Age-standardized to 2011 standard population.

Data source: Statistics Canada, Canadian Community Health Survey.

What do the results mean?

- Participation in cervical cancer screening was found to be high across Canada, with similar rates across most provinces and territories.
- In 2015, for the first time, a system performance target has been set for cervical cancer screening. The target was set by experts from the Partnership's System Performance Targets and Benchmarks Working Group, who recommended alignment with the programmatic target of 80% participation set by the Pan-Canadian Cervical Screening Network (PCCSN). For the purposes of system performance reporting, the target is applied to self-reported screening rates which include all screening activity, both programmatic and non-programmatic (unlike the program target, which includes only programmatic screening). The goal is to facilitate evaluation of cervical cancer screening at the system level and to increase the proportion of the population that is protected against this screenable cancer through regular screening. In 2012, five provinces/territories achieved the 80% target. Of the remaining provinces/territories, all were within 10 percentage points of the target, meaning it appears to be a reasonable goal.
- When cervical cancer screening participation rates in Canada were compared to those in 14 other Organisation for Economic Co-operation and Development (OECD) countries, Canada performed above the OECD average of 67.6%. However, Canada lagged behind countries like Italy, Germany and the United States, which had the highest screening percentages among the comparison countries in 2012 (76.9%, 78.7% and 85.0% respectively).⁶²

What are some examples of efforts in this area?

- Cervical cancer screening guidelines from the Canadian Task Force on Preventive Health Care recommend routine screening every three years starting at age 25 for asymptomatic women who are or ever have been sexually active.⁶⁰
- Organized cervical cancer screening programs exist in all Canadian provinces except Quebec and Prince Edward Island (although Quebec does have provincial guidelines for cervical cancer screening and PEI provides province-wide access to screening without an organized program). In most provinces, provincial guidelines recommend screening begin at age 21, with varying screening intervals. There are no organized cervical cancer screening programs currently available in the three territories.³²
- The PCCSN is a national network that works to maximize cervical cancer control. The PCCSN report *Cervical Cancer Screening in Canada: Setting Targets for Program Performance*, released in November 2013, outlines a set of six quality indicators related to cervical cancer screening. These include: participation, specimen adequacy, cytology turnaround time, time to colposcopy, cytology-histology agreement and cancer incidence. Targets have been set for five of these indicators.⁶³
- In 2014, the Canadian Partnership Against Cancer held an expert workshop to discuss and formulate options for optimal cervical cancer screening in the relatively new era of HPV vaccination. Participants explored the most feasible short- and long-term options for cervical cancer screening strategies that would serve both vaccinated and unvaccinated cohorts. The experts recommended that planning for an eventual move to primary HPV testing should begin immediately. Until an actual move is feasible, they recommended that screening protocols should remain the same as they are now, and that the same protocol should continue being used to screen both vaccinated and unvaccinated women.

What else do we know?

- The cervical cancer screening landscape is changing with the availability of a vaccine against human papillomavirus (HPV). Vaccination will result in increased protection against cervical and some other types of cancer in a growing number of young women and men. There are also new tests to detect early disease, including ones that detect infection with high-risk HPV types.⁶¹ These tests are more sensitive, more reproducible and have better predictive value than Pap testing alone.⁶⁴ With these important developments, new opportunities and methods for cervical cancer control are being investigated across Canada and internationally.
- Monitoring of cervical cancer screening must still continue in the era of HPV vaccination for several reasons:
 - Current vaccines do not provide protection for those who became infected with high-risk strains of HPV before immunization. (HPV is a group of over 150 related viruses, some of which are referred to as “high-risk” because they are linked to cancer.)
 - The current vaccine targets only HPV types 16 and 18, which together account for most — about 70%—but not all cervical cancer cases.⁶⁵
 - HPV vaccines were only recently introduced; there currently is not enough evidence to determine the future role of screening in HPV-vaccinated women.

Breast Cancer Screening

What are we measuring and why?

This indicator measures the percentage of eligible women aged 50-69 who reported having had a screening mammogram in the previous two years. The indicator is presented for both 2012 (nationally) and 2013 (for participating provinces and territories) using Canadian Community Health Survey (CCHS) data.

- Breast cancer is the most common cancer diagnosed among women in Canada and is the second leading cause of death due to cancer for women.⁵⁰
- Evidence shows that widespread adoption of mammography screening has contributed to a decline in mortality from breast cancer.^{66, 67} Early detection allows for the prompt delivery

of more effective treatments, resulting in better outcomes.

- The Canadian Partnership Against Cancer’s System Performance Targets and Benchmarks Working Group recently established a national target of 70% of women reporting a screening mammogram in the last two years (see *What do the results mean?* for more information on this target).

What are the results?

- Data from 2012 show variation across the country in the percentage of women aged 50-69 reporting that they had undergone a screening mammogram in the previous two

years; rates ranged from 57.4% of women in the Yukon to 74.9% of those living in Quebec. Seven provinces/territories (British Columbia, Alberta, Manitoba, Ontario, Quebec, New Brunswick, and Newfoundland and Labrador) achieved the 70% target set for this indicator; the other six did not (Figure 2.2).

- Data from 2013 were available from just four provinces/territories. Screening rates for these provinces/territories varied compared to those reported in 2012, although it is difficult to

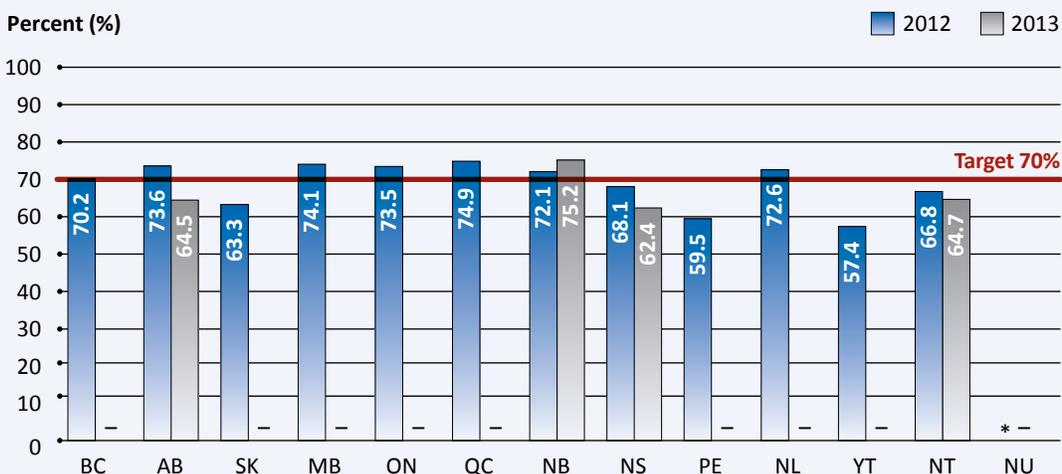
discern a trend from just two years of data. Rates decreased in three of the jurisdictions (Alberta, Nova Scotia and the Northwest Territories) and increased in one (New Brunswick). The decrease is particularly notable for Alberta, where self-reported screening rates dropped from 73.6% in 2012 to 64.5% in 2013. Of the four provinces/territories that provided 2013 data, only New Brunswick achieved the 70% target set for this indicator (Figure 2.2).

Data and measurement considerations

- The indicator excludes women who had mammograms to investigate a lump or other breast problem or as follow-up to breast cancer treatment.
- In 2013, questions on mammography were “optional content” (i.e., content selected by health authorities to address regional or provincial priorities). For this reason, not all provinces/territories collected mammography data.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 2.2

Percentage of eligible[†] women (aged 50 to 69) reporting a screening^{††} mammogram in the last two years, by province/territory – 2012 and 2013 reporting years



* Suppressed due to small numbers.
 “-” Data not available.
 † A woman is deemed eligible for screening mammography if her reason for undergoing a mammogram is not to investigate previously detected lumps or breast problems, or as follow-up to breast cancer treatment.
 †† Excludes tests done to investigate symptoms.
 Data source: Statistics Canada, Canadian Community Health Survey.

What do the results mean?

- Self-reported participation in breast cancer screening was high across the country. However, there was still some variation in self-reported breast cancer screening across provinces/territories. Some of this could be due to differences in the socio-demographic profile of women who access screening (see *Special Feature: Screening in Underserved Populations*).
- In 2015, for the first time, a system performance target has been set for breast cancer screening. The target was set by experts from the Partnership's System Performance Targets and Benchmarks Working Group, who recommended alignment with the programmatic target of 70% participation set by the Canadian Breast Cancer Screening Network (CBCSN). For the purposes of system performance reporting, the target is applied to self-reported screening rates which include all screening activity, whether programmatic or non-programmatic (unlike the program target, which includes only programmatic screening). The goal is to facilitate evaluation of breast cancer screening at the system level and to increase the proportion of the population that is protected against this screenable cancer through regular screening.
- When compared to breast cancer screening participation in 14 other Organisation for Economic Co-operation and Development (OECD) countries, Canada's screening rate was above the OECD average of 66.4%. However, Canada lagged behind countries like the United States and the Netherlands, which had the highest screening percentages among the comparison countries in 2012 (80.0% and 85.6% respectively).⁶²

What are some examples of efforts in this area?

- National breast screening guidelines disseminated by 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.¹ Organized screening programs that invite women aged 50-69 for screening mammography are offered in all provinces and territories except Nunavut.⁶⁸
- A recent Canadian study showed that the risk of dying from breast cancer decreased substantially with mammography screening. Breast cancer mortality was found to be 40% lower in screening program participants than in non-participants. Reductions in mortality were seen within 10 years of women starting screening.⁶⁷

What else do we know?

- In a position paper published in 2014 by the World Health Organization (WHO), mammography was strongly recommended through organized screening programs for women aged 50-69 living in well-resourced settings such as Canada (*moderate quality evidence*). Mammography was conditionally recommended for women aged 40-49 (*moderate quality evidence*) and also for those aged 70-74 (*low quality evidence*). The WHO paper suggested that a shared decision-making approach involving women and their doctors should be used by women in these two age groups (40-49 years and 70-74 years).⁶⁹

Colorectal Cancer Screening

What are we measuring and why?

This indicator measures the percentage of the population aged 50-74 who reported being up-to-date on colorectal cancer screening. This includes having undergone a fecal test in the previous two years or a colonoscopy or sigmoidoscopy in the previous five years. The indicator is presented for 2012 (nationally) and 2013 (for participating provinces and territories) and is based on Canadian Community Health Survey (CCHS) data.

- Colorectal cancer is the third most commonly diagnosed cancer and the second leading cause of cancer death in Canada.⁵⁰
- Regular screening using a fecal test among those aged 50 and older, followed by a colonoscopy for those with an abnormal result, can reduce deaths from colorectal cancer.⁵³
- The Canadian Partnership Against Cancer's System Performance Targets and Benchmarks Working Group recently established a national target of 60% of people reporting a screening fecal test in the last two years (see *What do the results mean?* for more information on this target).

What are the results?

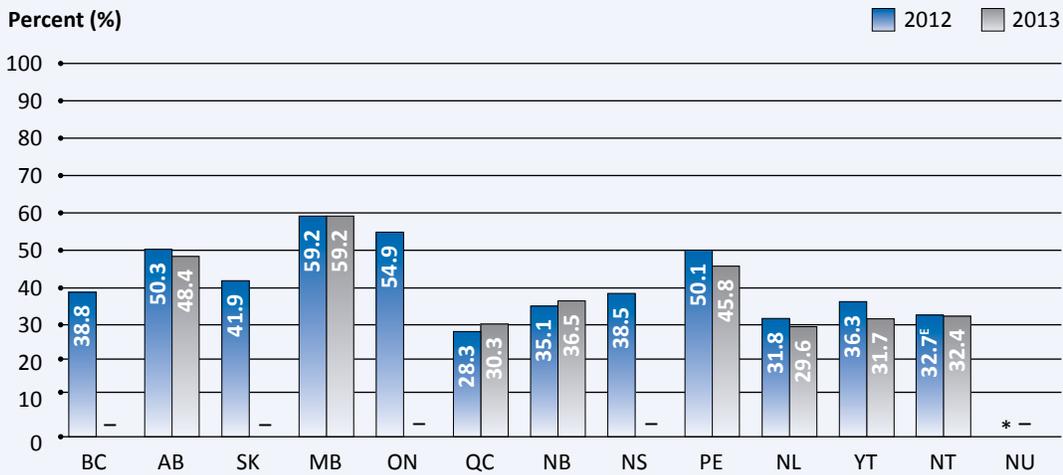
- In 2012, the percentage of Canadians who reported being up-to-date with their colorectal cancer screening (fecal test and/or screening sigmoidoscopy/colonoscopy) ranged from 28.3% in Quebec to 59.2% in Manitoba. Eight provinces/territories provided updated data for 2013. Screening rates in these provinces/territories were fairly stable compared to 2012, moderately increasing in some jurisdictions (Quebec and New Brunswick) and decreasing in others (Alberta, Prince Edward Island, Newfoundland and Labrador and the Yukon) (Figure 2.3).
- When screening rates were examined by test type (i.e., fecal test in the past two years vs. endoscopy in the past five years), sigmoidoscopy or colonoscopy use was highest in Ontario, while fecal test use was highest in Manitoba (2012 data). Of the eight provinces that provided updated data for 2013, sigmoidoscopy or colonoscopy use was highest in Alberta, while fecal test use continued to be highest in Manitoba (Ontario did not report in 2013). As of 2012 and 2013, no provinces had achieved the 60% target for screening using a fecal test set for this indicator (Figures 2.4 and 2.5).
- In 2013, colorectal cancer screening rates were higher among Canadians in the 60-74 age group compared to those in the 50-59 age group (42.0% vs. 32.5%) (Figure 2.6).
- Rates of colorectal cancer screening were similar among men (38.0%) and women (36.1%) in 2013 (Figure 2.6).

Data and measurement considerations

- This section examines the percentage of Canadians who reported being up-to-date on their colorectal cancer screening based on self-reported data from the Canadian Community Health Survey. “Up-to-date” is defined as having had a fecal test within the previous two years or colonoscopy or sigmoidoscopy within the previous five years.
- The recommended screening interval is five years for sigmoidoscopy and 10 years for colonoscopy.⁷⁰ Since the Canadian Community Health Survey does not distinguish between the two modalities (sigmoidoscopy and colonoscopy), the five-year timeframe was used for both. This indicator may therefore underestimate the number of Canadians who were up-to-date.
- The denominator for the fecal test figure (Figure 2.4) includes asymptomatic individuals within this age range, including those who reported having had a colonoscopy or sigmoidoscopy in the past five years. This indicator may underestimate how many Canadians have completed fecal testing, as it is possible that not everyone in the denominator was eligible for the test; the results may not provide a complete picture of colorectal cancer screening using fecal testing.
- The indicator includes respondents who reported having had a colorectal cancer screening test for any of the following reasons: family history of colorectal cancer, regular check-up, routine screening, age or race. The indicator excludes screening for any of the following reasons: follow-up of a problem, follow-up of colorectal cancer treatment and any other reason.
- A fecal test (also known as a Fecal Occult Blood Test or FOBT) can be either a guaiac test (gFOBT) or an immunochemical test (FIT).
- In 2013, questions on colorectal cancer screening were “optional content” (i.e., content selected by health authorities to address regional or provincial priorities). For this reason, not all provinces collected colorectal cancer screening data.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 2.3

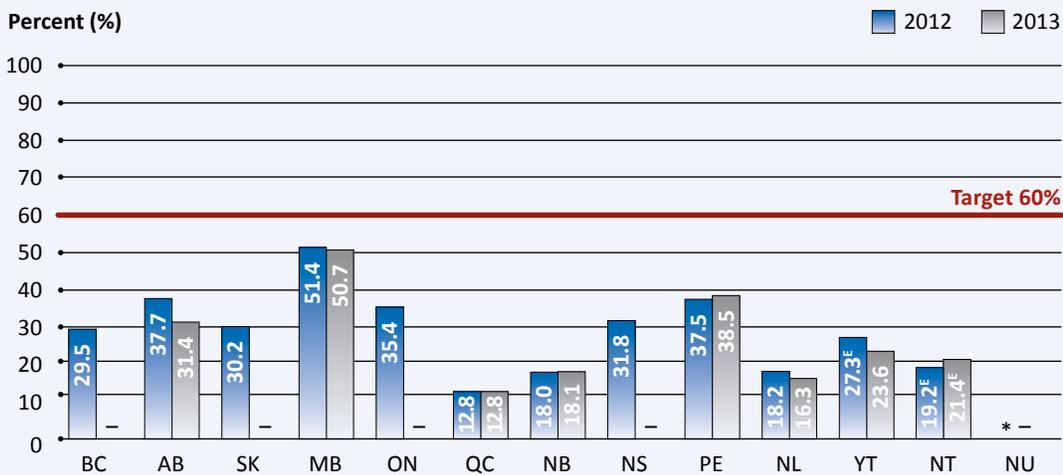
Percentage of population (aged 50 to 74) reporting a screening[†] fecal test in the last two years and/or screening[†] sigmoidoscopy/colonoscopy in the last five years, by province/territory – 2012 and 2013 reporting years



* Suppressed due to small numbers.
 “-” Data not available.
 £ Interpret with caution owing to large variability in the estimate.
 † Excludes tests done to investigate symptoms.
 Data source: Statistics Canada, Canadian Community Health Survey.

FIGURE 2.4

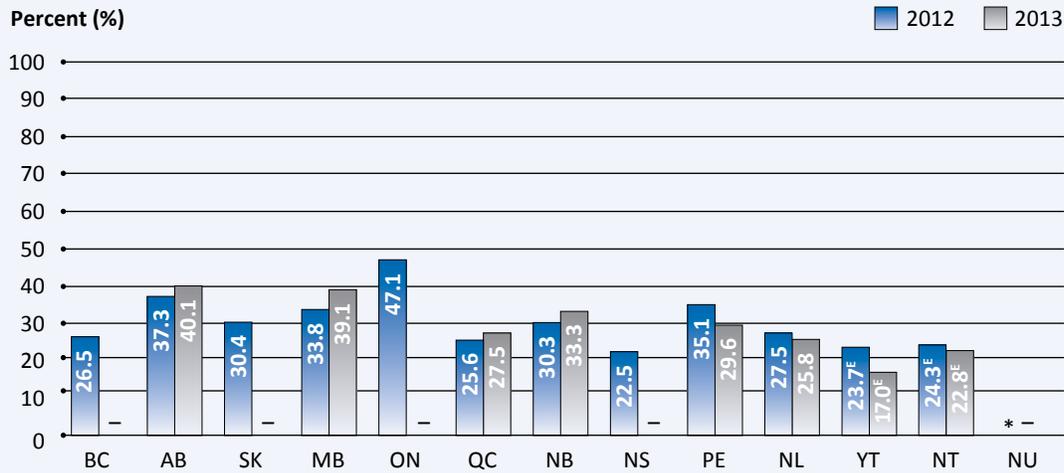
Percentage of population (aged 50 to 74) reporting a screening[†] fecal test in the last two years, by province/territory – 2012 and 2013 reporting years



* Suppressed due to small numbers.
 “-” Data not available.
 £ Interpret with caution owing to large variability in the estimate.
 † Excludes tests done to investigate symptoms.
 Data source: Statistics Canada, Canadian Community Health Survey.

FIGURE 2.5

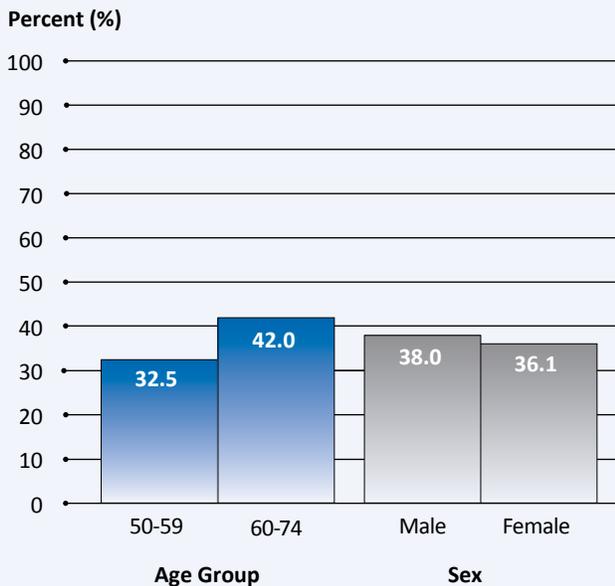
Percentage of population (aged 50 to 74) reporting a screening[†] sigmoidoscopy/ colonoscopy in the last five years, by province/territory – 2012 and 2013 reporting years



* Suppressed due to small numbers.
 “-” Data not available.
[‡] Interpret with caution owing to large variability in the estimate.
[†] Excludes tests done to investigate symptoms.
 Data source: Statistics Canada, Canadian Community Health Survey.

FIGURE 2.6

Percentage of population (aged 50 to 74) reporting a screening[†] fecal test in the last two years and/or screening[†] sigmoidoscopy/ colonoscopy in the last five years, by age group and sex – 2013 reporting year



[†] Excludes tests done to investigate symptoms.
 Results include AB, MB, QC, NB, PE, NL, YT and NT.
 Data source: Statistics Canada, Canadian Community Health Survey.

What do the results mean?

- Self-reported screening rates for colorectal cancer were found to be lower than those for breast and cervical cancer. This is not surprising, however, because screening guidelines for colorectal cancer have been in place for a much shorter time than those for breast and cervical cancer.
- In 2015, for the first time, a system performance target has been set for colorectal cancer screening. The target was set by experts from the Partnership's System Performance Targets and Benchmarks Working Group, who recommended alignment with the programmatic target of 60% participation in a screening fecal test set by the National Colorectal Cancer Screening Network (NCCSN). The target was assigned for fecal testing as opposed to overall up-to-datedness (which includes endoscopy) in order to promote fecal tests as the primary screening modality for colorectal cancer. For the purposes of system performance reporting, the target is applied to self-reported screening rates which include all screening activity, whether programmatic and non-programmatic (unlike the program target, which includes only programmatic screening). The goal is to facilitate evaluation of colorectal cancer screening at the system level and to increase the proportion of the population that is protected against this screenable cancer through regular screening.
- Variations in colorectal cancer screening across the country likely reflect different stages of screening program announcement and roll-out in different provinces, as well the various primary care initiatives (e.g., physician referral) adopted in some jurisdictions to increase opportunistic colorectal cancer screening. The first provinces to launch colorectal cancer screening programs (Ontario, Manitoba and Alberta) had the highest screening rates in 2012 and 2013 (Note: No Ontario data were available for 2013).
- Colorectal cancer screening rates are generally lower in Canada than in the United States (when colonoscopies and sigmoidoscopies are included). Recent US data showed that screening coverage for colorectal cancer varied across the different states, from 54.1% to 75.2%.⁷¹

What are some examples of efforts in this area?

- The Canadian Task Force on Preventive Health Care guidelines on colorectal cancer recommend that asymptomatic individuals over age 50 be screened for colorectal cancer using a fecal test or flexible sigmoidoscopy.⁷² These guidelines are currently being updated, with new ones expected in 2015.
- The National Colorectal Cancer Screening Network (NCCSN) is a national network composed of provincial and territorial representatives whose goal is to maximize colorectal cancer control. The NCCSN report *Colorectal Cancer Screening in Canada: Monitoring and Evaluation of Quality Indicators, Results Report, January 2011-December 2012*, released in December 2014, outlines a set of quality indicators related to colorectal cancer screening of average-risk Canadians. Targets have been set for six indicators, including screening participation, fecal test inadequacy rate, follow-up colonoscopy uptake, wait time for follow-up colonoscopy, positive predictive value and colorectal cancer detection rate.⁷³

Special Feature: Screening in Underserved Populations

What are we measuring and why?

This special feature presents data on variations in cancer screening rates by household income and immigrant status, focusing on breast, colorectal and cervical cancers. The indicators are based on self-reported data from the 2012 Canadian Community Health Survey (CCHS).

- A 2014 report from the Canadian Partnership Against Cancer (*Examining Disparities in Cancer Control*) looked at inequalities in screening by household income, geography and immigrant status using data from the 2008 CCHS.⁷⁴ This special feature provides an update to that report by including more current data on household income and immigrant status.
- There is substantial evidence that cancer screening rates are lower among Canadians with low socioeconomic status (SES) than they are among those with higher SES, despite a system of universal health care.^{75–77}
- Research has also shown that new immigrants to Canada tend to underutilize cancer screening services compared to people who were born in Canada.^{77–79} This trend has also been observed in other countries.⁸⁰
- The Canadian Partnership Against Cancer’s System Performance Targets and Benchmarks Working Group recently established national targets for screening by household income and by immigrant status, as follows (see *What do the results mean?* for more information on these targets):
 - Cervical cancer screening target: 80% screened.
 - Breast cancer screening target: 70% screened.

What are the results?

CERVICAL CANCER SCREENING (FIGURE 2.i)

- In 2012, lower-income women (aged 21–69) were less likely to report having been screened for cervical cancer than their higher-income counterparts. In the lowest income quintile (Q1), 69.2% of women reported having a Pap test in the previous three years compared to 84.5% of those in the highest-income quintile (Q5). Screening rates in the highest three income quintiles (Q3–Q5) met the target of 80% set for this indicator.
- Like lower-income women, recent immigrants were less likely to report having undergone cervical cancer screening: 65.0% of women who had lived in Canada for less than 10 years reported having a Pap test in the previous three years (compared to 81.8% of Canadian-born women). This disparity in screening rates decreased as immigrants remained in Canada for a longer period of time (10 years or more). Canadian-born women were the only group whose cervical cancer screening rates met the 80% target set for this indicator.

BREAST CANCER SCREENING (FIGURE 2.ii)

- In 2012, lower-income women (aged 50–69) were less likely to be screened for breast cancer than higher-income women. In the lowest income quintile (Q1), 62.3% of women reported having undergone a screening mammogram in the previous two years compared to 80.5% of those in the highest-income quintile (Q5). Screening rates in all income quintiles except Q1, which is the lowest, met the target of 70% set for this indicator.
- There was no real difference in self-reported breast cancer screening rates among women based on their immigrant status; rates in all groups were above the 70% target set for this indicator. The difference between recent

immigrants (<10 years in Canada) and Canadian-born women was just 1.9 percentage points (within the statistical margin of error). Note that this pattern is different than the one previously reported, using 2008 data; these data showed breast cancer screening rates among immigrants who had lived in Canada for less than 10 years were substantially lower than screening rates among Canadian-born women.

COLORECTAL CANCER SCREENING (FIGURE 2.iii)

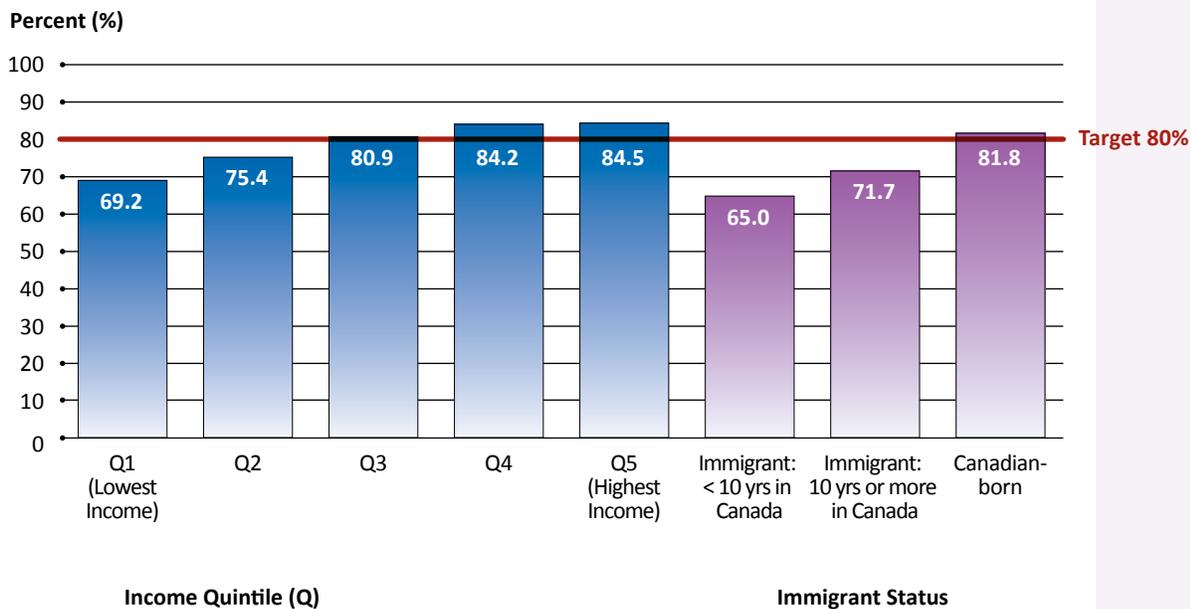
- Colorectal cancer screening rates were lower than breast or cervical screening rates, regardless of income or immigrant status—most likely because this type of cancer screening has been in place for the shortest time period.
- In 2012, lower-income Canadians (aged 50-74) were less likely to report having been screened for colorectal cancer than those in higher-income groups. In the lowest-income quintile (Q1), 36.4% of people reported being up-to-date on their colorectal cancer screening, compared to 50.1% of those in the highest-income quintile (Q5).
- Recent immigrants were also less likely to report that they had undergone colorectal cancer screening; 27.1% of respondents who had lived in Canada for less than 10 years reported they were up-to-date on their screening, compared to 44.3% of Canadian-born respondents. (However the rate for new immigrants should be interpreted with caution due to small sample size and large variability in the estimate). The disparity between screening rates decreased as immigrants remained in Canada for a longer period of time (10 years or more). In fact, longer-term immigrants had the highest self-reported colorectal cancer screening rates.

Data and measurement considerations

- Canada's three territories (Yukon, the Northwest Territories and Nunavut) are excluded from income analysis in the Canadian Community Health Survey, so it was not possible to provide results and analysis of screening rates in these regions by socioeconomic status.
- Regarding breast cancer screening, women who had mammograms to investigate a lump or other breast problem or as follow-up to breast cancer treatment were excluded.
- As for colorectal cancer screening, respondents were included if they reported having undergone a colorectal cancer screening test for any of the following reasons: family history of colorectal cancer, regular check-up, routine screening, age or race. The indicator excludes screening for any of the following reasons: follow-up of a problem, follow-up of colorectal cancer treatment, and any other reason.
- This section reports on the percentage of Canadians who were up-to-date on their colorectal cancer screening based on self-reported data from the Canadian Community Health Survey. "Up-to-date" is defined as having had a fecal blood test within the previous two years or colonoscopy or sigmoidoscopy within the previous five years. (Note that the recommended screening interval is five years for sigmoidoscopy and 10 years for colonoscopy.)⁷⁰ Since the Canadian Community Health Survey does not distinguish between the two modalities (sigmoidoscopy and colonoscopy), the five-year timeframe was used for both. This indicator may therefore underestimate the number of Canadians who were up-to-date.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 2.i

Percentage of women[†] (aged 21 to 69) reporting at least one Pap test in the last three years, by household income quintile and immigrant status, Canada – 2012 reporting year



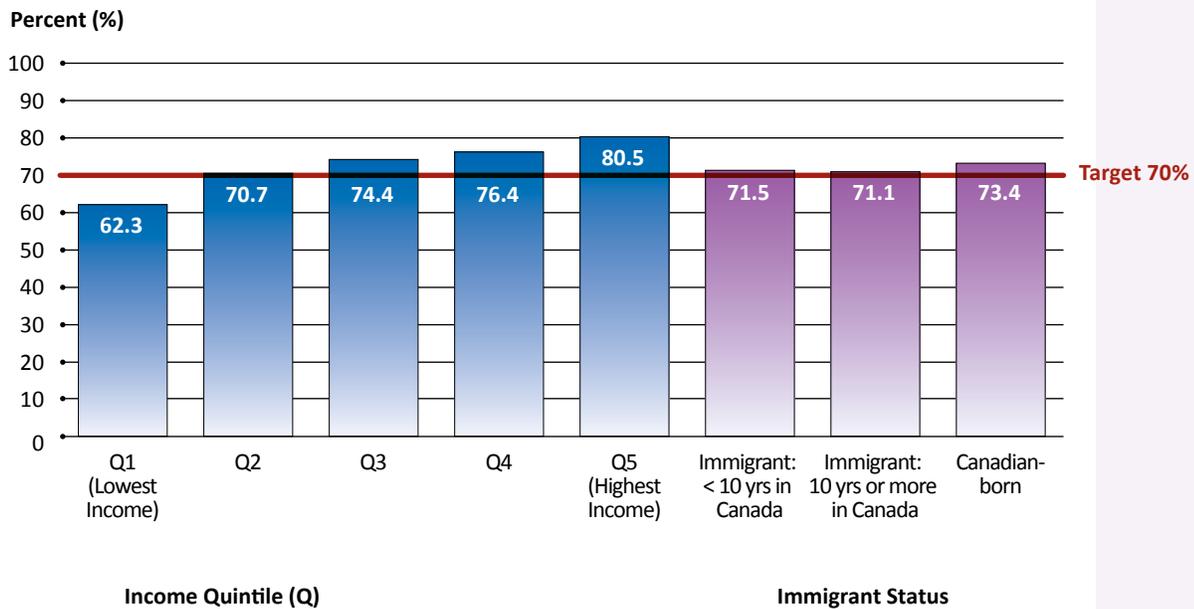
The territories are excluded from income analysis in the Canadian Community Health Survey.

[†] Age-standardized to 2011 standard population.

Data source: Statistics Canada, Canadian Community Health Survey.

FIGURE 2.ii

Percentage of eligible[†] women (aged 50 to 69) reporting a screening^{††} mammogram in the last two years, by household income quintile and immigrant status, Canada – 2012 reporting year



The territories are excluded from income analysis in the Canadian Community Health Survey.

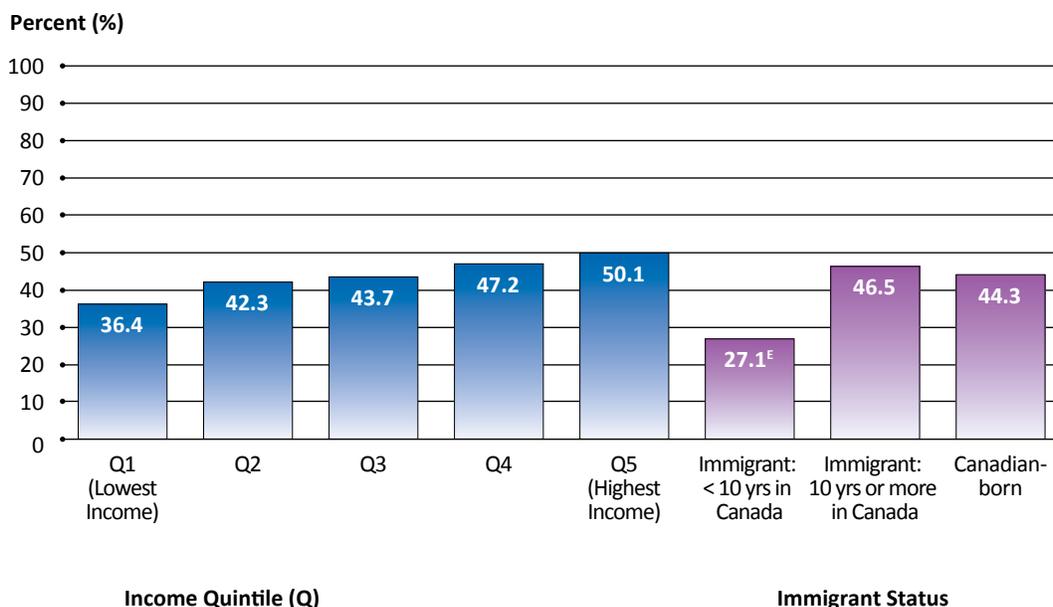
[†] A woman is deemed eligible for screening mammography if her reason for undergoing a mammogram is not to investigate previously detected lumps or breast problems, or as follow-up to breast cancer treatment.

^{††} Excludes tests done to investigate symptoms.

Data source: Statistics Canada, Canadian Community Health Survey.

FIGURE 2.iii

Percentage of the population (aged 50 to 74) who are up-to-date[†] on colorectal cancer screening for asymptomatic^{††} reasons, by household income quintile and immigrant status, Canada – 2012 reporting year



The territories are excluded from income analysis in the Canadian Community Health Survey.

[†] Up-to-date is defined as having a fecal test in the past two years and/or sigmoidoscopy/colonoscopy in the past five years.

^{††} Excludes patients being investigated for symptoms.

[£] Interpret with caution owing to large variability in the estimate.

Data source: Statistics Canada, Canadian Community Health Survey.

What do the results mean?

- While cancer screening in Canada has been effective, disparities in screening participation still exist among certain groups, including recent immigrants and people from low-income households. Future efforts should focus on more equitable access to and increased use of cancer screening among these underserved populations.
- In 2015, for the first time, system performance targets were set for cervical and breast cancer screening in underserved populations, both by household income and by immigrant status. The targets were set by experts from the

Partnership’s System Performance Targets and Benchmarks Working Group, who recommended alignment with participation targets set by the screening networks: 80% for cervical cancer screening and 70% for breast cancer screening across all income quintiles and immigrant statuses. Note that because income analysis was done using CCHS data at the national level, provinces may be unable to replicate the results when analysis is restricted to an individual province. The goal is to direct interventions at women in the lowest income quintiles (where screening rates have not yet reached the set targets), underscoring the importance of screening women in

underserved populations. The ultimate goal of setting screening targets by household income and by immigrant status is to improve overall screening rates across Canada and reduce disparities in access to cancer screening services over time. (Note that a target was not set for colorectal cancer screening by income because the screening network target is specific to fecal testing; this Special Feature reports on overall up-to-datedness in colorectal cancer screening).

- When it comes to cervical and colorectal cancer screening, the results show that screening rates were higher among longer-term immigrants (i.e., those who had lived in Canada for 10 years or more) than they were among more recent immigrants. This is consistent with previous research showing that screening rates increased slowly with each year immigrants remained in Canada.^{80, 81}
- Additional data from the Partnership (not shown) indicate that observed disparities in cervical cancer screening by income and immigrant status persisted over time (from 2003 to 2012). For breast cancer screening, disparities by income increased between 2005 and 2012; however, by 2012, no disparities in breast cancer screening were observed in immigrant women.⁸²
- Barriers to screening exist for immigrant and low-income populations. These could negatively influence screening uptake and self-reported screening participation rates. Such barriers may include: a lack of knowledge about screening; a lack of resources which prevents people from using screening services (i.e., they may be unable to afford transportation and/or lack affordable child care services); poor health

literacy (i.e., not understanding what cancer is, why screening is important and how to access services); and the language and gender of the person's physician.^{80, 83-85} Encouraging physicians, policy-makers and screening programs to recognize and understand these barriers may improve accessibility which could eventually translate into better uptake of screening within these underserved populations.

What are some examples of efforts in this area?

- The Pan-Canadian Cervical Screening Network (PCCSN), the Canadian Breast Cancer Screening Network (CBCSN) and the National Colorectal Cancer Screening Network (NCCSN) are each working on initiatives to increase screening in underserved populations.
- Across Canada, several community and health agencies have developed innovative and effective practices to reach underserved populations, including low-income and immigrant Canadians. The *Pan-Canadian Best and Promising Practices to Engage Seldom or Never Screened Women in Cancer Screening* project has compiled these initiatives into a compendium. The goal is to assist provincial and territorial screening programs, community and health agencies, policy-makers, governments, decision-makers and funders in their efforts to increase screening among underserved populations.⁸⁶

What else do we know?

- A 2014 Canadian Partnership Against Cancer report entitled *Examining Disparities in Cancer Control* presented data on the impact of language on cervical cancer screening. Results showed that women who spoke neither English nor French at home were less likely to have had a Pap test in the previous three years (66.1%) compared to women who spoke either English or French (82.4%).⁷⁴ This is likely due to the fact that language barriers make it more difficult for women to understand and act upon health information and therefore to make positive and informed decisions about their health, including the use of cancer screening services available to them.⁷⁸
- Recent studies have provided evidence on the effectiveness of strategies for promoting screening uptake in low-income and immigrant women and improving health equity. These strategies include:
 - Enrolment with a primary care physician which can help ensure regular access to primary care and therefore to screening.^{83, 87}
 - Connecting immigrant women to female health care providers (e.g., a physician, nurse or physician assistant within a primary care model), which creates a more comfortable environment for some women and may increase their participation in mammography and/or cervical cancer screening.⁸³

3. Diagnosis

**Breast Cancer Diagnosis
Wait Time**

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**Colorectal Cancer Diagnosis
Wait Time**

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**Special Feature: Use of PET
Scans in the Management
of Non-Small Cell Lung
Cancer in Canada**

67



3. Diagnosis

A timely and effective diagnostic process can lead to improved outcomes. These include prompt resolution for people who turn out not to have cancer, and timely, effective treatment for those who do. Measures that contribute towards improving 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 section presents two indicators pertaining to timely access to the diagnostic process: wait time from abnormal breast screen to resolution; and wait time from abnormal fecal test result to colonoscopy.

Indicator	Summary of results
Breast cancer diagnosis wait time: from abnormal breast screen to resolution	In 2012, Alberta, Saskatchewan, Ontario, New Brunswick and Nova Scotia achieved or were close to achieving the wait time target of 90% of women waiting five weeks or less (without biopsy) between an abnormal breast screen result and resolution. Trends suggest improvements in wait times in several provinces. None of the reporting provinces met the target (90% of women waiting seven weeks or less between an abnormal breast screen result and resolution) for women who did need a biopsy.
Colorectal cancer diagnosis wait time: from abnormal fecal test to colonoscopy	Median wait times from an abnormal fecal test result to follow-up colonoscopy among those screened through organized colorectal cancer screening programs (between 2011 and 2012) ranged from 63 days in Nova Scotia to 105 days in Newfoundland and Labrador. None of the five reporting provinces had median or 90 th percentile wait times below the 60-day target.

Breast Cancer Diagnosis Wait Time

What are we measuring and why?

This indicator measures the time elapsed between an abnormal breast screen result and resolution, with or without biopsy, and compares wait times to current Canadian

targets. The data show the median and 90th percentile wait times for asymptomatic women aged 50 to 69 screened by provincial breast screening programs in 2012.

- Guidelines identifying target wait times from abnormal breast screen to resolution were established by the Canadian Breast Cancer Screening Network's Working Group on the Integration of Screening and Diagnosis in 2000.⁸⁸ The target set for this indicator was that 90% of women should achieve resolution within seven weeks (for those requiring a biopsy), and within five weeks for women not requiring a biopsy. These guidelines apply to asymptomatic women aged 50 to 69 with no prior diagnosis of breast cancer.
 - Timely resolution of an abnormal screen through clinical investigation and a definitive biopsy (if required) facilitates prompt initiation of treatment and potentially improves patient outcomes. Measuring and comparing provincial wait times from an abnormal screening result to resolution allows for the identification of gaps, which could be addressed through quality improvement strategies.
- provincial median wait times ranged from 2.9 weeks in Alberta to 11.0 weeks in the Northwest Territories. The 90th percentile wait times ranged from 11.0 weeks in Alberta to 18.1 weeks in Quebec (Figure 3.2).
- The percentage of women with an abnormal screen result whose diagnosis was resolved within the target timeframes ranged from 38.0% in the Northwest Territories to 93.3% in Alberta when a biopsy was not required and from 33.0% in the Northwest Territories to 80.3% in Alberta when a biopsy was required.
 - In 2012, Alberta, Saskatchewan, Ontario, New Brunswick and Nova Scotia met or were close to meeting the national target for women not requiring a biopsy (Figure 3.1). None of the reporting provinces met the national target for women who did need a biopsy. In 2011, none of the provinces reporting data for this indicator achieved the wait time targets—that is, 90% of women waiting five weeks or less (without biopsy) or seven weeks or less (with biopsy) between an abnormal screening result and resolution.⁸⁹
 - Compared to data presented in the *2014 Cancer System Performance Report*, the current findings show improvements in median wait times for women who did not require biopsy in several provinces, including British Columbia, Alberta, Manitoba, Quebec and Nova Scotia (Figure 3.3).

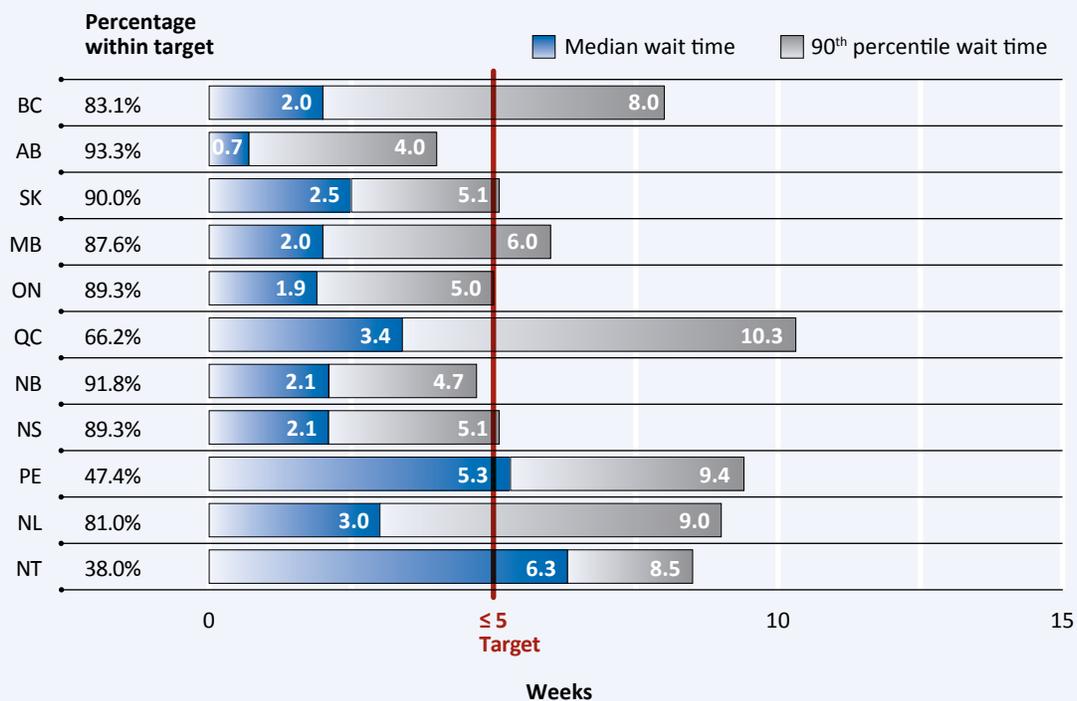
What are the results?

Data and measurement considerations

- Data for this indicator reflect wait times for women receiving mammograms through organized provincial breast cancer screening programs.
- While the target for abnormal breast screen to resolution is for 90% of women (five weeks or less without biopsy or seven weeks or less with biopsy), trend charts (Figures 3.3 and 3.4) report on median wait times.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 3.1

Median and 90th percentile wait times for resolution of abnormal breast screen without tissue biopsy for women (aged 50 to 69), by province/territory – 2012



AB: Data were not available after March 31, 2013.

QC: Data are from January 1, 2012 to September 30, 2012.

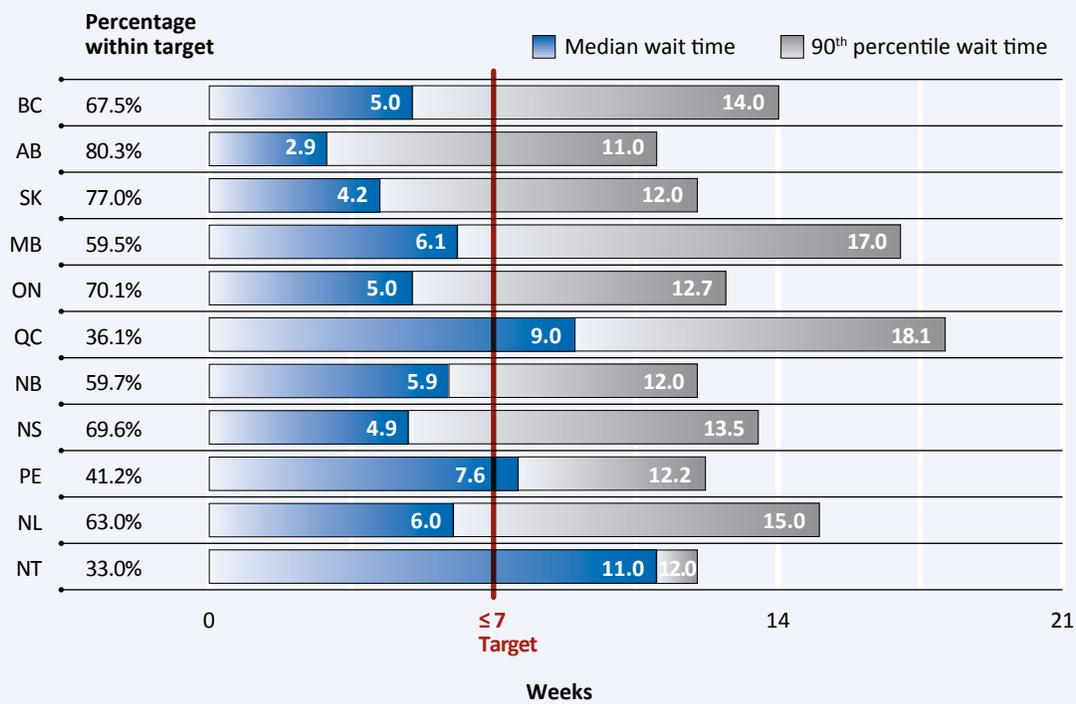
NT: Data include one site (Stanton) only.

The target is for 90% of women to have resolution of their abnormal breast screen within 5 weeks (for those not requiring a tissue biopsy).

Data source: Provincial breast cancer screening programs.

FIGURE 3.2

Median and 90th percentile wait times for resolution of abnormal breast screen through tissue biopsy for women (aged 50 to 69), by province/territory – 2012



AB: Data were not available after March 31, 2013.

QC: Data are from January 1, 2012 to September 30, 2012.

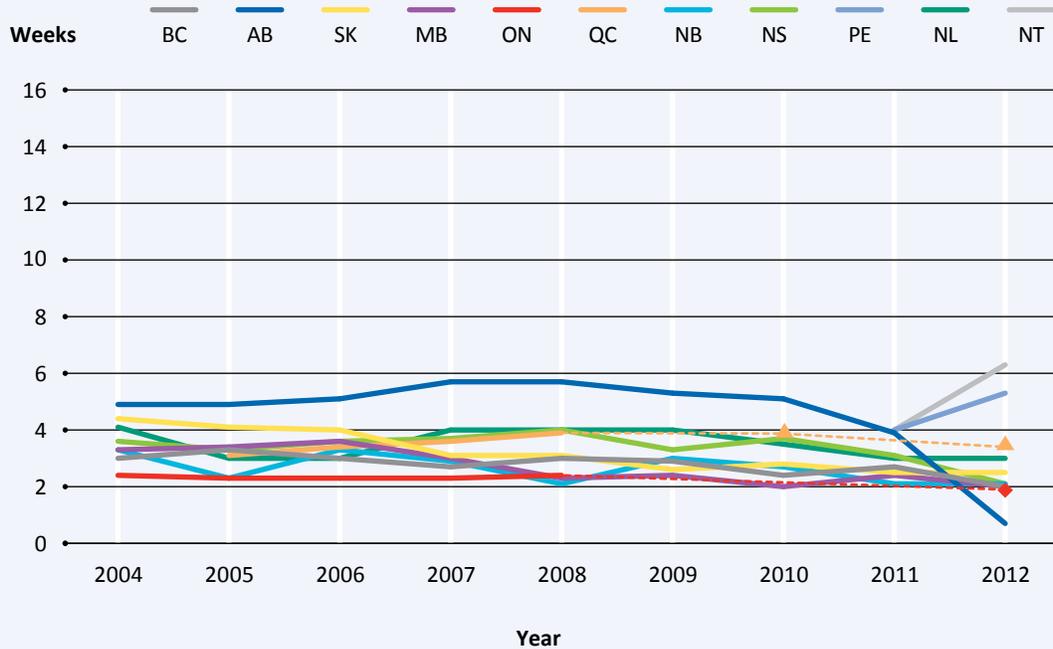
NT: Data include one site (Stanton) only.

The target is for 90% of women to have resolution of their abnormal breast screen within 7 weeks (for those requiring a tissue biopsy).

Data source: Provincial breast cancer screening programs.

FIGURE 3.3

Median wait time for resolution of abnormal breast screen without tissue biopsy for women (aged 50 to 69), by province/territory – from 2004 to 2012



Dash line indicates data not available.

AB: Data before 2012 were based on screening mammograms done by *Screen Test*, which accounted for about 10% of screening mammograms in AB. Data for 2012 covered entire province (all screening mammograms for women aged 50 to 69). Data for 2012 were not available after March 31, 2012.

ON: Data not available from 2009 to 2011.

QC: Data not available for 2009 and 2011. Data for 2012 were from January 1, 2012 to September 30, 2012.

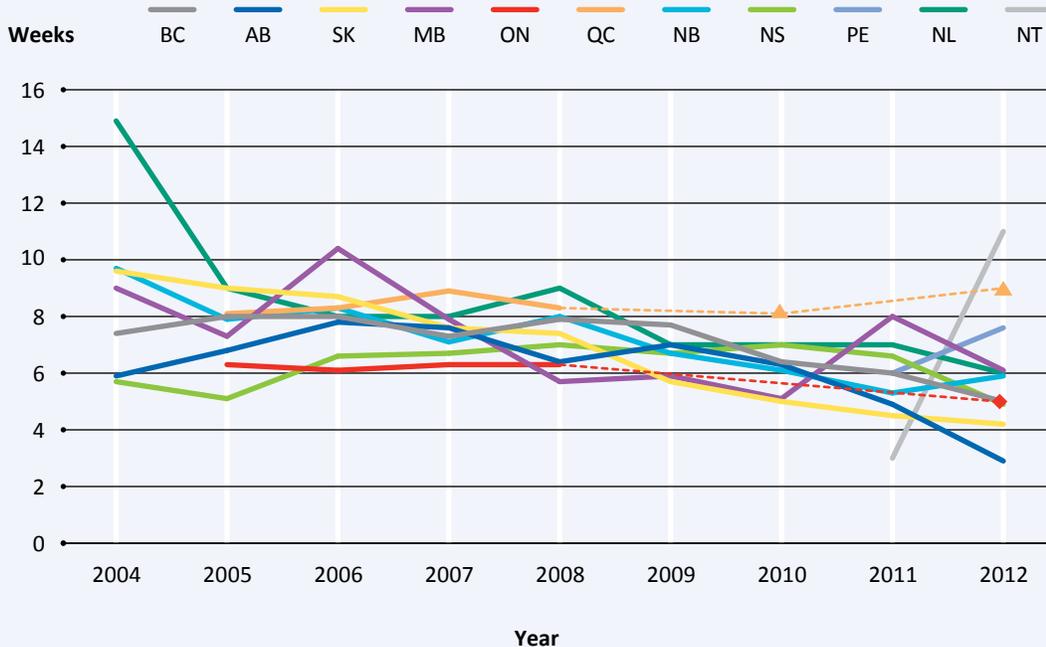
PE: Data only available for 2011 to 2012.

NT: Data include one site (Stanton) only.

Data source: Provincial breast cancer screening programs.

FIGURE 3.4

Median wait time for resolution of abnormal breast screen through tissue biopsy for women (aged 50 to 69), by province/territory – from 2004 to 2012



Dash line indicates data not available.

AB: Data before 2012 were based on screening mammograms done by *Screen Test*, which accounted for about 10% of screening mammograms in AB. Data for 2012 covered entire province (all screening mammograms for women aged 50 to 69). Data for 2012 were not available after March 31, 2012.

ON: Data not available from 2009 to 2011.

QC: Data not available for 2009 and 2011. Data for 2012 were from January 1, 2012 to September 30, 2012.

PE: Data only available for 2011 to 2012.

NT: Data include one site (Stanton) only.

Data source: Provincial breast cancer screening programs.

What do the results mean?

- None of the provinces met the wait time target of resolving 90% of abnormal results within seven weeks (for women requiring a tissue biopsy). This has been the situation for a number of years, suggesting that a thorough examination of barriers to reducing wait times is needed.

What are some examples of efforts in this area?

- The Canadian Breast Cancer Screening Network (CBCSN) monitors and assesses the

performance of screening in Canada every two years. A CBCSN workshop was held in Fall 2014 to consider strategies for reducing wait times from an abnormal breast screen to resolution and start of treatment. Initial steps have been taken to scan practices and assessment programs across the country, along with updated analysis of more current data related to those activities. Key lessons will be shared so that all provinces and territories can benefit from learning about successful strategies.

- Diagnostic intervals may be impacted by a number of factors. These include 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 between healthcare providers involved in screening and diagnosis. To shorten breast cancer wait times from an abnormal screen to first treatment, several provinces, including Alberta, Manitoba, Ontario and Nova Scotia, have developed initiatives aimed at improvement. This includes the development of wait time pathways, dissemination of best practices, and/or implementation of local strategies to improve performance.

- Several initiatives in Alberta may have contributed to the shorter breast cancer

diagnosis wait times reported in that province. These initiatives include *Screen Test* mobile digital mammography units that increase access to services for patients throughout rural Alberta; regional breast health programs that coordinate patient care from cancer suspicion to treatment, allowing for timely access to needed services; and ongoing collaboration between the provincial breast cancer screening program and the Alberta Society of Radiologists that represents all community radiology clinics.

What else do we know?

- Disparities in wait time between receipt of an abnormal screening result and a definitive diagnosis have been noted and may exist due to differences in neighbourhood income and geography.⁷⁴ Generally in Canada, the time a woman waited for resolution following an abnormal breast screening result was longer for women living in low-income neighbourhoods than for those living in high-income neighbourhoods, and longer for women living in rural and remote areas of the country than for those living in urban areas.

Colorectal Cancer Diagnosis Wait Time

What are we measuring and why?

This indicator measures the time elapsed between an abnormal fecal test result and a follow-up colonoscopy required to resolve the diagnosis among people screened through organized colorectal cancer screening programs. The median and 90th percentile wait times are presented for fecal test follow-up conducted between January 2011 and December 2012.

- Timely resolution of an abnormal cancer screening result leads to a shortened period of

uncertainty and anxiety for people who turn out to have a negative diagnosis (no cancer) and to earlier detection and potentially improved treatment outcomes for people with a positive diagnosis (cancer).

- Early detection of colorectal cancers through timely and accurate screening using the guaiac fecal occult blood test and removal of polyps during follow-up colonoscopy has been shown in a number of major studies to reduce colorectal cancer mortality.⁵³

- Colonoscopy is the recommended diagnostic test for follow-up of an abnormal fecal test result. The Canadian Association of Gastroenterology (CAG) recommends that a colonoscopy be completed within 60 days of an abnormal fecal test; this is based on a pan-Canadian consensus on medically acceptable wait times.⁹⁰
- As of 2012, all provinces had developed or were developing organized colorectal cancer screening programs using fecal tests (either guaiac or immunochemical) as the primary screening modality. All programs recommend screening for average-risk people age 50 to 74 (see *Screening* chapter). Although the territories do not have organized colorectal screening programs, initiatives have been developed to standardize clinical practice for colorectal cancer screening or to explore the feasibility of implementing a territory-wide screening program.⁹¹

What are the results?

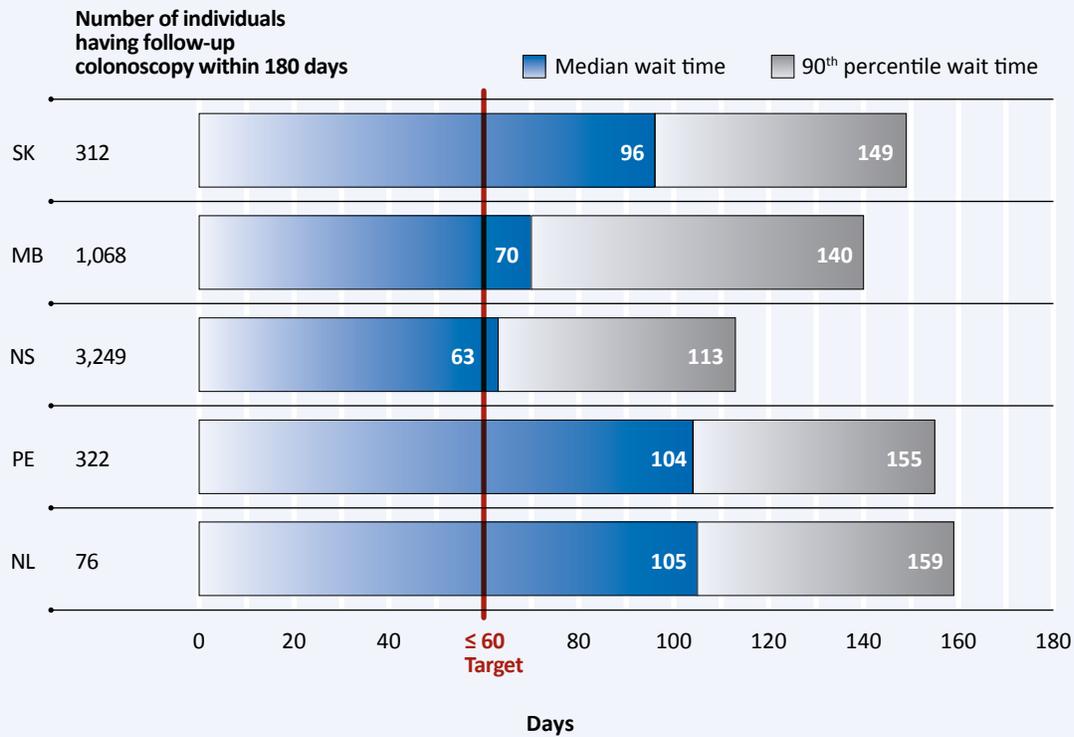
- For 2011 to 2012, five provinces provided sufficient data to report wait times from an abnormal fecal test to follow-up colonoscopy. Median wait times ranged from 63 days in Nova Scotia to 105 days in Newfoundland and Labrador. None of the five reporting provinces had median or 90th percentile wait times below the 60-day target recommended by the CAG (although Nova Scotia came close to reaching the target for their median wait times). The 90th percentile wait times ranged from 113 to 159 days (Figure 3.5).
- Manitoba has made progress towards the 60-day target, while wait times in Nova Scotia have increased from the target between January 1, 2009 to December 31, 2011 and January 1, 2011 to December 31, 2012.⁸⁹

Data and measurement considerations

- Only colonoscopies done within 180 days of an abnormal fecal test result are included in this analysis. The 180-day time frame was selected to minimize the inclusion of colonoscopies that were unrelated to abnormal fecal tests.
- The reporting period analyzed varied somewhat by province (see notes, Figure 3.5).
- Colorectal cancer screening programs are currently at the early stages of development in Canada, so findings should be considered preliminary; however, these early data do give us an indication of colorectal cancer diagnosis wait times across Canada.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 3.5

Median and 90th percentile wait times from abnormal fecal test to follow-up colonoscopy, by province – first-round screening tests conducted between January 1, 2011 and December 31, 2012



Data include colonoscopies performed within 180 days of abnormal fecal test result.

SK: Data include one (of 13) health regions.

PE: Data reflect only patients who participated in the screening program between May 1, 2011 and December 31, 2012.

NL: Data are for the final 5 months of the reporting period, in one (of four) health regions.

Target: the Canadian Association of Gastroenterology (CAG) recommends that a colonoscopy be completed within 60 days of an abnormal fecal test.

Data source: National Colorectal Cancer Screening Network.

What do the results mean?

- The findings suggest that work is needed to examine the pathways between an abnormal fecal screen and a follow-up colonoscopy. There is a need to identify sources of delay and opportunities for better system integration that will produce more timely diagnoses. Colorectal cancer screening programs are still in the early stages of implementation in some of the provinces; that was particularly true during the measurement timeframe for this indicator.

What are some examples of efforts in this area?

- These results represent early measurement of the timeframes for colonoscopy following abnormal fecal tests. Future efforts will focus

on including data from all provinces, standardizing the measurement timeframes and reporting on progress toward achieving the target.

- Manitoba's IN SIXTY initiative aims to improve the cancer patient journey from cancer suspicion to diagnosis and first treatment, if needed. The goal of this initiative is to reduce the time from suspicion of cancer to first treatment to 60 days or less by 2016. IN SIXTY is a partnership between Manitoba Health, CancerCare Manitoba, regional Manitoba health authorities, and providers such as Diagnostic Services Manitoba, family physicians and other health care professionals. Initiatives are underway to improve the cancer patient journey in primary care, diagnostics, speciality care, IT support and communication in that province.

What else do we know?

- Previous work has demonstrated a reduction in mortality from colorectal cancer with regular fecal test screening and appropriate follow-up of early-stage cancers or pre-cancers.⁵³ However, to achieve these benefits, individuals with an abnormal fecal test should have timely follow-up of abnormal results with colonoscopy.

Special Feature: Use of PET Scans in the Management of Non-Small Cell Lung Cancer in Canada

Evidence suggests that the use of positron emission tomography (PET) in the diagnosis and treatment of lung cancer can lead to better cancer staging and treatment planning. This may allow some patients to avoid unnecessary and invasive treatment.

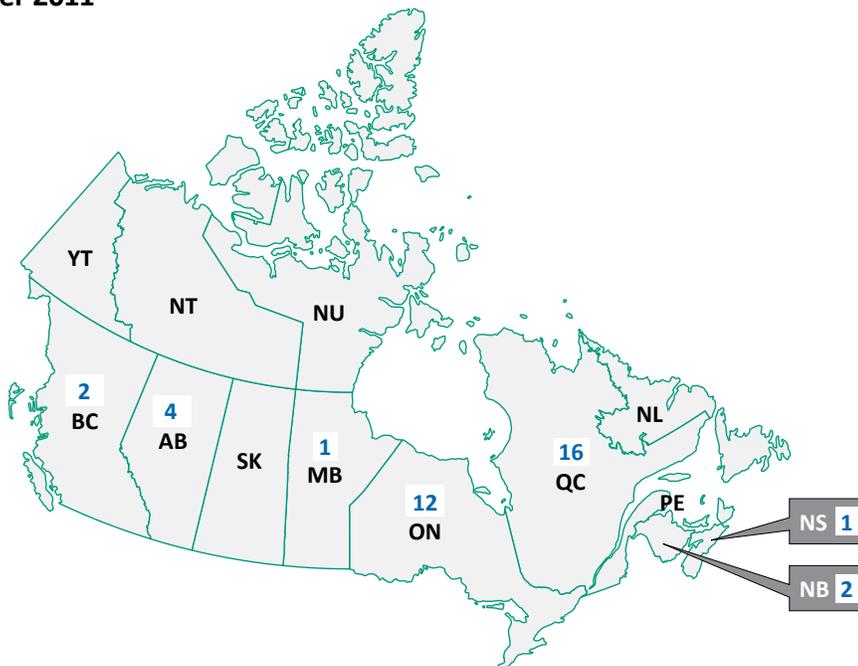
PET imaging has emerged as an effective tool in managing lung cancer.⁹² Studies have shown that information derived from PET imaging led to a change in intended treatment plans in 36-50% of cases.⁹³

As of December 2011 (corresponding to the timeframe of the data used in this study), there

were approximately 38 centres operating publicly-funded PET scanners in seven Canadian provinces (British Columbia, Alberta, Manitoba, Ontario, Quebec, New Brunswick, and Nova Scotia) (see Figure 3.i).⁹⁴ To date, the only indicators available at a pan-Canadian level were limited to per capita capacity of diagnostic technology—in this case, the number of PET scanners per million population.^{43,93} While this is an acceptable indicator for the availability of PET scanners in Canada, it provides no evidence about the actual utilization of this technology relative to evidence about how it should be used.

FIGURE 3.i

Number of positron emission tomography (PET) scanners per province – December 2011



Data source: Provincial cancer agencies.

Diagnostic indications for the use of PET scans include: determining if a suspicious lesion could be cancer; staging newly diagnosed cancers; detecting the primary tumour site in a patient with a confirmed or suspected metastatic lesion; and radiation therapy planning.

Non-diagnostic indications for the use of PET scans include: monitoring treatment response during chemotherapy, radiation therapy, or combined modality therapy; restaging cancer after the completion of therapy; and investigating a suspected recurrence of a previously treated cancer.

It is important to note that evidence supporting the different indications listed above varies in quality. For example, evidence supporting the use of PET to restage a cancer following treatment or to investigate a suspected recurrence is not as strong as the evidence for using PET to determine cancer stage after an initial diagnosis.^{95,96}

At this time, guidelines for using PET in the management of non-small cell lung cancer (NSCLC) are not standardized across the country. Given the high cost of this technology and the continually emerging evidence around its benefit in different settings, a study was warranted to address the knowledge gap in performance measurement by improving our understanding of PET use in Canadian patients with NSCLC. Patients with this diagnosis were selected as the study population because NSCLC accounts for 85%-90% of all lung cancers.⁹⁷

The study, launched in 2012, examined the utilization of PET scans on patients with NSCLC in Canada. Six provinces participated: British Columbia (BC), Alberta (AB), Manitoba (MB), Ontario (ON), New Brunswick (NB) and Nova Scotia (NS).

PET scan data, including patient identifiers and date of scan, were extracted from hospital/PET centre information systems. Cancer registry and PET utilization data were linked by way of patients' provincial health card numbers or the equivalent. Provinces were responsible for the extraction, linkage and analysis of their data using a standardized methodology coordinated by the Canadian Partnership Against Cancer.

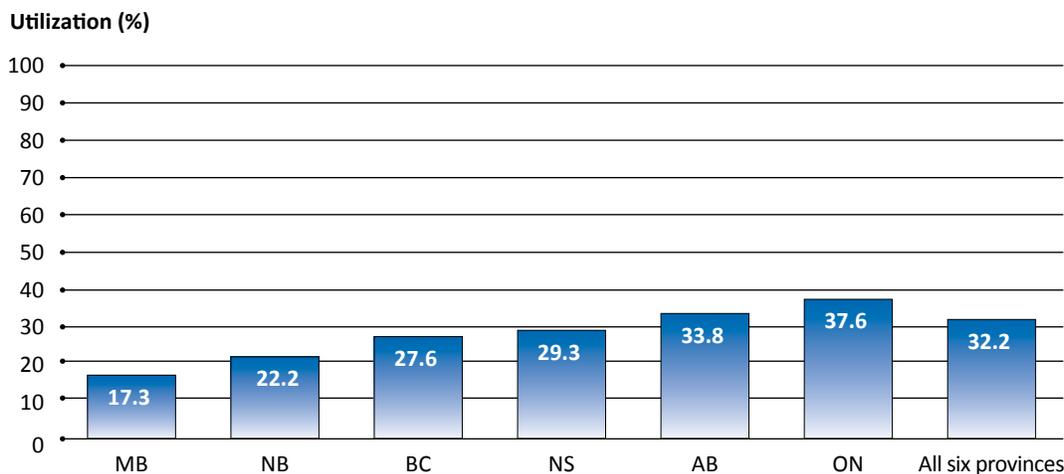
The study population comprised 27,984 patients with NSCLC diagnosed during the calendar years 2009 to 2011. Utilization of PET scans was analyzed by province, by patient age at diagnosis, by sex and by stage at diagnosis.

Utilization of PET Scans by Province

Between 2009 and 2011, 32.2% (9,004) of the 27,984 patients diagnosed with NSCLC in the participating provinces had undergone at least one PET scan during the index period (i.e., between three months before and one year after diagnosis) (Figure 3.ii). The number of PET scans ranged from 338 to 4,667 across provinces (Figure 3.iii).

FIGURE 3.ii

Percentage of non-small cell lung cancer patients who received at least one positron emission tomography (PET) scan within three months before and up to one year after diagnosis, by province – patients diagnosed from 2009 to 2011



BC: Data were only for non-small cell lung cancer patients diagnosed in 2010 and 2011, since stage data were not available for 2009.

Data source: Provincial cancer agencies.

The percentage of NSCLC patients who received a PET scan ranged from 37.6% (4,667 of 12,426 patients) in Ontario to 17.3% (338 of 1,956 patients) in Manitoba. Although Manitoba had the lowest PET utilization rate, the province's five-year net survival for lung cancer was among the highest across Canada and internationally.⁹⁸ Lower utilization rates may reflect accessibility issues due to Canada's geographical size and distance from patients' place-of-residence to PET centres and large hospitals.

Different funding policies and medical practice guidelines may also contribute to province-to-province variations in PET utilization among patients with NSCLC. For example, all the participating provinces listed lung cancer as an approved indication for PET utilization (i.e., the cost of the scan was covered by the province). However, the list of approved indications was shorter in Ontario than in other provinces.⁹³ Because of this, the funding allocated to Ontario would have been spread across fewer cancer

types. This may have led to a higher proportion of PET use for diagnosing and treating NSCLC in Ontario—one of the approved indications for PET utilization in that province.

Rates of PET utilization among some patients with NSCLC appear to be higher in the United States compared to Canada. A recent report showed that 65.3% of American patients age 66 or older with Medicare who were diagnosed with NSCLC received one or more PET scans during 2005-2007.⁹⁹

Utilization of PET Scans by Age and Sex

The average percentage of patients who received a PET scan during the study period was 34.6% for those aged 18-69 years (4,693 of 13,559 patients), compared to 29.9% for those aged 70 years or older (4,311 of 14,425 patients) (Figure 3.iii). In all provinces except Ontario, the use of PET was lower for patients over age 70 compared to those in the younger group.

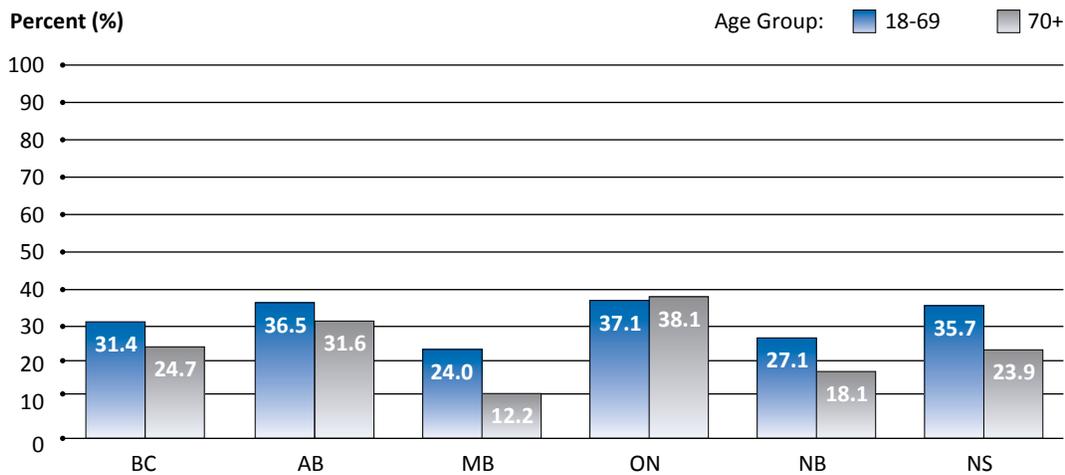
The link between PET usage and older age may be related to differences in lung cancer treatment. For example, the *2014 Cancer System Performance Report* showed that Stage II or IIIA non-small cell lung cancer resection rates were 24.2% lower among male patients over age 70 compared to those aged 18-69 (22.4% vs 46.6%). Resection rates were 29.6% lower among female patients over age 70 (28.6%) compared to those aged 18-69 (58.2%).⁸⁹

While older patients with lung cancer were less likely to have a lung resection, evidence supports the use of this surgery in both older and younger age groups, since both respond well to this treatment.¹⁰⁰ Reasons for the differences in resection rates by age are not well-understood and may warrant further investigation.

There were only slight differences in PET utilization rates between males and females.

FIGURE 3.iii

Percentage of non-small cell lung cancer patients who received at least one positron emission tomography (PET) scan within three months before and up to one year after diagnosis, by province and age group – patients diagnosed from 2009 to 2011



BC: Data were only for non-small cell lung cancer patients diagnosed in 2010 and 2011, since stage data were not available for 2009.
Data source: Provincial cancer agencies.

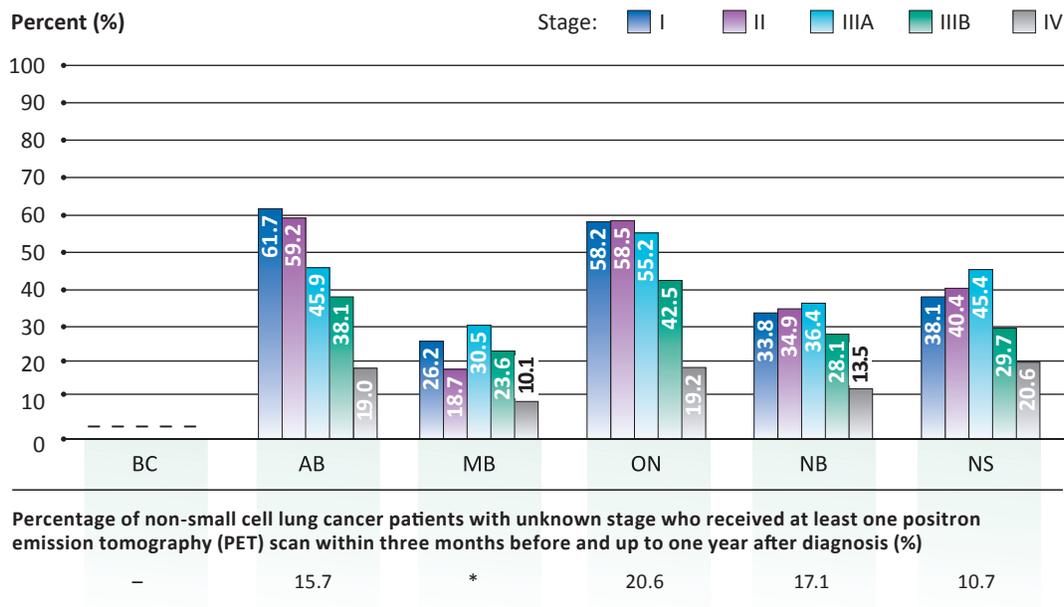
Utilization of PET Scans by Cancer Stage in Patients with NSCLC

PET utilization was highest in patients with Stage I and II lung cancers, intermediate in those with Stage III, and lowest among those with Stage IV cancers (Figure 3.iv). The percentage of patients with Stage I NSCLC who received a PET scan ranged from 26.2% in Manitoba to 61.7% in

Alberta. PET utilization for patients with Stage IV disease ranged from 10.1% in Manitoba to 20.6% in Nova Scotia. This is not surprising—in patients with advanced lung cancers, metastatic disease tends to be identified through conventional imaging modalities such as chest x-ray and computed tomography (CT) scans.

FIGURE 3.iv

Percentage of non-small cell lung cancer patients who received at least one positron emission tomography (PET) scan within three months before and up to one year after diagnosis, by province and stage at diagnosis – patients diagnosed from 2009 to 2011



* Suppressed due to unreliability by small numbers and/or to avoid residual disclosure.

“-” Data not available.

AB: The classification of stage for 2009 were based on AJCC 6th, for 2010 and 2011 based on AJCC 7th. Cases with Death Certificate Only (DCO) or confirmed by autopsy only were excluded. Cases with Stage III were upstaged as Stage IIIB.

BC: Data were not available by stage due to lack of surgery information for the cases diagnosed in 2009 to 2011 by treatment modality and stage.

MB: Cases with Stage III were upstaged as Stage IIIB.

NS: Cases with Stage III were upstaged as Stage IIIB.

Data source: Provincial cancer agencies.

Approximately 91% of these scans were used for diagnostic purposes; 9% were undertaken for treatment purposes^a (data not shown). (Please refer to the Technical Appendix available at systemperformance.ca to learn how a proxy measure was used to determine the purpose of a PET scan.)

Patients' registered stage and diagnosis date can vary according to each cancer registry's methodology. Because surgical and pathology data tend to be more exact, they take precedence over diagnostic imaging data. So it is possible that a patient's diagnosis date and his or her assigned stage (i.e., as determined from the PET scan) may change once the person has undergone surgery and pathological testing.

Although the percentages of patients with Stage IV NSCLC who received a PET scan may seem high from a surgical resection point of view, there are other reasons why a Stage IV patient may undergo a PET scan. For example, someone who is not a candidate for surgery or who had a previous CT scan that confirmed Stage IV disease may be referred for a PET scan for the purpose of radiation therapy treatment planning.¹⁰¹

Given the methodology used in the current study, it is not possible to determine why Stage IV NSCLC patients received a PET scan—only that one was administered before or after the diagnosis date.

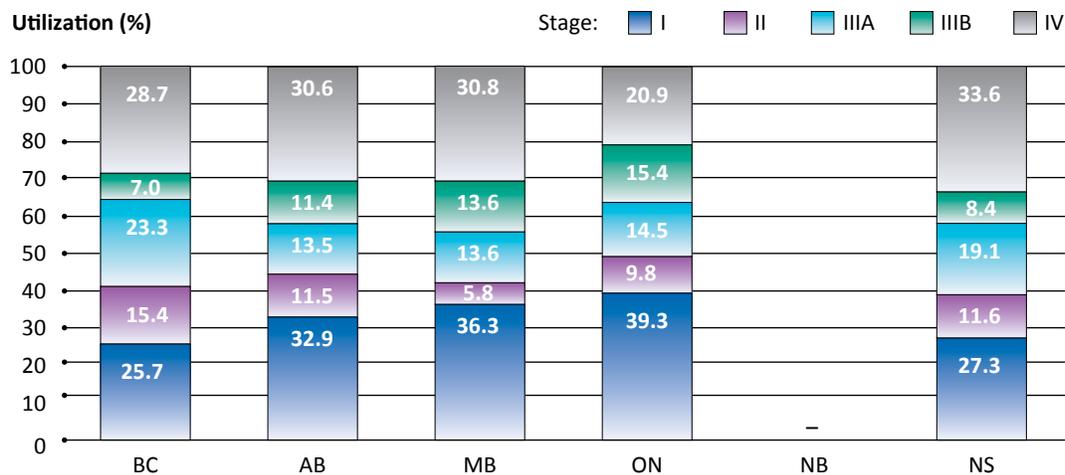
Proportion of PET Scans Conducted by Cancer Stage

On average, about 32.3% of the PET scans conducted during the study period were for patients with Stage I NSCLC; 28.9% were for those with Stage IV disease (Figure 3.v). Although the percent utilization of PET scans for Stage IV patients was lower than it was for those with Stage I cancer (Figure 3.iv), the higher incidence of Stage IV NSCLC increases the percentage of scans allotted for it. Because no organized early detection program for lung cancer currently exists in Canada, interprovincial variation of PET usage by stage at diagnosis could reflect differences in how diagnostic services are used in different jurisdictions.

^a Data may be incomplete as treatment in this analysis only refers to radiation therapy or surgery.

FIGURE 3.v

Distribution of total diagnostic positron emission tomography (PET) scans among non-small cell lung cancer patients, by stage at diagnosis, by province – patients diagnosed from 2009 to 2011



“–” Data not available.

The total percentages of Stage I through Stage IV may not equal 100 due to rounding approach.

AB: The classification of stage for 2009 were based on AJCC 6th, for 2010 and 2011 based on AJCC 7th. Cases with Death Certificate Only (DCO) or confirmed by autopsy only were excluded. Cases with Stage III were upstaged as Stage IIIB.

BC: Data were only for NSCLC cases diagnosed in 2010 and 2011, since stage data were not available for 2009. Data may not be complete and comparable with other provinces due to lack of information about surgery for the diagnosis years 2010 and 2011; these data were used to determine if PET scans were for diagnosis or for management of treatment. Cases with Stage III disease were staged upward to Stage IIIA.

MB: Cases reported only as Stage III were categorized as Stage IIIB.

NB: Data were not available due to lack of radiation therapy information for the diagnosis years.

NS: Cases reported only as Stage III were categorized as Stage IIIB.

Data source: Provincial cancer agencies.

Conclusion

This study found that there were differences in the utilization of PET scans for patients with non-small cell lung cancer (NSCLC) by province, by cancer stage and by age group. PET utilization rates were highest in Ontario and lowest in Manitoba; rates were lower for patients over age 70 and higher for those with Stage I and II cancers.

Provinces should ensure that steps are taken to maintain an evidence-based approach to the use of PET for managing NSCLC. Continuous updating

and uptake of the evidence would ensure that patients receive the right test at the right time. This will help minimize unnecessary exposure to radiation, reduce false positives and negatives, and ensure the most efficient use of health system resources. Future work in this area should include: continued monitoring of PET scan usage; conducting a chart review of Stage IV NSCLC patients to examine reasons for PET utilization; and capturing rates of privately-funded PET scanner utilization.

Data and measurement considerations

- Cases of NSCLC were identified from provincial cancer registries using ICDO-3 codes (C34.0 to C34.9) with exclusion of small cell, lymphoma and neuroendocrine carcinoma and sarcomas.
- Analyzed PET scans were restricted to those performed within an index period defined as three months prior to a patient's diagnosis through one year post-diagnosis. A proxy measure was used to determine whether the utilization of a PET scan was for diagnostic or treatment purposes. The diagnostic period was defined as the first occurrence of either four months post-diagnosis or the earliest treatment date. Scans occurring after this period were considered to be for non-diagnostic/treatment purposes.
- This was done in an attempt to eliminate the possibility that these scans were used for any prior or subsequent condition or occurrence. Utilization was measured as the proportion of NSCLC patients who received a PET scan during this index period.
- The time period included in the study represents early implementation efforts for many of the provinces' PET programs. Therefore, the data reported may not be representative of the current state of PET utilization across Canada.

4. Treatment

Removal and Examination of 12 or More Lymph Nodes in Colon Resections 77

Breast Cancer Resections That Are Mastectomies 81

Radiation Therapy Wait Time 84

Pre-Operative Radiation Therapy for Stage II or III Rectal Cancer Patients 88

Post-Operative Chemotherapy for Stage II or IIIA Non-Small Cell Lung Cancer Patients 93



4. Treatment

Cancer treatment accounts for the majority of resources consumed in cancer control and involves a broad range of services/modalities, including surgery, systemic therapy and radiation therapy. Treatment goals can include cure, disease control and controlling symptoms. Factors influencing treatment goals include the type of cancer and stage at diagnosis, patient characteristics such as comorbidities and patient preferences.

This chapter includes a number of treatment indicators at the system level, including wait times and treatment patterns, compared with evidence-based guidelines.

Performance targets have also been included for four treatment indicators: the removal of 12 or more lymph nodes in colon resections; radiation therapy wait times; pre-operative radiation for

Stage II or III rectal cancer; and adjuvant chemotherapy for Stage II and IIIA non-small cell lung cancer (NSCLC) among patients aged 70-79.

Some indicators were available only for a subset of provinces that were able to provide required data that conformed to the agreed-upon definitions and specifications.

Indicator	Summary of results
Surgery	
Removal and examination of 12 or more lymph nodes in colon resections	From 2008 to 2011, the percentage of colon cancer resection surgeries with 12 or more lymph nodes removed and examined continued to increase steadily across all provinces. In 2011, Ontario was close to the target of 90%, with Alberta, Manitoba and Newfoundland and Labrador above 80%. There were no notable differences in treatment patterns by patient age group or by sex.
Breast cancer resections that are mastectomies	There was substantial interprovincial variation in the percentage of breast cancer resections done by mastectomy based on data from 2007/2008 to 2011/2012. The percentage of women who were treated by final mastectomy (either as their first surgery or within one year of breast-conserving surgery) ranged from 25.9% in Quebec to 68.8% in Newfoundland and Labrador.
Radiation therapy	
Radiation therapy wait time: from ready-to-treat to start of treatment	In 2013, eight of nine provinces with available data had achieved the target: 90% of patients treated within the national wait time target of 28 days from ready-to-treat to start of treatment. The shortest 90 th percentile wait times for all cancers were in Ontario (14 days) and Saskatchewan (15 days).
Pre-operative radiation therapy for Stage II or III rectal cancer patients	The percentage of Stage II or III rectal cancer cases undergoing pre-operative radiation therapy has increased over time but is still well below the 70% target. The province with the highest treatment rate for 2011 was Newfoundland and Labrador at 59.6%. Patient age affected the treatment rate: 58% for patients under aged 60 with rectal cancer who underwent pre-operative radiation therapy compared to 22% of those over 80 years of age.

Indicator	Summary of results
Systemic therapy	
Post-operative chemotherapy for Stage II or IIIA non-small cell lung cancer patients	The percentage of patients with non-small cell lung cancer receiving adjuvant chemotherapy in 2011 ranged from 45.8% in Alberta to 50.0% in Nova Scotia. Rates were almost 20 percentage points lower for patients aged 70 or older compared to rates among those under age 60. The treatment rate for patients aged 70-79 was close to the 45% target.

4.1 Surgery

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

What are we measuring and why?

This indicator measures the percentage of resections for colon cancer in which 12 or more lymph nodes were removed and then examined by a pathologist for cancer spread. Results are presented by province for resected colon cancer cases diagnosed each year from 2008 through 2011; overall percentages are compared by age group and by sex.

- Most clinical guidelines recommend that a minimum of 12 nodes be removed and then examined to more definitively establish cancer's nodal status (which indicates the extent of cancer spread to lymph nodes). This 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 12 or more nodes are removed and examined.¹⁰²
- A system performance target of 90% (i.e., 90% of colon cancer resections include removal and examination of 12 or more lymph nodes) for all provinces has been set for this indicator by experts from the Canadian Partnership Against

Cancer's System Performance Targets and Benchmarks Working Group^b.

- Measuring provincial treatment patterns relative to this guideline can help identify variations and inform opportunities for quality improvements at the provincial level.

What are the results?

- For all eight participating provinces, the percentage of colon resections with 12 or more lymph nodes examined continued to increase steadily over time (Figure 4.1). As of 2011, Ontario had almost reached the system performance target of 90% while three other provinces (Alberta, Manitoba and Newfoundland and Labrador) were above 80%.
- In 2011, there was some interprovincial variation in the percentage of colon resections that had 12 or more lymph nodes examined. Results ranged from 71.6% of resections done in Prince Edward Island to 89.6% of resections done in Ontario for 2011 (Figure 4.1).

^b The Targets and Benchmarks Working Group identified targets for System Performance indicators through a process that included a variety of inputs: those set in other jurisdictions, Partnership-identified priorities and other available evidence. The Working Group is comprised of clinical, research, policy and system experts from across Canada.

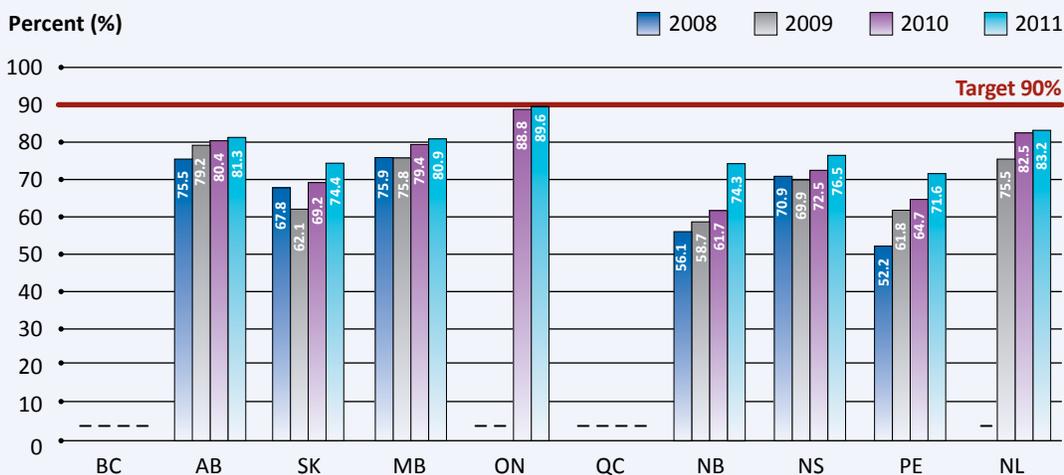
- From 2008 to 2011, the percentage of patients who had 12 or more lymph nodes examined was relatively consistent across age groups (Figure 4.2).
- In 2011, the percentage of colon cancer resections where 12 or more lymph nodes were examined was slightly higher for women than for men and also slightly higher for patients aged 70 years of age and older compared to those aged 18-69 (Figure 4.3).

Data and measurement considerations

- The source of information for this indicator is the collaborative staging system. Information on the number of lymph nodes removed during resection surgery for colon cancer and then examined by a pathologist was abstracted from patient charts and is based on standardized collaborative staging data elements.
- Cases with an unknown number of nodes removed and examined were excluded from both the numerator and denominator for comparison purposes.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 4.1

Percentage of colon resections with 12 or more lymph nodes removed and examined, by province – patients diagnosed from 2008 to 2011



“-” Data not available.

AB: All coded surgeries including polypectomy were included as complete colon resection.

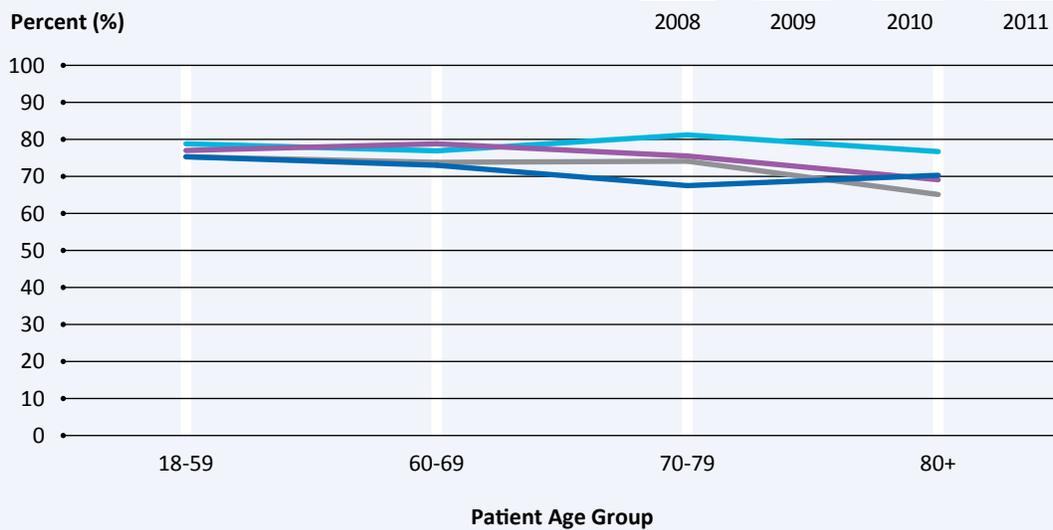
ON: Data represent colon cases with 12 or more nodes examined rather than the cases diagnosed in the corresponding year.

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

Data source: Provincial cancer agencies.

FIGURE 4.2

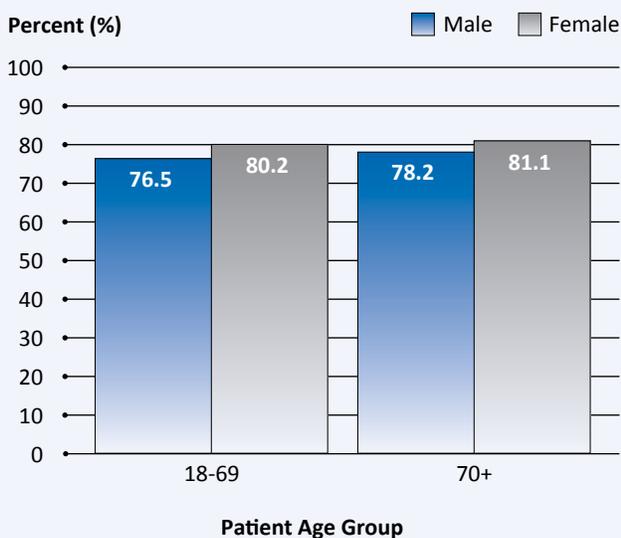
Percentage of colon resections with 12 or more lymph nodes removed and examined, by patient age group – patients diagnosed from 2008 to 2011



Data include AB, SK, MB, NB, NS and PE (provinces that submitted comparable data for all four years).
 AB: All coded surgeries including polypectomy were included as complete colon resection.
 Data source: Provincial cancer agencies.

FIGURE 4.3

Percentage of colon resections with 12 or more lymph nodes removed and examined, by patient age group and sex – patients diagnosed in 2011



Data include AB, SK, MB, NB, NS, PE and NL (provinces that submitted comparable data for all four years).
 AB: All coded surgeries including polypectomy were included as complete colon resection.
 Data source: Provincial cancer agencies.

What do the results mean?

- We first reported on this indicator in the *2010 Cancer System Performance Report*, beginning with 2007 provincial data. Since then, we have seen steady improvement across all provinces, up to and including data for 2011. We can now begin to assess the impact that reporting on this indicator has had on related clinical practice.
- The Canadian Partnership Against Cancer's System Performance Targets and Benchmarks Working Group established a national evidence-informed benchmark of 90% for this indicator. The benchmark was chosen on the strength of evidence for the guideline and taking into account variations observed among provinces. The setting of a performance target is intended to signal the importance of evidence-based practice and to help motivate local efforts aimed at increasing adherence. As of 2011, none of the reporting provinces had met the system performance target of 90%.
- In 2011, all laboratories in New Brunswick were capturing synoptic pathology resection data and submitting this information to the registry electronically. Synoptic reporting utilizes a standardized template for noting pathological findings after a tumour or other tissue has been removed for the purposes of a cancer diagnosis and/or treatment. New Brunswick's adoption of synoptic pathology reporting may explain the increase in rates of recommended lymph node removal in that province compared to the previous year. Ontario has also implemented this initiative. This move, combined with other quality initiatives such as publishing evidence-based guidelines in this area and public reporting, may have influenced the high rates of recommended lymph node removal in that province and the steady upward trend over the last 10 years. These activities were largely enabled by the Partnership-funded *Electronic Synoptic Pathology Reporting Initiative (ESPRI)*.
- There was little variation in lymph node removal across age and sex. A few recent studies from the US found that older patients with colon cancer were less likely to have 12 or more lymph nodes removed than younger patients.^{103–105} The lack of variation by age reported here is likely influenced by the fact that patients who underwent resections were all healthy enough to have surgery.
- The impact of reporting and target-setting on the number of lymph nodes retrieved has not been widely studied; however, a US study published in 2013 found that concordance with the 12-or-more-lymph-nodes guideline increased from 34% in the period before the guideline was released (1988 to 1990) to 75% by 2009 following release of the guideline and setting of local targets.¹⁰⁶

What are some examples of efforts in this area?

- To date, the *Electronic Synoptic Pathology Reporting Initiative (ESPRI)* has been implemented in two provinces (Ontario and New Brunswick); roll-out is being phased in at sites across four other provinces (British Columbia, Manitoba, Prince Edward Island and Nova Scotia).¹⁰⁷ The initiative aims to facilitate the implementation of electronic synoptic pathology reporting for breast, colorectal, lung, prostate and endometrial cancers. Using a standardized template for reporting may help yield additional information that will prove useful in understanding surgical and pathological practices.

Breast Cancer Resections That Are Mastectomies

What are we measuring and why?

This indicator measures the percentage of women who underwent mastectomy among those who had breast cancer surgery to treat unilateral invasive breast cancer. We are presenting the percentage of patients who received mastectomy as their first surgery (i.e., index) and the percentage of patients who underwent mastectomy first or mastectomy within a year of having breast-conserving surgery (i.e., final). Results are presented by province and include breast cancer resections that occurred between April 2008 and March 2013.

- Most women diagnosed with non-metastatic breast cancer are candidates for surgery—either mastectomy or breast-conserving surgery^c typically followed by radiation therapy, referred to as breast conserving therapy (BCT).¹⁰⁸ BCT is less invasive than mastectomy and is associated with lower

morbidity, improved cosmetic appearance and better psychological outcomes. Evidence shows that mortality from non-metastatic breast cancer is equal across both procedures.

What are the results?

- The use of index mastectomy (where mastectomy was the first choice procedure) ranged from 20.9% in Quebec to 56.4% in Saskatchewan (Figure 4.4). The final mastectomy rate ranged from 25.3% in Quebec to 68.3% in Newfoundland and Labrador (Figure 4.4). This suggests substantial variation in breast cancer surgical practice among provinces. Note that the difference between the index and final rates within a province may reflect the proportion of mastectomies that followed unsuccessful breast-conserving surgery^d.

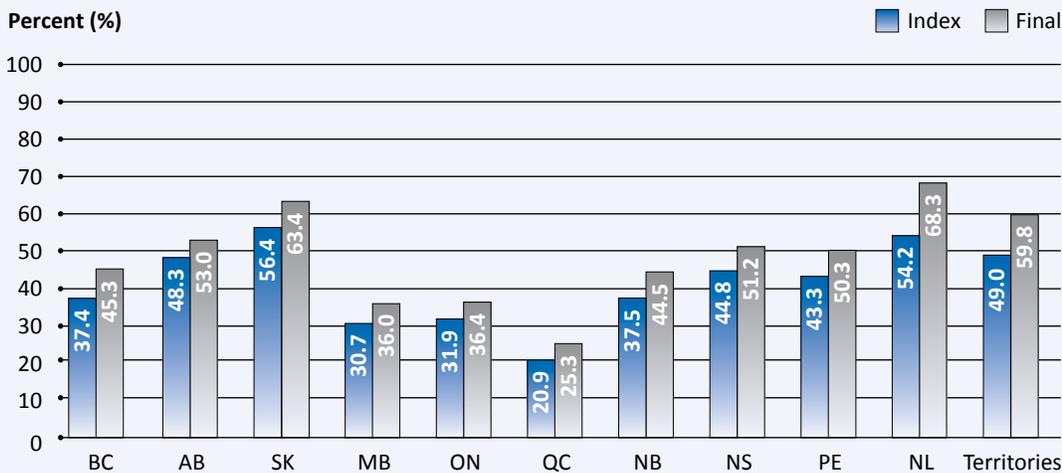
Data and measurement considerations

- Data for this indicator are based on hospital abstract databases maintained by the Canadian Institute for Health Information (CIHI) or data provided to CIHI. There was no linkage with data in provincial cancer registries. Thus data may include women with recurrent disease—although attempts to minimize this were made through the case selection criteria.
- The data include women with unilateral invasive breast cancer whose surgery occurred between April 2008 and March 2013.
- The procedure codes used do not differentiate between excisional biopsies and breast-conserving surgery (BCS). For this reason, patients who received excisional biopsy followed by mastectomy would have been grouped in the results with patients who received BCS first followed by mastectomy. Additionally, provinces with higher excisional biopsy rates compared to others may show a lower proportion of index mastectomies.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

^c Mastectomy is surgery to remove the entire breast; breast-conserving surgery involves complete removal of the tumour along with a margin of non-cancerous breast tissue.

^d This occurs when the pathology report following breast-conserving surgery shows positive margins (i.e., cancer cells near the excised tissue).

FIGURE 4.4

Percentage of breast cancer resections that are mastectomies, by province/territory – from 2008/2009 to 2012/2013 fiscal years combined

The mastectomy data include women who received a mastectomy first (Index) as well as women who received breast-conserving surgery first followed by a mastectomy within one year (Final).

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

What do the results mean?

- Because mastectomy and breast-conserving therapy (BCT) yield comparable survival outcomes, the interprovincial differences shown here do not necessarily reflect differences in the appropriateness of treatment or the quality of care. While BCT should be considered for most early-stage breast cancer patients, there are no formal Canadian performance targets for the actual treatment rate. The choice of BCT versus mastectomy should be made by the breast cancer patient based on a clear understanding of the risks, benefits and practical considerations associated with each choice.
- There is evidence that the proportion of patients with limited access to radiation therapy (e.g., those who live far away from a treatment centre) does influence BCT rates.^{109–113} Patients who live far from the nearest radiation treatment centre may be less likely to have BCT than mastectomy due to the

challenges of travelling to a treatment facility regularly for five to seven weeks of treatment. Newfoundland and Labrador, which had the highest final mastectomy rate, has just one radiation centre to serve the entire province. Saskatchewan, which had the highest index mastectomy rate, has two radiation centres that are located in the main metropolitan areas (Saskatoon and Regina). Ontario and Quebec, which had among the lowest mastectomy rates, also have the most radiation treatment centres. While some are located in the northern parts of the provinces, many women still live long distances away from the centres. Data on the percentage of the Canadian population living within a short distance to a radiation centre are not available.

- Some interprovincial differences in rates of mastectomy may be explained by the use of diagnostic excisional biopsies across provinces. In recent years, the use of core needle biopsy (where a hollow needle is used to excise a

sample from the suspect tissue) has been recommended over excisional biopsy (a surgical procedure in which the suspect breast tissue is removed) as the diagnostic procedure of choice; however, the surgical option, while less common, is still used. Current coding practices in hospitals do not reliably distinguish between excisional biopsies and breast-conserving surgery. For this reason, provinces with higher excisional biopsy rates compared to other provinces may show a lower proportion of index mastectomies.¹¹⁴ Similarly, these provinces may have a higher proportion of patients undergoing initial breast-conserving surgery but who end up having a final mastectomy.

What are some examples of efforts in this area?

- The Partnership and the Canadian Institute for Health Information (CIHI) have collaborated on the analysis and reporting of breast cancer surgery patterns. A joint report published in 2012 presented data on breast surgery patterns and also highlighted variation by factors such as patient age, income and travel time to the nearest radiation centre.¹¹⁵ Further analyses at the local level may help identify opportunities for potential system improvements. For example, in Saskatchewan, a mastectomy working group has been established to further investigate the reasons for variations in that province and the factors that influence a patient's choice to have mastectomy versus breast-conserving surgery.¹¹⁶

What else do we know?

- The use of mastectomy can be influenced by many factors besides those already discussed here. These include: access to immediate breast reconstruction following mastectomy; prevalence of and testing for gene mutations that may predispose a woman to developing breast cancer (e.g., BRCA 1/2), which can influence the choice to opt for prophylactic (preventive) removal of one or both breasts; surgeon preference; clinical factors;^e and personal preference.¹¹⁷

^e Not every patient with invasive breast cancer is a good candidate for breast-conserving surgery. Women with certain types of tumours or who have contraindications to radiation therapy may choose to undergo mastectomy.¹¹⁴

4.2 Radiation Therapy

Radiation Therapy Wait Time

What are we measuring and why?

This indicator measures radiation therapy wait times for patients treated for all types of cancer and for the four most common cancers in 2013. Wait time is defined as the number of days from when the patient is ready for treatment to the start of treatment. Data on median and 90th percentile wait times in days are presented, as well as the percentage of patients treated within the national target wait time of 28 days. We also show data for the 90th percentile wait times target of 14 days set by the Canadian Association of Radiation Oncologists (CARO).

- Timely access to radiation therapy is a key component of a high-quality cancer control system. Reducing radiation therapy wait times for cancer patients is a national health-care priority. National wait time targets have been set and provincial initiatives to reduce wait times have been implemented.

What are the results?

- In 2013, eight of nine reporting provinces had achieved the target of 90% of patients treated within the national wait time benchmark of 28 days for radiation therapy (Figure 4.5). This includes radiation therapy for all kinds of cancer.
- Nova Scotia's wait times are moving toward the target; this is based on trends from

previously reported results. The percentage of patients receiving radiation therapy below the 28-day target was 86.8% in the 2012 treatment year and 82.0% in the 2011 treatment year.^{89, 118}

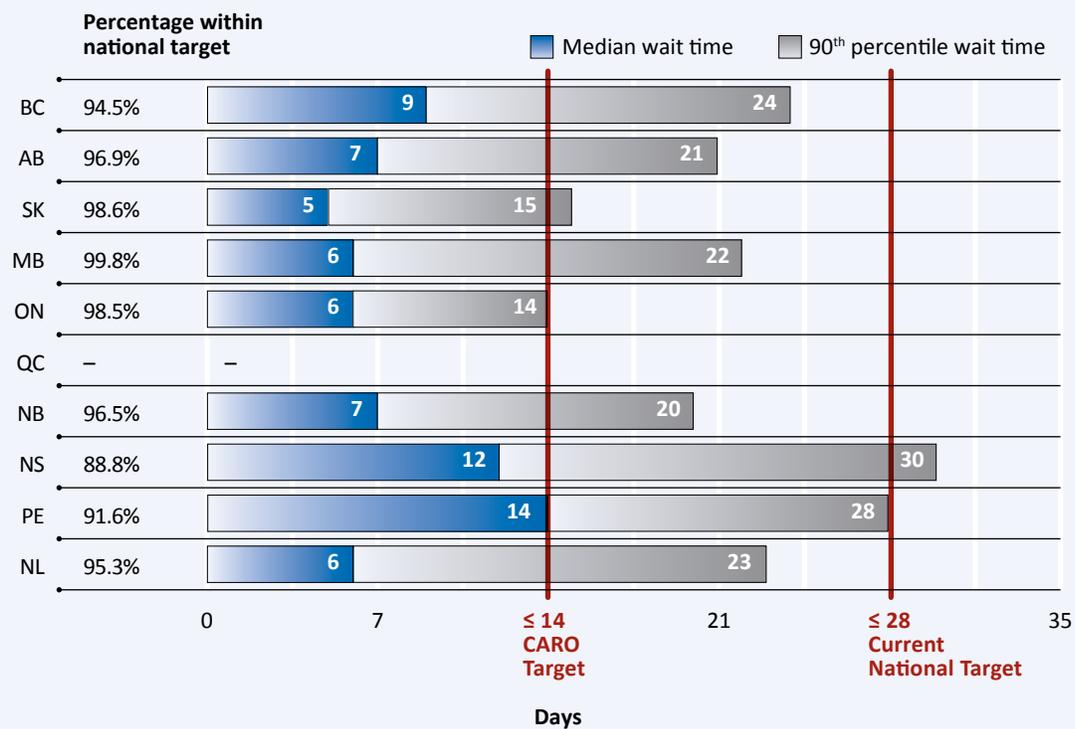
- The shortest 90th percentile wait times were in Ontario (14 days) and Saskatchewan (15 days) (Figure 4.5).
- Of the four most common disease sites, the highest interprovincial variability in the 90th percentile wait times was for men with prostate cancer (22 days between the shortest and longest provincial 90th percentile wait times) (Figure 4.6). The wait time from being ready for treatment to the start of treatment was longest for prostate cancer in all eight reporting provinces. In 2013, several reporting provinces increased their percentage of prostate cancer patients treated within the target (i.e., compared to 2012 treatment year data).⁸⁹
- Wait times for lung cancer radiation treatment showed the least variability (12 days) (Figure 4.6).
- The percentage of patients with all types of cancer receiving radiation treatment within the target wait time of 28 days ranged from 88.8% in Nova Scotia to 99.8% Manitoba; six of the nine provinces reported that over 95% of patients were treated within the target wait time (Table 4.1).

What else do we know?

- “Ready to treat” is the starting point for the wait time measurement. The Canadian Institute for Health Information (CIHI) defines this as the time when the referral to start radiation treatment is made by a referring physician. While considerable effort has gone into the development and adoption of standardized definitions for this term, interprovincial variations may persist.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 4.5

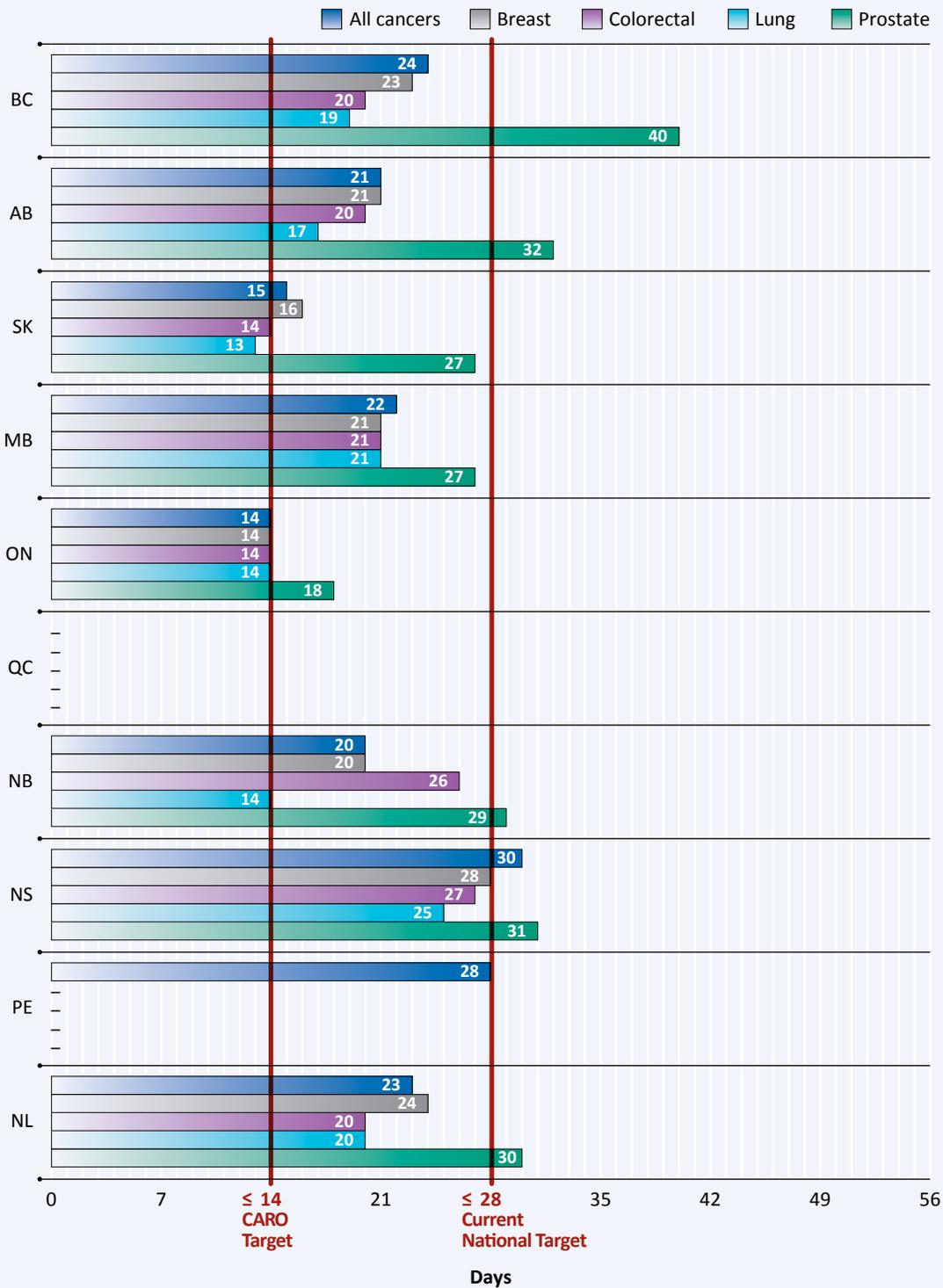
Median and 90th percentile wait times for radiation therapy, all cancers, by province – 2013 treatment year



“–” Data not available.
 Wait time is the number of days between ready-to-treat and start of radiation treatment.
 The target recommended by the Canadian Association of Radiation Oncology (CARO) is that 90% of patients receive radiation therapy within 14 days.
 The national target is that 90% of patients receive radiation therapy within 28 days.
 Data source: Provincial cancer agencies.

FIGURE 4.6

90th percentile wait time for radiation therapy, by disease site, by province – 2013 treatment year



“-” Data not available.
Wait time is the number of days between ready-to-treat and start of radiation treatment.
The target recommended by the Canadian Association of Radiation Oncology (CARO) is that 90% of patients receive radiation therapy within 14 days.
The national target is that 90% of patients receive radiation therapy within 28 days.
Data source: Provincial cancer agencies.

TABLE 4.1

Percentage of patients treated within the radiation therapy wait time target, four most common cancers and all cancers, by province – 2013 treatment year

Province	Breast	Colorectal	Lung	Prostate	All cancers
British Columbia	95.9	98.1	98.2	82.4	94.5
Alberta	99.0	98.5	99.0	86.9	96.9
Saskatchewan	100.0	100.0	100.0	90.8	98.6
Manitoba	99.9	100.0	99.4	99.4	99.8
Ontario	99.3	99.4	99.4	95.1	98.5
Quebec	–	–	–	–	–
New Brunswick	97.0	92.8	98.8	89.3	96.5
Nova Scotia	90.5	93.8	94.6	86.9	88.8
Prince Edward Island	–	–	–	–	91.6
Newfoundland and Labrador	97.7	98.0	97.2	88.6	95.3

“–” Data not available.
Wait time target is four weeks between ready-to-treat and start of treatment.
Data source: Provincial cancer agencies.

What do the results mean?

- Examining wait times by province can help to identify regions where improvements can be made and best practices can be applied. For example, historic wait time information shows that residents of Manitoba continued to receive radiation therapy within the wait time target. This is based on the high percentage of patients (99.8% in 2013) treated within wait time targets from 2009 through 2013. Best practices from this province can be identified and shared to help improve wait times in other jurisdictions.^{89, 118}
- Radiation therapy wait times for all cancers continued to improve in Nova Scotia (from 80.0% treated within the 28-day target in 2010 to 88.8% in 2013).¹¹⁸ However, the province has not yet met the goal of 90% of patients treated within the wait time target.
- Prostate cancer patients had the longest waits for radiation therapy across the reporting provinces. Patient age, stage of disease and patient-driven delays are factors that can contribute significantly to radiation therapy wait times; this is particularly true in prostate cancer.¹¹⁹ When wait times data are evaluated, the urgency of each patient’s situation should be taken into account to determine if appropriate care was provided. Not all prostate cancer patients require immediate radiation therapy; at this time the data do not factor appropriateness into account.

What are some examples of efforts in this area?

- Informed by system performance monitoring, Nova Scotia has been working through a multi-year strategy to enhance radiation treatment capacity at its provincial treatment facilities. The province continues to improve access to radiation therapy for people with cancer and to further reduce wait times.
- The short radiation treatment wait times in Ontario may have been influenced by major investments in and performance management of the cancer system. Investments were made by the Government of Ontario to increase the number of cancer centres and treatment units;

to increase health human resources such as radiation oncologists, medical physicists and radiation therapists; and to expand the role of advanced practice radiation therapists through the Clinical Specialist Radiation Therapist (CSRT) project aimed at improving access to services and reducing wait times.¹²⁰ Ontario also engages in performance management. This includes monthly monitoring of radiation treatment wait times by urgency category (target wait time of one day for emergent cases to 14 days for non-emergent cases), yearly target setting to improve performance, and public reporting of wait times on Cancer Care Ontario's website and the Cancer Quality Council of Ontario's Cancer System Quality Index.^{121, 122}

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

What are we measuring and why?

This indicator measures the percentage of patients with Stage II or III rectal cancer who received pre-operative radiation therapy according to widely published treatment guidelines.^{123, 124}

This year's indicator compares results for patients diagnosed in 2008 through 2011; it also examines age and sex patterns and makes interprovincial comparisons.

- Approximately 9,200 people in Canada die from colorectal cancer each year.¹²⁵ Around 20% of these cases involve tumours of the rectum.¹²⁶ According to pooled analyses from three North American trials, five-year relative survival in Stage II or III rectal cancer ranges from 78% for Stage IIA to 31% for Stage IIIC; local recurrence rates can be as high as 22% for Stage III disease.¹²⁷

- The delivery of radiation therapy (often combined with chemotherapy) prior to surgical resection (i.e., pre-operatively) has been shown to improve outcomes and local control; it may also reduce acute and long-term toxicity for patients with Stage II or III rectal cancer.¹²⁷ This is especially true among patients with large malignancies that are difficult to remove.¹²⁸
- This is the fifth year that concordance with treatment guidelines has been measured in the Partnership's system performance reports. As of 2014, a target treatment rate of 70% was established for this indicator by the System Performance Targets and Benchmarks Working Group.

What are the results?

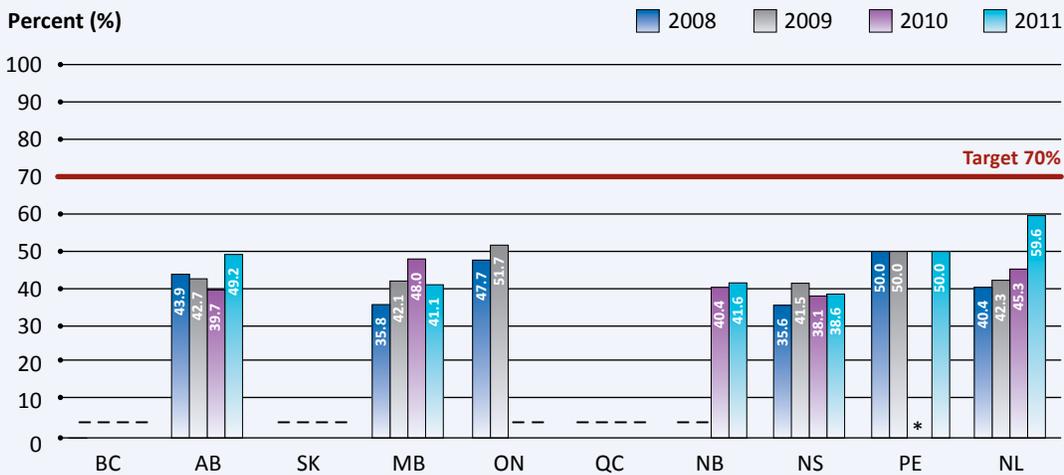
- In general, rates of pre-operative radiation therapy consistent with treatment guidelines increased steadily over the four-year period (2008-2011). Findings for this indicator were first reported in the *2010 Cancer System Performance Report*. This is the first year that we are able to assess the impact of indicator reporting on improvements in guideline-consistent treatment.
- The rates of guideline-consistent pre-operative radiation therapy in the six provinces submitting data for this indicator in 2011 varied from 38.6% in Nova Scotia to 59.6% in Newfoundland and Labrador—a difference of 21 percentage points (Figure 4.7).
- The biggest increase in guideline-consistent treatment was seen in Newfoundland and Labrador where 59.6% of patients received pre-operative radiation therapy in 2011 compared to 40.4% in 2008—a 19.2% increase for this indicator (Figure 4.7).
- The use of pre-operative radiation treatment for Stage II or III rectal cancer varied by age (Figure 4.8). The treatment rate dropped substantially for older patients in 2011—from 57.7% for patients under age 60 to 21.6% for those aged 80 and older.
- The use of pre-operative radiation therapy consistent with treatment guidelines varied by sex for patients aged 18-69: it was 55.0% for males and 42.4% for females (Figure 4.9). The treatment rates increased from 2010 to 2011 for both sexes in patients aged 70 and older.⁸⁹

Data and measurement considerations

- Results for British Columbia are not shown as they were in previous reports because BC only collected data for cases referred to its provincial cancer centres (through the 2011 diagnosis year).
- In the past, it has been noted that several provinces reported substantial increases in the number of Stage II or III rectal cancer cases included in the indicator calculation from year to year. While this may reflect improvements in the ability to identify the target cases in the administrative data, it may also reflect real trends in cancer incidence.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.⁸⁹

FIGURE 4.7

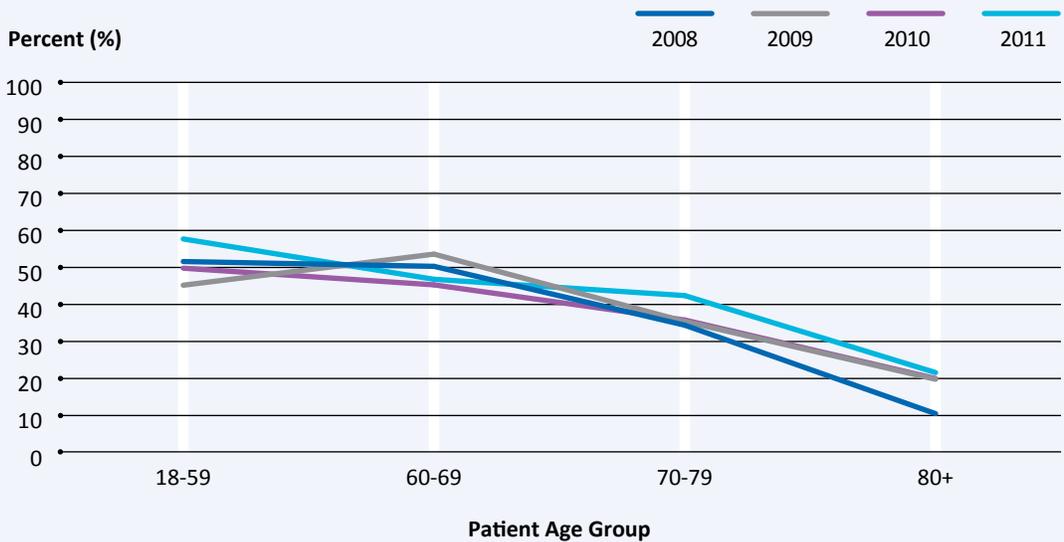
Percentage of Stage II or III rectal cancer patients who received radiation therapy before surgery, by province – patients diagnosed from 2008 to 2011



* Suppressed due to due to small numbers.
 “-” Data not available.
 Data include radiation therapy started up to 120 days prior to resection.
 Data source: Provincial cancer agencies.

FIGURE 4.8

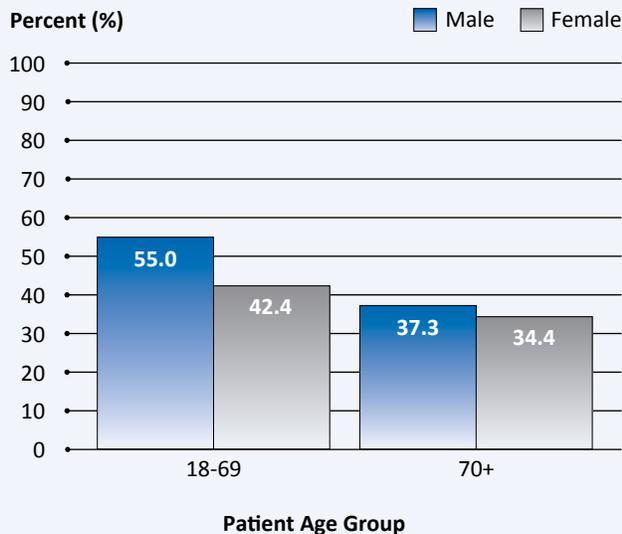
Percentage of Stage II or III rectal cancer patients who received radiation therapy before surgery, by patient age group – patients diagnosed from 2008 to 2011



Data include AB, MB, NS, PE and NL (provinces that submitted comparable data for all four years).
 Data include radiation therapy started up to 120 days prior to surgery.
 Data source: Provincial cancer agencies.

FIGURE 4.9

Percentage of Stage II or III rectal cancer patients who received radiation therapy before surgery, by patient age group, by sex – patients diagnosed in 2011



Data include AB, MB, NB, NS, PE and NL.

Data include radiation therapy started up to 120 days prior to surgery.

Data source: Provincial cancer agencies.

What do the results mean?

- The 70% target is supported by chart review data and establishes an achievable improvement (i.e., based on the treatment rate in the best-performing province in 2009). This target is also comparable to the performance achieved in Sweden.¹²⁸
- None of the provinces reporting data for this indicator achieved the target rate in 2011, but the results suggest an increasing trend in the radiation therapy treatment rate in some provinces. As the target rate was set in 2013, it is too early to know the effect of target-setting on this indicator.
- There are a variety of reasons why pre-operative radiation therapy may not be provided to patients with Stage II and III rectal cancers—for example, non-referral or other health care problems (comorbidities). Findings from a chart review study included in the Canadian Partnership Against Cancer's 2012

Cancer System Performance Report shed some light on these issues.¹¹⁸ In the five participating provinces, 88% of patients diagnosed with Stage II or III rectal cancer were referred to a medical or radiation oncologist by a surgeon; the remaining 12% were not. The most common reason for non-referral for radiation therapy among Stage II or III rectal cancer cases was the presence of comorbidities. The most common reason for non-treatment was the patient not being referred to a radiation oncologist for consultation.

- There is emerging evidence that pre-operative chemoradiation can be safely omitted in some patients with Stage II rectal cancer.^{129, 130} The results of subsequent randomized trials in this area will be important to better refine the role of pre-operative radiation in rectal cancer.

What are some examples of efforts in this area?

- The Canadian Partnership Against Cancer conducted a retrospective chart review (in collaboration with several provinces) to validate the indicator results obtained through administrative data and to identify factors that influence concordance with evidence-based practices. Five provinces—Alberta, Saskatchewan, Manitoba, Prince Edward Island and Newfoundland and Labrador—participated in the study. The retrospective chart review of patients who underwent surgical resection of their tumours provided a better understanding of referral and treatment patterns for pre-operative radiation therapy. The study identified gaps which could be addressed through a review of clinical practice and quality improvement strategies.¹¹⁸ (For more information on the chart review, please see the *2012 Cancer System Performance Report*.)
- There is a need to better understand the observed decline in treatment rates among patients aged 70 and older with Stage II and III rectal cancers. Future system performance reports will continue to monitor treatment rates in this age group. Additional target-setting may be warranted if the shift toward the current target continues to be age-specific.
- To increase the adoption of quality initiatives that contribute to high-quality rectal cancer treatment, a pan-Canadian initiative is being funded through the Partnership. It uses key quality indicators to conduct an audit and feedback process at eight high-volume centres across the country (St. Paul's Hospital, Vancouver, BC; Foothills Hospital, Calgary, AB; Victoria General Hospital, Winnipeg, MB; Mount Sinai Hospital, Toronto, ON; St. Michael's Hospital, Toronto, ON; McGill, Montreal, QC; CHUQ Pavillon St-Francoise d'Assise, Quebec City, QC; QEII Health Science Centre, Halifax, NS). Data from this process will stimulate implementation of quality initiatives to address gaps locally across all disciplines including radiation oncology. The goal of the project is to create a multidisciplinary Canadian community of practice to share best practices between centres and improve the quality and consistency of care across Canada.

4.3 Systemic Therapy

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

What are we measuring and why?

This indicator measures the percentage of patients with resected Stage II or IIIA non-small cell lung cancer (NSCLC) receiving adjuvant (post-operative) chemotherapy, as per widely published treatment guidelines. This indicator includes treatment rates for patients diagnosed from 2009 to 2011 by province, by age group and by sex. A target treatment rate has been set at 45% for patients aged 70-79.

- The delivery of chemotherapy following resection has been shown to improve disease-free five-year survival rates (39% with chemotherapy vs 34% without) and overall five-year survival rates (45% with chemotherapy vs 40% without) for patients with Stage II or IIIA NSCLC when compared to surgery alone.¹³¹
- This is the fifth year we have reported on this indicator in one of our system performance reports. Measuring national practice patterns relative to this treatment guideline enables us to identify gaps and other variations which could be addressed through quality improvement strategies. Having multiple years

of data also allows us to better quantify treatment rates in provinces with small numbers of annual cases.

- Non-small cell lung cancer (NSCLC) is the most common type of lung cancer, accounting for 85%–90% of all lung cancers.⁹⁷ About 21% of lung cancer patients are diagnosed with Stage II or IIIA disease.⁸⁹ This rate corresponds to roughly 4,000 NSCLC cases.
- Median survival for NSCLC patients is 47 months (for Stage IIA), 24 months (for Stage IIB) and 17 months (for Stage IIIA) (based on international data from the International Association for the Study of Lung Cancer database).¹³²
- As of 2014, a target treatment rate of 45% for those aged 70-79 was established for this indicator by the System Performance Targets and Benchmarks Working Group. The target is assigned at an age group level to promote higher levels of adjuvant chemotherapy in the treatment of patients over age 70, which is the median age for lung cancer incidence.

What are the results?

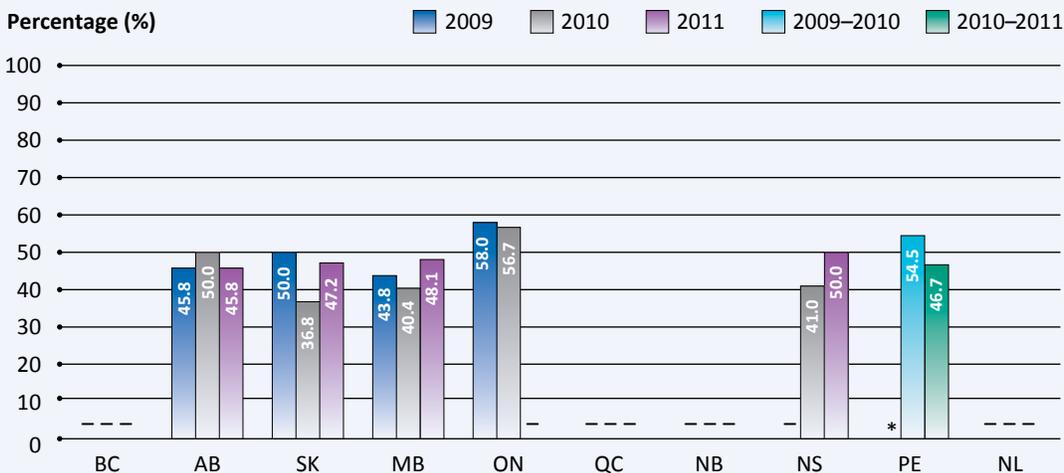
- Adjuvant chemotherapy rates among Stage II or IIIA NSCLC patients diagnosed in 2011 ranged from 45.8% in Alberta to 50.0% in Nova Scotia in the provinces submitting data (Figure 4.10).
- In 2011 the treatment rate was 61.4% for patients under age 60; for older patients aged 70-79 it was 42.5%. For those 80 years and older, the rate was close to 0% based on the available data (Figure 4.11).
- Women under age 70 were more likely to receive chemotherapy following lung cancer surgery compared to men (61.3% of women vs. 48.6% of men), while men over 70 had substantially higher treatment rates compared to women (45.7% of men vs. 25.0% of women) (Figure 4.12).

Data and measurement considerations

- Nova Scotia began submitting data in 2010. Prince Edward Island data are combined (2009-2010 and 2010-2011) to avoid suppression owing to small case volumes.
- Data on patients whose chemotherapy started within 120 days of lung cancer surgery are included.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 4.10

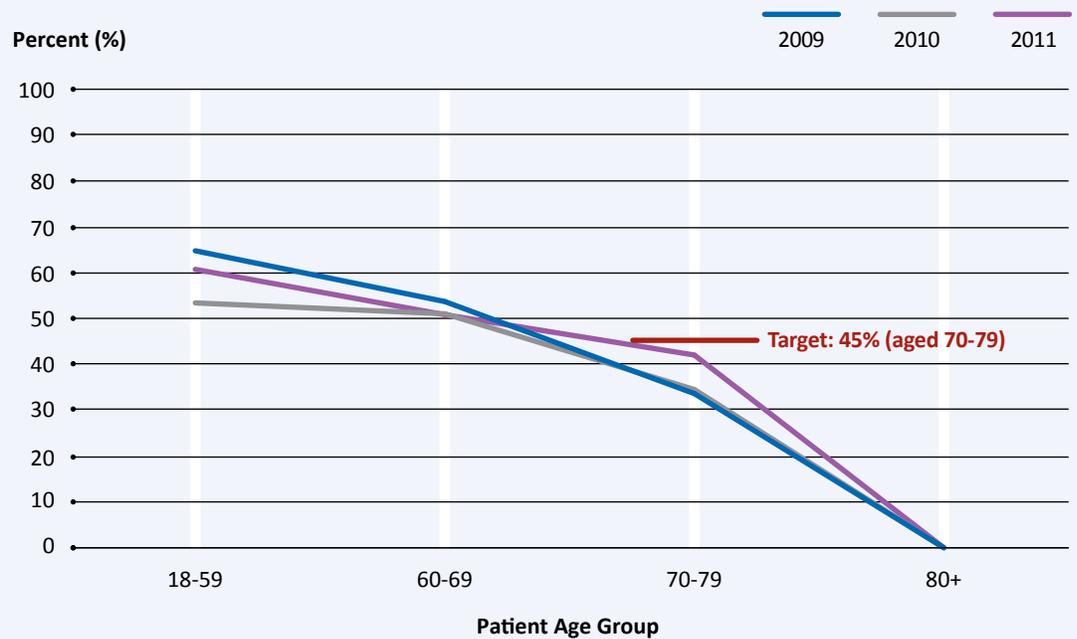
Percentage of Stage II or IIIA non-small cell lung cancer patients who received chemotherapy following surgical resection, by province – patients diagnosed from 2009 to 2011



* Suppressed due to small numbers.
 “-” Data not available.
 The data specification for this year was amended to include squamous cell carcinoma.
 PE: Data were for 2009 to 2010 combined and 2010 to 2011 combined.
 ON: 2010 data are for 2010/2011 fiscal year.
 Data included chemotherapy started within 120 days following surgery.
 Data source: Provincial cancer agencies.

FIGURE 4.11

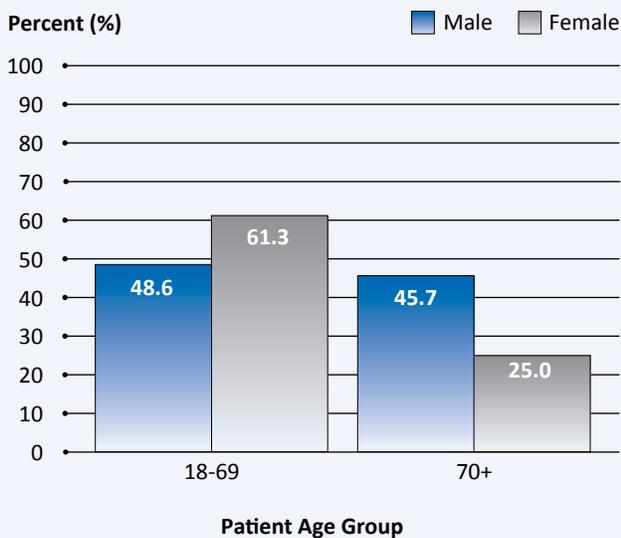
Percentage of Stage II or IIIA non-small cell lung cancer patients who received chemotherapy following surgical resection, by patient age group – patients diagnosed from 2009 to 2011



The data specification for this year was amended to include squamous cell carcinoma.
Data included AB, SK, MB and PE (provinces that submitted comparable data for all three years).
Data included chemotherapy started within 120 days following surgery.
Data source: Provincial cancer agencies.

FIGURE 4.12

Percentage of Stage II or IIIA non-small cell lung cancer patients who received chemotherapy following surgical resection, by patient age group, by sex – patients diagnosed in 2011



The data specification for this year was amended to include squamous cell carcinoma.
Data included AB, SK, MB, NS and PE.
Data included chemotherapy started within 120 days following surgery.
Data source: Provincial cancer agencies.

What do the results mean?

- While guidelines suggest that adjuvant chemotherapy should be considered for most patients with resected Stage II or IIIA NSCLC, factors such as the patient's performance status and comorbidities, among others, play a part in the decision to treat with chemotherapy. A detailed chart review study conducted by the Canadian Partnership Against Cancer in 2011 (in collaboration with a number of provinces) validated the results of the administrative data-based indicators presented here and identified reasons for non-treatment. In the four participating provinces, 86% of patients diagnosed with Stage II or IIIA NSCLC were referred to a medical or radiation oncologist by a surgeon, while the remaining 14% were not. Of those who were referred, the most common reason for non-treatment was patient choice, followed by comorbidities and complications.¹¹⁸
- In 2011, the adjuvant chemotherapy rate among NSCLC patients age 70-79 was close to the target of 45% (i.e., within 2.5% of the target). The rate of adjuvant chemotherapy seems to be rising among patients in this age group: there was an 8.5% increase from 2009 to 2011 (Figure 4.11).

What are some examples of efforts in this area?

- The Cancer Quality Council of Ontario monitors and publicly reports on the performance of the cancer system in Ontario, including the percentage of patients with Stage II or IIIA NSCLC who were treated with guideline-recommended chemotherapy following surgery. Although Cancer Care Ontario continues to explore reasons for the regional variability and non-concordance with the guidelines for this indicator, research has shown that some patients may not receive adjuvant chemotherapy because they have medical conditions that preclude its use or because they refused the treatment after being referred to a medical oncologist. Understanding how and why treatment practices vary can inform efforts to improve quality of care and associated outcomes. Treatment guidelines, based on evidence from the latest clinical research, are meant to help clinicians and patients choose the treatments that will lead to the best possible outcomes.¹²²

What else do we know?

- Meaningful national-level data on the percentage of patients with Stage II or III NSCLC receiving adjuvant chemotherapy are scarce. Most utilization studies based in the United States are either outdated (Surveillance, Epidemiology and End Results data are from the 1990s) or are single-centre studies. However, one study that used data from the Netherlands Cancer Registry showed that 24% of patients with Stage II NSCLC who were under age 75 received adjuvant chemotherapy as recommended in practice guidelines.¹³³

5. Person-Centred Perspective

Screening for Distress

99



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.¹³⁴ The core components of person-centred care are dignity and respect, communication and information sharing, collaboration and participation.¹³⁵

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 the cancer control system involves intentional planning and delivery of care based on the experiences and perspectives of people affected by cancer.

Designing and delivering more person-centred care requires standardized measures to assess patients’ experiences—from diagnosis to treatment to aftercare and, for some, to end-of-life care. This information can then be used to determine whether or to what extent the health care system is responding to those needs. The next step would be to improve care as needed and to evaluate the benefits to patients and families.

Embedding the person-centred perspective across cancer control

Organizations that work in cancer control need to adopt specific strategies to embed a culture of person-centred thinking and care across all programs: at point of service, at program levels and at the system level. Involvement of all staff, as well as meaningful engagement of patients, families and health care providers, are critical for success.¹³⁶ Such organizations need to show how the expectations of patients and family members are being met. These are embodied in the following thoughts:

“I am respected. I am heard. I understand. I am involved.”

For a more detailed discussion on this topic, refer to the document called *Embedding Person-Centred Perspective in Cancer Control: Describing What It Means*, prepared by the Person-Centred Perspective Advisory Committee.¹³⁶

Traditionally, the assessment of quality of care includes measures of accessibility, appropriateness and effectiveness of services; however, another important way to measure the quality of our cancer control system is to determine how well it provides patients, their families and loved ones with person-centred care and support along their cancer journey.

Although progress has been made, the person-centred perspective is an emerging and thus

under-measured area of research and practice. Later in this chapter we will highlight several initiatives currently underway to collect meaningful pan-Canadian data in this area.

For the purposes of this report, and based on information available at the provincial level, we chose to focus on a specific indicator: the use of a standardized “screening for distress” tool, which reflects efforts within provinces to achieve more person-centred cancer care.

Indicator	Summary of results
Screening for distress	Since 2007, the use of standardized screening tools in provincial cancer centres or programs has increased; however, implementation varies across the country. In 2014, eight provinces used a standardized symptom screening tool for at least a portion of patients at some or all provincial cancer centres or programs; screening tools may be used in other provinces, but data on their use were not available when this report was being prepared.

Screening for Distress

What are we measuring and why?

This indicator measures the extent to which provincial cancer programs have implemented standardized tools to screen for distress (as of 2014). These tools assess patient-reported symptoms such as emotional and physical symptoms, including pain.

- Late identification of distress in cancer patients has been associated with negative outcomes, including poorer adherence to treatment recommendations,^{140, 141} lower levels of satisfaction with care^{141, 142} and poorer self-reported quality of life.^{141, 143}
- Routine screening for distress has been identified in Canada as a standard of care for

cancer patients.¹³⁹ Screening helps to identify problems early on, so that appropriate follow-up assessment, intervention and referrals to services can be offered to address a patient’s specific needs.

- Screening for distress at various points in the patient journey can be useful in customizing interventions that address patients’ changing needs and that may improve their quality of life. Knowing which jurisdictions have implemented screening for distress programs across the country can help system planners to coordinate efforts and further support the efforts to provide person-centred care.

What is distress?

Being diagnosed with cancer has a significant impact on a person's life. Throughout the entire cancer journey, individuals may experience a range of physical, social, emotional and practical challenges.

In people with cancer, *distress* is generally defined as an unpleasant emotional experience or experiences. These are related to psychological, social, spiritual, practical or physical concerns that may impact a person's ability to cope with cancer and its treatment.

Distress can be manifested in many ways (e.g., depression, pain, trouble interacting with family members). Distress may occur during some or all phases of the cancer experience, such as the time of diagnosis, at the start of active treatment, if there is a recurrence of cancer, and—for some—during the transition to end-of-life care.¹³⁷

The degree of distress—which can range from mild to severe—and the nature of this distress vary by individual and by cancer type. According to the National Comprehensive Cancer Network Guidelines for Distress Management, mild distress can include symptoms such as “sadness about loss of good health, anger and feeling that life is out of control, poor sleep, poor appetite, [and] poor concentration.”¹³⁸ Symptoms that require further evaluation could include “excessive worries and fears, excessive sadness, unclear thinking, despair and hopelessness.”¹³⁸

In fact, distress is so common among people with cancer, it is often referred to as “the sixth vital sign” by cancer professionals in Canada and around the world.^{138, 139}

What are the results?

- Since 2007, the use of standardized screening for distress tools in provincial cancer centres has increased twofold, from four provinces with at least partial implementation to eight provinces currently using such tools (Table 5.1).
- The current implementation and use of standardized symptom screening tools (as of July 2014) varied across provincial cancer centres and programs (Table 5.1). British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Nova Scotia and Prince Edward Island all used a standardized symptom tool for at least a portion of patients in their provincial cancer centres, with findings reported centrally.
- Quebec has undertaken standardized symptom screening for at least a portion of patients within selected cancer programs; the province is rolling out a standardized screening tool for expanded use.
- New Brunswick is in the early stages of planning province-wide use of a standardized screening tool. The degree to which cancer patients were screened for distress varied across the province, and data were not provincially centralized.
- Newfoundland and Labrador is planning to implement standardized screening for distress for all newly-diagnosed breast cancer and colorectal cancer patients later this year.
- In the Territories, there are currently no formal screening for distress programs for cancer patients.

TABLE 5.1

Extent of usage of standardized screening for distress tools across clinics in provincial cancer agencies and programs – 2014

Province	2007			2014		
	Province-wide implementation (provincially coordinated and centrally reported)	Partial implementation (provincially coordinated)	Not provincially coordinated (some local use possible)	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			✓			✓

The 2007 results were reported in the Canadian Partnership Against Cancer's 2009 report: *System Performance Initiative – A First Year Report* available at systemperformance.ca.

British Columbia data are collected but not electronically.

Saskatchewan data are not collected centrally or electronically.

Prince Edward Island undertakes standardized province-wide symptom screening but only upon initial patient consultation.

Data source: Provincial cancer agencies and programs.

Examples of screening for distress tools

- The *Edmonton Symptom Assessment System (ESAS)*, or its most current version—the *ESAS-Revised (ESAS-r)*—is the most frequently used self-reporting 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) on a scale from 0 to 10.¹⁴⁴ Patients can continue to report their symptoms and results can be followed over time. The tool has been validated for use in cancer populations, is available free online (<http://www.palliative.org/tools.html>), and is available in many languages, as well as in Braille.¹⁴⁵
- Another tool commonly used to assess the well-being of cancer patients is the *Canadian Problem Checklist (CPC)*, which was designed by the Canadian Partnership Against Cancer's Cancer Journey Advisory Group and adapted from a checklist published by the National Comprehensive Cancer Network in the United States. The CPC screens for other emotional and physical problems and practical concerns not captured on the ESAS.¹⁴⁴
- Other standardized instruments used across the country to screen for distress and other physical symptoms of cancer include the *Calgary Symptoms of Stress Inventory* and the *Profile of Mood-States Short Form*.¹⁴⁶ However the ESAS-r and the CPC are the most commonly accepted tools in Canada to assess the well-being of cancer patients. (See Figure 5.1 for a sample image of the *ESAS-r* and *CPC* tools.)

Data and measurement considerations

- Table 5.1 only provides information about the level of implementation of standardized screening for distress activities across the provinces. It does not reflect the number of cancer patients actually screened for distress—or the proportion of patients screened—within each province. More work is needed to better understand the actual proportion of patients screened so that this information will be more useful in assessing impact on both patient outcomes and health care policy. Current initiatives led or funded by the Canadian Partnership Against Cancer (as described under *What are examples of efforts in this area?*) are aimed at achieving this.

FIGURE 5.1

Edmonton Symptom Assessment System (ESAS) Screening Tool and the Canadian Problem Checklist

Edmonton Symptom Assessment System Screening Tool

Completed by:

Patient's Name: _____ Patient

Date of Completion: _____ Family

Time: _____ Health professional

Assisted by family or health professional

Please circle the number that best describes:

No pain	0 1 2 3 4 5 6 7 8 9 10	Worst possible pain
No tiredness (tiredness = lack of energy)	0 1 2 3 4 5 6 7 8 9 10	Worst possible tiredness
No drowsiness (drowsiness = feeling sleepy)	0 1 2 4 4 5 6 7 8 9 10	Worst possible drowsiness
No nausea	0 1 2 3 4 5 6 7 8 9 10	Worst possible nausea
No lack of appetite	0 1 2 3 4 5 6 7 8 9 10	Worst possible lack of appetite
No shortness of breath	0 1 2 3 4 5 6 7 8 9 10	Worst possible shortness of breath
No depression (depression = feeling sad)	0 1 2 3 4 5 6 7 8 9 10	Worst possible depression
No anxiety (anxiety = feeling nervous)	0 1 2 3 4 5 6 7 8 9 10	Worst possible anxiety
Best well-being (well-being = how you feel overall)	0 1 2 3 4 5 6 7 8 9 10	Worst possible well-being
No _____(other problem) (for example, constipation)	0 1 2 3 4 5 6 7 8 9 10	Worst possible _____

Source: Regional Palliative Care Program in Edmonton, Alberta.

Canadian Problem Checklist

Please check all of the following items that have been a concern or problem for you in the past week, including today:

<p>Practical</p> <p><input type="checkbox"/> Work/School</p> <p><input type="checkbox"/> Finances</p> <p><input type="checkbox"/> Getting to and from appointments</p> <p><input type="checkbox"/> Accommodation</p> <p>Emotional</p> <p><input type="checkbox"/> Fears/Worries</p> <p><input type="checkbox"/> Sadness</p> <p><input type="checkbox"/> Frustration/Anger</p> <p><input type="checkbox"/> Changes in appearance</p> <p><input type="checkbox"/> Intimacy/Sexuality</p>	<p>Social/Family</p> <p><input type="checkbox"/> Feeling a burden to others</p> <p><input type="checkbox"/> Worry about family/Friends</p> <p><input type="checkbox"/> Feeling alone</p> <p>Informational</p> <p><input type="checkbox"/> Understanding my illness and/or treatment</p> <p><input type="checkbox"/> Talking with the health-care team</p> <p><input type="checkbox"/> Making treatment decisions</p> <p><input type="checkbox"/> Knowing about available resources</p>	<p>Spiritual</p> <p><input type="checkbox"/> Meaning/Purpose of life</p> <p><input type="checkbox"/> Faith</p> <p>Physical</p> <p><input type="checkbox"/> Concentration/Memory</p> <p><input type="checkbox"/> Sleep</p> <p><input type="checkbox"/> Weight</p>
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Source: Canadian Partnership Against Cancer, Cancer Journey Action Group Guide to Implementing Screening for Distress, the 6th Vital Sign: Moving Towards Person-Centered Care. Part A. Background, recommendations and implementation. Toronto, ON: The Partnership; 2009.

What do the results mean?

- Many provinces have implemented province-wide screening for distress programs for many cancer patients, but most have not established formal targets for screening rates. However, in 2009 the Screening for Distress National Implementation Group, representing eight provinces, agreed that within specific screening for distress programs, a target of 90% of patients screened should be set.¹⁴⁷
- Several provincial cancer agencies have recently outlined targets for screening for distress. These are: 70% of all patients visiting a regional cancer centre and designated hospitals in Ontario;¹⁴⁸ 90% of new patients (first cancer centre consultation) in Saskatchewan; and 80% of newly-diagnosed cancer patients in Nova Scotia.
- The implementation of screening for distress programs across disease sites varies by province. For example, in some provinces, standardized screening for distress only includes breast cancer patients, while other provinces screen patients who have been diagnosed with all types of cancers. As well, levels of coverage across the provinces differ: some provinces have implemented screening in all cancer centres and in other facilities providing cancer care, while others have limited coverage to several smaller sites across the province.
- Some jurisdictions which have implemented screening for distress programs have reported that the use of these standardized tools has increased over time. In Ontario, the proportion of cancer patients screened using the *Edmonton Symptom Assessment System (ESAS)* increased from 51% in 2011 to 59% in 2013.¹⁴⁹ In Saskatchewan, the proportion of patients screened for distress was 57% in 2011 and 59% in 2012.¹⁵⁰
- A majority of oncologists in the United States and the United Kingdom reported screening their patients for distress; however, only 14.3% and 10% (respectively) said they had used a standardized screening tool.^{151, 152} A recent survey of clinicians who provide psychosocial support to cancer patients in American cancer care organizations found that only 51% of those organizations routinely screened new patients for distress; among those, about 60% reported using a standardized screening tool.¹⁵³
- Routine screening alone is insufficient for addressing the needs of individual cancer patients. In order to have an impact on patient well-being, screening must be accompanied by adequate follow-up and treatment as required (e.g., psychosocial intervention, further assessment, referral or a combination).^{138, 139} As well, it is important to evaluate the effectiveness of these programs within specific clinical settings and their impact on identifying patient needs.

What are some examples of efforts in this area?

- While guidelines covering screening for distress have been implemented in several jurisdictions, there is growing awareness that translating this knowledge into clinical practice requires practical training for clinicians and other care providers. In 2011, a national workshop was held in Quebec, with representatives from seven provinces attending. The goal was to develop an approach for implementing guidelines in clinical practice as part of established screening for distress programs.¹⁵⁴
- Nova Scotia, Prince Edward Island and Newfoundland and Labrador are working together on a Canadian Partnership Against Cancer-funded project that is centred on screening cancer patients for distress. As part of this project, Nova Scotia and Prince Edward Island are expanding their screening for distress

programs and are working with Newfoundland and Labrador to develop their program.¹⁵⁵

- The Canadian Partnership Against Cancer's Person-Centred Perspective (PCP) portfolio has convened a National Measurement Steering Committee to develop a common and systematic way to collect and report on both patient-reported outcome measures and patient-reported experiences. The ultimate goal is to build infrastructure to support the collection of pan-Canadian information. This information can be used to drive improvements in how cancer care systems identify and respond to patients' symptoms and also to their needs for information and emotional support.
- The PCP portfolio is also currently supporting efforts across the provinces that will enhance the ability to report at a pan-Canadian level on improvements in patient-reported outcomes, particularly those related to using tools and resources designed to monitor patient distress. For example:
 - As part of the *Patient Experience and Patient Reported Outcomes Initiative*, the Partnership is funding projects in eight provinces aimed at establishing consistent standardized measurement of patient-reported outcomes. The Initiative is also addressing how to ensure the uptake of best practices to improve patient experience outcomes. A working group is also providing input and expertise towards the identification and advancement of a national set of measures and tools in the area of patient-reported outcomes. One example is the development of a standard, nationally-accepted definition for reporting *full* and *partial* implementation of screening for distress programs.
 - Other work related to PCP is in the early stages. This includes investigating quality indicators for palliative care, and studying how people with cancer transition back to primary health care after their primary cancer treatment. These projects are in the early stages. Expert panels in these areas have been convened to help define specific sets of indicators that could be reported at the system level and used to help drive improvements.
- As programs continue to evolve and more data are collected, future reporting on screening for distress may include the percentage of patients screened, as well as how many are screened for distress according to the site of their disease (e.g., breast cancer patients, lung cancer patients).

6. Research

**Adult Clinical
Trial Participation** 108



6. Research

Research that evaluates important aspects of emerging cancer treatments establishes a foundation for best practices in cancer control. For example, clinical trials are essential for evaluating the safety and efficacy of new therapies and protocols. Patients who take part in clinical trials are contributing to the development and evolution of evidence-based treatments for cancer. Over time, this could lead to more and better options for screening, diagnosis, treatment and after-care, as well as improved outcomes for those affected by cancer today and in the future.

A number of studies have shown that patients who were treated in cancer centres with active clinical trial programs tended to have better health outcomes (such as increased length of survival and better quality of life) compared to those treated in centres that did not participate in clinical trials. One explanation for this may be a correlation between high levels of clinical trial activity and adherence to evidence-based treatment guidelines that yields better outcomes.^{156–158}

Because data are not available to calculate the actual clinical trial participation or the

percentage of qualifying patients who are enrolled in a clinical trial, a proxy indicator has been developed. This proxy indicator measures the ratio of the number of adult patients who were newly enrolled in Phase 1 to 4 clinical trials (e.g., cancer-related therapeutic trials or clinical research studies) at provincial cancer centres in 2013 to the estimated number of cancer incident cases in the same year.

This chapter presents data on the proxy cancer system performance indicator of clinical research activity: clinical trial participation ratios for adult cancer patients.

Phases of Clinical Trials^{159, 160}

Phase 1 trials are intended to measure safety and adverse effects of a new drug or treatment.

Phase 2 trials continue to measure safety and further evaluate the effectiveness of a drug or treatment.

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.

Indicator	Summary of results
Adult clinical trial participation	The ratio of adult patients enrolled in clinical trials to cancer incident cases ranged from 0.004 to 0.058 (interpretable as 0.4% to 5.8%) across reporting provinces in 2013. For the four most common disease sites, the ratio ranged from 0.012 (1.2%) for lung cancer to 0.050 (5%) for breast cancer.

Adult Clinical Trial Participation

What are we measuring and why?

The clinical trial participation rate was calculated as the ratio of cancer patients aged 19 years and older who were newly enrolled in cancer-related therapeutic clinical trials or clinical research studies at provincial cancer centres in 2013 to the estimated number of cancer incident cases in 2013.

- Comparing clinical trial participation rates across the country can provide opportunities for action—for example, there may be ways to increase the number of patients taking part in cancer research. The desired end result would be improved cancer outcomes and better quality of life for people with cancer.
- Data from other sources have suggested that the cancer clinical trials system in Canada is facing difficulties for several reasons. These include increasing clinical trial complexity; a more onerous regulatory environment; and increasing workloads for research ethics boards.¹⁶¹ In addition, although the number of cancer clinical trials opened per year had remained the same or grown from 2000-2010, patient enrolment per year had plateaued or decreased.¹⁶¹

- Several population-based studies show that patients who were treated in cancer centres with active clinical trial programs had health outcome advantages such as improved survival. This is likely due to better processes and delivery of care, including treatment guideline concordance.^{156-158, 162}

What are the results?

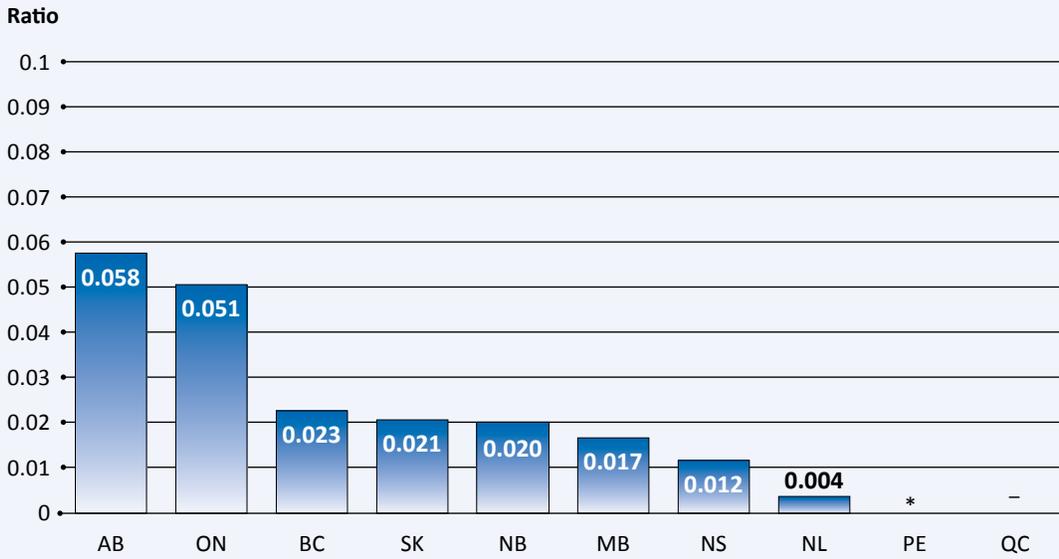
- In 2013, the clinical trial participation rate (i.e., the ratio of adult patients enrolled in clinical trials to the estimated cancer incident cases for provinces submitting data) ranged from 0.004 in Newfoundland and Labrador to 0.058 in Alberta (Figure 6.1). In the 2012 enrolment year, Alberta also reported the highest clinical trial participation ratio (0.055), while Newfoundland and Labrador reported the lowest (0.007).⁸⁹
- In 2013 the adult clinical trial participation ratios for the four most common disease sites ranged from a low of 0.012 for lung cancer to a high of 0.050 for breast cancer (Figure 6.2). A similar pattern was observed in the 2012 enrolment year.⁸⁹

Data and measurement considerations

- The adult clinical trial participation 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 and could be recurrent cases.
- As a proxy for the actual clinical trial participation rate, the results of this indicator, while presented as a ratio, can (for convenience only) be interpreted as a percentage (e.g. 0.05 = 5%).
- For this indicator, the numerator was the total number of adult cancer patients (aged 19 or older) newly enrolled in all phases of therapeutic clinical trials or research studies (for the following treatment modalities: radiation, systemic and surgery trials and for the following intents: curative, adjuvant/neo-adjuvant or palliative) at provincial cancer centres in 2013. The denominator was the estimated number of cancer incident cases in 2013.
- The Canadian Cancer Society's (CCS) projected 2013 cancer incident cases were used for the purpose of this proxy indicator only and should not be compared with the long-term outcomes incident cases which are not projected. CCS projections are derived from statistical models incorporating data obtained from the Canadian Cancer Registry, National Cancer Incidence Reporting System (NCIRS), Canadian Vital Statistics' Death database, and population life tables, censuses and forecasts.⁵⁰
- The denominator used to calculate adult clinical trial participation in system performance reports before 2014 was the total number of cancer cases newly registered in provincial cancer centres. The denominator in this report and in the *2014 Cancer System Performance Report* is the projected number of incident cases.
- Alberta had the highest ratio of adult patients enrolled in clinical trials in 2013, which may reflect how patient information is captured in the Alberta Cancer Clinical Trials (ACCT) database. If a patient is enrolled in multiple clinical trials in a given year, he or she would be counted for each accrual. The ACCT database also includes patients who were living outside Alberta during their cancer treatment, as long as they were enrolled in a clinical trial based in Alberta.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 6.1

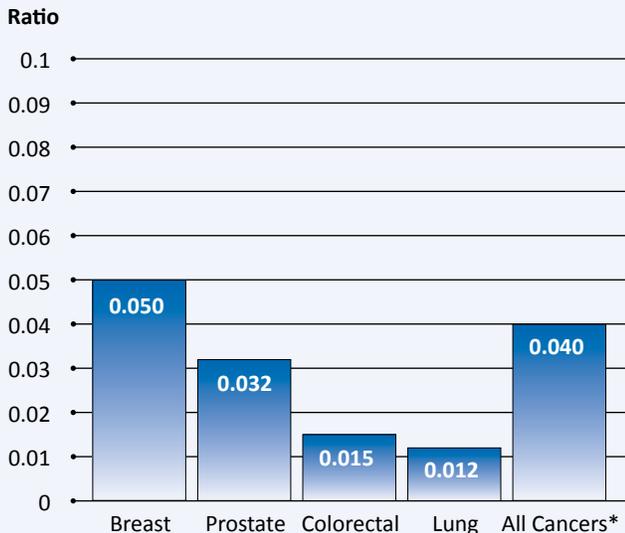
Ratio of adult patients enrolled in clinical trials to number of incident cases, all cancers, by province – 2013 enrolment year



* Suppressed due to small numbers.
 “-” Data not available.
 See Technical Appendix for details on numerator and denominator, available at systemperformance.ca.
 Incident cases were estimated for all ages from the Canadian Cancer Statistics.
 AB data included patients who were living outside AB but were participants of a clinical trial in AB. Non-melanoma skin cancer patients might be included. For breast cancer, both females and males were counted.
 Data source: Provincial cancer agencies; Canadian Cancer Society, Canadian Cancer Statistics.

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 – 2013 enrolment year



* See Technical Appendix for details on numerator and denominator, available at systemperformance.ca.
 The ratios for the four most common cancers included BC, AB, SK, MB, NB, NS, PE and NL.
 The overall clinical trial cases and incident cases included BC, AB, SK, MB, ON, NB, NS, PE and NL.
 All cancers excluded non-melanoma skin cancer patients, except in AB.
 Incident cases were estimated for 2013 from the Canadian Cancer Statistics.
 Data source: Provincial cancer agencies; Canadian Cancer Society, Canadian Cancer Statistics.

What do the results mean?

- Comparing clinical trial participation across the country can provide opportunities for action. For example, it could enable more trial participation and allow jurisdictions to achieve the goals as set out in the design of existing clinical trials. This could yield better cancer outcomes and improved quality of life for cancer patients.
- In 2013, several provinces reported a slight decrease in clinical trial enrolment compared to 2012. Breast cancer continued to have the highest enrolment, while lung cancer continued to report the lowest.⁸⁹ This suggests differences in the use of research investments (e.g., the proportion of funding dedicated to clinical trials) between breast cancer and other types of cancer.
- To date, targets and benchmarks for clinical trial enrolment have not been set in Canada; however, the Canadian Partnership Against Cancer's System Performance Initiative is in the process of establishing them for many indicators, including clinical trial participation. In the future, more precise measures of clinical trial enrolment in Canada would provide information on research engagement and patient access to new cancer therapies.

What are some examples of efforts in this area?

- A 2011 report developed by the Canadian Cancer Research Alliance (CCRA) Clinical Trials Working Group recommended the creation of a pan-Canadian infrastructure program that links to and builds on the strengths of existing clinical trial groups. The goal of this program is to support cancer clinical trials.¹⁶¹ In response to this recommendation, the Canadian Cancer Clinical Trials Network (3CTN) was created to act as a coordinating centre for clinical trial centres. The coordinating centre—housed at the Ontario Institute for Cancer Research (OICR)—has now been launched with funding support from the OICR, the Canadian Partnership Against Cancer, the Canadian Breast Cancer Foundation (CBCF), CancerCare Manitoba, the BC Cancer Foundation, the Alberta Cancer Foundation, the New Brunswick Health Research Foundation and the Nova Scotia Health Research Foundation. The goal of the initiative is to improve patient access to academic clinical trials; improve site performance of academic trials; improve the trial environment for the conduct of academic clinical trials through collaboration and facilitation of important national trial initiatives; and demonstrate impact of the Network and academic trials on the Canadian health system.

What else do we know?

- In the United States, the National Cancer Institute (NCI) has estimated that fewer than 5% of adult cancer patients participate in clinical trials.¹⁶³ In contrast, the United Kingdom (UK) had the highest rate of cancer clinical trial participation worldwide: in 2006, approximately 14% of adults diagnosed with cancer participated in cancer trials. The National Cancer Research Network was established in the UK in 2001 to enhance recruitment to trials and to other patient-centred research; this produced a boost in clinical trial participation.¹⁶⁴

7. Appropriateness

**Breast Cancer Screening
Outside Recommended
Guidelines**

114

**Breast Cancer Mastectomies
Done as Day Surgery** 117



7. Appropriateness

As with health care in general, decisions on the delivery of cancer control services should be based on certain fundamental principles. These can be framed by asking the following questions:

- *Does acceptable scientific evidence exist showing that patients will benefit from a specific intervention (i.e., there is evidence that the expected benefits outweigh any potential harms)?*
- *Are the costs of care—to individual patients, to the health care system and to society in general—considered reasonable and acceptable?*
- *Have patient preferences and individual circumstances been considered in the decision-making process?*

Fortunately, decision-makers do not need to make these decisions on their own. They can draw on a range of clinical practice guidelines and related recommendations from multi-disciplinary conferences and peer-reviews, as well as those issued by various agencies and authorities. These guidelines and recommendations have been generated by synthesizing and consolidating the evidence in a systematic and scientific way. As such they provide a set of general parameters for “appropriate” care. They should always be balanced with the perspectives and preferences of Canadians with cancer and their family members.

This chapter on the appropriateness^f of clinical cancer interventions presents two indicators that measure the utilization of select cancer control services. While not a comprehensive assessment of the efficient use of cancer control services, the data suggest possible opportunities to better align service delivery with evidence of appropriateness and benefit at the population level.

The plan for future system performance reports is to increase the scope of *appropriateness* indicators. This expanded set of reliable measures can be used to help inform decisions aimed at better aligning the needs of cancer patients with health system use, resources and capacities.

^f In previous System Performance Reports, this chapter was titled *System Efficiency*. As of this report, we have changed the title to *Appropriateness* because the term reflects the broader scope of examining both the patient outcome implications as well as system resource impacts that result from cancer control service delivery decisions.

Indicator	Summary of results
Breast cancer screening outside recommended guidelines	Depending on the province, between 13.5% and 37.7% of screening mammograms were performed on women outside of the target age range of 50-74 years.
Breast cancer mastectomies done as day surgery	The percentage of mastectomies done as day surgery varied widely by province, ranging from 1.3% in Alberta to 34.4% in Ontario.

Breast Cancer Screening Outside Recommended Guidelines

What are we measuring and why?

This indicator measures the percentage of self-reported screening mammograms performed in women outside of the target age group recommended in screening guidelines (ages 50-74) in the previous two years. This indicator is based on 2012 Canadian Community Health Survey (CCHS) data.

- In the 2011 guidelines on breast cancer screening, the Canadian Task Force on Preventive Health Care (CTFPHC) recommended that women aged 50-74 years considered to be at average risk for breast cancer be routinely screened with mammography every two to three years (*weak recommendation, moderate quality evidence* for those aged 50-69; *weak recommendation, low quality evidence* for those aged 70-74). While screening women in their 40s is not contraindicated, the CTFPHC does not recommend routine mammography for this group (*weak recommendation, moderate quality evidence*), as the evidence of absolute benefit is weaker and the risk of false-positives is higher in this age group. The CTFPHC suggests an individual decision-making approach for this age group, where women and their physicians discuss the harms and benefits.¹
- To date, organized breast cancer screening programs are offered in all provinces and territories except Nunavut. All programs invite women aged 50-69 years to undergo breast cancer screening by mammography every two years; many provincial and territorial programs also invite older women aged 70-74 years to be screened (within guidelines). Provincial and territorial screening program guidelines vary in their acceptance and screening of women outside of the 50-74 year age range.⁶⁸ It is important to note that women may also access mammographic screening without going through a provincial program— for example, through their physicians or by self-referral (this is called *opportunistic screening*).
- Mammograms and the subsequent investigations associated with abnormal results can be resource-intensive. When these mammograms are done outside the evidence-based guidelines established for effectiveness, they can cause unnecessary and potentially harmful interventions such as repeated biopsies.¹⁶⁵
- Given the cost of mammograms and subsequent follow-up, interprovincial comparisons of screening rates for mammography being done outside the recommended target age group can yield important information. For example, they may identify opportunities in some provinces for balancing resource allocations.

What are the results?

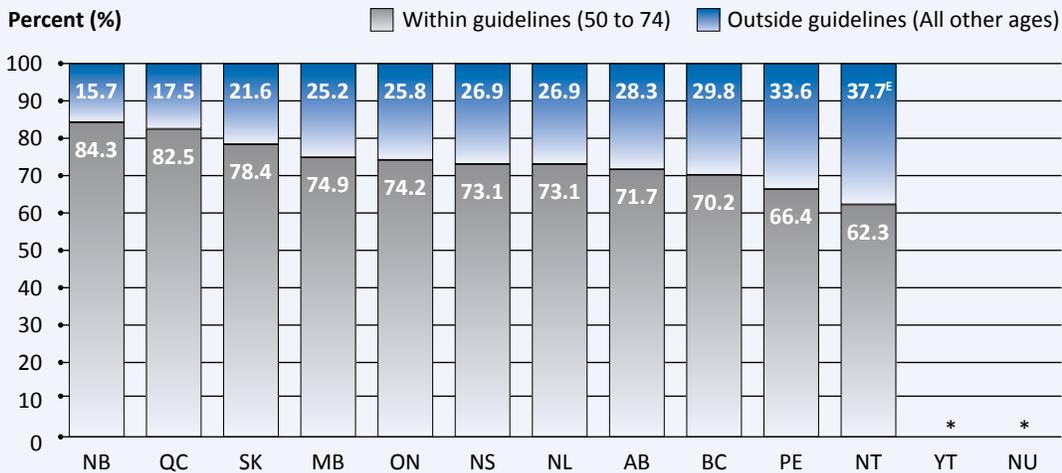
- In 2012, a sizeable proportion of screening mammograms were performed in women outside of the target age range recommended in the CTFPHC guidelines (50-74 years).
- The percentage of self-reported screening mammograms performed in women outside of the recommended age range (ages 50-74) in the previous two years varied widely, from 15.7% in New Brunswick to 37.7% in the Northwest Territories (Figure 7.1).
- The percentage of self-reported screening mammograms in women under age 50 ranged from 11.5% in Quebec to 37.7% in the Northwest Territories. Screens performed outside of guidelines in the Northwest Territories were exclusive to women in the under-50 age group (data not shown).
- In women aged 75 and older, the percentage of self-reported screening mammograms ranged from 3.6% in New Brunswick to 8.6% in Saskatchewan. These percentages were lower in all cases when compared to reported screens in younger (under age 50) women (data not shown).
- The percentage of self-reported screening mammograms performed in women within the recommended age range of 50-74 years (within guidelines) in the previous two years ranged from 62.3% in the Northwest Territories to 84.3% in New Brunswick (Figure 7.1).

Data and measurement considerations

- The indicator excludes mammograms performed to investigate a lump or other breast problem or as follow-up to breast cancer treatment.
- This indicator does not distinguish between women at higher-than-average risk (e.g., those with a first-degree family history, with high breast density or who are on hormone-replacement therapy) versus women deemed to be at average risk. As such, “outside of guidelines” means outside of the age range recommended by the CTFPHC guidelines (50-74 years) only, regardless of women’s risk levels.
- The youngest women who answered questions related to screening mammography were 35. Therefore, this indicator includes screens in women aged 35-49 and 75+.
- The survey question does not take into account frequency of testing (i.e., whether the respondent had undergone more than one mammogram in the previous two years).
- This indicator is based on self-reported survey data from the Canadian Community Health Survey; it includes all women who said that they had undergone breast screening by mammography within the previous two years. While concern exists about the accuracy of such self-reported data, previous studies have shown that self-reported screening rates are comparable to actual utilization rates gleaned from administrative data.⁵⁹
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 7.1

Percentage of all self-reported screening[†] mammograms performed within and outside of guideline-recommended age groups (50 to 74 years), by province/territory – 2012 reporting year



* Suppressed due to small numbers.

[‡] Interpret with caution owing to large variability in the estimate.

[†] A woman is deemed eligible for screening mammography if her reason for undergoing a mammogram is not to investigate previously detected lumps or breast problems, or as follow-up to breast cancer treatment.

Outside guidelines (all other ages): includes all women who responded to this question between age 35-49 and 75+. Women under age 35 were not captured.

Women who reported a screening mammogram in the last two years were included as screened.

Data source: Statistics Canada, Canadian Community Health Survey.

What do the results mean?

- Most breast cancer screening in Canada is done within the target age groups outlined in the CTFPHC guidelines, although a considerable minority of screening mammograms appear to be performed in women outside of this target age range.
- The amount of screening performed outside these guidelines differed between provinces and territories in 2012. This could be the result of differing eligibility criteria used by individual provincial/territorial screening programs (i.e., for women under 50 and for those over age 75).⁶⁸ It could also be due to the fact that women can access screening mammograms outside provincial programs through opportunistic screening (i.e., through consultation with their family physician or via self-referral). These women may not be subject to the same guidelines and eligibility that govern provincial programs and may differ in their characteristics.
- Should current screening practices continue, screening outside of guidelines could account for more than 500,000 mammograms annually (based on 2012 data). Women who undergo breast cancer screening mammography outside the recommended age guidelines face potential harms. These include false-positive results; increased detection of indolent (slow-growing) cancers that pose minimal risk; unnecessary biopsies; overtreatment and

emotional harm (i.e., anxiety, stress).^{166, 167} The Canadian National Breast Screening Study estimated that approximately 22% of invasive breast cancers detected through screening were over-diagnosed (i.e., the cancers detected might not otherwise become clinically apparent during the woman's lifetime).¹⁶⁸

- The results do not present a full picture of screening outside of guidelines, as they do not capture women who receive annual mammograms. For women who are in their 40s and getting screened, some recommendations indicate that screening be done on an annual basis due to the faster growth rate of breast cancers for this age group.^{169, 170} Currently, CCHS data do not allow the identification of women who are receiving annual mammograms (whether due to age or risk level), only the age at which they report receiving a screening mammogram within the previous two years.

As such, when taking into account frequency of screening mammography, the resource impact of screening outside of guidelines is likely greater than has been described here.

What are some examples of efforts in this area?

- The Canadian Partnership Against Cancer recently published a report measuring programmatic and self-reported breast cancer screening rates inside and outside the Canadian Task Force on Preventive Health Care (CTFPHC) guidelines. The purpose of the report—entitled *Cancer Screening in Canada: An Overview of Screening Participation for Breast, Cervical and Colorectal Cancer*—is to inform strategies on cancer screening participation and guideline adherence.¹⁷¹

Breast Cancer Mastectomies Done as Day Surgery

What are we measuring and why?

This indicator measures the percentage of mastectomies for breast cancer tumour resection that were done as day surgery.

- 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 as same-day surgery.¹⁷² Provided patient outcomes are similar, same-day surgeries can be cost-saving. This is because patients are not admitted to hospital for recovery and thus consume fewer hospital resources. There may also be a lower risk of exposure to hospital-acquired infection since the patient spends less time in the hospital.

- Measuring the percentage of mastectomies being performed as day surgery across provinces allows us to see what is happening in this area across jurisdictions and to detect variations in practice.

What are the results?

- Across all provinces, the majority of mastectomies were done in an inpatient setting rather than in a day surgery setting (Figure 7.2).
- The percentage of mastectomies done as day surgery by province (based on data from 2007/2008 to 2011/2012) ranged from 1.3% in Alberta to 34.4% in Ontario (Figure 7.2).

Data and measurement considerations

- Data and analysis for this indicator were provided by the Canadian Institute for Health Information (CIHI).
- This analysis is based on hospital discharge abstract data which have not been linked to cancer registry data. Surgeries for women with newly-diagnosed breast cancer were identified by excluding patients with a record of previous cancer treatment in data for previous years.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 7.2

Percentage of breast cancer mastectomies done as day surgery, by province/territory – from 2007/2008 to 2011/2012 fiscal years combined



* Suppressed due to small numbers.

Territories include NU, NT and YT.

SK: Data include 2010/11 to 2011/12. Data for 2007/08 to 2009/10 were suppressed due to small numbers and could not be used for calculation.

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

What do the results mean?

- As long as patient outcomes are similar, shifting from inpatient to same-day surgery for women undergoing mastectomy would yield a reduction in system costs and free up inpatient capacity. This in turn could facilitate additional capacity for inpatient care, including for other cancer surgeries. The fact that one province (Ontario) performed 34% of mastectomies as day surgeries from 2007/08 to 2011/12 suggests that other provinces can move closer to that benchmark, assuming they can provide the necessary system support for this shift.
- In the United States, recent estimates of the percentage of mastectomies performed as day surgery ranged from 19.4% to 33.6%, which is comparable to the percentages observed in many provinces as reported here.^{173–175}

What are some examples of efforts in this area?

- This indicator is part of a suite of metrics recommended by the Canadian Partnership Against Cancer's System Efficiency Measurement Working Group for ongoing reporting and monitoring. The indicator may also be a candidate for the development of benchmarks or targets, which would signal the desired level of performance across the country. The objective is to make breast cancer surgeons and other provincial decision-makers aware of how their province compares with others and to consider whether there is an opportunity to move more cases to the day surgery setting.

What else do we know?

- Further research is needed to evaluate patient outcomes related to mastectomies that are done as day surgery. It has been demonstrated that as long as proper follow-up and home care are provided, patient outcomes for mastectomy done in an outpatient setting are at least as good as those for mastectomy performed in an inpatient setting.^{172, 176}
- Same-day surgery has also been linked to better psychological outcomes, likely because many patients prefer to recover at home.¹⁷⁶ In general, the impact of where surgery is done on patient outcomes—for example, on patient satisfaction or rates of post-surgery infection—has not been clearly established.

8. Long-Term Outcomes

Breast Cancer	122	Lung Cancer	127	Colorectal Cancer	133
Prostate Cancer	139	Pancreatic Cancer	144		



8. Long-Term Outcomes

Cancer control efforts are focused in three main areas: 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).

In general, cancers detected at an early stage have better survival outcomes. Population-level stage data became available in the national cancer registry as of the 2010 diagnosis year for the four cancers that most commonly affect Canadians (breast, lung, colorectal and prostate). The availability of such data in nine of 10 Canadian provinces provides new opportunities: it can be used to support system-level surveillance of cancer trends, to more accurately measure system performance and to evaluate the impact

of differences in early detection and screening efforts across the country—particularly how they affect patient outcomes.

In this chapter, data on incidence (including incidence rates by stage), mortality and survival are presented for breast, lung, colorectal and prostate cancers. Data are also presented for pancreatic cancer which has surpassed prostate cancer as the fourth leading cause of cancer-related death in Canada.⁵⁰

Indicator	Summary of results
Breast cancer	Age-standardized incidence rates were stable while age-standardized mortality rates continued to decrease. Breast cancer was commonly diagnosed at Stage I or II. The lowest age-standardized mortality rates for breast cancer were in British Columbia; the highest were in Newfoundland and Labrador. Five-year relative survival for breast cancer improved from 82% in 1992–1994 to 88% in 2006–2008.
Lung cancer	Age-standardized incidence and mortality rates for lung cancer continued to decrease for men. The previously increasing trend for women appears to be levelling off in the most recent years. Lung cancer was commonly diagnosed at Stage IV. The lowest age-standardized mortality rates for lung cancer were in British Columbia; the highest were in Quebec. Five-year relative survival for lung cancer improved from 14% in 1992–1994 to 18% in 2006–2008.
Colorectal cancer	Age-standardized mortality rates for colorectal cancer continued to decrease for both men and women; however, a decreasing trend in incidence rates was seen only among women. Colorectal cancer was commonly diagnosed at Stage III, though differences in stage-specific incidence were modest in some provinces. The lowest age-standardized mortality rates for colorectal cancer were in Alberta; the highest were in Newfoundland and Labrador. Five-year relative survival for colorectal cancer improved from 56% in 1992–1994 to 65% in 2006–2008.
Prostate cancer	Age-standardized incidence and mortality rates continued to decrease for prostate cancer; however, the decrease in incidence was not statistically significant. Prostate cancer was commonly diagnosed at Stage II. The lowest age-standardized mortality rates for prostate cancer were in Quebec; the highest were in Saskatchewan.
Pancreatic cancer	Age-standardized mortality rates for pancreatic cancer continued to decrease slowly for both men and women; however, a significant decreasing trend in incidence rates was seen only among men. The lowest age-standardized mortality rates for pancreatic cancer were in Newfoundland and Labrador; the highest were in New Brunswick. Five-year relative survival for pancreatic cancer increased from 5% in 1992–1994 to 8% in 2006–2008. Pancreatic cancer still has one of the lowest survival rates.

Breast Cancer

What are we measuring and why?

This section presents age-standardized incidence rates, including rates by stage, age-standardized mortality rates and five-year relative survival for breast cancer. Incidence and mortality rates were standardized to the 2011 Canadian population. These indicators are examined over time and by province.

- Breast cancer is the most common cancer diagnosed among women in Canada and the second leading cause of death due to cancer.⁵⁰

What are the results?

AGE-STANDARDIZED INCIDENCE RATES (ASIR)

- The ASIR for breast cancer in Canada remained relatively stable from 1992 to 2010 at around 130 cases per 100,000 females (annual percent change [APC]=-0.2%; overall relative change=-2.2%) (Figure 8.1).
- For 2008 to 2010 combined, the relative difference in ASIR between the lowest and highest provincial rate was 17.3%. The ASIR ranged from 114.1 cases per 100,000 females in Newfoundland and Labrador to 133.8 cases per 100,000 females in Prince Edward Island (Figure 8.2).

STAGE-SPECIFIC INCIDENCE

- For 2010 to 2012 combined (diagnosis years), the ASIRs for Stage I and II breast cancers were higher than those for Stage III and IV in all provinces. In some provinces, the age-standardized incidence rate for Stage I breast cancer was as much as 10 times higher than the rate for Stage IV disease (Figure 8.3).

- The incidence of Stage I breast cancer ranged from 58.3 cases per 100,000 females in New Brunswick to 93.7 cases per 100,000 females in Prince Edward Island, a 60.7% relative difference (Figure 8.3).
- The incidence of Stage IV breast cancer ranged from 7.2 cases per 100,000 females in New Brunswick to 13.2 cases per 100,000 females in Newfoundland and Labrador, an 83.3% relative difference (Figure 8.3).

AGE-STANDARDIZED MORTALITY RATES (ASMR)

- The ASMR for breast cancer 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). As would be expected, a similar reduction in ASMR occurred for women aged 50-79 years who likely would have benefited from screening (data not shown).
- For 2009 to 2011 combined, the ASMR ranged from 23.9 deaths per 100,000 females in British Columbia to 31.9 deaths per 100,000 females in Newfoundland and Labrador, a 33.5% relative difference (Figure 8.4).

FIVE-YEAR RELATIVE SURVIVAL RATIOS (5-RSR)

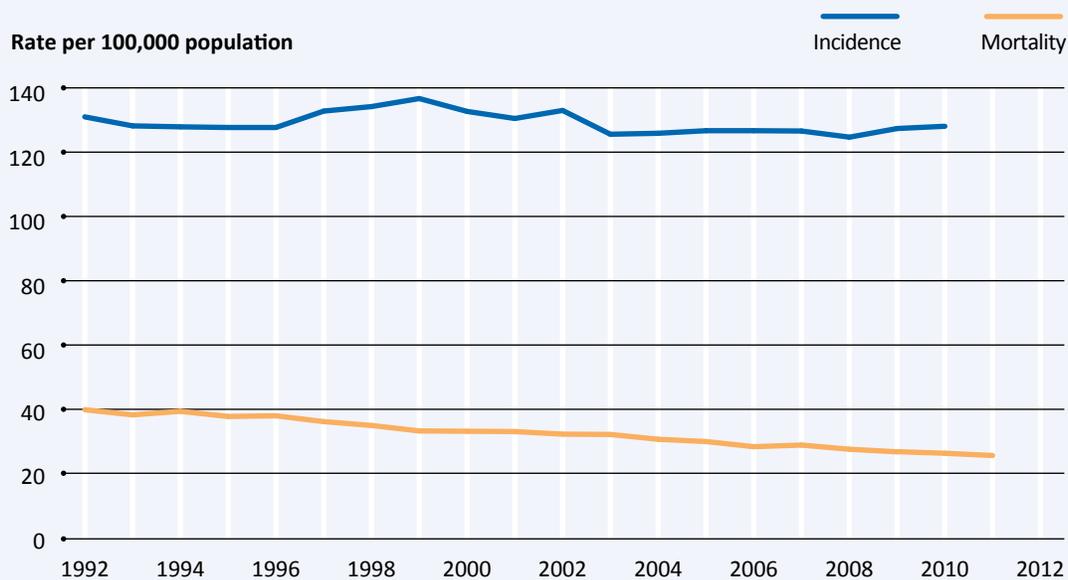
- For 2006 to 2008 combined, the five-year relative survival ratios for breast cancer ranged from 85% in Manitoba to 89% in New Brunswick and Ontario for both sexes combined (Figure 8.5).
- Canada's 5-RSR for both sexes combined increased by six percentage points, from 82% in 1992-1994 to 88% 2006-2008 (Figure 8.6).

Data and measurement considerations

- More up-to-date survival data were not available due to delays in the process of completing death clearance. This process of identifying deaths from cancer involves linking patient data from the Canadian Cancer Registry to death certificate records. The number of cancer deaths is needed to enable survival analysis. Death clearance is conducted by Statistics Canada; it was last completed for 2008 data.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 8.1

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

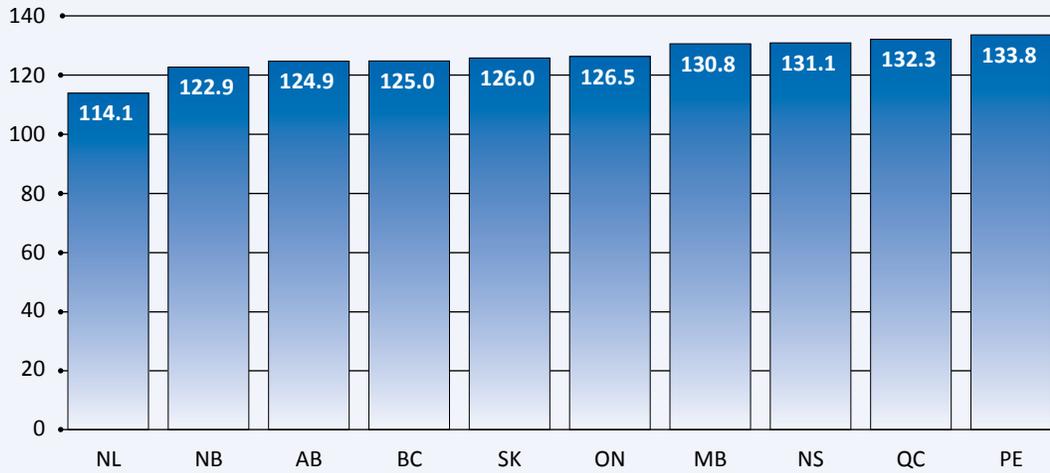


Data source: Statistics Canada, Canadian Cancer Registry and Vital Statistics Death Database.

FIGURE 8.2

Incidence rates for breast cancer in women, by province, age-standardized to the 2011 population – 2008-2010 combined

Rate per 100,000 population



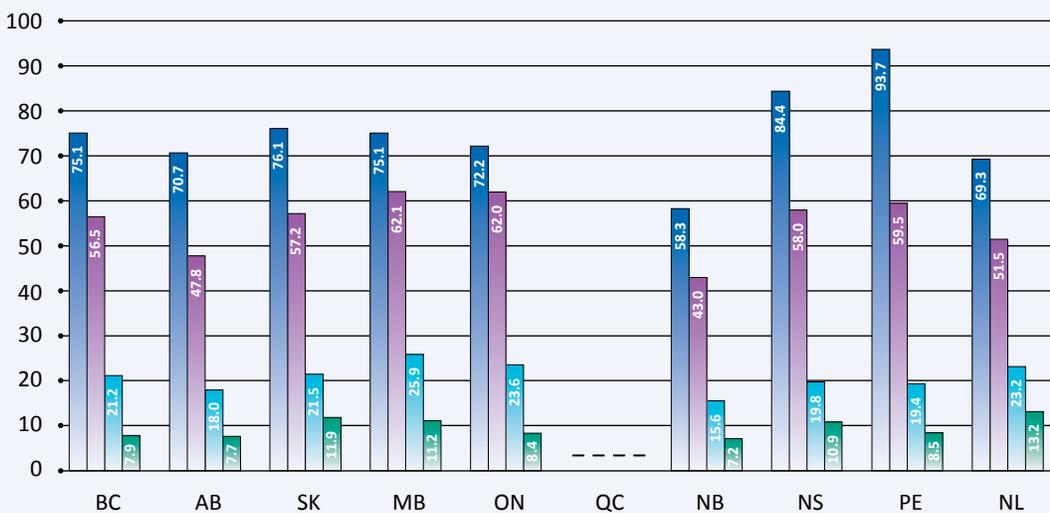
Data source: Statistics Canada, Canadian Cancer Registry.

FIGURE 8.3

Incidence rates for breast cancer in women, by stage at diagnosis, by province, age-standardized to the 2011 population – 2010-2012 diagnosis years combined

Rate per 100,000 population

Stage: I II III IV

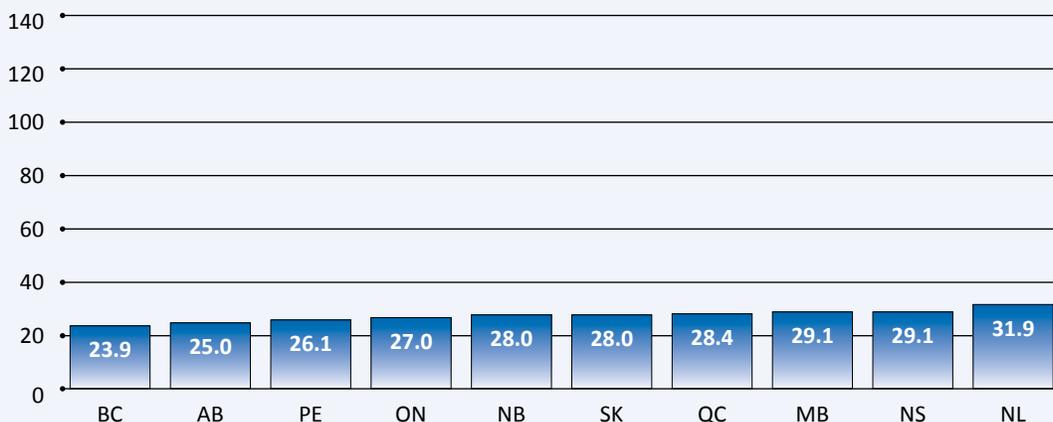


"-" Data not available.
Data source: Provincial cancer agencies.

FIGURE 8.4

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

Rate per 100,000 population

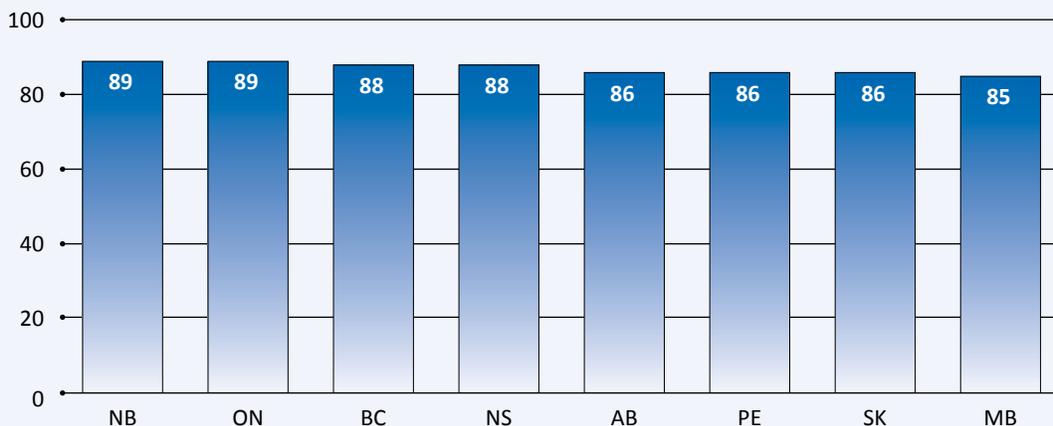


Data source: Statistics Canada, Vital Statistics Death Database.

FIGURE 8.5

Five-year relative survival ratios for breast cancer, both sexes combined, by province, age-standardized[†] – 2006-2008 combined

Relative survival (%)



[†] Age-standardized to population diagnosed with breast cancer in Canada between 1992 and 2001.

Data based on 15 to 99 years of age at diagnosis.

QC: Data excluded due to different methodology for determining date of diagnosis.

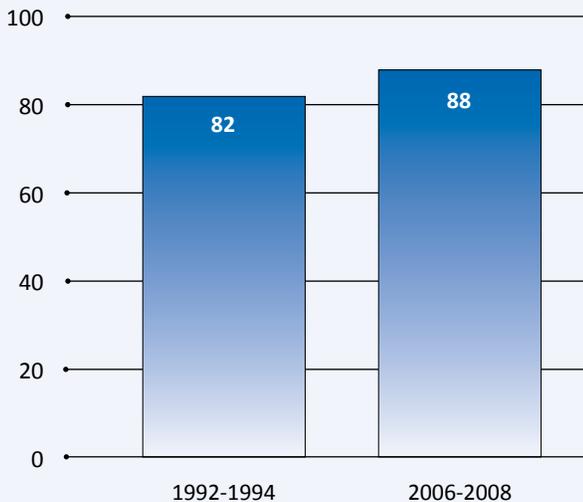
NL: Survival ratios not shown due to incomplete death clearance data, which may result in inflated survival ratios.

Data source: Canadian Cancer Society, Canadian Cancer Statistics.

FIGURE 8.6

Five-year relative survival ratios for breast cancer, both sexes combined, Canada,[†] age-standardized^{††} – 1992-1994 combined vs. 2006-2008 combined

Relative survival (%)



† Canada data excluded QC due to difference in methodology for determining date of diagnosis.

†† Age-standardized to population diagnosed with breast cancer in Canada between 1992 and 2001.

Data based on 15 to 99 years of age at diagnosis.

Data source: Canadian Cancer Society, Canadian Cancer Statistics.

What do the results mean?

INCIDENCE

- Breast cancer incidence rates remained largely stable during the timeframe analyzed for this report. This stability in ASIRs has also been observed in Europe, the United States and Australia.^{177–179}
- High ASIRs for Stages I and II compared to those for late-stage cancers may reflect the success of breast cancer screening across Canada.
- Based on the 2012 Canadian Community Health Survey, the percentage of women who reported receiving a screening mammogram in the previous two years ranged from 57.4% in the Yukon to 74.9% in Quebec (see *Screening* chapter). While the relationship between these survey results and stage-specific and overall incidence patterns reported here is not necessarily direct, over time, these types of comparisons can help inform the evaluation of screening and early detection efforts in breast cancer.

MORTALITY

- The substantial decline in breast cancer mortality reported here likely reflects improvements in early detection through mammography screening, as well as more effective treatment.
- Similar to the trend observed in Canada, breast cancer mortality rates in the United States, Europe and Australia have also been declining since the early 2000s.^{177–180}

FIVE-YEAR RELATIVE SURVIVAL RATIOS (5-RSR)

- The increase in five-year relative survival for breast cancer observed in Canada between 1992–1994 and 2006–2008 is likely due to improvements in breast cancer control, including early diagnosis and more effective treatment.
- Improved survival has also been observed in most developed countries and rates are similar to those seen in Canada. Based on data from the CONCORD-2 study, five-year net survival for breast cancer was 88.6% in the United States, 86.2% in Australia and 81.1% in the

United Kingdom in 2005-2009.¹⁸¹ Findings from the International Cancer Benchmarking Project suggest that international differences in breast cancer survival could be explained by

differences in the distribution of stage at diagnosis and differences in stage-specific survival (i.e., reflecting treatment access and quality) across jurisdictions.¹⁸²

What else do we know?

- A recent study (CONCORD-2), partly funded by the Canadian Partnership Against Cancer, examined five-year net survival across 67 countries for several cancers, including breast, lung, cervical, prostate, colon and rectal. The purpose of the CONCORD-2 study—worldwide surveillance of five-year net survival—is meant to inform global cancer control policies, improve survival rates and ultimately to reduce cancer deaths.¹⁸¹
- The International Cancer Benchmarking Project (ICBP) is a collaboration of clinicians, academics and policy-makers from six countries across three continents who are studying how and why cancer survival varies among countries and jurisdictions. The ICBP is examining: cancer survival; population awareness and beliefs; attitudes, behaviours and systems in primary care; delays in diagnosis and treatment; and treatment, comorbidities and other factors. The participating countries include Australia (New South Wales and Victoria), Sweden, Denmark, Norway, the United Kingdom (England, Northern Ireland and Wales) and Canada (Alberta, British Columbia, Manitoba and Ontario).¹⁸³ The Canadian Partnership Against Cancer is a collaborator on the ICBP.

Lung Cancer

What are we measuring and why?

This section presents age-standardized incidence rates, including rates by stage, age-standardized mortality rates and five-year relative survival for lung cancer. Incidence and mortality rates were standardized to the 2011 Canadian population. These indicators are examined over time and by province.

- Lung cancer is the most commonly diagnosed cancer in Canada and the leading cause of death due to cancer in both men and women.⁵⁰

What are the results?

AGE-STANDARDIZED INCIDENCE RATES (ASIR)

- In Canada, the ASIR for lung cancer significantly decreased among men from approximately 120.1 cases per 100,000 males in 1992 to 81.7 cases per 100,000 males in 2010 (annual percent change [APC]=-1.9%; overall relative change=-32.0%) (Figure 8.7).
- 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 (APC=1.4%). There was a non-significant decline after 2006, to 60.5 cases per 100,000 females in 2010 (APC=-0.7%). The overall relative change in incidence rates from 1992 to 2010 was 15.5% for women (Figure 8.7).

- Across all provinces, the ASIR for men was higher than it was for women. Among men, lung cancer incidence rates ranged from 68.7 cases per 100,000 males in British Columbia to 115.5 cases per 100,000 males in Quebec, a relative difference of 68.1%. Incidence rates for women ranged from 47.0 cases per 100,000 females in Newfoundland and Labrador to 76.3 cases per 100,000 females in Quebec, a relative difference of 62.3% (Figure 8.8).
- The biggest difference between ASIRs for males and females was observed in Prince Edward Island, followed by Newfoundland and Labrador. British Columbia had the least variation between male and female ASIRs (Figure 8.8).

STAGE-SPECIFIC INCIDENCE

- For 2010-2012 (diagnosis years), Stage IV lung cancers had the highest ASIRs compared to early stage cancers (Figure 8.9).
- The incidence of Stage I lung cancer ranged from 10.9 cases per 100,000 people in British Columbia to 21.7 cases per 100,000 people in Nova Scotia, a 99.1% relative difference (Figure 8.9).
- The incidence of Stage IV lung cancer ranged from 32.3 cases per 100,000 people in New Brunswick to 57.4 cases per 100,000 people in Nova Scotia, a 77.7% relative difference (Figure 8.9).

AGE-STANDARDIZED MORTALITY RATES (ASMR)

- The ASMR for lung cancer 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%). By contrast 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 8.7).
- For 2009 to 2011 combined, the ASMR 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 (Figure 8.10).

FIVE-YEAR RELATIVE SURVIVAL RATIOS (5-RSR)

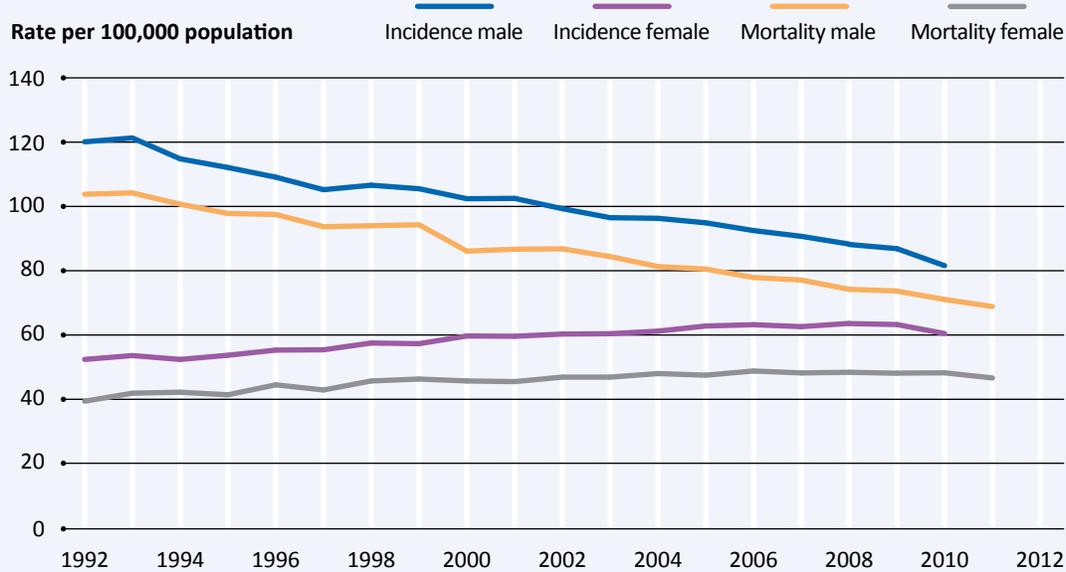
- For 2006 to 2008 combined, the five-year relative survival ratios for lung cancer ranged from 15% in Nova Scotia and Alberta to 21% in Manitoba (Figure 8.11).
- Canada's 5-RSR increased by four percentage points from 14% in 1992-1994 to 18% in 2006-2008 (Figure 8.12).

Data and measurement considerations

- More up-to-date survival data were not available due to delays in the process of completing death clearance. This process of identifying deaths from cancer involves linking patient data from the Canadian Cancer Registry to death certificate records. The number of cancer deaths is needed to enable survival analysis. Death clearance is conducted by Statistics Canada; it was last completed for 2008 data.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 8.7

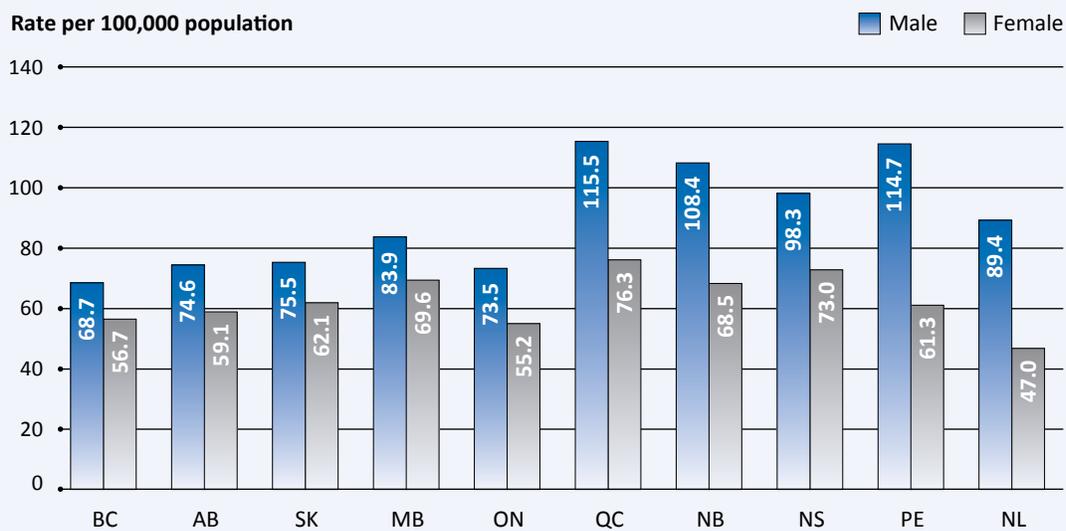
Incidence and mortality rates for lung cancer, by sex, Canada, age-standardized to the 2011 population – from 1992 to 2011



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

FIGURE 8.8

Incidence rates for lung cancer, by sex, by province, age-standardized to the 2011 population – 2008-2010 combined



Data source: Statistics Canada, Canadian Cancer Registry.

FIGURE 8.9

Incidence rates for lung cancer, by stage at diagnosis, by province, age-standardized to the 2011 population – 2010-2012 diagnosis years combined

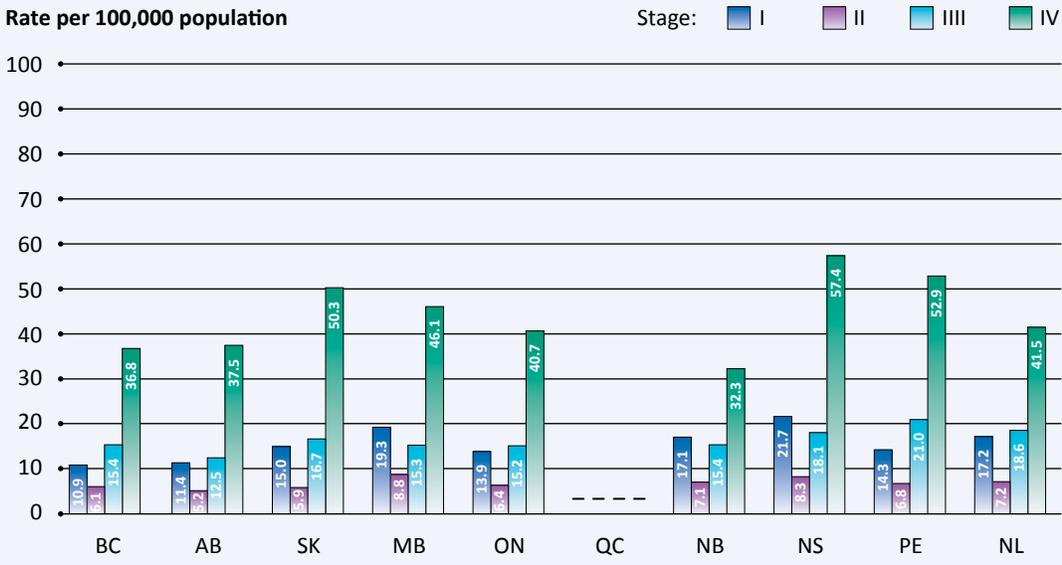


FIGURE 8.10

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

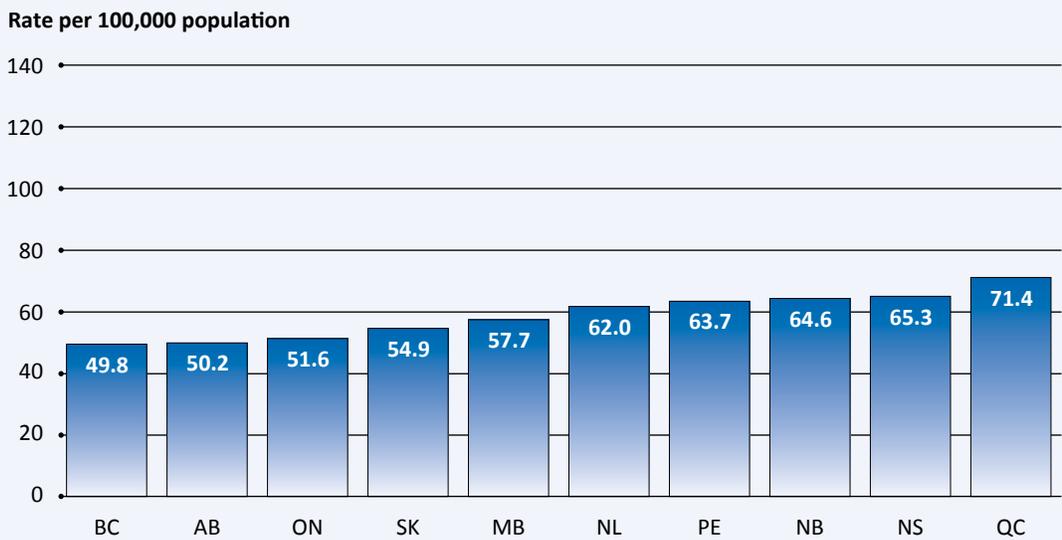
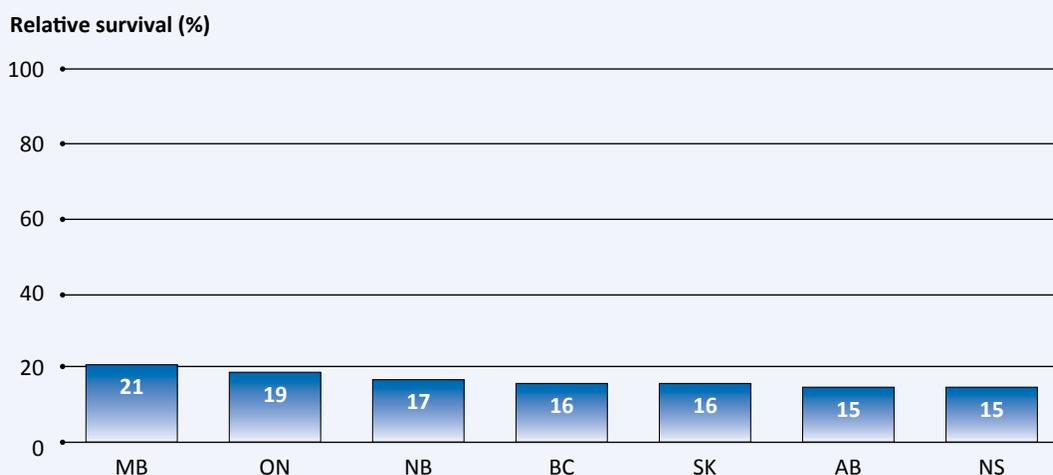


FIGURE 8.11

Five-year relative survival ratios for lung cancer, by province, age-standardized[†] – 2006-2008 combined



[†] Age-standardized to population diagnosed with lung cancer in Canada between 1992 and 2001.

Data based on 15 to 99 years of age at diagnosis.

QC: Data excluded due to different methodology for determining date of diagnosis.

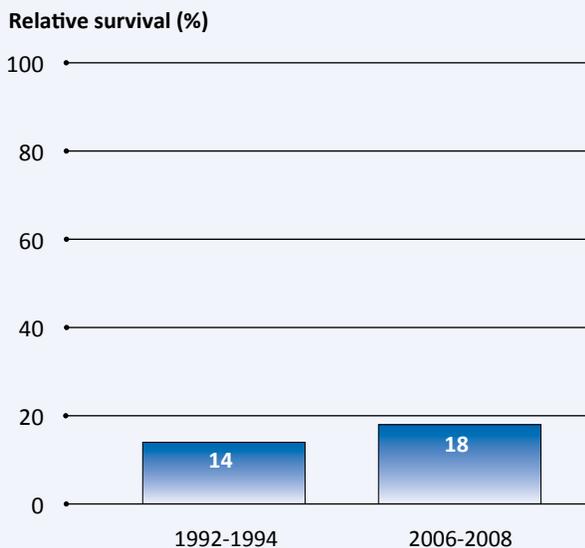
NL: Survival ratios not shown due to incomplete death clearance data, which may result in inflated survival ratios.

PE: Data not shown due to small number of cases.

Data source: Canadian Cancer Society, Canadian Cancer Statistics.

FIGURE 8.12

Five-year relative survival ratios for lung cancer, Canada,[†] age-standardized^{††} – 1992-1994 combined vs. 2006-2008 combined



[†] Canada data excluded QC due to difference in methodology for determining date of diagnosis.

^{††} Age-standardized to population diagnosed with lung cancer in Canada between 1992 and 2001.

Data based on 15 to 99 years of age at diagnosis.

Data source: Canadian Cancer Society, Canadian Cancer Statistics.

What do the results mean?

INCIDENCE AND MORTALITY

- 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. Lung cancer incidence and mortality have been declining for men; a similar decline among women is expected in the future.⁵⁰ The slight inflection point (i.e., change in the direction of a data curve) in incidence for women, seen after 2006 (Figure 8.7), could mark the beginning of this expected decline and will need to be monitored over the next several years to confirm the trend.
- Differences in provincial lung cancer incidence and mortality rates also reflect interprovincial variations in tobacco use. Quebec and the Atlantic provinces have traditionally had higher smoking prevalence rates than central and western Canada,⁶ which largely explains the higher lung cancer burden in those provinces.
- Provincial variation in ASIRs between men and women reflects historical differences in smoking rates and related trends by sex. A larger smoking differential between men and women would be reflected in later lung cancer incidence differentials. For instance, the difference in smoking rates between men and women in the early 2000s was much narrower in British Columbia than it was in Prince Edward Island and Newfoundland and Labrador, where the current difference in lung cancer rates between men and women was also larger.⁶
- Lung cancer is rarely detected before progressing to a late stage; detection is often coincidental (i.e., a lesion shows up on a CT scan intended to detect a different health problem).¹⁸⁴ As a result, lung cancer is most often diagnosed at Stage IV, as seen in the stage-specific incidence data presented above.
- Trends in lung cancer incidence among Canadians are consistent with those seen internationally, including in the United Kingdom and the United States. In these countries, lung cancer incidence has declined in men but increased in women.^{179, 180}
- Canadian mortality trends also match international trend data, suggesting that lung cancer mortality rates have peaked and are now declining among men in many developed countries, including the United States, England, Denmark, Australia, Finland and the Netherlands.^{185, 186} Mortality rates among women continue to rise, except in the US, where the mortality rate for women with lung cancer began to decline in 2003.¹⁸⁰

FIVE-YEAR RELATIVE SURVIVAL RATIOS (5-RSR)

- Stage IV lung cancer has a poor prognosis. Many lung cancers are diagnosed when they are already at Stage IV, which is a major factor that contributes to low rates of overall survival.
- Improved five-year relative survival rates, as seen in Canada, have also been observed internationally; however, in all countries, lung cancer survival is generally poor. Based on data from the CONCORD-2 study, five-year net survival for lung cancer was 18.7% in the United States, 15.0% in Australia and 9.6% in the United Kingdom in 2005-2009. In 1995-1999, survival was 15.2%, 13.7% and 7.3%, respectively.¹⁸¹ Findings from the International Cancer Benchmarking Project suggest that international differences in lung cancer survival could be explained partly by differences in stage at diagnosis; however, disparities in stage-specific survival suggest that other factors, such as treatment access and quality, could be important in influencing overall survival rates.¹⁸⁷

What else do we know?

- The Pan-Canadian Lung Cancer Screening Network (PLCSN) was assembled in 2011. The Network supports initiatives that inform, leverage expertise and make evidence-based recommendations about lung cancer screening. The Network comprises representatives from provincial cancer care organizations, provincial and territorial ministries of health, the Public Health Agency of Canada, and non-government and professional organizations. In 2014, PLCSN released the *Lung Cancer Screening Framework for Canada* to provide guidance to jurisdictions considering or planning for lung cancer screening programs.¹⁸⁸

Colorectal Cancer

What are we measuring and why?

This section presents age-standardized incidence rates, including rates by stage, age-standardized mortality rates and five-year relative survival for colorectal cancer. Incidence and mortality rates were standardized to the 2011 Canadian population. These indicators are examined over time and by province.

- Colorectal cancer is the third most commonly diagnosed cancer in Canada and the second leading cause of cancer death.⁵⁰

What are the results?

AGE-STANDARDIZED INCIDENCE RATES (ASIR)

- The ASIR for colorectal cancer in Canada has remained relatively stable for men since 1992, hovering at approximately 80 cases per 100,000 males. The ASIR for women decreased significantly, from 58.3 cases per 100,000 females in 1992 to 52.5 cases per 100,000 females in 2010 (annual percent change [APC]=−0.4%; overall relative change=−9.9%) (Figure 8.13).

- In all provinces, the ASIR for men was higher than for women. Among men, colorectal cancer incidence rates ranged from 69.8 cases per 100,000 males in British Columbia to 105.1 cases per 100,000 males in Newfoundland and Labrador, a relative difference of 50.6%. Incidence rates for women ranged from 48.2 cases per 100,000 females in British Columbia and Alberta to 69.0 cases per 100,000 females in Newfoundland and Labrador, a relative difference of 43.1% (Figure 8.14).

STAGE-SPECIFIC INCIDENCE

- Colorectal cancer was commonly diagnosed at Stage III; there were modest differences in stage-specific incidence in some provinces for 2010-2012 combined (diagnosis years) (Figure 8.15).
- The incidence of Stage I colorectal cancer ranged from 10.5 cases per 100,000 people in British Columbia to 22.9 cases per 100,000 people in Newfoundland and Labrador, a 118.1% relative difference (Figure 8.15).

- The incidence of Stage III colorectal cancer ranged from 14.5 cases per 100,000 people in New Brunswick to 35.0 cases per 100,000 people in Newfoundland and Labrador, a 141.4% relative difference (Figure 8.15).
- The incidence of Stage IV colorectal cancer ranged from 12.8 cases per 100,000 people in New Brunswick to 22.5 cases per 100,000 people in Newfoundland and Labrador, a 75.8% relative difference (Figure 8.15).

AGE-STANDARDIZED MORTALITY RATES (ASMR)

- The ASMR for colorectal cancer decreased significantly for both men and women between 1992 and 2011. The ASMR for men declined from 43.1 deaths per 100,000 males in 1992 to 31.6 deaths per 100,000 males in 2011 (APC=-1.6%). 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%). The overall relative reduction from 1992 to 2011 was -26.7% for men and -25.5% for women (Figure 8.13).
- For 2009 to 2011 combined, 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 (Figure 8.16).

FIVE-YEAR RELATIVE SURVIVAL RATIOS (5-RSR)

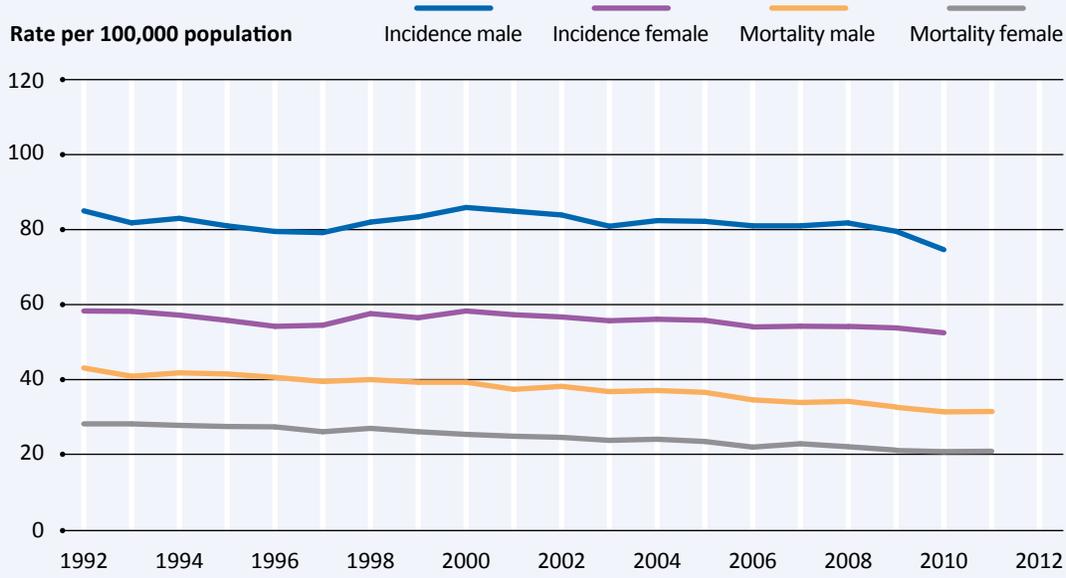
- For 2006 to 2008 combined, the five-year relative survival ratio for colorectal cancer ranged from 61% in Manitoba, Nova Scotia, Prince Edward Island and Saskatchewan to 67% in Ontario (Figure 8.17).
- Canada's 5-RSR increased by nine percentage points from 56% in 1992-1994 to 65% in 2006-2008 (Figure 8.18).

Data and measurement considerations

- The proportion of colorectal cancer cases with *stage unknown* was particularly high in British Columbia due to a lack of available documentation for patients not referred to the BC Cancer Agency (Table 8.1). This can make it more difficult to compare stage-specific incidence rates by province. *Stage unknown* is assigned to a case when the pathological and/or clinical diagnosis is not complete or when the information available in patient charts is not sufficient to assign a stage.
- More up-to-date survival data were not available due to delays in the process of completing death clearance. This process of identifying deaths from cancer involves linking patient data from the Canadian Cancer Registry to death certificate records. The number of cancer deaths is needed to enable survival analysis. Death clearance is conducted by Statistics Canada; it was last completed for 2008 data.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 8.13

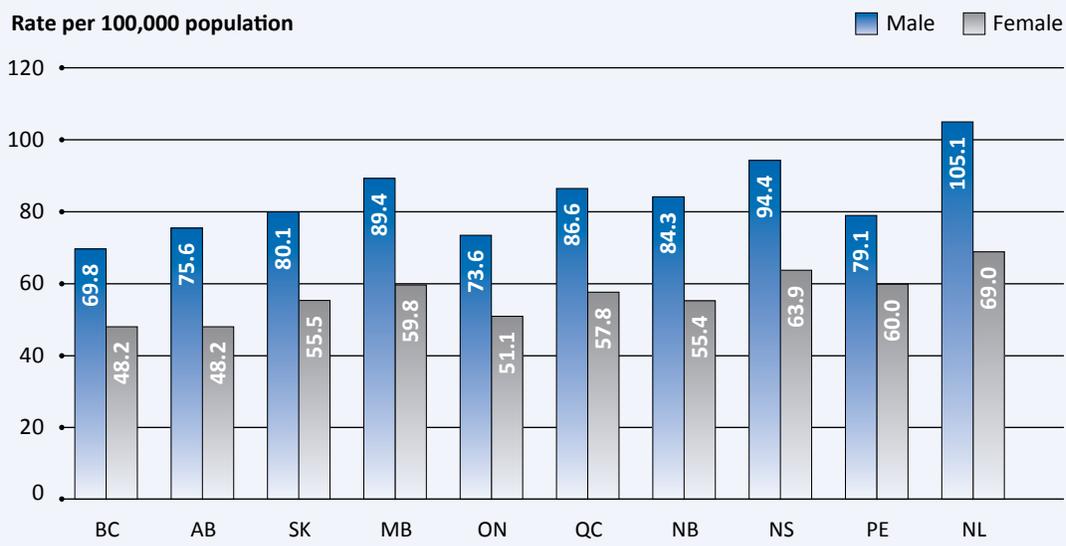
Incidence and mortality rates for colorectal cancer, by sex, Canada, age-standardized to the 2011 population – from 1992 to 2011



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

FIGURE 8.14

Incidence rates for colorectal cancer, by sex, by province, age-standardized to the 2011 population – 2008-2010 combined



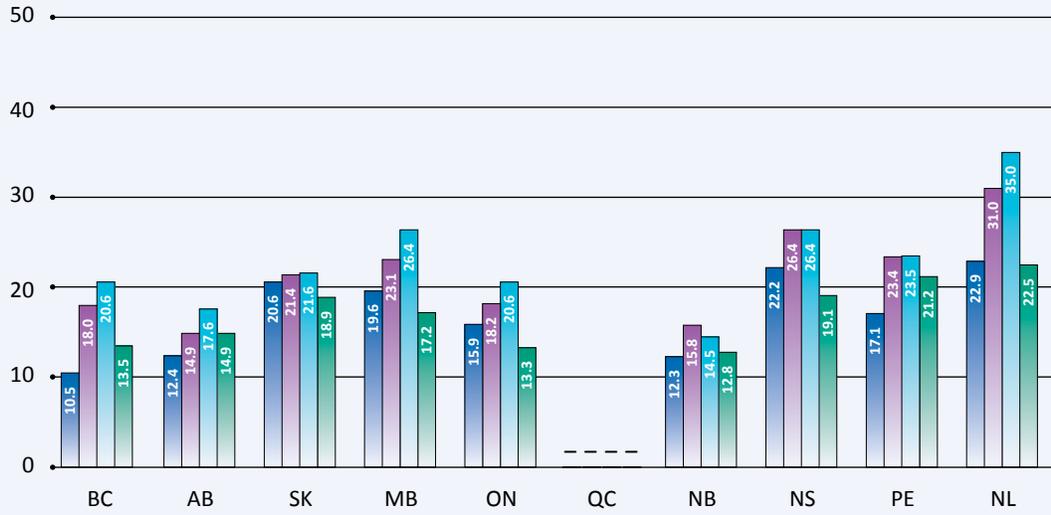
Data source: Statistics Canada, Canadian Cancer Registry.

FIGURE 8.15

Incidence rates for colorectal cancer,[†] by stage at diagnosis, by province, age-standardized to the 2011 population – 2010-2012 diagnosis years combined

Rate per 100,000 population

Stage: I II III IV



“-” Data not available.
 † Appendix (C18.1) was excluded.
 Data source: Provincial cancer agencies.

FIGURE 8.16

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

Rate per 100,000 population

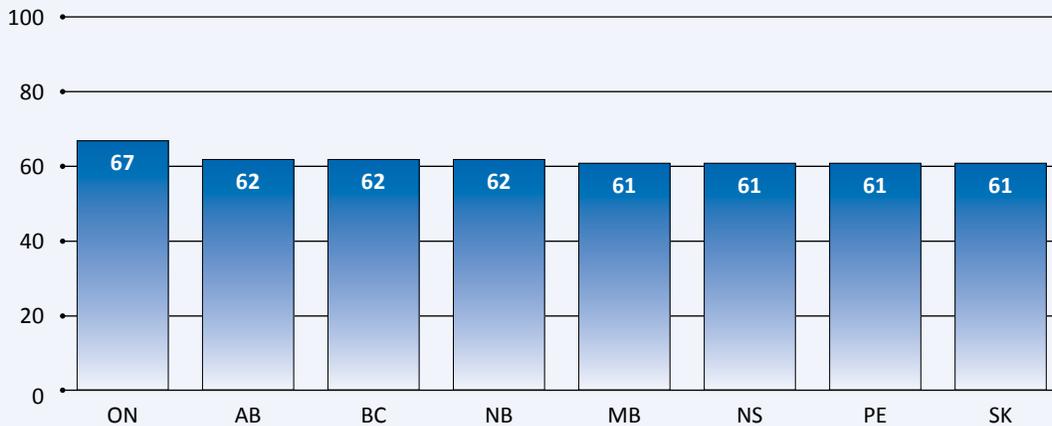


Data source: Statistics Canada, Vital Statistics Death Database.

FIGURE 8.17

Five-year relative survival ratios for colorectal cancer, by province, age-standardized[†] – 2006-2008 combined

Relative survival (%)



[†] Age-standardized to population diagnosed with colorectal cancer in Canada between 1992 and 2001.

Data based on 15 to 99 years of age at diagnosis.

QC: Data excluded due to different methodology for determining date of diagnosis.

NL: Survival ratios not shown due to incomplete death clearance data, which may result in inflated survival ratios.

Data source: Canadian Cancer Society, Canadian Cancer Statistics.

FIGURE 8.18

Five-year relative survival ratios for colorectal cancer, Canada,[†] age-standardized^{††} – 1992-1994 combined vs. 2006-2008 combined

Relative survival (%)



[†] Canada data excluded QC due to difference in methodology for determining date of diagnosis.

^{††} Age-standardized to population diagnosed with colorectal cancer in Canada between 1992 and 2001.

Data based on 15 to 99 years of age at diagnosis.

Data source: Canadian Cancer Society, Canadian Cancer Statistics.

What do the results mean?

INCIDENCE

- Because colorectal cancer screening is still in the early stages and screening programs are in varying phases of implementation (the earliest Canadian programs were announced in 2007), it is not yet possible to assess the impact of screening on reductions in incidence and mortality.
- Reductions in colorectal cancer incidence rates are expected as organized screening programs become better established in Canada, though these reductions will likely be smaller than the expected reduction in colorectal cancer mortality. Reduced incidence has already occurred in some European countries and in the United States.^{177, 189}
- Given the recent implementation of population screening for colorectal cancer, the differences among the nine reporting provinces in stage-specific incidence patterns represent more of a baseline measure (i.e., a starting point for comparisons).
- Colorectal cancer incidence rates should continue to be monitored over time, in order to evaluate the impact of screening. It is expected that the distribution of colorectal stage-specific incidence rates will change over time, as screening and early detection results in a reduction in late-stage cancers.
- There is generally a west-east gradient in colorectal cancer incidence, with lower incidence in the western provinces relative to eastern provinces. The eastern provinces also have the greatest difference in ASIR between men and women, with the exception of Prince Edward Island (as seen in Figure 8.14). A similar west-east gradient exists for colorectal cancer mortality, with higher mortality in the eastern provinces relative to the rest of Canada. These gradients may reflect differences in provincial risk factor prevalence, investigations and screening for colorectal cancer.¹⁹⁰

- In the United Kingdom, colorectal cancer incidence rates increased after the introduction of national screening programs in 2006, likely because prevalent cases that would not have manifested clinically until later were detected earlier; however these rates declined again after 2011. It is expected that incidence rates in the UK will decline to pre-screening rates (as is expected in Canada), since most undiagnosed cases of colorectal cancer in the target age group will have been detected.¹⁷⁹ While colorectal cancer incidence rates also declined in the United States,¹⁷⁷ in Australia they have been increasing for men while remaining stable for women.¹⁹¹

MORTALITY

- The observed decreases in mortality from colorectal cancer could be due to improved treatment and also—to a lesser degree—to increased awareness and early detection.¹⁸⁰
- Further declines in mortality are expected with the implementation and roll-out of colorectal cancer screening programs across Canada.
- Colorectal cancer mortality rates have also declined for both men and women in the United States, the United Kingdom and Australia.^{177,179,191}

FIVE-YEAR RELATIVE SURVIVAL RATES (5-RSR)

- The improved survival among Canadians diagnosed with colorectal cancer has also been observed in the United States, Australia and the United Kingdom. In the US, the five-year relative survival increased between 1995 and 2001 and has since stabilized at around 65%.¹⁸⁰ In Australia, five-year relative survival reached 66.2% in 2006-2010,¹⁹¹ while in the UK (England and Wales), it increased from 41.6% in the early 1990s to 58.7% in 2010-2011.¹⁷⁹
- Data from the CONCORD-2 study also reflects this improved five-year net survival, though the data are broken down into colon cancer and rectal cancer. The Canadian survival rates

for colon and rectal cancers were similar to the results presented in this report: 62.8% (for each) in 2005-2009. Colon cancer survival was 64.7% in the United States, 64.2% in Australia and 53.8% in the United Kingdom. Rectal cancer survival was 64.0%, 64.2% and 56.6%, respectively.¹⁸¹

- Findings from the International Cancer Benchmarking Project (ICBP) suggest that

international differences in colorectal cancer survival could be the result of differences in stage distribution (i.e., due differences in diagnostic delay, awareness of symptoms or staging procedures). Differences in stage-specific survival also existed in the ICBP, which suggests survival rates may be affected by access to and quality of treatment.¹⁹²

Prostate Cancer

What are we measuring and why?

This section presents age-standardized incidence rates, including rates by stage, and age-standardized mortality rates for prostate cancer. Incidence and mortality rates were standardized to the 2011 Canadian population. The findings are examined over time and by province. Five-year relative survival data were not available for prostate cancer and thus are not included in this report.

- Prostate cancer is the most common cancer affecting Canadian men and the third leading cause of cancer death in this population.⁵⁰

What are the results?

AGE-STANDARDIZED INCIDENCE RATES (ASIR)

- There was a slight, non-significant decrease in the ASIR for prostate cancer in Canadian men, from 166.9 cases per 100,000 males in 1992 to 142.2 cases per 100,000 males in 2010 (annual percent change [APC]=-0.4%; overall relative change=-14.8%) (Figure 8.19).
- The incidence of prostate cancer peaked sharply in 1993 (186.0 cases per 100,000 males) and again in 2001 (177.3 cases per 100,000 males) (Figure 8.19).

- For 2008 to 2010 combined, the relative difference in ASIR between the lowest and highest provincial rate was 56.8%. The ASIR ranged from 123.7 cases per 100,000 males in Quebec to 194.0 cases per 100,000 males in New Brunswick (Figure 8.20).

STAGE-SPECIFIC INCIDENCE

- For 2010 to 2012 combined (diagnosis years), Stage II prostate cancers had the highest ASIRs in all provinces, with the exception of Prince Edward Island where the Stage I ASIR was highest (Figure 8.21).
- The incidence of Stage I prostate cancer ranged from 16.7 cases per 100,000 males in British Columbia to 103.3 cases per 100,000 males in Prince Edward Island, 518.6% relative difference (Figure 8.21).
- The incidence of Stage II prostate cancer ranged from 75.2 cases per 100,000 males in New Brunswick to 105.7 cases per 100,000 males in Newfoundland and Labrador, a 40.6% relative difference (Figure 8.21).
- The incidence of Stage IV prostate cancer ranged from 8.5 cases per 100,000 males in New Brunswick to 25.4 cases per 100,000 males in Saskatchewan, a 198.8% relative difference (Figure 8.21).

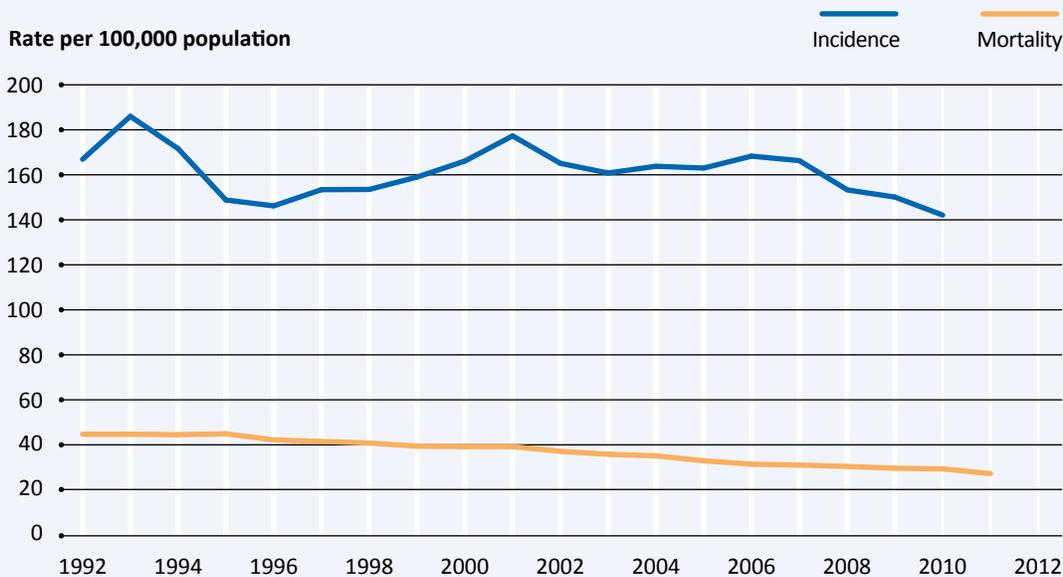
AGE-STANDARDIZED MORTALITY RATES (ASMR)

- The 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 8.19).
- For 2009 to 2011 combined, the ASMR ranged from 26.0 deaths per 100,000 males in Quebec to 36.6 deaths per 100,000 males in Saskatchewan, a 40.8% relative difference (Figure 8.22).

Data and measurement considerations

- The proportion of cases with *stage unknown* was particularly high in British Columbia due to a lack of available documentation that provides PSA and Gleason Score information for patients not referred to the BC Cancer Agency (Table 8.1). This can make it more difficult to compare stage-specific incidence rates by province. *Stage unknown* is assigned to a case when the pathological and/or clinical diagnosis is not complete or when the information available in patient charts is not sufficient to assign a stage.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 8.19

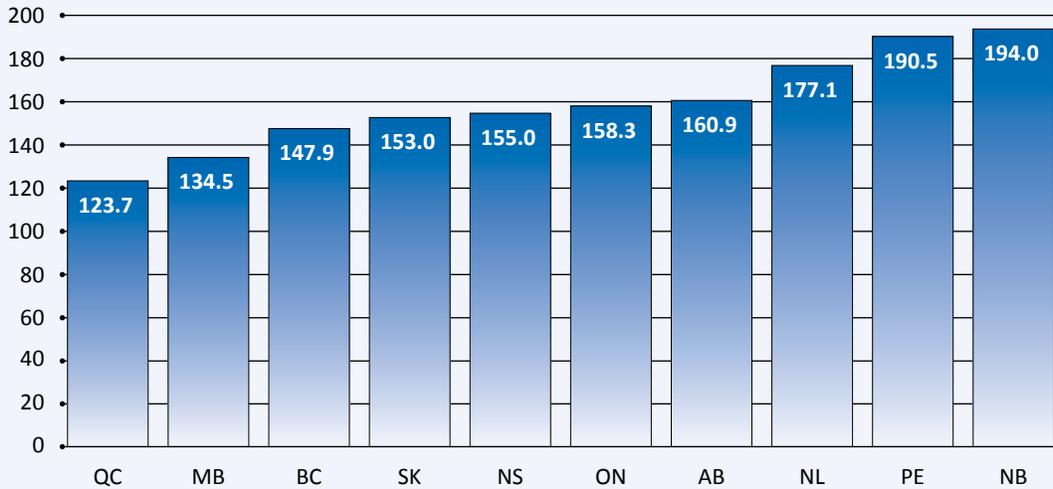
Incidence and mortality rates for prostate cancer, Canada, age-standardized to the 2011 population – from 1992 to 2011

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

FIGURE 8.20

Incidence rates for prostate cancer, by province, age-standardized to the 2011 population – 2008-2010 combined

Rate per 100,000 population



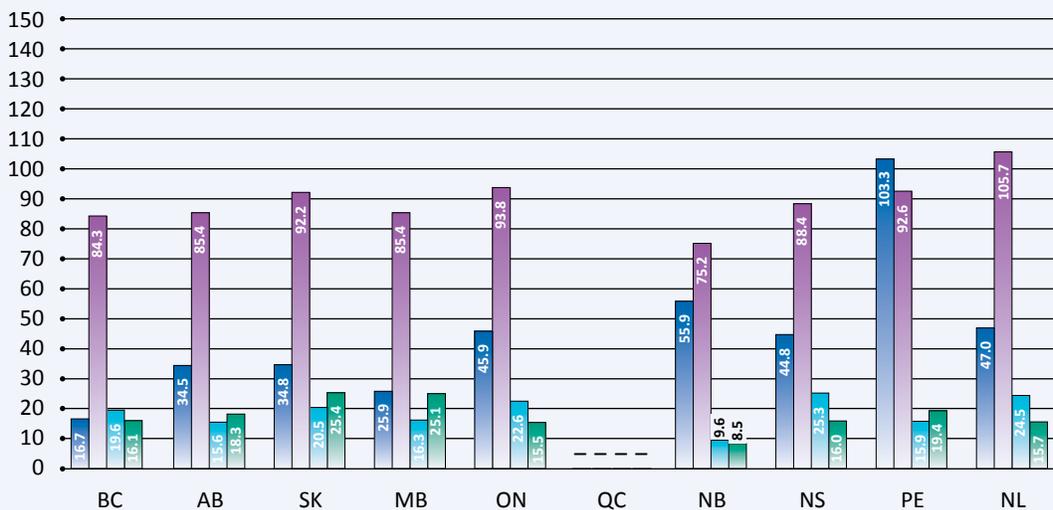
Data source: Statistics Canada, Canadian Cancer Registry.

FIGURE 8.21

Incidence rates for prostate cancer, by stage at diagnosis, by province, age-standardized to the 2011 population – 2010-2012 diagnosis years combined

Rate per 100,000 population

Stage: I (blue), II (purple), III (teal), IV (green)

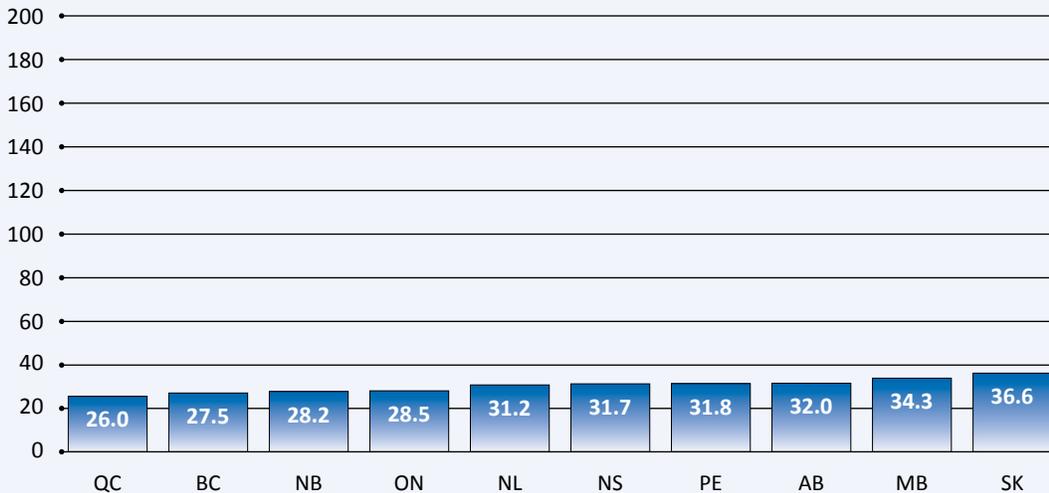


“-” Data not available.
Data source: Provincial cancer agencies.

FIGURE 8.22

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

Rate per 100,000 population



Data source: Statistics Canada, Vital Statistics Death Database.

What do the results mean?

INCIDENCE

- Incidence rates for prostate cancer appear to be decreasing in Canada after rising dramatically in the late 1980s and early 1990s, a pattern also seen in the United States and Australia. However, rates are increasing in the United Kingdom and other parts of Europe. This is likely due to differences in prostate-specific antigen (PSA) testing practices and the more gradual adoption of PSA testing in the UK and Europe.^{193, 194}
- In Canada, the incidence of prostate cancer spiked in 1993 and again in 2001. The 1993 peak was likely due to the introduction of PSA testing, which became widely used in the early 1990s and increased the detection of prostate cancer; the 2001 peak might have been due to increased awareness and PSA testing activity.¹⁹⁴⁻¹⁹⁶ The introduction of extended biopsy practice (increasing the number of cores sampled per biopsy from 6-8 to 10 or more), which took place around the year 2000, may have also contributed to the second peak in the detection of prostate cancer.¹⁹⁷
- Similar peaks in incidence were seen internationally. Those in the United States (in both the early 1990s and early 2000s) and in Australia (in the early 1990s only) were higher than peaks that occurred in Canada; however, European countries did not reach the incidence levels Canada did at these points in time.^{198, 199}
- No organized screening programs for prostate cancer exist in Canada due to lack of evidence on the effectiveness of population-based PSA testing. Provinces vary in their funding of and recommendations for PSA testing.²⁰⁰ Differences in PSA testing practices may impact provincial incidence rates (both overall and by stage).

This is because such testing has clearly been shown to increase the detection of early-stage or low-risk prostate cancers that would not impact a man's health if left untreated.^{201, 202}

This testing also results in a reduction of late-stage cancers which is reflected in lower ASIRs for Stage III and IV disease relative to earlier stages, as reported here.

- The wide range of Stage I incidence rates across provinces, from 16.7 to 103.3 cases per 100,000 people, will be interesting to observe over time to determine whether this diversity is a continuing pattern or the result of data quality (i.e., small numbers and wide confidence intervals in some provinces).

MORTALITY

- Overall, mortality rates from prostate cancer have been decreasing in many western jurisdictions, including North America, Oceania, Western Europe and parts of northern Europe.²⁰³ This aligns with the pattern observed in Canada between 1992 and 2011.

What else do we know?

- Data from an upcoming report by the Canadian Partnership Against Cancer, *Prostate Cancer Control in Canada: A System Performance Spotlight Report*, show that while prostate cancer incidence was highest in Canadian men aged 65-79 years, mortality rates were significantly higher in Canadian men aged 80 years and older than in any other age group. Across all age groups, prostate cancer had a low fatality rate, which was particularly evident in younger patients. These findings are consistent with patterns seen in the literature and internationally.
- Incidence rates are influenced by prostate-specific antigen (PSA) testing, which can result in the overdiagnosis of latent or early-stage prostate cancers that would not impact health. Randomized controlled trials have estimated that approximately 60% of PSA-detected prostate cancers are overdiagnosed.^{8,205} Data from the Surveillance Epidemiology and End Results (SEER) program in the US estimates that over-diagnosis of prostate cancer ranges from 23% to 42%.²⁰⁶

⁸ Overdiagnosis refers to the detection of a cancer that was not destined to present clinically in that individual in his or her lifetime.²⁰⁴

Pancreatic Cancer

What are we measuring and why?

This section presents age-standardized incidence rates, age-standardized mortality rates and five-year relative survival for pancreatic cancer. Incidence and mortality rates were standardized to the 2011 Canadian population. These indicators are examined over time and by province. Stage-specific incidence data were not available for pancreatic cancer and are not included in this report.

- Pancreatic cancer is the tenth most common cancer and the fourth leading cause of cancer death in Canada (behind lung, colorectal and breast cancer) due to its low survival rate.⁵⁰

What are the results?

AGE-STANDARDIZED INCIDENCE RATES (ASIR)

- The ASIR for pancreatic cancer decreased significantly among men, from 15.1 cases per 100,000 males in 1992 to 12.5 cases per 100,000 males in 2010 (annual percent change [APC]=-0.5%; overall percent change=-17.2%). The ASIR for women remained relatively stable over the same time period (APC=-0.2; overall relative change=-10.5%) (Figure 8.23).
- For 2008 to 2010 combined, the relative difference in ASIR between the lowest and highest provincial incidence rate for pancreatic cancer was 78.3%. The ASIR ranged from 8.3

cases per 100,000 people in Newfoundland and Labrador to 14.8 cases per 100,000 people in Prince Edward Island (Figure 8.24).

AGE-STANDARDIZED MORTALITY RATES (ASMR)

- The ASMR for pancreatic cancer decreased significantly for both males and females. The ASMR for men decreased from 15.3 deaths per 100,000 males in 1992 to 13.5 deaths per 100,000 males in 2011 (APC=-0.6%; overall relative change=-11.8%). 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 8.23).
- For 2009 to 2011 combined, the ASMR 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 (Figure 8.25).

FIVE-YEAR RELATIVE SURVIVAL RATIOS (5-RSR)

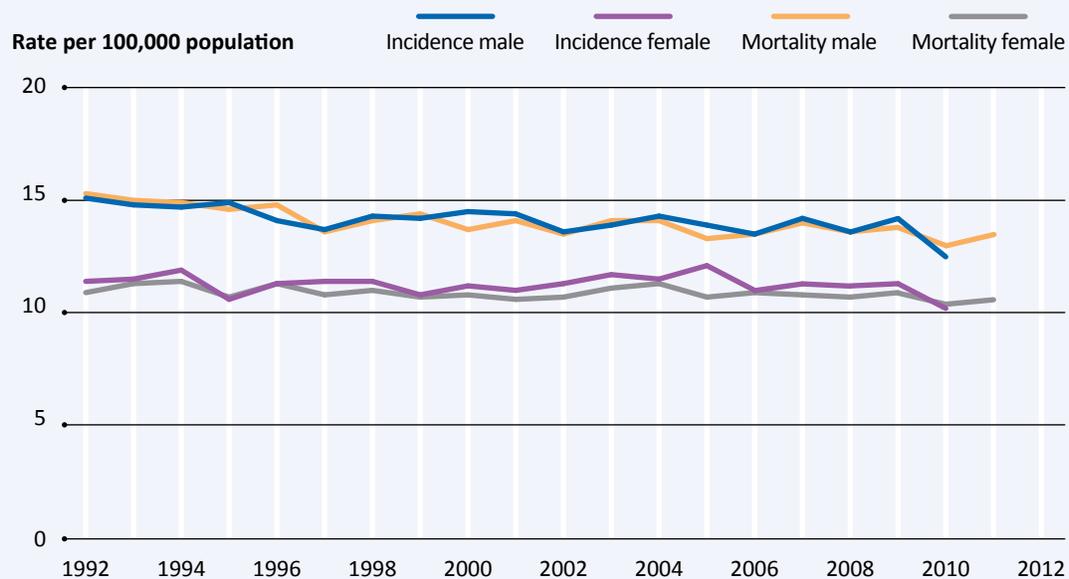
- For 2005 to 2007 combined, the five-year relative survival ratios for pancreatic cancer ranged from 4.7% in Nova Scotia to 10.9% in Ontario (Figure 8.26).
- Canada's 5-RSR increased by three percentage points, from 5% in 1992-1994 to 8% in 2006-2008 (Figure 8.27).

Data and measurement considerations

- Age-standardized 5-RSRs were not available for all provinces because sparse data in some age groups would have resulted in unstable age-standardized rates.
- More up-to-date survival data were not available due to delays in the process of completing death clearance. This process of identifying deaths from cancer involves linking patient data from the Canadian Cancer Registry to death certificate records. The number of cancer deaths is needed to enable survival analysis. Death clearance is conducted by Statistics Canada; it was last completed for 2008 data.
- Data tables for this indicator (including confidence intervals), along with detailed calculation methodology contained in the full Technical Appendix, are available at systemperformance.ca.

FIGURE 8.23

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



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

FIGURE 8.24

Incidence rates for pancreatic cancer, by province, age-standardized to the 2011 population – 2008-2010 combined

Rate per 100,000 population

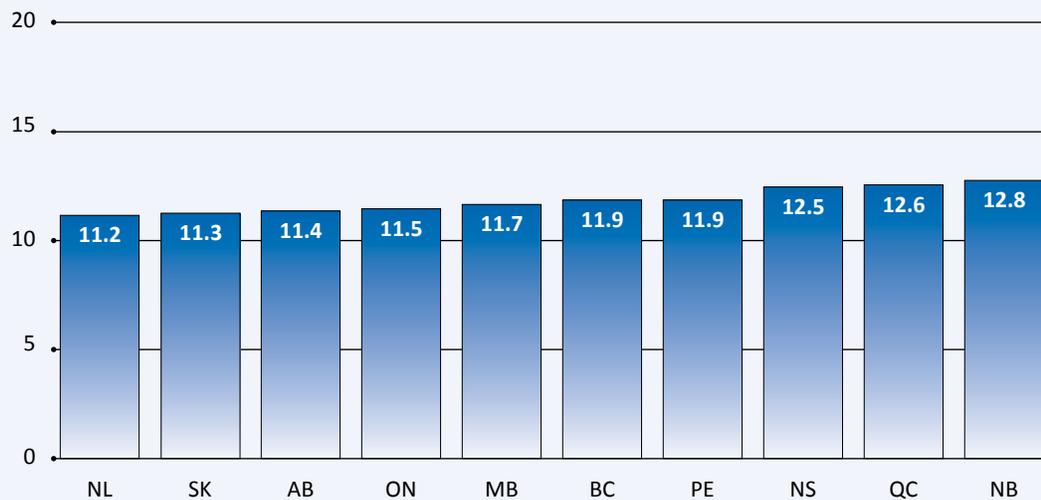


Data source: Statistics Canada, Canadian Cancer Registry.

FIGURE 8.25

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

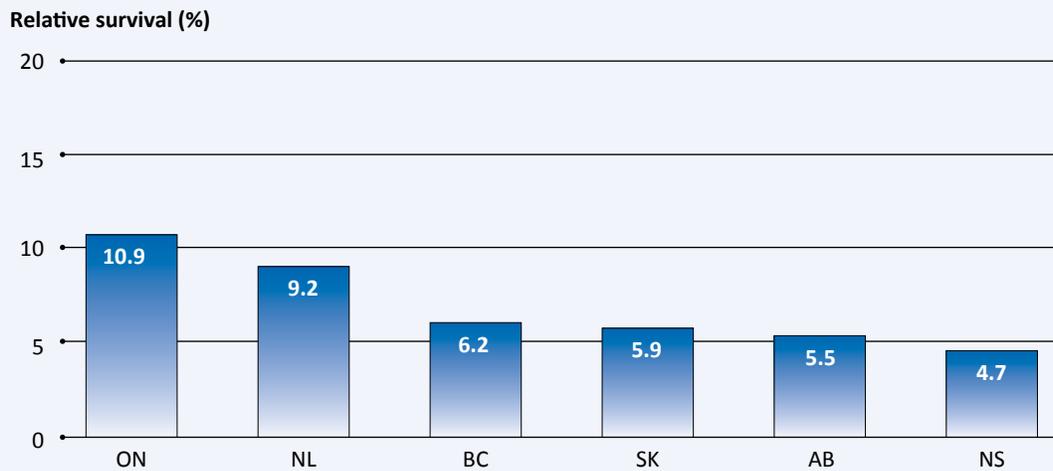
Rate per 100,000 population



Data source: Statistics Canada, Vital Statistics Death Database.

FIGURE 8.26

Five-year relative survival ratios for pancreatic cancer, by province, age-standardized[†] – 2005-2007 combined



† Age-standardized to population diagnosed with pancreatic cancer in Canada between 2001 and 2005.

Data based on 15 to 74 years of age at diagnosis.

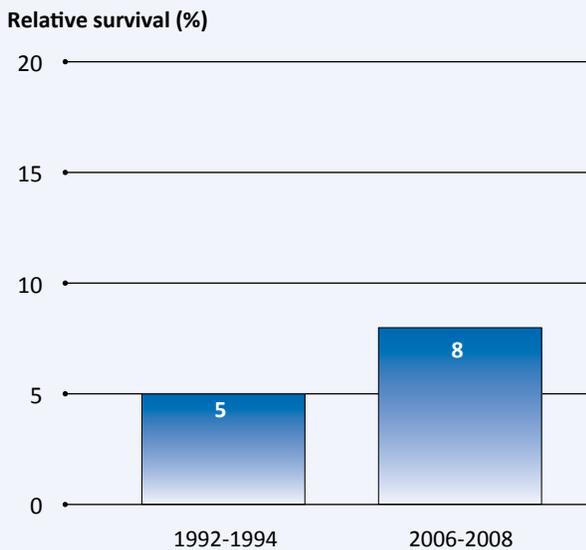
QC: Data excluded due to different methodology for determining date of diagnosis.

MB, NB, PE: Sparse data in some age groups, therefore, results not shown due to unstable estimate.

Data source: Statistics Canada, Canadian Cancer Registry.

FIGURE 8.27

Five-year relative survival ratios for pancreatic cancer, Canada,[†] age-standardized^{††} – 1992-1994 combined vs. 2006-2008 combined



† Canada data excluded QC due to difference in methodology for determining date of diagnosis.

†† Age-standardized to population diagnosed with pancreatic cancer in Canada between 1992 and 2001.

Data based on 15 to 99 years of age at diagnosis.

Data source: Canadian Cancer Society, Canadian Cancer Statistics.

What do the results mean?

INCIDENCE AND MORTALITY

- Pancreatic cancer is difficult to detect at an early stage. Patients who are typically diagnosed at a later stage are unlikely to survive, even with treatment. As a result, pancreatic cancer mortality rates closely mirror incidence rates.⁵⁰ For this reason pancreatic cancer is extremely challenging from a cancer control perspective.²⁰⁷
- Smoking and obesity are two known modifiable risk factors for pancreatic cancer.²⁰⁷ The more recent peak of smoking prevalence in women (compared to men) may explain why a decrease in pancreatic cancer incidence has occurred for men but not yet for women. However, obesity has been increasing in Canada over the same timeframe and could be offsetting some of the benefits of reduced tobacco use.
- Making sense of interprovincial variations in incidence and mortality rates is difficult in pancreatic cancer. However, differences between provincial risk profiles (e.g., rates of tobacco use) may explain some of the variations that have been observed.
- Unlike the patterns seen in Canada, incidence rates of pancreatic cancer increased in the United Kingdom between 2000 and 2011 (following an earlier decrease in the 1990s)

and in the United States between 2001 and 2008.^{179,180} In the UK, incidence rates increased by a greater degree in women (11%) than in men (4%). In Australia, pancreatic cancer incidence rates have remained relatively stable since 1982.²⁰⁸

- When it comes to mortality rates from pancreatic cancer, these have declined in Canada and also in the UK (since the early 1970s).¹⁷⁹ By contrast, mortality in the US dropped between 1975 and 2002 before increasing between 2002 and 2008.¹⁸⁰ As with incidence, the mortality rate for pancreatic cancer in Australia has remained relatively stable.²⁰⁸

FIVE-YEAR RELATIVE SURVIVAL RATIOS (5-RSR)

- While increases in five-year relative survival from pancreatic cancer have been observed, outcomes remain poor.
- Pancreatic cancer five-year relative survival is also low in Australia and the United Kingdom. In Australia, the five-year relative survival increased from 3.0% (1982-1987) to 5.2% (2006-2010).²⁰⁸ In the United States, 5-RSRs increased from 3.0% in 1975 to 7.3% in 2006.²⁰⁹ Survival rates in the UK have remained relatively stable at around 3% since the 1970s.¹⁷⁹

TABLE 8.1

Percentage of cases for which stage is unknown,[†] by disease site and province – from 2010 to 2012

Disease Site	Year	Province									
		BC	AB	SK	MB	ON	QC	NB	NS	PE	NL
Breast	2010	5.3	1.6	1.6	1.7	0.5	–	0.9	2.9	*	1.4
	2011	3.6	1.6	1.5	1.3	0.8	–	1.6	2.9	*	1.5
	2012	2.9	1.1	1.7	1.1	0.9	–	0.8	2.0	1.1	*
Colorectal	2010	13.2	4.1	2.8	3.2	1.2	–	3.6	3.4	*	5.8
	2011	13.9	3.4	2.9	4.3	2.3	–	4.6	3.9	*	3.6
	2012	15.0	4.4	3.1	2.3	2.3	–	3.7	2.9	3.3	1.6
Lung	2010	7.7	1.3	1.6	1.1	0.6	–	1.0	2.0	*	4.7
	2011	9.1	1.5	*	1.9	0.8	–	2.1	1.4	*	3.5
	2012	6.7	1.6	1.3	2.1	1.0	–	0.7	1.6	2.1	*
Prostate	2010	32.9	5.4	4.1	5.1	0.5	–	0.9	6.2	*	2.3
	2011	19.7	3.2	2.5	5.8	0.9	–	2.3	4.3	*	3.7
	2012	18.5	3.5	2.9	5.2	1.8	–	*	3.5	1.7	*

[†] Data entered in the Collaborative Stage (CS) algorithm were not sufficient to ascertain a stage.

* Suppressed due to small numbers.

“–” Data not available.

ON: Denominator includes ‘Not Applicable’ cases.

PE: Due to small numbers, percentages for 2012 represent 2010 to 2012 combined.

Colorectal cancer exclude Appendix C18.1.

Data source: Provincial cancer agencies.

Looking Ahead

A person who is diagnosed with cancer today has a better chance of surviving than if he or she had been diagnosed just 15 years ago. In Canada, between 1992–1994 and 2006–2008, survival rates increased from 56% to 63% for all cancers combined.⁵⁰ New advances in diagnosis and treatment have led to improved outcomes—from earlier and more accurate diagnosis and staging of cancers, to more effective treatment options that are aimed at cure or remission. Even so, cancer continues to be the leading cause of death in Canada, responsible for nearly 30% of all deaths, followed by cardiovascular diseases and chronic lower respiratory diseases.¹²⁵

The advances in cancer control enjoyed by

Canadians have been achieved through the sustained efforts and collaborations of national, provincial and territorial partners. The Canadian Partnership Against Cancer (the Partnership) will continue to play its unique role: working with the cancer community and partners towards 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 the 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 the provincial cancer agencies and programs and national partners, will work towards producing the following products and engaging in several key activities in the next two years:

- We will continue disseminating the information contained in the recently released system performance spotlight report entitled *Cancer Stage in Performance Measurement: A First Look*. The report, released in February 2015, was the first of its kind, presenting provincial population-level data on cancer staging. Such stage data allows to evaluate cancer control activities such as screening and early detection, and to identify patterns of care in diagnosis and treatment. The report includes incidence rates by stage for the four most common cancers, and prevalence rates for three key prognostic factors: incidence of breast cancer cases that were triple-negative, a breakdown of prostate cancer cases by risk category, and the percentage of rectal cancer cases with a positive circumferential resection margin. The report is available for downloading at systemperformance.ca.
- Later this year, new data on relative survival-by-stage for lung and colorectal cancer across Canada will be made available. This represents the first-ever provincial population-level data on the relationship between the stage at which cancers are first diagnosed and patient outcomes.

- In Fall 2015, a spotlight report on prostate cancer will be released presenting indicators across the continuum of care—from prevention to survivorship and end-of-life care. Quantitative findings will be enriched with qualitative information from prostate cancer patients and survivors across Canada who have shared their experiences in navigating the health care system. Their personal experiences and perspectives will support decision-makers in understanding what the prostate cancer journey looks like from the patient’s point of view.
- Early in 2016, a spotlight report on the “appropriateness” of cancer interventions will follow, featuring baseline indicator results for a number of the *Choosing Wisely Canada* oncology interventions. This effort aims to engage physicians in conversations about tests and treatments with questionable value or outcomes, with the ultimate goal of helping clinicians and patients make informed choices that lead to better outcomes.
- A two-year, in-depth study to examine the experiences of cancer patients in transition launched in early 2015 and will continue through 2017. The study will report findings from a national patient survey aimed at understanding the experiences of cancer patients as they transition from the end of curative cancer treatment such as chemotherapy, radiation treatment and surgery, to follow-up care and support services such as primary care and community care. The survey will be followed by a series of consultations with system leaders and health care providers; they will help with the interpretation of survey results and the development of recommendations on how the system can better respond to post-treatment needs of patients in a more integrated manner.
- The system performance web application, launched in June 2014, was aimed at providing broad access to the latest available data and analysis measuring the quality of cancer control across Canada. It will continue to be

enhanced in terms of content and functionality. Phase 1 provided users with the ability to browse performance indicators by cancer control domain. Phase 2 (launched in February 2015) allowed users to search for performance indicators organized by the four most common disease sites (breast, lung, colorectal and prostate). Phase 3, expected to launch in 2016, will introduce other functionalities such the ability to call up provincial and territorial views of the data. Other features currently available include the ability download graphs and data directly from the app for the user’s own analysis. The web application can be accessed at systemperformance.ca.

- Finally, the Partnership’s System Performance Initiative recently conducted an “impact” evaluation study of its body of work to date. While evaluations have been conducted every year, these have focused mainly on our users’ satisfaction with specific system performance reports. The current effort aims to identify what impact system performance knowledge has had on advancing cancer control across the country. More specifically, the evaluation is looking to:
 - understand who has been reached or should be reached;
 - understand how system performance information has been used to inform quality improvements within specific jurisdictions;
 - understand the enablers of and barriers to better uptake and use of the information; and
 - identify knowledge translation strategies and mechanisms that would improve the reach and use of the information by different audiences.

Findings from the impact evaluation study will inform a knowledge translation and exchange (KTE) plan for more focused efforts towards the dissemination, reach and uptake of system performance knowledge across the country. The KTE plan will begin implementation in Fall 2015.

Future reports on the performance of the Canadian cancer control system, together with the ability to access the information online and other written publications and KTE tools, will continue to give health system decision-makers, practitioners and researchers detailed system performance knowledge that can be used to inform advances in cancer control across the country. However, reporting on system performance is not an end in itself. Rather it is a key mechanism for stimulating action. It

embodies a collaborative effort and coordinated approach from multiple national, provincial and territorial partners in helping promote a “continuous improvement” feedback loop through meaningful interprovincial system performance comparisons. These not only shed light on areas where further attention and action are needed, but they also point to potential best practices that can be implemented more broadly to advance the quality and effectiveness of cancer control efforts across the country.

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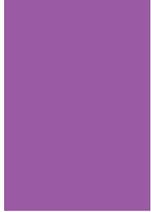
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