CANADIAN PARTNERSHIP AGAINST CANCER
PARTENARIAT CANADIEN CONTRE LE CANCER

SYSTEM PERFORMANCE REPORTS

The 2012 Cancer System Performance Report

DECEMBER 2012

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Executive Summary

This 2012 Report is the fourth annual system performance report on the Canadian cancer control system produced by the Canadian Partnership Against Cancer (the Partnership) in collaboration with its provincial and national partners. The Partnership's System Performance initiative produces a range of reports, including annual system performance reports, special focus reports, and technical reports on special studies.

The annual reports present performance indicators that span the cancer control continuum dimensions, cancer sites, and the Canadian population. The 2012 Report introduces a few new indicators including hepatitis B incidence, mastectomy rates for breast cancer, cancer research investment, and a number of new disease sites in the long-term outcomes section (including pancreas, non-Hodgkin lymphoma, thyroid, liver, melanoma and head and neck). Also new this year are the results of a special study involving a retrospective chart review explaining non-adherence to treatment guidelines for lung cancer and rectal cancer.

The indicators presented in this report are the result of a collaborative effort with a number of partners at the national and provincial/territorial levels. Consultations with a broad range of experts and knowledge leaders from across the cancer control landscape also informed the work. Provincial cancer agencies and programs provided detailed data to assist with the calculation of many indicators in this report. At the national level, the Partnership works closely with Statistics Canada, the Canadian Institute for Health Information (CIHI), the Canadian Breast Cancer Screening Initiative (CBCSI), and the C[17] council of Canadian pediatric oncology programs, to produce various indicators.

As in prior years, results are compared (where meaningful) by province and territory, patient/population age group and sex. Explanatory analysis, including results by geography and socio-economic status, will now be provided in the special focus reports. As before, this year's report is organized along the dimensions of the cancer control continuum: *Prevention, Screening, Diagnosis, Treatment, Patient Experience and End-of-Life Care, Research, and Long-Term Outcomes*.

Results highlights

In **Prevention**, analysis of smoking prevalence has shown that 20% of Canadians aged ≥ 12 years reported smoking in the previous year. The lowest percentage was 15.8%, in British Columbia. Eighteen percent of recent smokers aged ≥ 12 years reported quitting in the past two years. The highest quit rate was 26.7%, in Newfoundland and Labrador. Second-hand smoke exposure in public places was reported to be 12.6% among Canadians aged ≥ 12 years. Vehicle and home exposures were lower at 5.5% and 6.7%, respectively. Vehicle and home exposures were lowest in British Columbia at 2.4% and 4.6%, respectively, while exposure in public places was lowest in Yukon at 4.6%.

In 2011, 19.7% of Canadians aged ≥ 18 years were abstaining from alcohol consumption in the previous year. The highest percentages were 23.5% in Nunavut and 22.9% in New Brunswick. Meanwhile, 11% of adults in Newfoundland and Labrador reported exceeding the Canadian

Cancer Society alcohol intake recommendations. Fifty-two percent of Canadians aged ≥ 18 years were classified as overweight or obese. British Columbia had the lowest percentage at 47%. In 2006, 10.5% of Canadians 16 to 64 years old reported using artificial tanning equipment over a one-year period; among females 16 to 24 years old, the reported rate was 27%.

As of 2010, all provinces and territories have implemented school-based, organized HPV vaccination programs. For the 2008/2009 school year, uptake rates ranged from 52% in Manitoba to 88% in Newfoundland and Labrador. In 2008, the reported rate of acute hepatitis B virus (HBV) infection was 1.7 per 100,000 people. All provinces and territories have implemented universal HBV vaccination programs. In 2009, the reported rate of hepatitis C virus infection was 33.7 per 100,000 people.

In **Screening**, the cervical cancer screening participation rate was relatively comparable across provinces, ranging from 64% in Saskatchewan to 76% in Alberta for women having at least one Pap test in the three-year period 2006 to 2008. The participation rate in the two provinces that corrected for hysterectomy was 72% in Ontario and 80% in British Columbia.

Participation in organized breast cancer screening programs varies by province, ranging from 6% in Alberta to 56% in Quebec. Data based on self-report show that coverage is much higher with 72% of women reporting a screening mammogram in the past two years, ranging from 58% in Prince Edward Island to 75% in New Brunswick.

In 2011, the percentage of Canadians who were up to date on colorectal cancer screening (based on self-report) ranged from 22% in Newfoundland and Labrador to 64% in Manitoba.

In **Diagnosis**, nine of 10 provincial registries had stage data on at least 90% of cases in the top four cancer sites for 2010, thus achieving the national staging initiative target. The capture of stage data for all cancers has increased steadily from 2007 to 2010. None of the reporting provinces had achieved the wait time targets for timely resolution of an abnormal screen as of 2010. Patients not requiring a biopsy continued to be more likely to be diagnosed within the target timeframes than those requiring a biopsy to resolve their diagnosis. Data on wait times from an abnormal fecal test for colorectal cancer to colonoscopy are reported on for the first time, and are available for four provinces for 2009 to 2010. Efforts will focus on expanding the number of reporting provinces in future reports for this important access indicator.

In **Treatment**, in 2011, nine of ten provinces with available data had achieved the target of 90% of patients treated with radiation within the national wait time benchmark of 28 days. Saskatchewan and Ontario had the shortest 90th percentile wait time at 18 days. Radiation therapy use varied slightly by province and over time. The highest utilization rate was in British Columbia at 33%.

The percentage of stage II and III rectal cancer cases undergoing pre-operative radiation therapy as per evidence-based guidelines has increased over time; however, the percentage is much lower for patients aged 80 years and older compared to those younger than 60 years old. The province with the highest guideline treatment rate for the latest available year was Saskatchewan at 56.6%. Based on the chart review study, the most common reason for non-referral for radiation therapy among stage II and III rectal cancer cases was the presence of co-morbidities and the most common reason for non-treatment was not being seen by a radiation oncologist.

There was interprovincial variation in the percentage of early stage breast cancer cases treated with radiation therapy as per guidelines. The treatment rate dropped substantially for patients 80 and older. The province with the highest guideline treatment rate was Newfoundland and Labrador at 93.4%.

There was interprovincial variation in the percentage of resected stage III colon cancer cases treated with adjuvant chemotherapy. The treatment rate dropped substantially with patient age and potentially for older women relative to older men. The province with the highest guideline treatment rate for 2009 was Saskatchewan at 81.8%.

The percentage of stage II and IIIA non-small cell lung cancer cases undergoing post-operative chemotherapy as consistent with guidelines varies by province and the percentage is much lower for older patients. The province with the highest guideline treatment rate for 2009 was Ontario at 58%. Based on the chart review study results, the most common reason for non-referral for chemotherapy among stage II and IIIA non-small cell lung cancer cases was the presence of co-morbidities and the most common reason for non-treatment was patient choice.

In 2007 to 2009, slightly fewer than 40% of breast cancer resections were mastectomies, but the provincial rates varied widely. For women under age 40 and age 80 and older, mastectomy rates were 10 to 15 percentage points higher than for women age 40 to 79. The province with the lowest use of mastectomy was Quebec at 26.5%.

There was interprovincial variation in the percentage of colon resections where 12 or more lymph nodes were removed, as recommended by guidelines. Differences by age and sex were not detected. Ontario was the province with the highest percentage of cases with 12 or more nodes removed for the latest available year at 89.4%.

In **Patient Experience and End-of-Life Care**, there was variation in the implementation of standardized symptom screening tools across the country. In 2012, seven provinces are using a standardized symptom screening tool for at least a portion of patients at some or all provincial cancer centres; in the other provinces, screening tools may be used but data on their use are not available at a provincial level.

Overall satisfaction with physical comfort care, as measured using the standardized Ambulatory Oncology Patient Satisfaction Survey by NRC Picker, ranged from 76% to 84% in the seven provinces from which results are available (survey year varies by province). Of the five measures related to Physical Comfort, patients ranked the items related to management and control of pain and discomfort the lowest. Overall satisfaction with emotional support care ranged from 40% to 59% in the seven provinces. Of the nine measures related to Emotional Support, patients ranked trusting care providers with confidential information the highest and being referred to a care provider in the last 6 months for issues related to anxiety and fear the lowest.

In 2009, 71% of cancer deaths in Canada occurred in hospital. The percentage of cancer patients dying outside of the hospital ranged from 11% to 47% by province. Comparable studies in Europe have reported the percentage of cancer deaths occurring at home to be as high as 45%.

In **Research**, the ratio of adult patients enrolled in clinical trials to newly registered cancer centre patients ranged from 0.02 to 0.10 across the seven provinces that reported data in 2011 and from 0.04 to 0.08 across disease sites for the six provinces that submitted data. There was no consistent trend in the overall ratio from 2009 to 2011. The same ratio for pediatric patients ranged from 0.12 to 0.47 across the eight provinces that have pediatric cancer centres. There was no consistent trend in the ratio from 2009 to 2011.

Data on funding from 2009 showed that breast cancer had a proportionately higher share of disease site specific research funding relative to its burden of illness (incidence and mortality) while lung cancer had a proportionately lower share.

In **Long-Term Outcomes**, age-standardized incidence rates and age-standardized mortality rates and relative survival for the top four cancer sites and selected cancers (where meaningful) were presented by province, sex, and over time to identify meaningful trends and selected interprovincial variations, but also to allow for assessment of the impact of cancer control initiatives on reducing the burden of cancer.

Looking ahead

Looking ahead, plans are in place to expand indicator development and reporting to address performance domains that are under-measured. These will include indicators that measure cancer *system efficiency* and expanded indicators of the patient experience and patient reported outcomes. Also in 2013, a special focus report will more closely assess the impacts of *socio-economic status* (income and education level) and highlight issues related to patient residence geography (including *rural, remote, and northern communities*) and *new immigrants*.

Another focus of efforts in 2013 and beyond will be the development of performance *targets and benchmarks* for a number of the indicators reported on. This will be done through a consensus-based process incorporating available evidence. The targets and benchmarks will help identify the direction and magnitude of potential improvements based on indicator results.

Another aspect of system performance work is conducting *special studies* that help shed light on aspects relevant to indicator results. In 2013, a special study will be conducted on the use of PET scanners in the diagnosis and treatment of non-small cell lung cancer. This will help identify opportunities for more consistent and evidence-based use of this resource-intensive technology across the country.

The system performance team, working with the provincial partners, has initiated a concerted *knowledge translation and exchange (KTE)* strategy aimed at enhancing the reach and impact of system performance information across a broad range of target audiences in the Canadian cancer control systems. These KTE efforts and other enhancements to System Performance work are informed by *independent evaluations* conducted on the 2010 and 2011 reports; an evaluation of this 2012 report is planned for Spring 2013. The results will be used to continue to enhance the usability and usefulness of system performance data and analysis.

Introduction

Introduction

This 2012 Report is the fourth annual system performance report on the Canadian cancer control system produced by the Canadian Partnership Against Cancer (the Partnership) in collaboration with its provincial and national partners. The Partnership's System Performance initiative produces a range of reports, including annual system performance reports, special focus reports, and technical reports on special studies.

The annual reports present performance indicators that span the cancer control continuum dimensions, cancer sites, and the Canadian population. Early annual system performance reports were opportunistic in their content, in that they included a selection of indicators that were feasible to calculate with then current data capabilities, as well as indicators that were proxies for more meaningful yet non-feasible measures. As of the 2011 Report, the emphasis began shifting to a definitive set of 'sentinel' indicators for which performance targets, or a plan for their development, are in place or indicators that provide key information that help in monitoring the performance of the system. The 2012 Report continues to move along that path, doing away with many proxy indicators.

In addition to the refocus described above, this 2012 Report introduces a few new indicators including hepatitis B incidence, mastectomy rates for breast cancer, cancer research investment and a number of new disease sites in the long-term outcomes section (including pancreas, non-Hodgkin lymphoma, thyroid, liver, melanoma, and head and neck). Also new this year are the results of a special study that involved a retrospective chart review to look at reasons for non-adherence to treatment guidelines for lung cancer and rectal cancer.

About the Partnership

The Canadian Partnership Against Cancer (the Partnership) is an independent organization funded by Health Canada to accelerate action on cancer control for all Canadians. The Partnership is a group of cancer experts, charitable organizations, governments, patients and survivors all determined to bring positive change to the cancer control domain. We work together to stimulate the generation of new knowledge and to accelerate the implementation of existing knowledge about cancer control across Canada.

The Partnership strives to improve cancer control in Canada by being a catalyst for a coordinated approach that will:

- reduce the risk of cancer;
- enhance the quality of life for those affected by cancer;
- lessen the likelihood of Canadians dying from cancer; and
- increase the effectiveness and efficiency of the cancer control domain.

In support of its vision, one of the Partnership's key mandates is to measure and report on the quality of cancer control and health care. The Partnership has identified System Performance Analysis and Reporting as one of its core enabling functions for its new five-year mandate (2012 to 2017), and as such, has developed a multi-faceted plan for advancing the understanding of system performance in Canada.

Why system performance reporting?

Evidence-based planning, management and policy development has for some time now been the standard for advancing Canada's health care system. While each province and territory is largely responsible for planning and funding cancer service delivery within its jurisdiction, national comparisons of standardized performance indicators help identify opportunities for pan-Canadian system improvements. This, in turn, promotes exchange and uptake of best practices, which allows for the achievement of advances in quality across the country. Furthermore, interprovincial measurement and comparison supports the development and adoption of national performance targets and benchmarks.

For interprovincial system performance comparisons to be meaningful, a coordinated strategy is required to ensure standardized definitions, methodologies and interpretations. The Partnership's System Performance program constitutes a national effort to identify the aspects of the cancer control system that need to be measured, define and collect valid and comparable data needed for the measurement, and present results in an integrated report that allows for synthesis of results and interpretation of patterns in a manner designed to inform quality improvement strategies.

A collaborative approach for system performance measurement

The indicators presented in this report are the result of a collaborative effort with a number of partners at the national and provincial/territorial levels. Consultations with a broad range of experts and knowledge leaders from across the cancer control landscape also informed the work.

At the provincial level, the System Performance Steering Committee and Technical Working Group, each comprising locally-appointed representatives from all 10 provinces, guided the planning and development of this report from beginning to end. Provincial cancer agencies and programs also provided detailed data to assist with the calculation of many indicators in this report, particularly in the domains of screening, diagnosis, treatment, research, and the patient experience. 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 Partnership works closely with Statistics Canada as the survey administrator and data steward for the Canadian Community Health Survey (CCHS); the report uses CCHS information on health status, health care utilization and health determinants for the Canadian population. Statistics Canada also houses the Canadian Cancer Registry and Vital Statistics Database, which were used to generate key measures of long-term outcome such as cancer incidence, mortality and survival. The Canadian Cancer Registry is developed

based on annual data submissions from the 13 provincial and territorial cancer registries. The Partnership worked with the Canadian Institute for Health Information (CIHI) in developing indicators related to cancer surgery based on national-level hospitalization data held within that organization. The Canadian Breast Cancer Screening Initiative (CBCSI) provided information on breast cancer screening practices from organized provincial programs offering mammography. The C[17] council of pediatric oncology programs across Canada provided data to calculate the pediatric clinical trial participation indicator.

Other reports in the System Performance series

In addition to the annual System Performance reports, the Partnership produces special focus reports that provide more detailed indicators and other exploratory information that helps contextualize and explain pan-Canadian performance for a specific topic in cancer control. Recent special focus reports included *Breast Cancer Control in Canada: A System Performance Special Focus Report* published in September 2012 and *Lung Cancer in Canada: A Supplemental System Performance Report* published in July 2011. Technical reports on special studies exploring indicator results using supplemental data collection may also be published in the future.

How this report is organized

As in prior years, in addition to provincial and territorial comparisons, many of the indicators are examined by patient/population age group and sex. Wherever multi-year data are available, time trends are shown. In contrast to previous annual reports, the indicators are no longer presented by geography (urban, rural, remote, etc.) and socio-economic status (SES); these types of explanatory analyses will now be provided in the special focus reports. In the future, expanded results will be available online.

As in the previous reports, which began in 2009, this year's is organized along the dimensions of the cancer control continuum: *Prevention, Screening, Diagnosis, Treatment, Patient Experience and End-of-Life Care, Research, and Long-Term Outcomes.*

The chapter content organization is similar to the 2011 report. An introduction prefaces each chapter, providing background, setting context and describing data sources and other relevant information on the set of indicators included in the chapter. The indicator results are provided graphically in charts and/or tables, and the discussion of the results is organized into the following categories (although not all categories are included for all indicators):

- **What are we measuring?** Describes the indicators presented.
- **Why are we measuring this?** Provides the rationale for including the indicator and relevant information on burden of disease or implication of cancer control activity being assessed.
- **What do the results mean?** Describes the results highlighting notable patterns or trends and providing some interpretation, where helpful. Also discusses any available or planned targets, benchmarks, norms, or international comparisons useful to assessing the measured level of performance.
- **What is being done?** Highlights some of the key activities planned or currently underway by the Partnership and its partners aimed at improving performance for the domain being measured. Also describes actions that can be pursued to see better results.

- **What should you be aware of about data and measurement?** Highlights key data or indicator calculation issues that are relevant to interpreting the indicator results. As in previous reports, a Technical Appendix, which provides full details on indicator data and methodologies, is provided towards the end of the *Report*.

The table below lists the indicators by cancer continuum dimension and highlights those that are new for 2012.

TABLE 1

Indicators in the 2012 Report

Cancer control continuum	Indicator	Data source		Updated	Unchanged in 2012	New or expanded in 2012
		Cancer agencies/ equivalent	Other			
Prevention	Smoking prevalence		✓	✓		
	Smoking cessation		✓	✓		
	Second-hand smoke exposure		✓	✓		
	Alcohol consumption		✓	✓		
	Adult overweight and obesity		✓	✓		
	Use of artificial tanning equipment		✓			✓
	HPV vaccination uptake	✓ (screening network)				
	Hepatitis B infection		✓			✓
	Hepatitis C infection		✓			✓
Screening	Cervical cancer screening rates (in organized programs)	✓ (screening network)			✓	
	Breast cancer screening rates (in organized programs)	✓ (screening network)	✓		✓	
	Colorectal cancer self-reported screening rates	✓ (screening network)				✓

TABLE 1

Indicators in the 2012 Report (continued)

Cancer control continuum	Indicator	Data source		Updated	Unchanged in 2012	New or expanded in 2012
		Cancer agencies/ equivalent	Other			
Diagnosis	Capture of stage data	✓				✓
	Wait times: abnormal breast screen to resolution	✓		✓		
	Wait times: abnormal fecal test to colonoscopy		✓			✓
Treatment	Radiation therapy wait times: ready to treat to treatment	✓		✓		
	Radiation therapy utilization and capacity	✓		✓		
	Pre-operative radiation therapy for stage II and III rectal cancer	✓				✓
	Adjuvant radiation therapy for stage I and II breast cancer	✓		✓		
	Adjuvant chemotherapy for stage III colon cancer	✓				✓
	Adjuvant chemotherapy for stage II and IIIA non-small cell lung cancer	✓				✓
	Mastectomy rates		✓			✓
	Removal and examination of 12 or more lymph nodes in colon resections	✓		✓		

TABLE 1

Indicators in the 2012 Report (continued)

Cancer control continuum	Indicator	Data source		Updated	Unchanged in 2012	New or expanded in 2012
		Cancer agencies/ equivalent	Other			
Patient experience and end-of-life care	Screening for distress	✓		✓		
	Patient satisfaction with care	✓				✓
	Place of death		✓	✓		
Research	Adult clinical trial participation ratio	✓		✓		
	Pediatric clinical trial participation ratio	✓ (C^{17})		✓		
	Cancer research investment		✓			✓
Long-term outcomes	Age-standardized incidence rates		✓			✓*
	Age-standardized mortality rates		✓			✓*
	Relative survival					✓*

*New disease sites included in 2012.

Prevention

Prevention

Prevention is a key element of cancer control. Many factors influence a person's risk of cancer and an understanding of the role of risk factors and their prevalence in the population can help to guide cancer prevention efforts. Many risk factors are modifiable by adjusting health behaviours (such as tobacco use) or changing environments (such as second-hand smoke), or through vaccination (such as for HPV), but many are non-modifiable (such as age and genetic makeup). The indicators included in this chapter focus on the modifiable risk factors.

The 2012 Report presents updated information on several health behaviour-related risk factors for which pan-Canadian data are readily available. Updates to information on smoking (prevalence, cessation and second-hand exposure), alcohol and obesity are presented. New in this year's report are pan-Canadian data on the use of artificial tanning equipment, hepatitis B incidence and immunization policies and hepatitis C incidence.

Many cancers can be prevented through healthy behaviours.

Prevention is an effective long-term strategy to reduce the burden of cancer. The World Cancer Research Fund (WCRF) estimates that approximately one-third of cancers can be prevented by not smoking and that another third of cancers can be prevented through a combination of healthy food and nutrition, including limiting alcohol consumption, participating in regular physical activity and maintaining a healthy body weight.[1]

National targets set the standard for healthy living.

Prevention targets, where they exist, are set at the federal, provincial or municipal levels. The following are examples of pan-Canadian prevention targets or guidelines:

- The Canadian Healthy Living Strategy has set a series of targets related to eating healthy foods, being physically active, and having a healthy body weight. Targets are set at a 20% improvement by 2015, from a 2003 baseline measured by the Canadian Community Health Survey (CCHS).[2]
- The Federal Tobacco Control Strategy has developed targets for smoking prevalence, quitting smoking and second-hand smoke exposure.[3] These targets aimed to reduce smoking prevalence from 19% in 2003 to 12% by 2011, to reduce the percentage of people exposed to second-hand smoke from 28% in 2006 to 20% in 2011, and to increase the number of adults who quit smoking by 1.5 million.[3] These targets use the Canadian Tobacco Use Monitoring Survey (CTUMS) as the underlying data source.

- No targets exist for alcohol consumption, although there are commonly accepted low-risk drinking guidelines. The Canadian Cancer Society currently recommends no more than two drinks per day for men and one drink per day for women in order to reduce the risk of cancer.[4]
- The World Health Organization (WHO) as a result of the United Nations Political Declaration on the Prevention and Control of Non-Communicable Diseases has set out a Global Action Plan for the Prevention and Control of Non-communicable Diseases (NCDs), covering the period 2013 to 2020 (the 2013 to 2020 Action Plan). The main objective of the 2013 to 2020 Action Plan is the achievement of an overarching global target of a 25% relative reduction in premature mortality from cardiovascular disease, cancer, diabetes and chronic respiratory disease by 2025. Member states, including Canada, will provide information towards measurement of WHO health system targets.[5]

The Partnership, working with its partners, is supporting and promoting a broad range of cancer prevention initiatives.

The Partnership's Primary Prevention portfolio has been working with a variety of partners from across Canada to support the implementation of new prevention strategies and promote the adoption of existing initiatives. A major initiative is the Coalitions Linking Action and Science for Prevention (CLASP), which aims to improve the health of Canadians by bringing together multi-sector organizations from various provinces and territories, and forming coalitions to integrate cancer prevention with strategies to prevent other chronic diseases.[6]

Another initiative is the Prevention Policies Directory (www.cancerview.ca/preventionpolicies), which is a freely-accessible online tool that contains up-to-date information on Canadian policies related to cancer and chronic disease prevention. Summaries and direct access to policy documents and legal instruments related to modifiable risk factors for cancer and chronic disease are available directly through this tool.[7]

Most data on prevention originate from population surveys, particularly the CCHS.

Data in the prevention section of this Report were mostly sourced from the Canadian Community Health Survey (CCHS). This cross-sectional survey has been administered annually by Statistics Canada since 2007. From 2001 to 2005, CCHS data were collected every two years over a one-year period from approximately 130,000 respondents; starting in 2007, CCHS data were collected every year from approximately 65,000 respondents. During both periods, approximately half of the interviews were conducted using computer-assisted personal interviewing and the other half were conducted over the phone using computer-assisted telephone interviewing. Excluded from the sampling frame are individuals living on Indian Reserves and on Crown Lands, institutional residents, full-time members of the Canadian Forces, and residents of certain remote regions.[8] With every survey cycle, a standard set of questions is asked, with additional questions that are optional or fluctuate between cycles. CCHS provides a rich source of data for tracking Canadians' health behaviours over time. When comparing rates with other countries, however, it is important to interpret the data with caution as indicator definitions, sample population and data collection methods are dissimilar and can affect the results.

Prevention indicator	Summary of results (In 2011, unless otherwise specified)	Trends (Since 2003, unless otherwise specified)
Smoking prevalence	20% of Canadians aged ≥ 12 years were smoking. The lowest percentage was 15.8%, in British Columbia.	Smoking prevalence has gradually decreased from 23%.
Smoking cessation	18% of recent smokers aged ≥ 12 years reported quitting in the past two years. The highest quit rate was 26.7%, in Newfoundland and Labrador.	The percentage of recent smokers who have quit has fallen from 22%.
Second-hand smoke exposure	Second-hand smoke exposure in public places was reported to be 12.6% among Canadians aged ≥ 12 years. Vehicle and home exposures were lower at 6.7% and 5.5%, respectively. Vehicle and home exposure were lowest in British Columbia at 4.6% and 2.4%, respectively, while exposure in public places was lowest in Yukon at 4.6%.	While second-hand smoke exposure in vehicles and at home has been decreasing, exposure in public places has risen since 2009 when it bottomed out at 10%.
Alcohol consumption	In 2011, 19.7% of Canadians aged ≥ 18 years were abstaining from alcohol consumption in the previous year. The highest percentages were 23.5% in Nunavut and 22.9% in New Brunswick. Meanwhile, 11% of adults in Newfoundland and Labrador reported to be exceeding the Canadian Cancer Society alcohol intake recommendations.	The percentage of adults who have abstained from alcohol in the previous year has remained the same. Meanwhile, the percentage of adults exceeding low-risk drinking guidelines has increased slightly.
Adult obesity	52% of Canadians aged ≥ 18 years were classified as overweight or obese. British Columbia had the lowest percentage at 47%.	The percentage of adults classified as overweight or obese has increased by 3% in the 8-year period between 2003 and 2011.
Use of artificial tanning equipment	In 2006, 10.5% of Canadians 16 to 64 years old reported using artificial tanning equipment over a one-year period. Among females 16 to 24 years old, the reported rate was 27%.	The overall percentage of reported artificial tanning equipment use among Canadian adults has increased from 7.7% in 1996.
HPV vaccination uptake	As of 2010, all provinces and territories have implemented school-based, organized HPV vaccination programs. For 2008/2009, uptake rates ranged from 52% in Manitoba to 88% in Newfoundland and Labrador.	The first provincial HPV vaccination programs were implemented in 2007.
Hepatitis B virus infection	In 2008, the reported rate of acute hepatitis B infection was 1.7 per 100,000 people.	While the reported rate of acute hepatitis B infection in Canada has remained relatively stable since 2003, the rate of reported chronic infection appears to be increasing.
Hepatitis C virus infection	In 2009, the reported rate of hepatitis C infection was 33.7 per 100,000 people.	The reported rate of hepatitis C infection decreased from 40.5 per 100,000 people in 2005.

Smoking prevalence

What are we measuring?

This indicator examines the percentage of the population age 12 and older reporting daily or occasional smoking in the previous year.

Why are we measuring this?

It has been well established that tobacco use is a major preventable cause of cancer and deaths due to cancer in Canada.[9]

- The World Cancer Research Fund (WCRF), an international not-for-profit association that is committed to prevention of cancer, estimates that one-third of all cancers could be prevented from the elimination of tobacco use.[1]
- Tobacco use is estimated to cause 30% of all cancer deaths in Canada each year. It causes 85% of lung cancer deaths – the leading cause of cancer death among Canadian men and women.[9]

  Reporting on tobacco use patterns at a population level, a practice that has been undertaken by many countries around the world in accordance with the World Health Organization's Framework Convention for Tobacco Control,[10] allows for monitoring of progress in controlling its use and helps identify opportunities to improve prevention efforts.

What do the results mean?

One in five Canadians age 12 and older reported daily or occasional smoking in 2011 (Figure 1).

- The percentage of the adult population that reported smoking in Canada in 2011 is similar to what has been reported in the United States. Recently reported smoking rates (with somewhat different adult age cut-offs) in the U.S., the UK, and Australia were 21%, 20%, and 19%, respectively.[a]

There was variation by province/territory and by sex in the smoking classification of Canadians age 12 and older (Figure 2).

- The percentage of the population age 12 years and older reporting daily or occasional smoking in each province and territory in 2011 ranged from 16% in British Columbia to 60% in Nunavut, with a national average of 20%. The highest reported smoking rates were in Canada's three territories.
- Males were more likely than females to report being daily (17% versus 14%), occasional (6% versus 4%) or former (41% versus 34%) smokers. Females on the other hand were more likely to have never smoked (37% among males compared to 48% among females).

  One goal of the Federal Tobacco Control Strategy led by Health Canada was to reduce overall current smoking prevalence, as reported in the Canadian Tobacco Use Monitoring Survey (CTUMS), from 19% in 2006 to 12% by 2011.[3] According to the data reported here, none of the provinces or territories has achieved this target.

a) In the U.S., according to 2011 data from the Behavioral Risk Factor Surveillance System (BRFSS), 21.2% of respondents age 18 years and older reported having smoked >=100 cigarettes in their lifetime and are current smokers every day or on some days.[11] According to 2010 data from the General Lifestyle Survey, 20% of the adult population (age 16 years and older) of Great Britain were cigarette smokers.[12] A more recent update of these data is not available. The prevalence of smoking among adults age 18 years and older in Australia in 2007/2008 was 19% according to survey data.[13] A more recent update of these data is also not available.

What is being done?

The focus of funding of the Federal Tobacco Control Strategy, which aims to reduce tobacco-related disease and death through smoking prevention and cessation as well as protection and product regulation at a population level, was shifted in early 2012 from reducing smoking in the general population to reducing smoking in population groups with high rates, such as aboriginal populations.[14] With that said, many efforts were or are being undertaken at the provincial and municipal levels to reduce smoking prevalence.[7]

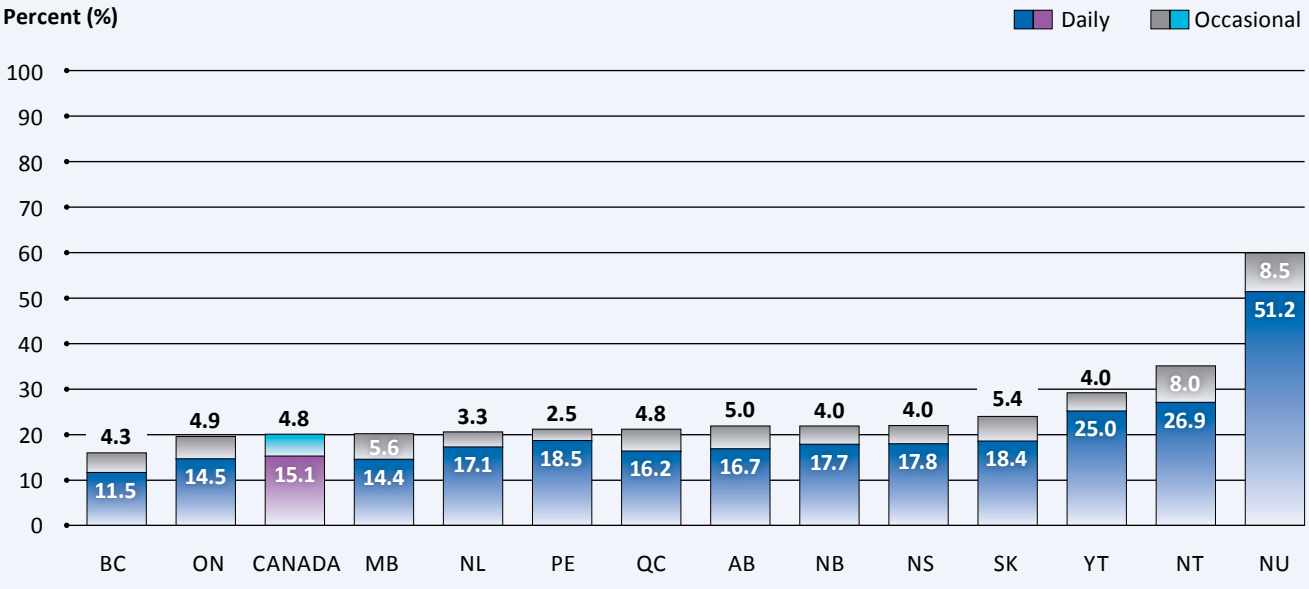
The Building on Existing Tools to Improve Chronic Disease Prevention and Screening in Family Practice (BETTER) Project, a CLASP initiative currently funded to 2014, addresses tobacco control at an individual and primary care practice level. The project aims to review and identify existing evidence-based tools for chronic disease prevention and screening, and develop and evaluate a multi-faceted intervention which adapts these strategies to the family practice setting. Two CLASP initiatives, funded to September 2012, also addressed tobacco control but in different settings, particularly in First Nations communities and in schools. Of note was the Youth Excel initiative, which developed a set of indicators on tobacco use and created collaboration opportunities among researchers, policy-makers, practitioners and communities to assess and guide policies and programs focused on risk factors including tobacco use.[15]

What should you be aware of about data and measurement?

Detailed calculation methodology is provided in the Technical Appendix (see page 174).

FIGURE 1

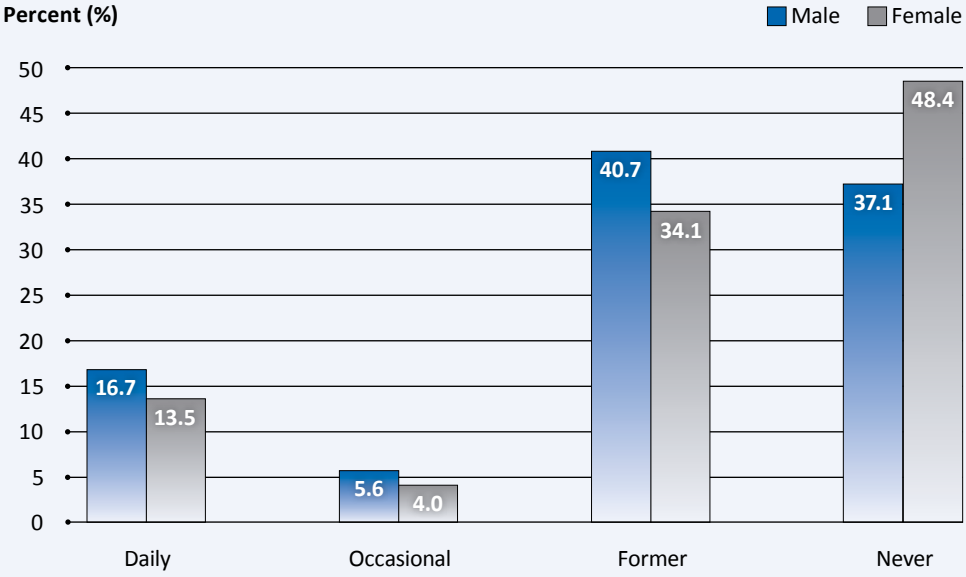
Percentage of population (age ≥ 12) reporting daily or occasional smoking, by province/territory – CCHS 2011



Data source: Statistics Canada, Canadian Community Health Survey.

FIGURE 2

Percentage of population (age ≥ 12) by smoking classification, by sex, Canada – CCHS 2011



Data source: Statistics Canada, Canadian Community Health Survey.

Smoking cessation

What are we measuring?

This indicator measures the percentage of recent smokers (who had been daily or occasional smokers) age 20 and older who reported having quit smoking in the past two years and were currently non-smokers.

Why are we measuring this?

International models have shown that the most efficacious impact on cancer mortality in the medium term can be achieved by getting tobacco users to quit.[1] Research has shown that, if cessation occurs before middle age, the risk of developing lung cancer attributed to smoking tobacco is cut by over 90%.[16] Benefits of smoking cessation exist regardless of age when quitting. The cumulative risk of death from lung cancer up to age 75 for men who smoke is 15.9%; by quitting at age 50, the cumulative risk is reduced to 6%.[16]

Reporting on smoking cessation rates across the country allows for monitoring of progress in controlling its use, and comparison of smoking prevalence and cessation rates allows for better assessment of the impact of prevention efforts and identifying opportunities for focus.[10]

What do the results mean?

There was variation by province in the percentage of recent smokers who reported quitting smoking in the previous two years (Figure 3).

- The percentage of recent smokers who reported quitting in the previous two years (measured in 2011) ranged from 14% in Saskatchewan to 27% in Newfoundland and Labrador, with a national average of 18%.
- In 2010, 6.2% of adults in the U.S. aged 18 years and older who were current smokers who had smoked for at least two years and former smokers who quit in the past year reported to have quit in the past year and did not smoke for at least six months prior to interview. These findings are according to the National Health Interview Survey.[17] Differences in data collection may account for the difference in the percentage of recent smokers who reported quitting in the previous two years between the United States and Canada.

There was variation by age, but not sex, in the percentage of recent smokers who reported quitting smoking in the previous two years (Figure 4).

- The quit rate was highest among those aged 20 to 34 at 21%, followed by those age 65 and older at 20%. The percentage was lowest among those aged 45 to 64 at 15%.
- In the United States, age appeared to be correlated with smoking quits according to 2010 data. Those aged 18 to 24 had the highest percentage of quits at 8.2% followed by those aged 25 to 44 at 7.1%.[17]

A goal of the Federal Tobacco Control Strategy was to increase the number of adult Canadians who have quit smoking to 1.5 million.[3] This target used the Canadian Tobacco Use Monitoring Survey (CTUMS) as its source.

What is being done?

There are Canadian smoking cessation evidence-based guidelines, resources and tools for health professionals, including physicians, that have been developed and made available by The Canadian Action Network for the Advancement, Dissemination and Adoption of Practice-informed Tobacco Treatment.[18]

Dr. Andrew Pipe and his team at the Ottawa Heart Institute have developed the Ottawa Model for Tobacco Cessation with a focus on hospital-based tobacco cessation.[19] The model is now being utilized in 144 hospitals across Canada.

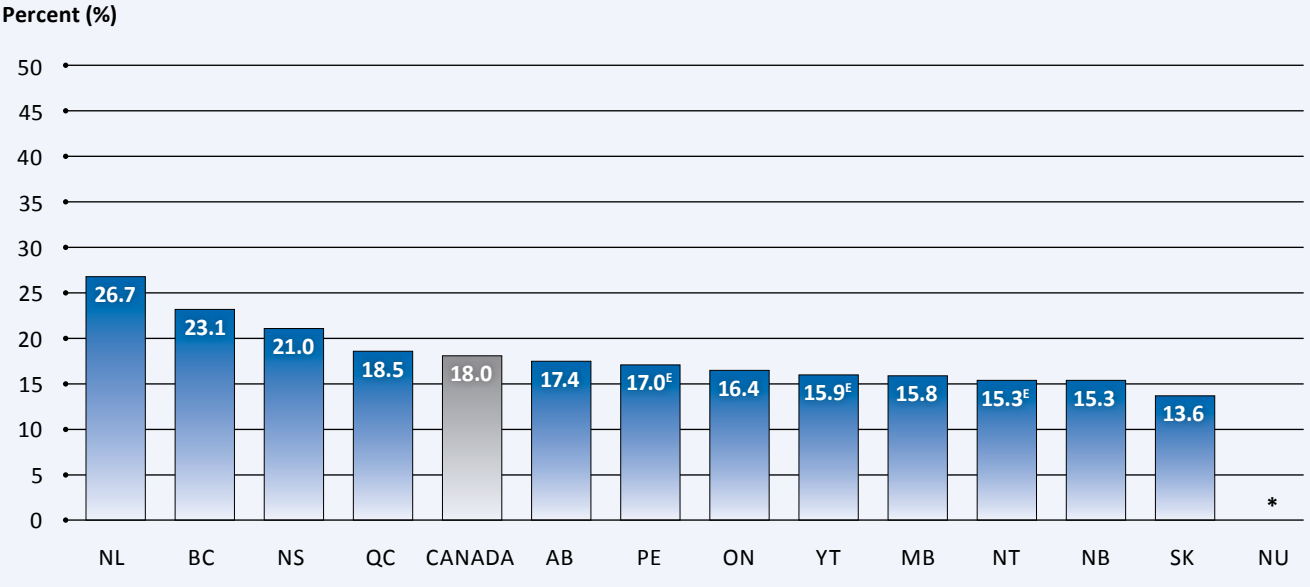
Please see “What is being done?” in the Smoking Prevalence Indicator section.

What should you be aware of about data and measurement?

Detailed calculation methodology is provided in the Technical Appendix (see page 174).

FIGURE 3

Percentage of recent smokers (age ≥ 20) who have quit smoking in the last two years, by province/territory – CCHS 2011



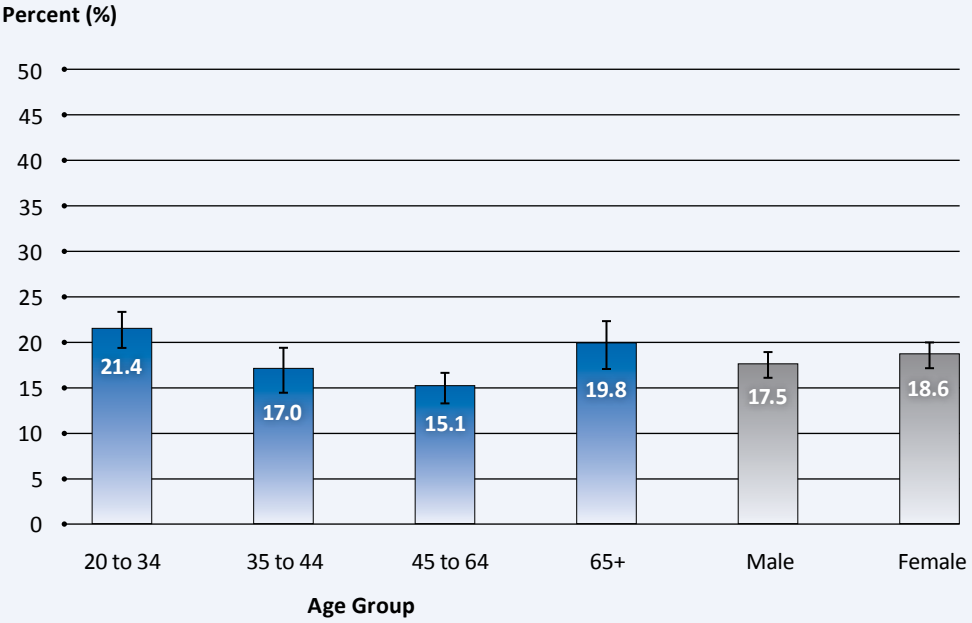
*Suppressed due to statistical unreliability caused by small numbers.

[E] Interpret with caution due to a large amount of variability in the estimate. See Technical Appendix for more details.

Data source: Statistics Canada, Canadian Community Health Survey.

FIGURE 4

Percentage of recent smokers (age ≥ 20) who have quit smoking in the last two years, by age group and sex, Canada – CCHS 2011



95% confidence intervals are indicated on figure.

Data source: Statistics Canada, Canadian Community Health Survey.

Second-hand smoke exposure

What are we measuring?

This indicator examines the percentage of non-smokers aged 12 years and older who reported being exposed to smoke in the home, in a vehicle, or in a public place every day or almost every day over the previous year.

Why are we measuring this?

The Canadian Cancer Society estimates that every year, 1,000 Canadians who do not smoke die from second-hand smoke.[20]

Health outcomes associated with second-hand smoke include an increased risk of lung cancer and second-hand smoke is considered to be the second-leading cause of lung cancer after smoking.[21] According to the 2006 U.S. Surgeon General Report, more than 50 epidemiologic studies have addressed the association between second-hand smoke exposure and the risk of lung cancer among lifetime non-smokers.[22] Pooled evidence from these studies suggests a 20% to 30% increase in the risk of lung cancer from second-hand smoke exposure associated with living with a smoker.[22]

Many Canadian jurisdictions have introduced legislation limiting exposure to second-hand smoke. Monitoring reductions in exposure over

time by province allows for evaluation of the impact of these measures at a national level.

What do the results mean?

Although it has generally decreased between 2003 and 2011, there is a good deal of variation across provinces and age groups in the percentage of the non-smoking population over the age of 12 reporting second-hand smoke exposure in the home, vehicle or public space.

- Figure 5 shows the percentage exposed in the home is particularly high in Nunavut, PEI and Quebec compared with other provinces (e.g., 11% in Nunavut and 9% in PEI and Quebec compared to 3% in British Columbia), while the percentage exposed in public spaces is highest in Manitoba, British Columbia, Ontario and Quebec (13% in all four compared to 5% in Yukon and 6% in Nunavut).
- Figure 6 shows that while a large decrease in the percentage of non-smokers exposed to second-hand smoke in public spaces was noted as of 2009, that percentage has since increased (a decrease from 20% in 2003 followed by an increase to 13% in 2011). Exposure at home and in vehicles decreased from about 11% in 2003 to about 6% in 2011.
- Figure 7 shows that exposure of non-smokers to second-hand smoke either in the home, vehicle or public space appears to be greatest among those age 16 to 19 (13%, 15% and 25%, respectively) and lowest among those over age 65 (3%, 3% and 5%, respectively).

The goal of the Federal Tobacco Control Strategy was to reduce the prevalence of Canadians exposed daily to second-hand smoke from 28% in 2006 to 20% by 2011.[3] According to the data shown, all age groups achieved this target regardless of location of exposure with the exception of those age 12 to 15 and 16 to 19 exposed to second-hand smoke in a public place.

In the United States, the National Health and Nutrition Examination Survey (NHANES), a survey of a sample of the entire population that is based on in-person interviews supplemented by physical measures, found that of all non-smokers in the population (children and adults included), 40.4% were exposed to second-hand smoke in 2007/2008, with 53.6% of young children (age 3 to 11) exposed and 36.7% of adults 20 and over. The study did not delineate place of exposure, and no recent updates of this data are available.[23]

What is being done?

Many Canadian jurisdictions, both provincial and municipal as well as federal, have been passing legislation aimed at reducing second-hand smoke exposure in a variety of settings from workplaces, bars and restaurants and vehicles carrying children to multi-unit dwellings and some outdoor areas.[15,24] Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, and Newfoundland and Labrador each had a full provincial ban on smoking in public places, as of 2007.[25] Laws prohibiting smoking in cars carrying children have been adopted in British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, New Brunswick, Prince Edward Island, Nova Scotia, Yukon Territory, and Newfoundland and Labrador.[24,26-27] Additionally, all provinces and territories prohibit smoking in public transportation vehicles.[24] Smoke-free multi-unit dwelling policies are an emerging issue in tobacco control policy in Canada with several jurisdictions enacting policies to prohibit smoking within such buildings.[24]

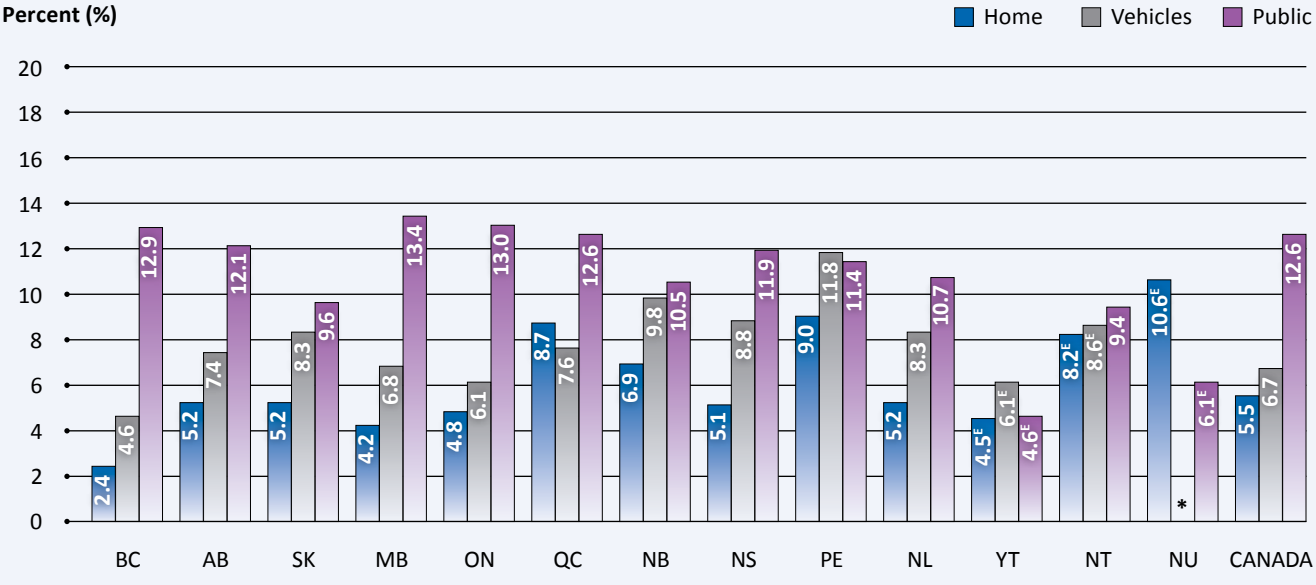
Please see “What is being done?” in the Smoking Prevalence Indicator section.

What should you be aware of about data and measurement?

Detailed calculation methodology is provided in the Technical Appendix (see page 174).

FIGURE 5

Percentage of non-smoking population (age ≥ 12) reporting second-hand smoke exposure, by location of exposure and province/territory – CCHS 2011



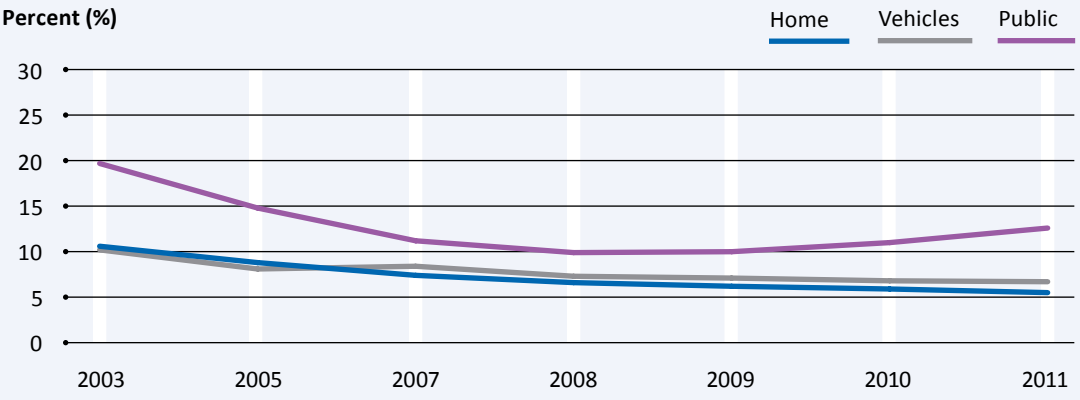
*Suppressed due to statistical unreliability caused by small numbers.

[E] Interpret with caution due to a large amount of variability in the estimate. See Technical Appendix for more details.

Data source: Statistics Canada, Canadian Community Health Survey.

FIGURE 6

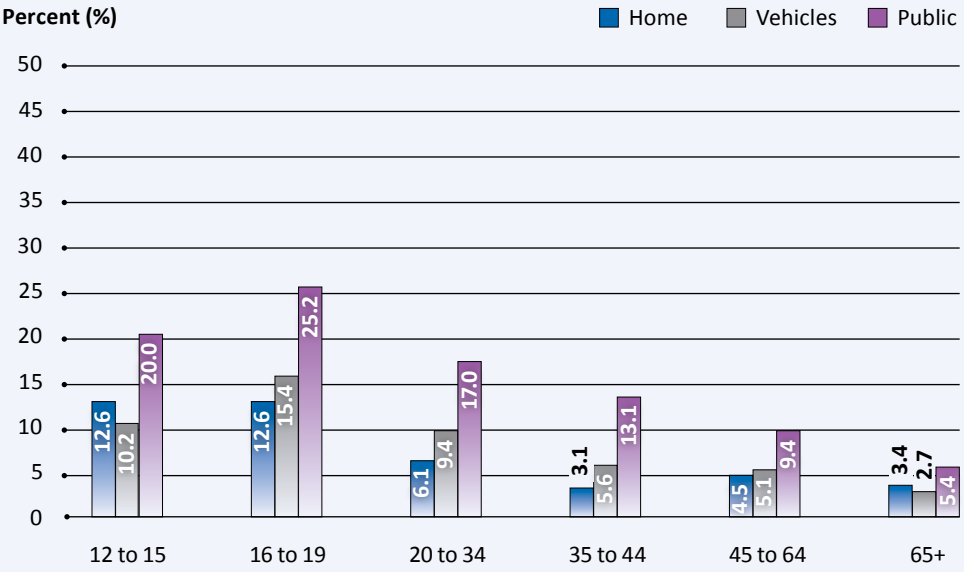
Percentage of non-smoking population (age ≥ 12) reporting second-hand smoke exposure by location of exposure, Canada – CCHS 2003 to 2011



Data source: Statistics Canada, Canadian Community Health Survey.

FIGURE 7

Percentage of non-smoking population (age ≥ 12) reporting second-hand smoke exposure by location of exposure and age group, Canada – CCHS 2011



Data source: Statistics Canada, Canadian Community Health Survey.

Alcohol consumption

What are we measuring?

This indicator measures the percentage of adults aged 18 years and older who report the following alcohol consumption behaviours:

- consuming no alcohol in the past 12 months,
- exceeding an average of two drinks per day for males and one drink per day for females (Canadian Cancer Society (CCS) guidelines).

Why are we measuring this?

Convincing evidence exists that alcohol increases the risk of cancer of the esophagus, mouth, throat (pharynx and larynx), breast (pre- and post-menopausal), and among men, the colon and rectum. Evidence also suggests that alcohol consumption probably increases the risk of liver cancer in both sexes and colorectal cancer in women.[1]

Convincing evidence also exists that excessive alcohol consumption is a cause of cirrhosis of the liver and predisposes some individuals to liver cancer. With that said, it is very important to note that at high levels of consumption, the effects of alcohol are likely to be confounded by other risky behaviours. For instance, heavy drinkers may have diets that are deficient in nutrients known to protect from cancer.[1]

To reduce the risk of cancer, both the Canadian Cancer Society and the World Cancer Research Fund (WCRF) recommend no more than two drinks per day for males and one drink per day for females.[1,4] Measuring the percentage of Canadians exceeding various low-risk drinking guidelines begins to help identify those at the greatest risk of cancer and other alcohol-related diseases.

What do the results mean?

In 2011, there was little interprovincial/territorial variation in the percentage of adults who report consuming no alcohol (Figure 8). Similarly, among provinces reporting data to allow for calculation of the percentage of adults exceeding drinking guidelines, there was little variation (Figure 9).

- The percentage of adults exceeding the Canadian Cancer Society drinking guidelines ranged from 9% in Saskatchewan to 11% in Newfoundland and Labrador (based on only five provinces reporting data).

International jurisdictions define low-risk drinking differently.

- In Australia, low-risk drinking has been defined as two drinks per day for males and for females. Country-level statistics from the 2007/2008 National Health Survey show that 21% of adults age 18 years and older exceeded these low-risk drinking guidelines. A breakdown by age and sex is unavailable.[29]

The 2005 Pan-Canadian Healthy Living Strategy did not set targets relating to alcohol consumption.[2]

What is being done?

The BETTER project, part of the CLASP initiatives, addresses alcohol consumption as a risk factor for chronic disease; it includes clinical chronic disease prevention strategies aimed at reducing alcohol consumption among patients seen in family practices.[15]

According to the Prevention Policies Directory maintained by the Partnership, many jurisdictions have within the past few years introduced policies, position papers and guides to public health policy aimed at reducing substance abuse and harms, and building safer communities.[7] Examples include the Ontario Ministry of Health Promotion's guidance document on Prevention of Substance Misuse,[30] Alberta Health Service's Developing substance use and gambling policies for Alberta schools,[31] and the BC Ministry of Healthy Living and Sport's Model Core Program paper on Prevention of Harms Associated with Substances.[32]

What should you be aware of about data and measurement?

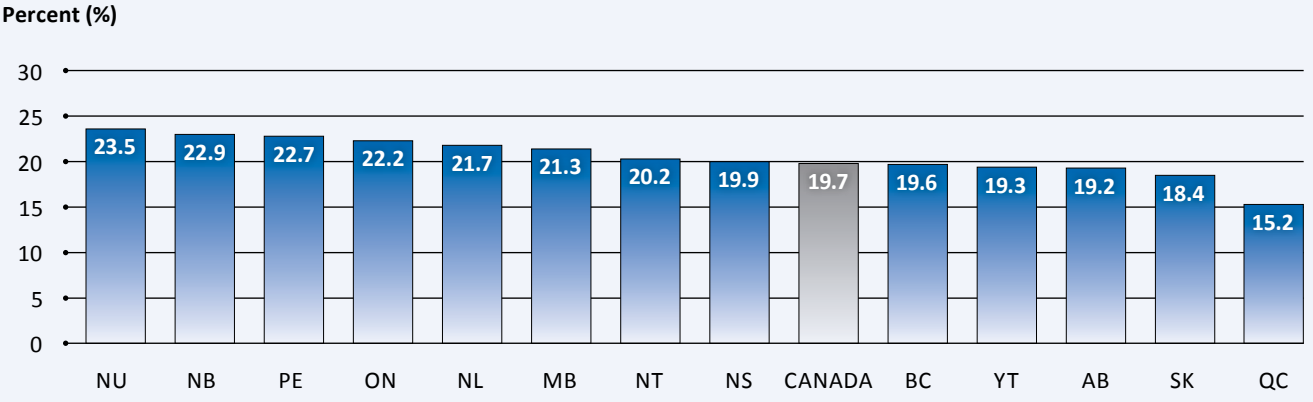
The daily average was calculated based on the total number of drinks the respondent reported consuming in the week prior to the CCHS interview, divided by seven days.

This Report uses the CCS/WCRF drinking guidelines for reducing the risk of cancer; the Canadian Centre on Substance Abuse has released different low-risk drinking guidelines for the general population.[28]

Detailed calculation methodology is provided in the Technical Appendix (see page 174).

FIGURE 8

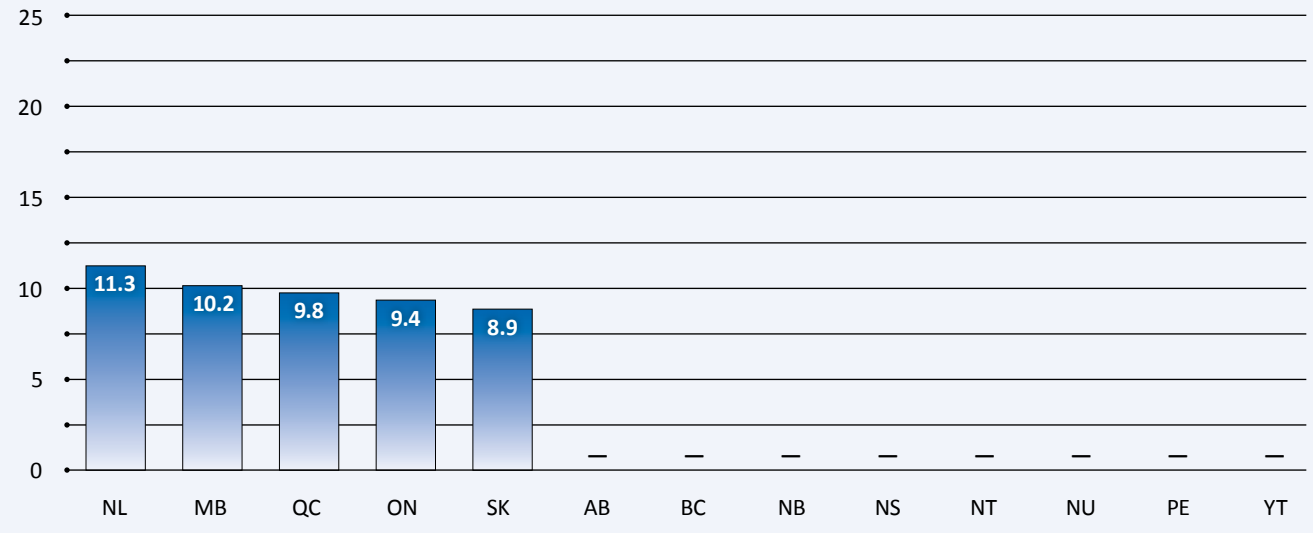
Percentage of adults (age ≥ 18) reporting drinking no alcohol in previous 12 months, by province/territory – CCHS 2011



Data source: Statistics Canada, Canadian Community Health Survey.

FIGURE 9

Percentage of adults (age ≥ 18) reporting exceeding low-risk drinking guidelines* in previous 12 months, by province/territory – CCHS 2011



"—" Data are not available for AB, BC, NB, NS, NT, NU, PE, YT.

Data source: Statistics Canada, Canadian Community Health Survey.

*Canadian Cancer Society guidelines.

Adult overweight and obesity

What are we measuring?

This indicator measures the percentage of the population age 18 years and older reporting height and weight that result in a Body Mass Index (BMI) of 25kg/m² or greater which is the overweight threshold, and 30kg/m² or greater which is the obesity threshold.

Why are we measuring this?

Obesity has been found to raise the risk of a number of cancers. According to a recent review by the World Cancer Research Fund, convincing evidence exists that excess body fat increases the risk of cancer of the colon and rectum, breast (in post-menopausal women), endometrium, esophagus, pancreas and kidney.[1]

The prevalence of obesity among both children and adults is on the rise in Canada.[33] Reporting on overweight and obesity rates and patterns across the country over time allows for monitoring progress of efforts meant to encourage healthy living and helps identify at-risk sub-populations.

What do the results mean?

52% of Canadians surveyed reported height and weight that places them in the overweight or obese categories (34% overweight and 18% obese) (Figure 10).

- According to recent published estimates based on the National Health and Nutrition Examination Survey, the rate of obesity among adults in the U.S. aged 20 years and older was 37% in 2009/2010.[34]
- Using measured BMI, Canada ranks fourth in prevalence of obesity among Organisation for Economic Co-operation and Development (OECD) countries, behind the U.S., Mexico and New Zealand. Using self-report data for Canada, the country ranks 10th out of 30 OECD countries.[35]
- British Columbia and Quebec had the lowest percentage of the population classified as overweight or obese at 47% and 50%, respectively. Nova Scotia and Newfoundland and Labrador continue to have among the highest percentages of overweight or obesity at 61% and 69.3%, respectively.

In general, a larger percentage of male respondents were categorized as overweight and obese, while a larger percentage of females were categorized as underweight. The differences in the normal range of BMI were less pronounced (Figure 11).

The Canadian Healthy Living Strategy has set a target of increasing by 20% the proportion of Canadians with "normal" body weight (BMI = 18.5 kg/m² to 24.9 kg/m²) by 2015 from a 2003 baseline. This translates to 56.0% classified as "normal" body weight, up from 46.7% in 2003.[2]

What is being done?

The Declaration on Prevention and Promotion by Canada's Ministers of Health and Health Promotion/Healthy Living was struck in 2010 to build upon the basic tenets of the Integrated Pan-Canadian Healthy Living Strategy. The Integrated Pan-Canadian Healthy Living Strategy addresses risk factors including physical inactivity, unhealthy eating and unhealthy body weights and suggests a framework for action.[2] The Declaration builds upon this and states that "the promotion of health and the prevention of disease, disability and injury are a priority and necessary to the sustainability of the health system."[36]

Three CLASP initiatives, CACO, Healthy Canada by Design, and the BETTER project, have been renewed through to the end of 2014 and have some component that addresses risk factors for overweight and obesity, including physical activity, nutrition, the built environment, social determinants of health and screening for overweight and obesity in primary care practices.[15]

The Canadian Obesity Research Investment Report presents patterns and gaps according to the most current and available research investment data from Canadian research funding agencies that is related to obesity research. It provides a baseline for planning and monitoring future obesity-related research investments.[37]

What should you be aware of about data and measurement?

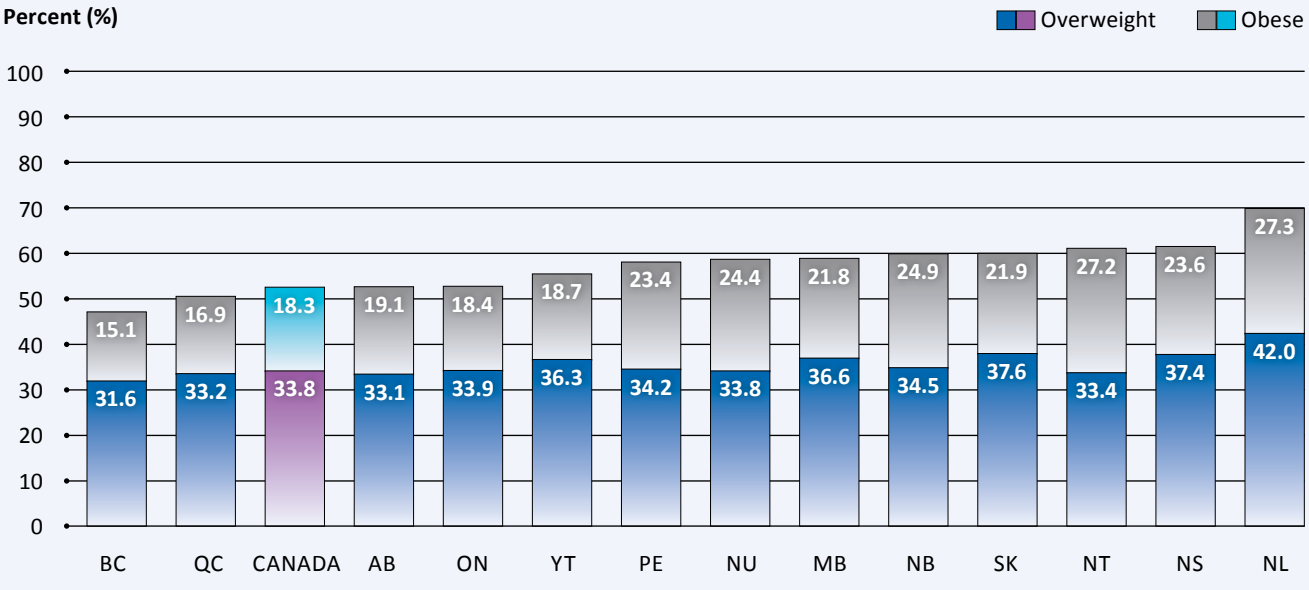
BMI was calculated using self-reported personal height and weight. Canadian studies that use measurement find the prevalence of obesity to be higher than what is measured in self-reported surveys (24.3% in the Canadian Health Measures Survey from 2007 to 2009).[38]

Respondents with a BMI of 25kg/m^2–29.9kg/m^2 were considered overweight; those with a BMI exceeding 30kg/m^2 were considered obese.[39-40]

Detailed calculation methodology is provided in the Technical Appendix (see page 175).

FIGURE 10

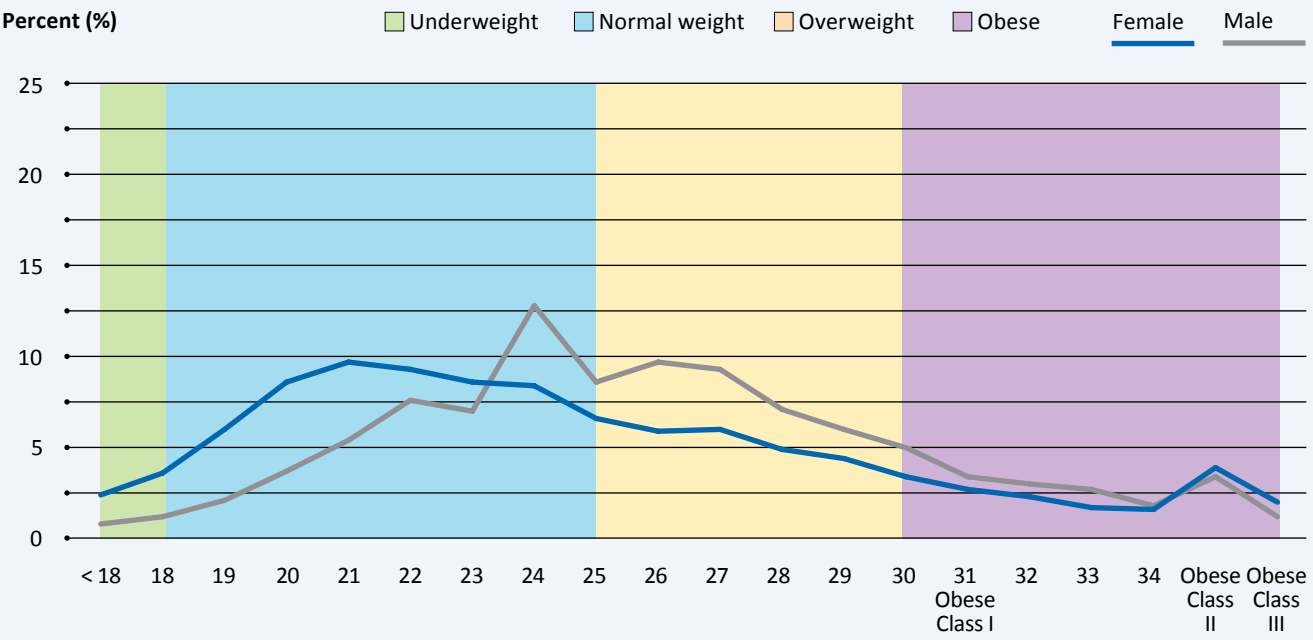
Percentage of adults (age ≥ 18) classified as overweight or obese, by province/territory – CCHS 2011



Data source: Statistics Canada, Canadian Community Health Survey.

FIGURE 11

Body Mass Index (BMI) distribution curves for adults (age ≥ 18), by sex, Canada – CCHS 2011



Data source: Statistics Canada, Canadian Community Health Survey.

Use of artificial tanning equipment

What are we measuring?

This indicator reports on the percentage of adults who use artificial tanning equipment by sex and age group.

Why are we measuring this?

Exposure to ultraviolet radiation damages the skin and can lead to skin cancer. Non-melanoma skin cancer (including basal cell carcinoma and squamous cell carcinoma) is the most common cancer in Canada. Reported incidence rates of non-melanoma are underestimated because most cancer agencies do not routinely collect data on the incidence of non-melanoma.[41]

Melanoma is the most serious form of skin cancer and incidence rates have been increasing in Canada, particularly among young adults (see page 156 for more information on melanoma).

The use of artificial tanning equipment, including tanning beds and lamps, is known to increase the risk of developing skin cancer, particularly when started before the age of 35.[42] Increased exposure to UV radiation during childhood and adolescence increases the risk of developing skin cancer later in life.[43]

A recent meta-analysis found a relative risk of 1.20 associated with people who have used tanning beds compared to those who have

never used them (95% confidence interval (CI), 1.08 to 1.34).[42]

Published studies have also shown that artificial tanning use increases the risk of developing non-melanoma skin cancer, particularly in people who were exposed at a younger age.[44]

What do the results mean?

Women are more likely to use artificial tanning equipment, in particular those younger than 25 years old.

- Based on a 2006 national survey, more than one quarter (27%) of women aged 16 to 24 reported using artificial tanning equipment over a one-year period (Figure 12).

Young people are reporting use of artificial tanning equipment and many were introduced to tanning by their parents.

- A recent survey conducted by Ipsos Reid for the Canadian Cancer Society of 1,476 middle school and high school students aged 12 to 17 in Ontario reported that 8% used tanning equipment, up from 5% in a similar survey done in 2006.[45] Among those in grades 11 and 12, 16% used tanning equipment, up from 7% in 2006. Among those students who reported using tanning equipment, 24% were introduced to tanning by their parents.

In Canada, overall reported tanning equipment use has significantly increased from 7.7% (95% CI, 6.8 to 8.7) in 1996 to 10.5% (95% CI, 9.0 to 12.0) in 2006.[46] In the United States, the age-adjusted proportion of adults reporting indoor tanning in the past 12 months was 5.6%, with higher rates among Caucasian women aged 18 to 25.[47]

What is being done?

Several organizations, including the Canadian Dermatology Association, American Academy of Dermatology, World Health Organization, Canadian Medical Association and Canadian Cancer Society, have released reports in support of a ban on indoor tanning among youth.[48-52]

Currently, four provinces (Nova Scotia, British Columbia, Newfoundland and Labrador, and Quebec) have passed legislation banning those under 18 or 19 from using an indoor tanning bed.[53-56] Ontario has also recently proposed a similar ban and the Prince Edward Island Department of Health and Wellness is planning to regulate the use of tanning beds for those under 18 years of age after an audit found tanning bed operators were not complying with guidelines to restrict use within this age group.[57-59] In 2012, the town of Oakville and Peel Region in Ontario passed by-laws to ban indoor tanning for those under 18 years of age.[60-61] In Quebec, it is also prohibited to specifically direct advertising for artificial tanning towards minors.[54] For more information on policies at the municipal level, go to the Prevention Policies Directory at http://www.cancerview.ca/preventionpolicies.

In the United States, California and Vermont have banned the use of indoor tanning beds for those 18 years and under, while 34 other states have restrictions on the use of tanning beds by young people.[48] Several other countries have bans targeted at lowering use among youths (definition varies), including Scotland, Germany, France and five states in Australia.[49]

In July 2010, the United States put into effect a 10% federal excise tax on indoor tanning services. A recent analysis in Illinois showed that 80% of salons surveyed charged this tax to their clients and that only 26% reported fewer clients after they began charging the tax.[62]

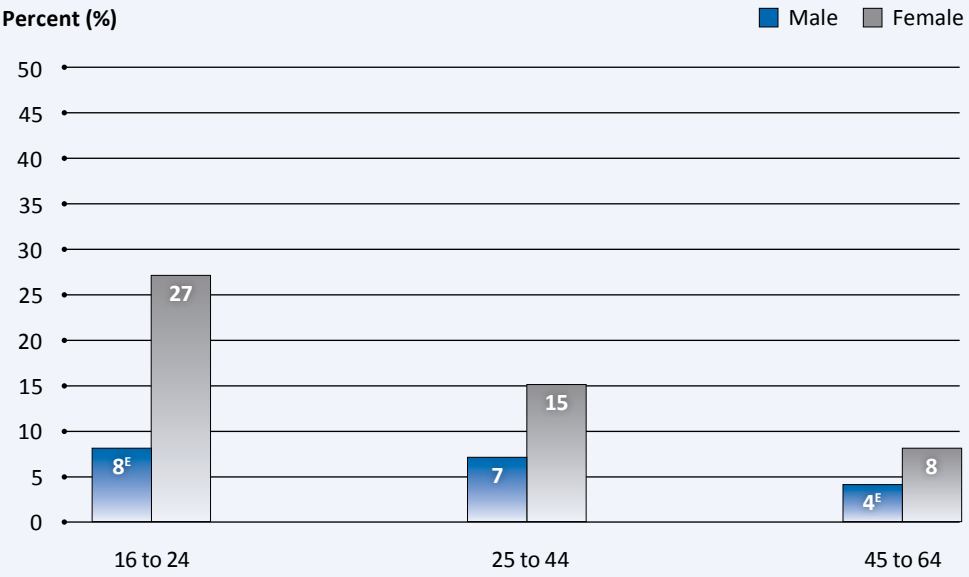
What should you be aware of about data and measurement?

The Second National Sun Survey was conducted in 2006. It surveyed 7,121 Canadians aged 16 years and older. The study population included all provinces and excluded the Territories. Interviews were conducted between August 2 and November 22, 2006.[46]

For details refer to the Technical Appendix on page 175.

FIGURE 12

Percentage of adults reporting their use of artificial tanning equipment, by sex and age group, Canada – 2006



[E] Interpret with caution due to a large amount of variability in the estimate. See Technical Appendix for more details.

Data source: 2006 Second National Sun Survey, National Skin Cancer Prevention Committee.

HPV vaccination uptake

What are we measuring?

This indicator measures the proportion of people in the targeted cohort to receive the first dose of the human papillomavirus (HPV) vaccination. The targeted cohort comprises females from schools (and specific grades/age groups) where the provincial HPV vaccination program has been offered.

Why are we measuring this?

Infection with Human Papillomavirus (HPV) causes nearly all cervical cancers as well as a significant proportion of anogenital cancers.[63] HPV is also linked to oropharyngeal cancer, which in recent years has seen increasing incidence in Canada (see Figure 30 on page 160).

In Canada 60% of HPV-attributable cancers were cervical cancer.[64]

HPV vaccines protect against high-risk HPV types (16 and 18), which are responsible for over 70% of cervical cancers.[63]

In 2007, the National Advisory Committee on Immunization released recommendations for the HPV vaccine,[65] and later that year the federal government announced funding for provinces and territories to implement HPV immunization programs. All provinces target females only.

Measuring and reporting on provincial HPV vaccination program uptake allows for identification of performance gaps and informs opportunities for increased efforts in prevention activities.

What do the results mean?

Uptake rates[b] of organized HPV vaccination programs varied by province/territory (Figure 13).

- Of provinces that are able to report on this indicator, the percentage of the target population included in vaccination programs in the 2008/09 school year that received the first dose of vaccination ranged from 88% in Newfoundland and Labrador to 52% in Manitoba.
- Northwest Territories and Prince Edward Island were unable to provide actual data and offered an estimate of participation rates. These estimates are within the range of actual data provided by other provinces/territories.

Uptake of HPV vaccination varied across different countries.

- In examining the 2011 HPV vaccination coverage in the U.S. among female adolescents aged 13 to 17, the Centers for Disease Control and Prevention (CDC) found that 53% of females received ≥1 dose while 35% received ≥3 doses.[66]
- In the United Kingdom and Australia, uptake of newly implemented organized HPV vaccination programs was high. The UK national HPV immunization program reported an uptake of 88% in their first implementation year (September 2008).[67] In Australia, organized HPV vaccination was first implemented in 2007, and among those 12 to 13 year-old girls who received the vaccine as part of the school-based program, approximately 73% received all three doses, while 83% only received one dose.[68]

What is being done?

All provinces and territories have implemented an HPV vaccination program. Ontario, Nova Scotia, Newfoundland and Labrador and Prince Edward Island were the first provinces to implement a school-based HPV vaccination program, with roll-out starting in 2007; other provinces started their programs in 2008. By 2010, all provinces and territories had implemented a school-based program (Table 1).

Target populations for the vaccination programs vary by province/territory with the youngest being 4th grade (approximately 8 to 10 years old) and the oldest being 8th or 9th grade (approximately 13 to 15 years old). Catch-up cohorts were established in 9 of 13 provinces/territories to offer the vaccine to older age groups. Catch-up cohorts are typically one to four grades ahead of the target population. Quebec and Northwest Territories opened their catch-up program to females in the general population under the ages of 18 and 22, respectively. Provincial and territorial programs continue to be rolled out, allowing for more females in the target age range to be offered vaccination.

In 2012, the National Advisory Committee on Immunization updated the recommendations to include sub-groups of males.[69] Provincial and territorial programs continue to target females only.

The Surveillance and Epidemiology Division of the Public Health Agency of Canada, in direct collaboration with the Pan-Canadian Cervical Screening Initiative, is in the process of drafting quality indicators for HPV vaccination and assessing readiness for the measurement of these indicators across provinces. The orientation of these activities is toward future reporting of a core set of indicators for cervical cancer control.

b) The denominator for the uptake rate reported on here is the number of target grade (which varies by province) girls in schools where the provincial HPV vaccination program has been offered. It is not the entire female population within the targeted age range for the province.

What should you be aware of about data and measurement?

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 the three doses (unless otherwise specified).

Alberta and Ontario data indicate the percentage of target population to receive all three doses of the series; it is expected that their results for the first dose would be higher than as currently shown.

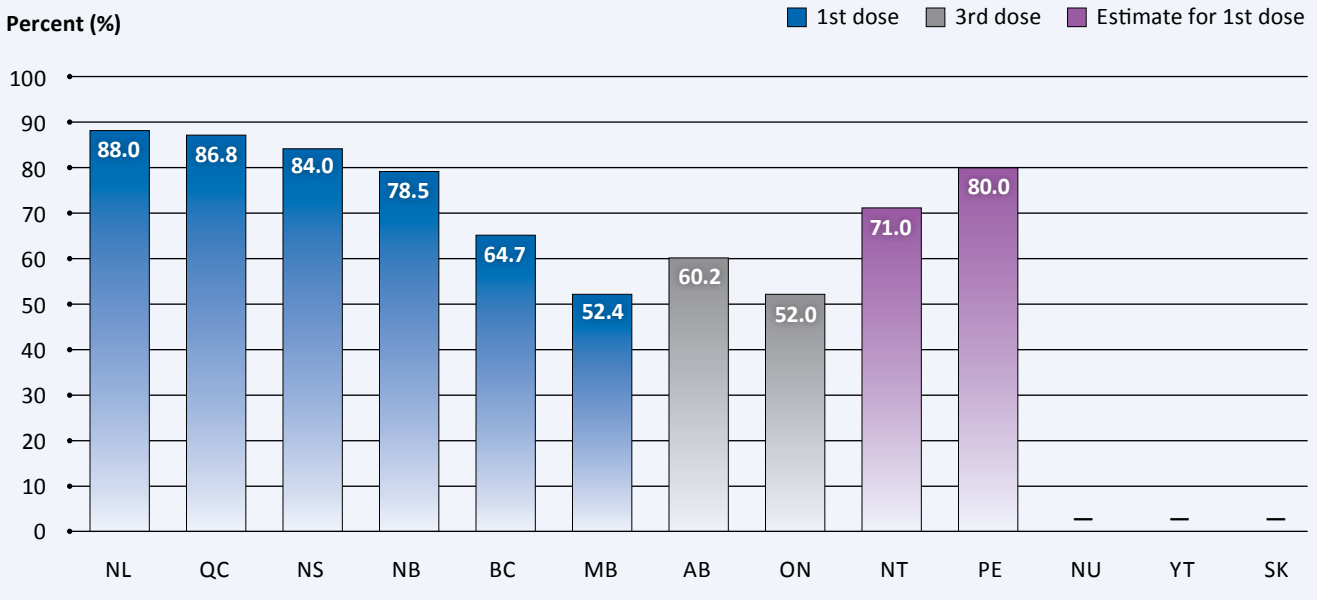
Provincial/territorial programs have different target populations, implementation plans and associated phases. As provinces continue with the implementation of the vaccine programs, it is expected that percentages will increase and interprovincial variation will decrease.

Northwest Territories and Prince Edward Island were able to provide only estimates of the number vaccinated; these numbers should be interpreted with caution.

Detailed calculation methodology is provided in the Technical Appendix (see page 175).

FIGURE 13

Percentage of cohort immunized* with first dose of HPV vaccine, by province/territory – 2008/2009 school year



"—" Data are not available for NU, YT, SK.

AB and ON data are for 3rd dose.

NT and PE data are estimates.

*Cohort immunized is unique to the province and implementation stage; it includes only schools/grades where programs have been offered.

Data source: Pan-Canadian Cervical Screening Initiative.

TABLE 1

Implementation of province-wide organized HPV vaccination programs by province

	Date of first implementation	Target age group/female cohort immunized	Catch-up program	Catch-up program details
BC	Sept 2008	Grade 6	Yes*	Grade 9
AB	Sept 2008	Grade 6	Yes	Grade 9
SK	Sept 2008	Grade 6	Yes	Grade 7
MB	Sept 2008	Grade 6	No	n/a
ON	Sept 2007	Grade 8	No**	n/a
QC	Sept 2008	Grade 4 (Pr. 3), Grade 9 (Sec. 3)	Yes	< 18 years old
NB	Sept 2008	Grade 7	Yes	Grade 8
NS	2007	Grade 7	No	n/a
PE	2007	Grade 6	Yes	Grade 9
NL	Sept 2007	Grade 7	Yes	Grade 9
NT	Sept 2009	Grade 5	Yes	All females < 22 years old
YT	Nov 2009	Grade 6	Yes	Grade 7, Grade 8
NU	2010	Grade 6 or ≥ 9 years old	No	n/a

*BC recently completed catch-up and as of 2011/12, the vaccine will no longer be offered to grade 9 females.

**ON offers extended eligibility to grade 9 females who have received at least one dose in grade 8.

Hepatitis B virus infection

What are we measuring?

This indicator reports on the incidence of hepatitis B virus (HBV) infection in Canada.

Why are we measuring this?

Worldwide, 80% of liver cancer cases are caused by chronic infection with HBV.

About 10% of adults infected with HBV will become carriers and develop chronic HBV.

The younger a person is when infected with HBV, the higher the chance of developing chronic infection.[70] While chronic HBV can be managed, it is transmissible, and carriers are at a high risk for developing complications, including cirrhosis and liver cancer.

Chronic HBV infection is high in certain countries, particularly those in Asia.[70] While there is a relatively low incidence of liver cancer in Canada, it has been increasing in recent years (see Figure 23 on page 154).

Regular screening of carriers of HBV for liver cancer and cirrhosis can lead to early detection and treatment.

Acute HBV infection can be prevented through immunization.

What do the results mean?

While acute infection with HBV has been decreasing, the rate of Canadians with chronic HBV appears to be on the rise.

- In 2008, the reported rate of acute hepatitis B infection was 1.7 per 100,000 of Canadians (Figure 14). The rate remained relatively stable in the 2000s after dramatic decreases since 1990, when the rate was 10.8 per 100,000 people.
- From 2004 to 2008, the reported rate of chronic HBV infections increased from 0.2 per 100,000 people to 4.3 per 100,000 people (Figure 15).
- The United States has seen similar decreases in acute HBV incidence since the 1990s.[71]

Decreases in acute HBV cases can largely be attributed to the introduction of routine HBV immunization, which was recommended in 2006 by the National Advisory Committee on Immunization.[72] Incidence of acute HBV among children aged 10 to 19 years has decreased dramatically since the adoption of universal immunization.[73]

While fewer acute infections result in a smaller pool of people eligible to develop chronic HBV infection, it will take some time before decreases in rates of chronic infection are seen. As well, rates of acute HBV among adults have not declined as dramatically as those seen among younger populations due to increased number of immigrants from countries in which HBV is endemic.

While there are many known risk factors for liver cancer, if the incidence rates of acute HBV continue to fall and the rates of chronic HBV eventually follow, the incidence of liver cancer may fall as well.

What is being done?

All provinces and territories have implemented universal HBV vaccination programs since the 1990s (Table 2). British Columbia, New Brunswick and Prince Edward Island immunize infants, while the rest target children or adolescents. The overall reported immunization rate was 17% in 2007 and increased to 70% in 2011;[74] however, rates in the 95% range have been reported for children and adolescents in some provinces.[73]

Since 2001, when British Columbia began to offer universal vaccination to both infants and adolescents, the reported incidence of acute HBV has continued to decline compared to other provinces, where the rates appear to have stabilized.[75]

Depending on the province, immunization programs are also offered to high-risk populations, including hemophiliacs, hemodialysis patients, transplant recipients, intravenous drug users and certain occupational groups (e.g., health care workers), among others. According to a 2006 survey commissioned by the Public Health Agency of Canada, about 30% of the general adult population is immunized against HBV, with those from higher-risk populations reporting rates over 50%.[76]

The World Health Organization has recommended universal HBV immunization of infants, and over 170 countries worldwide have included HBV as part of their national program. Among OECD countries with national programs, 95% of children over 2 years old are immunized against HBV.[77]

Routine vaccination of all children has been in place in the United States since 1991.[71]

What should you be aware of about data and measurement?

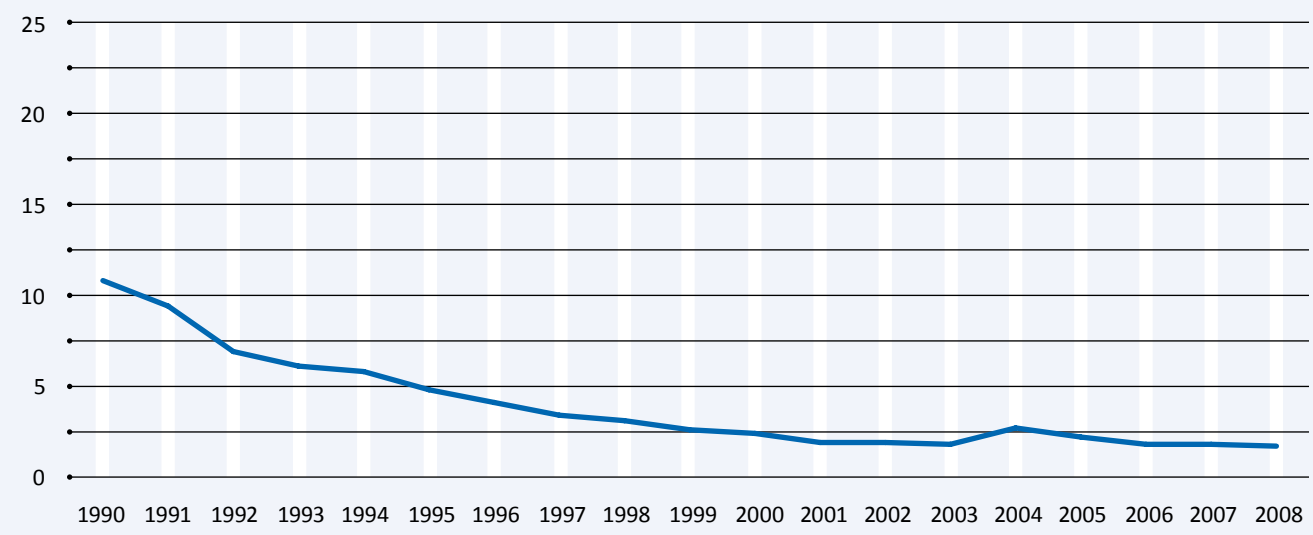
HBV has been reportable through the Canadian Notifiable Disease Surveillance System (CNDSS) since 1969; however, reporting practices may differ across provinces and territories. While all jurisdictions report acute HBV infections, only some report chronic HBV infections.

Reported chronic HBV infections are those cases with confirmed positive HBV antigen or HBV for more than six months.[78]

Detailed calculation methodology is provided in the Technical Appendix (see page 176).

FIGURE 14

Rate of reported acute/indeterminate hepatitis B virus infection, Canada – 1990 to 2008

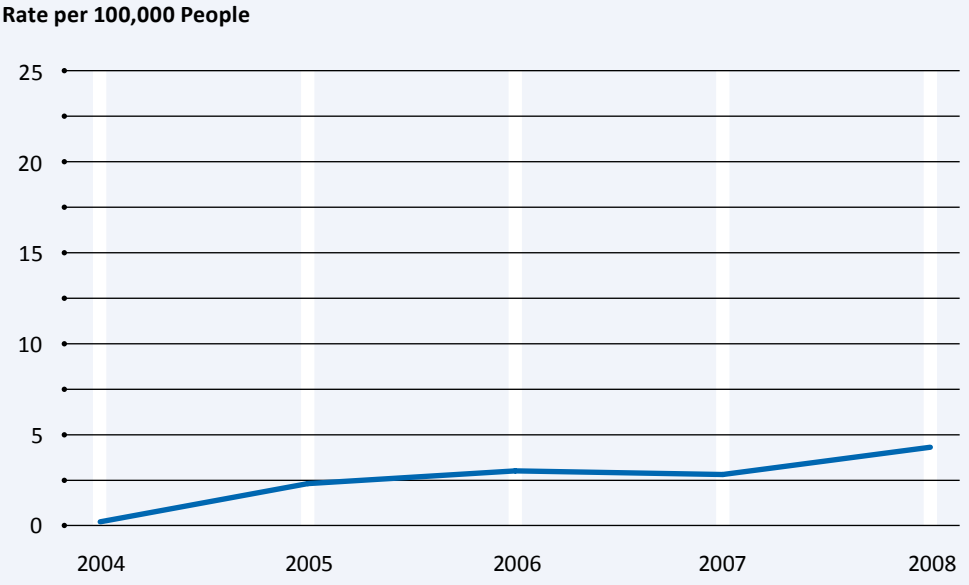


Data as of April 2011.

Data source: Canadian Notifiable Disease Surveillance System, Public Health Agency of Canada.

FIGURE 15

Rate of reported chronic/carrier hepatitis B virus infection, Canada – 2004 to 2008



Data as of April 2011.

Data source for chronic/carrier hepatitis B cases: Canadian Notifiable Disease Surveillance System, Public Health Agency of Canada.

Data source for population: Table 051-0001 – Estimates of population by age group and sex for July 1, Canada, provinces and territories, annual, Statistics Canada.

TABLE 2

Provincial/territorial hepatitis B immunization schedules for infants and children

Province	Age or school grade
National Advisory Committee on Immunization	Recommendation: Infancy (3 doses) or pre-teen/teen 2-3 doses
British Columbia	2, 4, 6 months or grade 6 catch-up
Alberta	Grade 5
Saskatchewan	Grade 6
Manitoba	Grade 4
Ontario	Grade 7
Quebec	Grade 4
New Brunswick	0, 2, 6 months
Nova Scotia	Grade 7
Prince Edward Island	2, 4, 15 months
Newfoundland	18 months
Northwest Territories	12, 18 months
Yukon	12, 18 months
Nunavut	12, 18 months or grade 12 catch-up

Source: Public Health Agency of Canada [Internet]. Publicly funded Immunization Programs in Canada – Routine Schedule for Infants and Children including special programs and catch-up programs (as of June 2012) [about 1 page]. Ottawa: Public Health Agency of Canada; 2012 (accessed 7 Sept 2012). Available from: http://www.phac-aspc.gc.ca/im/ptimprog-progimpt/table-1-eng.php.

Hepatitis C virus infection

What are we measuring?

This indicator reports on the incidence of hepatitis C infection in Canada.

Why are we measuring this?

Chronic infection with hepatitis C virus (HCV) is linked to liver cancer. In about 75% to 85% of people infected with HCV, the disease will become chronic and can develop into liver cancer or cirrhosis.[79] HCV infection is the leading cause of liver transplant.

While there is a relatively low incidence of liver cancer in Canada, it has been increasing in recent years (see Figure 23 on page 154).

Currently, there is no HCV vaccine available; however, effective drug treatments for managing symptoms are available.[80]

What do the results mean?

There has been a decrease in reported HCV infection in recent years.

- From 2005 to 2009, the reported rate of hepatitis C infection in Canada decreased from 40.5 per 100,000 people in 2005 to 33.7 per 100,000 people in 2009 (Figure 16).

Adult males are at highest risk for HCV infection.

- In 2009, the reported rate of HCV infection was 43.2 per 100,000 males, while it was 23.6 per 100,000 females. Males aged 40 to 59 years old had the highest reported HCV rate at 83.1 per 100,000 (Figure 17).

In 2009, it is estimated that 16,000 new, acute HCV infections occurred in the United States. Because many acute cases are asymptomatic, HCV infections are rarely reported.[79] By contrast, more than 11,000 HCV infections (including acute and chronic cases) were reported in Canada that year.

In 2007, the prevalence of HCV in Canada was 0.7%.[81] In the United States, estimates range from 1.3% to 1.9%.[79] In most European countries, the reported prevalence ranges between 0.5 and 2.0%.[82]

While there are many known risk factors for liver cancer, if the incidence of HCV continues to fall, the incidence of liver cancer may fall as well.

What is being done?

Because many cases of HCV infection are asymptomatic, testing of high-risk groups is recommended. Recently, in the United States, the Centers for Disease Control and Prevention recommended that people born between 1945 and 1965 be tested for HCV.[83]

What should you be aware of about data and measurement?

HCV is reportable through the Canadian Notifiable Disease Surveillance System (CNDSS); however, reporting practices may differ across provinces and territories. Reported rates do not distinguish between acute and chronic infections.

Detailed calculation methodology is provided in the Technical Appendix (see page 176).

FIGURE 16

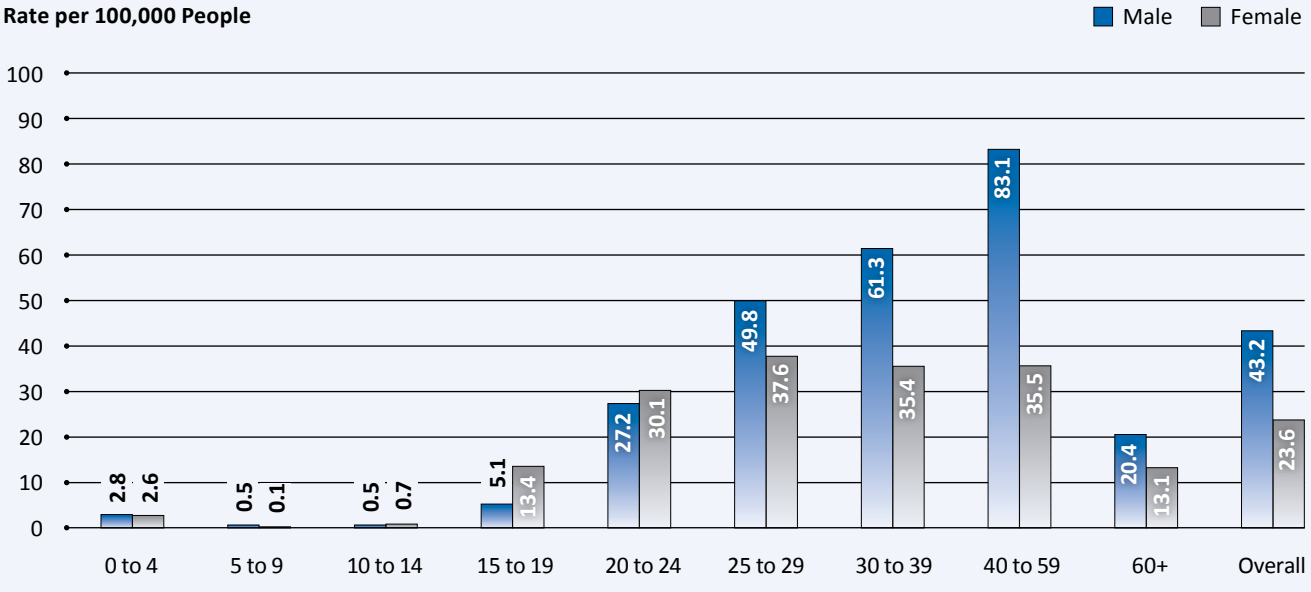
Rate of reported hepatitis C virus infection, Canada – 2005 to 2009

Does not distinguish between acute and chronic hepatitis C infection.

Data source: Hepatitis C and STI Surveillance and Epidemiology Section, Community Acquired Infections Division, Centre for Communicable Diseases and Infection Control, Public Health Agency of Canada, 2010.

FIGURE 17

Rate of reported hepatitis C virus infection, by sex and age group, Canada – 2009



Does not distinguish between acute and chronic hepatitis C infection.

Data source: Hepatitis C and STI Surveillance and Epidemiology Section, Community Acquired Infections Division, Centre for Communicable Diseases and Infection Control, Public Health Agency of Canada, 2010.

Screening

Screening

Screening has been shown to reduce both mortality and incidence of cervical and colorectal cancer, and mortality from breast cancer.

Regular screening has been identified as an effective strategy for reduction of mortality from cervical, colorectal and breast cancer through early detection, thus allowing for more successful treatment. For example, evidence from clinical trials and systematic reviews of the literature illustrate that screening can reduce the incidence, as well as the mortality, of colorectal cancer through the early detection of pre-cancerous polyps.[84-87] For these outcomes to be realized, high-quality screening needs to be accessed by a large proportion of the target population.

This chapter of the Report presents indicators for cervical, breast and colorectal cancer screening. As updated information on cervical cancer screening participation rates are not anticipated until 2013, this year's Report presents cervical cancer screening participation and retention rates, as presented in the *2011 System Performance* Report. Data presented here are from the inaugural *Cervical Cancer Screening in Canada: Monitoring Program Performance 2006 to 2008* report, prepared by the Pan-Canadian Cervical Cancer Screening Initiative, Monitoring Program Performance Working Group.

For breast cancer, participation rates in breast cancer screening within an organized program are presented and were obtained from the provincial breast screening programs.

Supplementary data on self-reported breast cancer screening, which includes screening taking place within an organized program (programmatic screening) and opportunistically (non-programmatic screening) are also presented.

For colorectal cancer (CRC), this year's Report presents data on self-reported CRC screening from the *Colon Cancer Screening in Canada* survey.[c] Future *Cancer System Performance Reports* will present participation in organized CRC screening programs across the country. As of 2012, all provinces have announced or were running organized CRC screening programs or pilot programs.

c) The Colon Cancer Screening in Canada surveys were commissioned by the Canadian Partnership Against Cancer's National Colorectal Cancer Screening Network. The survey polled Canadians aged 45 to 74 on their understanding and attitudes towards getting checked for colon cancer. The 2011 survey conducted by Ipsos Reid on behalf of CPAC builds on results from a related survey conducted in 2009. The 2011 survey used a combination of telephone and online methodologies and the margin of error for sampling variability was +/-1.5 percentage points, 19 times out of 20. Data were weighted to ensure that the sample's regional and age/sex/education composition reflects that of the actual Canadian population according to census data.

The Partnership, in collaboration with its partners, is working to create infrastructure to monitor, evaluate and ultimately improve screening in Canada.

Three national networks, the National Colorectal Cancer Screening Network (NCCSN), the Canadian Breast Cancer Screening Initiative (CBCSI) and the Pan-Canadian Cervical Screening Initiative (PCCSI), are working to promote and advance screening for their respective disease sites. Each network measures a range of quality indicators to help monitor and evaluate progress and identify opportunities for improvement.

Screening indicator	Summary of national situation	Trends
Cervical cancer screening rates	Screening participation rate was relatively comparable across provinces, ranging from 64% in Saskatchewan to 76% in Alberta for women having at least one Pap test in the three-year period 2006 to 2008. The participation rate in the two provinces that corrected for hysterectomy was 72% in Ontario and 80% in British Columbia.	Baseline screening program participation data suggest that coverage is high as has historically been the case according to self-report.[88]
Breast cancer screening rates	Participation in organized breast cancer screening programs varies by province, ranging from 6% in Alberta to 56% in Quebec, Manitoba and New Brunswick. Data based on self-report show that coverage is much higher with 72% of women reporting a screening mammogram in the past two years, ranging from 58% in Prince Edward Island to 75% in New Brunswick.	Two-year participation rates for breast screening programs show an increase in most provinces for years 2003 to 2004, 2005 to 2006, 2007 to 2008.[89]
Self-reported colorectal cancer screening rates	In 2011, the percentage of Canadians who were up to date on their CRC screening (based on self-report) ranged from 22% in Newfoundland and Labrador to 64% in Manitoba.	The proportion of average-risk Canadians age 50 to 74 who reported being up to date for CRC screening has increased between 2009 and 2011 from 38% to 43%.

Cervical cancer screening

What are we measuring?

Two indicators are presented that examine cervical cancer screening rates within provincial screening programs. They include:

- the percentage of women aged 20 to 69 who had at least one Pap test in a three-year period, also known as the "participation rate"; and
- the percentage of women aged 20 to 69 who had a Pap test within three years after a negative Pap test, known as the "retention rate".

Why are we measuring this?

Approximately 1,300 women are diagnosed with cervical cancer in Canada each year, and the case fatality rate is over 25%.[90]

Infection with high-risk types of HPV causes almost all cases of cervical cancer, with approximately 70% of cases caused by HPV types 16 and 18.[62]

Cervical cancer screening using cervical cytology (Pap smear) has been the primary reason for the decline in cervical cancer incidence and mortality in Canada and other developed countries.[91-92]

Cervical cancer screening can lead to early detection of pre-cancerous lesions before they develop into invasive cervical cancer, thereby reducing both cervical cancer incidence and mortality.[93-94]

Not being screened for cervical cancer at the recommended time interval is a major risk factor for developing cervical cancer.[95] A meta-analysis showed that on average, 53.8% of women diagnosed with invasive cervical cancer had inadequate screening histories and of these, 41.5% were never screened.[94]

What do the results mean?

The average percentage of women aged 20 to 69 who had at least one Pap test within a provincial program in a three-year period (the "participation rate") from 2006 to 2008 was 70% (74% when corrected for hysterectomy).

- The percentage of women who had at least one Pap test in the three-year period ranged from 64% in Saskatchewan to 76% in Alberta. The participation rate corrected for hysterectomy was 72% in Ontario (age-adjusted) and 80% in British Columbia (Figure 1). Data for Ontario are available for 2008 to 2010 and show no change in the participation rate (72%).[96]
- As yet, there are no national targets in Canada for cervical cancer screening participation or retention rates.
- Keeping in mind that target age groups, screening intervals and eligibility criteria may vary across countries, provincial cervical cancer screening participation rates compare with those of other countries, ranging from 71% to 79% in Australia, Finland, Norway, the United Kingdom and Iceland.[97-98]

Participation in cervical cancer screening declined with age.

- Among women aged 20 to 29, 80.7% underwent at least one Pap test in a three-year period compared to 50.6% of women aged 60 to 69. However, this may be due to a higher proportion of older women being ineligible for cervical cancer screening due to having had a hysterectomy.
- When rates were corrected for hysterectomy, participation varied little across age groups although participation remained lowest for women aged 60 to 69 (Figure 2). Provincial and territorial guidelines recommend stopping screening at age 69 (or older in some provinces); guidelines from the United States Preventative Services Task Force (USPSTF) recommend discontinuing screening after age 65, providing women have had adequate recent screening with normal Pap smears.[99]

The percentage of women aged 20 to 69 who had a Pap test within a provincial program within three years after a negative Pap test (the "retention rate") was 79.6% (Figure 3).

- Retention ranged from 75% in Saskatchewan to 87% in Alberta.
- Retention also decreased with age. Retention in the 20 to 29 age group was 82%, and in the 60 to 69 age group it was 72% (data not shown).

What is being done?

Canadian cervical cancer screening guidelines are currently under revision by the Canadian Task Force on Preventive Health Care. Provincial guidelines have also been recently updated or are currently under review. Revised guidelines across provinces recommend that screening be

initiated at age 21, a change from the previous recommendation of age 18.

The Pan-Canadian Cervical Screening Initiative (PCCSI), which held its inaugural meeting in June 2009, provides a national forum for discussion and action to improve cervical cancer control. Membership includes provincial and territorial government and cancer program representatives, the Public Health Agency of Canada, the Canadian Cancer Society, non-government and related professional organizations.

The report *Cervical Cancer Screening in Canada: Monitoring Performance 2006 to 2008* represents one early strategy that the Initiative has undertaken. The goal of this results report, which was released in 2011 and is the first of its kind in Canada, is to provide information on the performance of cervical cancer screening programs across Canada according to a standardized set of quality indicators to facilitate comparisons across the country and to identify gaps in data availability.

The second such results report is planned for publication early in 2013 and will include aggregated data from 2009 to 2011.

HPV testing and HPV vaccination programs implemented across the country may have an impact on cervical cancer screening guidelines. Moving forward, PCCSI will continue to foster the implementation and further development of cervical cancer screening programs, and focus on integrating screening with HPV vaccination, testing and surveillance initiatives.

What should you be aware of about data and measurement?

Data for this indicator come from *Cervical Cancer Screening in Canada: Monitoring Program Performance 2006 to 2008.*[100]

Data for women age 20 to 69 for the years 2006, 2007 and 2008 were provided by the provincial screening programs in Newfoundland and Labrador, Nova Scotia, Ontario, Manitoba, Saskatchewan, Alberta, and British Columbia.

The participation rate for Ontario and British Columbia was adjusted for women who have had a total hysterectomy. As women who have undergone a total hysterectomy do not require cervical screening, adjusting for hysterectomy provides a more accurate estimate of participation. These adjustments for the two provinces were made using slightly different methodologies. Ontario adjusted for hysterectomy by excluding women who had a prior hysterectomy from the numerator and denominator. British Columbia adjusted the denominator based on historical hysterectomy rates within the province.

For the participation rate indicator, Newfoundland and Labrador provided data from 2005 to 2007, and Alberta provided data for two health regions (approximately 40% of the population).

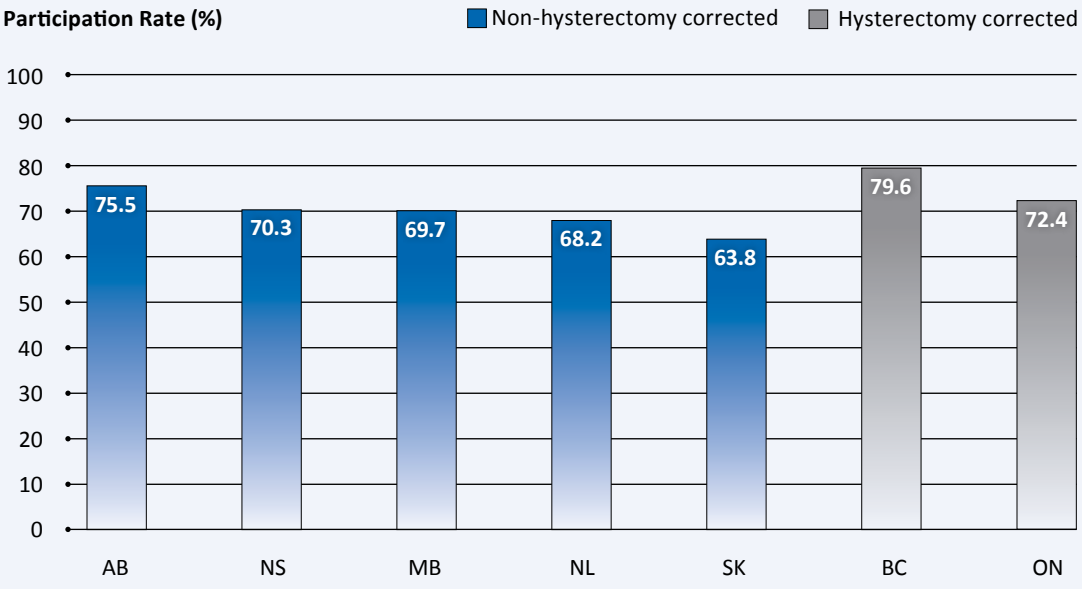
For the retention rate indicator, Newfoundland and Labrador provided data for 2004, and Alberta provided data for two health regions (approximately 40% of the population). Because women may have had a Pap test in a non-included area of the province, retention rates in Alberta may be underestimated.

Quebec does not have an organized cervical cancer screening program. The most recently available data for Quebec on cervical screening are from the 2008 Canadian Community Health Survey in which the percentage of Quebec women aged 18 to 69 who reported having a Pap test within the past three years was 74.1%, compared to a Canadian average of 78.5%.

Detailed calculation methodology is provided in the Technical Appendix (see page 176).

FIGURE 1

Percentage of women (aged 20 to 69 years) who had at least one Pap test within a three-year period, by province, from 2006 to 2008



ON and BC data are corrected for hysterectomy.

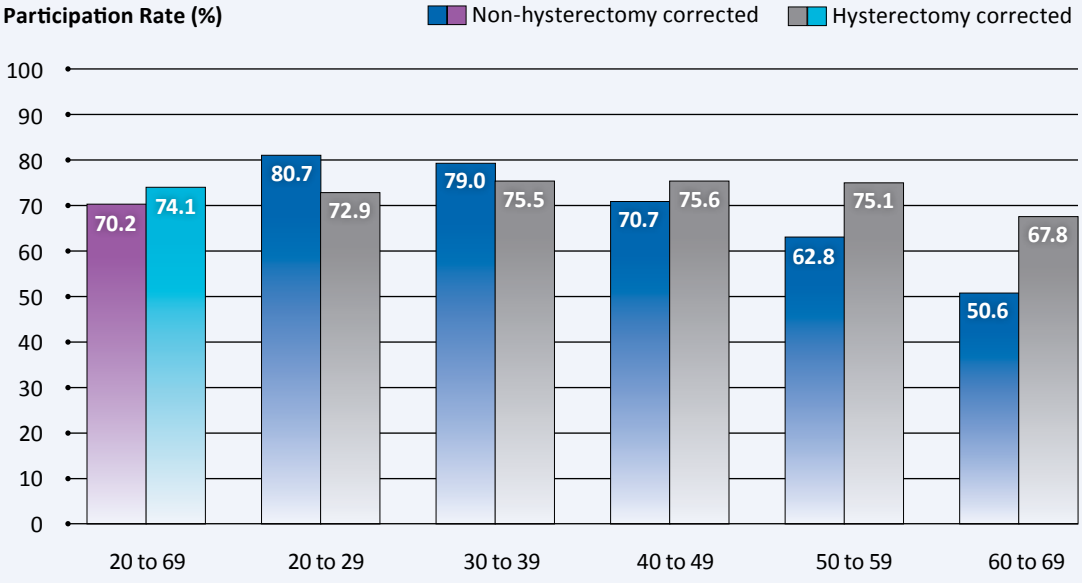
NL data are for 2005 to 2007.

AB data are for the areas in which the organized program operated during these years (= 40% of the population).

Data source: Provincial screening programs, Pan-Canadian Cervical Screening Initiative.

FIGURE 2

Percentage of women who had at least one Pap test within a three-year period, by age, from 2006 to 2008, provinces combined



Data includes SK, NL, NS, MB and AB (non-hysterectomy corrected), BC and ON (hysterectomy corrected).

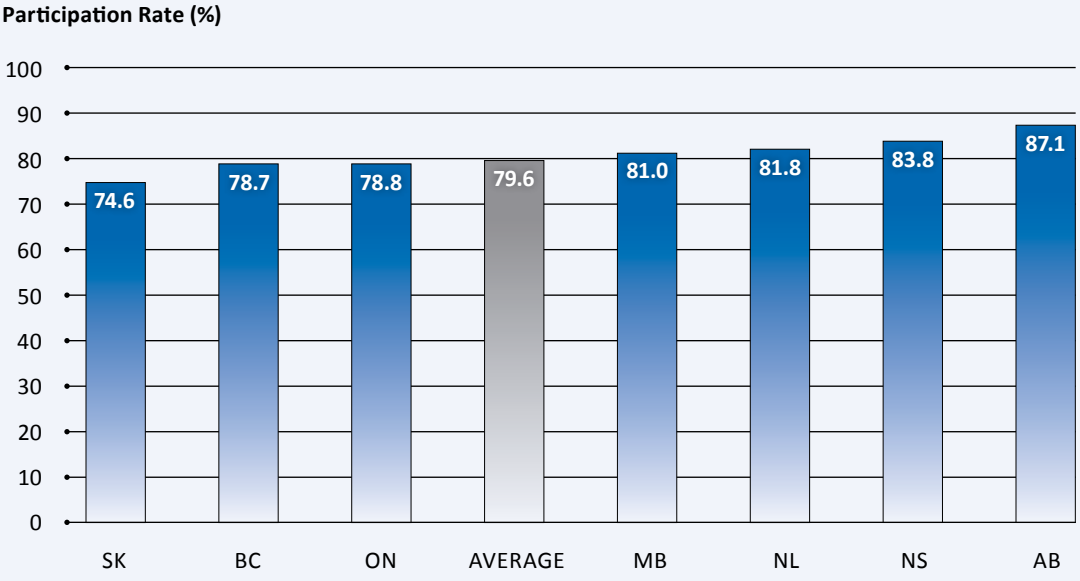
NL data are for 2005 to 2007.

AB data are for the areas in which the organized program operated during these years (= 40% of the population).

Data source: Provincial screening programs, Pan-Canadian Cervical Screening Initiative.

FIGURE 3

Percentage of women (aged 20 to 69 years) who had a Pap test within three years after a negative Pap test, by province, from 2004 to 2005



ON data are for 2003 to 2006 (= 85% of all Pap tests performed in the province).

NL data are for 2004.

AB data are for the areas in which the organized program operated during these years (= 40% of the population).

Data source: Provincial screening programs, Pan-Canadian Cervical Screening Initiative.

Breast cancer screening

What are we measuring?

This indicator measures the percentage of women aged 50 to 69 who were screened for breast cancer in an organized provincial breast cancer screening program in the past two years, also known as the "participation rate."

Why are we measuring this?

Breast cancer is the most common cancer among Canadian women, accounting for over one-quarter (25.6%) of new female cancer cases and 14% of female cancer deaths in 2012.

Widespread adoption of mammography screening has contributed to a decline in mortality from breast cancer.[101]

Evidence from clinical trials shows a significant reduction in deaths from breast cancer among women who had been randomized to a screening intervention relative to those receiving usual care.[102-107]

Organized breast cancer screening programs were established across Canada with the goal of identifying the disease early in asymptomatic women.

Presently, organized breast cancer screening programs are offered in all provinces and territories with the exception of Nunavut.

What do the results mean?

Participation in organized breast screening programs varies by province.

- The percentage of women aged 50 to 69 who were screened within an organized provincial screening program for the latest available time period (varying between 2008 and 2010) ranged from 6% in Alberta to 56% in Quebec, New Brunswick and Manitoba (Figure 4).
- The participation rate for Alberta is based only on women screened through the Screen Test Program, an organized program that conducts approximately 10% to 12% of screening mammograms in the province, of which 65% are performed in mobile units in rural areas.
- In Alberta, approximately 90% of women get their mammography through the Alberta Society of Radiologists (ASR). The participation rate, including data from the ASRs and the Screen Test Program, is 57.3%.
- In 2006, the Canadian Breast Cancer Screening Initiative (CBCSI) established a set of quality measures and targets that could be used to monitor and evaluate the performance of organized breast cancer screening programs in Canada. As adequate participation in organized breast screening is necessary for programs to be successful in reducing mortality from breast cancer, programs have set a target participation rate of 70% for women aged 50 to 69 over a two-year period.[108]

Overall breast cancer screening, including programmatic and non-programmatic screening, can be estimated from self-reported survey data.

- In 2008, 72% of Canadian women aged 50 to 69 eligible for screening reported having had a screening mammogram in the past two years.
- Self-reported breast cancer screening rates ranged from 58% in Prince Edward Island to 75% in New Brunswick (Figure 5).

What is being done?

National breast screening guidelines disseminated by The Canadian Task Force on Preventive Health Care have recently been revised and recommend that women aged 50 to 74 at average risk for breast cancer be routinely screened with mammography every two to three years.[109]

What should you be aware of about data and measurement?

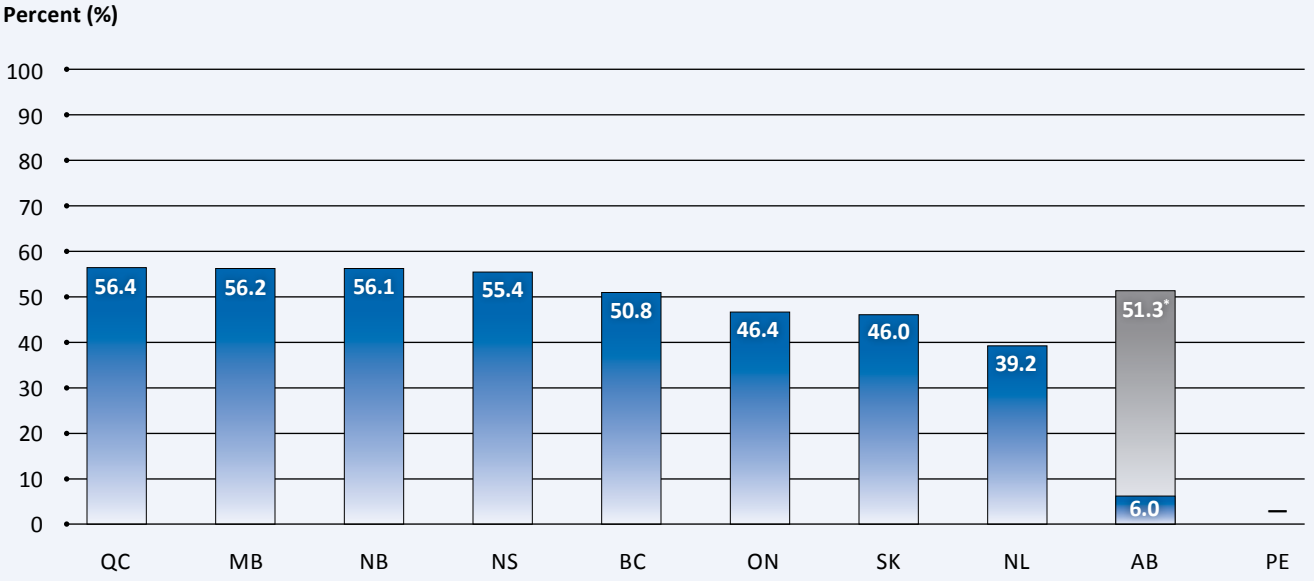
A recent study compared participation in programmatic breast cancer screening and screening conducted outside of an organized program with self-reported screening rates from the CCHS. The analysis showed that self-reported breast cancer screening rates in the CCHS closely approximate the total rate of screening taking place within an organized program and opportunistically.[110]

Prince Edward Island has an organized breast screening program but was unable to provide data for this report.

Detailed calculation methodology is provided in the Technical Appendix (see page 177).

FIGURE 4

Percentage of women (aged 50 to 69) who participated in an organized breast cancer screening program in the past two years, by province – 2009 to 2010



Notes: Data for MB are for April 2008 to March 2010. Data from QC are for 2009. Data from ON are for 2008 to 2009.

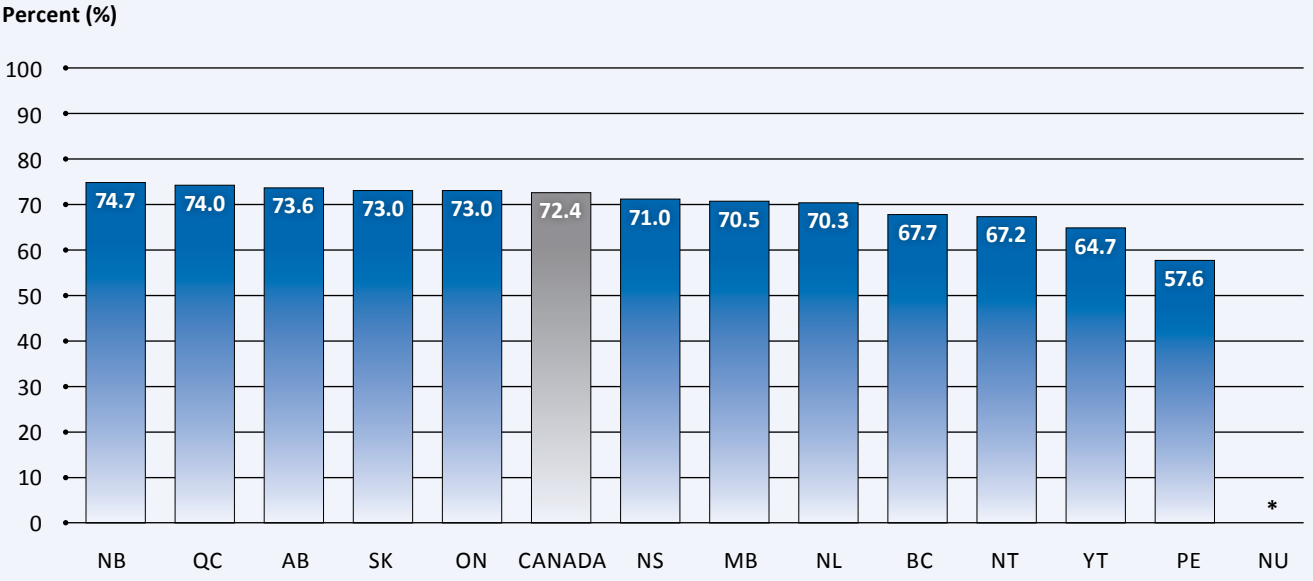
*In Alberta, the participation rate of 6% is for the Screen Test Program. Also shown on the graph is the contribution of screening by the Alberta Society of Radiologists (ASR) which would bring the overall participation rate to 57.3% in 2009 to 2010.

"—" Data for PE are not available.

Data source: Provincial breast cancer screening programs.

FIGURE 5

Percentage of eligible women (aged 50 to 69) reporting a screening mammogram in the past two years, by province/territory – CCHS 2008



Note: A woman was deemed 'eligible' for screening mammography if her reason for going for mammography was NOT one or the following: to investigate a previously detected lump or breast problem, as a follow-up to breast cancer treatment.

*Suppressed due to statistical unreliability caused by small numbers.

Data source: Statistics Canada, Canadian Community Health Survey.

Colorectal cancer screening

What are we measuring?

This indicator examines the percentage of the population aged 50 to 74 who are up to date with their colorectal cancer (CRC) screening for asymptomatic reasons based on self-reported data from the 2009 and 2011 Colon Cancer Screening in Canada surveys.

"Up to date" is defined as having had a fecal test within the previous two years and/or colonoscopy/sigmoidoscopy within the previous five years. Fecal test includes both guaiac tests and fecal immunochemical tests, also called FIT.

The Colon Cancer Screening in Canada surveys were commissioned by the Canadian Partnership Against Cancer's National Colorectal Cancer Screening Network in order to explore Canadians' knowledge and attitudes about CRC screening.

Why are we measuring this?

In 2011, it is estimated that 13,000 men and 10,300 women in Canada will be diagnosed with CRC and 9,200 will die, making CRC the second-leading cause of cancer death in Canada behind lung cancer.[111]

Screening using fecal tests reduces CRC mortality as well as its overall incidence (through detection of cancerous polyps).[84-87]

Colonoscopy and sigmoidoscopy are also used as screening tests and as such, play a part in data reported in the indicator, 'up to dateness'.

What do the results mean?

Self-reported CRC screening rates have increased in Canada.

- In 2011, results show that 43% of Canadians aged 50 to 74 are up to date with their CRC screening (Figure 6), an increase from that found in the same survey conducted in 2009, where 38% of Canadians were up to date.
- Self-reported CRC screening rates, although improving, are still lower than those for other types of cancer. For example, self-reported screening data from the Canadian Community Health Survey show that in 2008, 72% of women aged 50 to 69 reported a screening mammogram in the past two years and 79% of women aged 18 to 69 reported a Pap test in the past three years.[89]
- There was considerable variation across provinces in the percentage of Canadians who were up to date on their CRC screening, ranging from 22% in Newfoundland and Labrador to 64% in Manitoba in 2011.
- Women were more likely than men to be up to date with their CRC testing (45% vs. 41%) and the likelihood of being up to date increased with age. Among those aged 50 to 59, 35% were up to date compared to 52% of those aged 60 to 69 and 56% among those aged 70 to 74 (data not shown).

Among Canadians who were up to date on their CRC screening, the fecal test was the most common test taken among those who indicated they had a test to check for CRC.

- Overall, 67% of Canadians mentioned they had a fecal test done to check for CRC while 51% of Canadians mentioned they had a colonoscopy/sigmoidoscopy to check for CRC (Figure 7).
- There were variations across provinces in the type of test taken to check for CRC among Canadians who were up to date in their CRC screening. Having had a fecal test in the past two years to check for CRC was less likely to be mentioned among up to date residents of Quebec and more likely to be mentioned among up to date residents of Manitoba, ranging from 49% to 91%, respectively.
- There were variations across provinces in the percentage of up to date Canadians mentioning they had an endoscopy in the past five years to check for CRC, ranging from 25% in Manitoba to 65% in Quebec.
- In Quebec, New Brunswick and Newfoundland and Labrador, endoscopy was reported as more common than a fecal test to check for CRC. In the remaining provinces and territories, the opposite was true.

Only a minority of Canadians (32%) reported that their physician initiated a conversation about CRC screening.

- The percentage of Canadians who said their physician initiated a conversation about CRC screening showed much variation across provinces with the percentage lowest in New Brunswick (17%) and Quebec (22%) and highest in Ontario (41%) and Manitoba (38%) (Figure 8).

What is being done?

The National Colorectal Cancer Screening Network (NCCSN) was established in 2007 to "serve as a national forum to discuss and take action on matters of mutual interest or concern related to the implementation of organized colorectal screening programs."[112] This network has helped accelerate the development of organized screening programs in all provinces.

In 2010, the NCCSN launched a "Colonversation" campaign to promote awareness of CRC screening. The Colonversation.ca website was built to encourage discussion, inform the public and increase participation.

The NCCSN has also established a process for national reporting of quality indicators. In 2011, preliminary results were shared across provincial and territorial programs. This initial report included early stage results on programmatic participation rates, positivity, follow-up colonoscopy uptake, positive predictive value, wait time to colonoscopy, wait time to diagnosis and complications. A second report, based on analysis in 2012, includes several additional quality indicators.

The NCCSN has also begun a process to set national targets for colorectal cancer screening.

CRC participation rates from organized screening programs are yet to be shared nationally as programs continue to roll out across the provinces. It is anticipated that a national report for publication will be completed in 2013.

What should you be aware of about data and measurement?

The data are based on persons who reported being tested with fecal test within the previous two years and/or sigmoidoscopy/colonoscopy within the previous five years. This indicator is not limited to screening through organized programs.

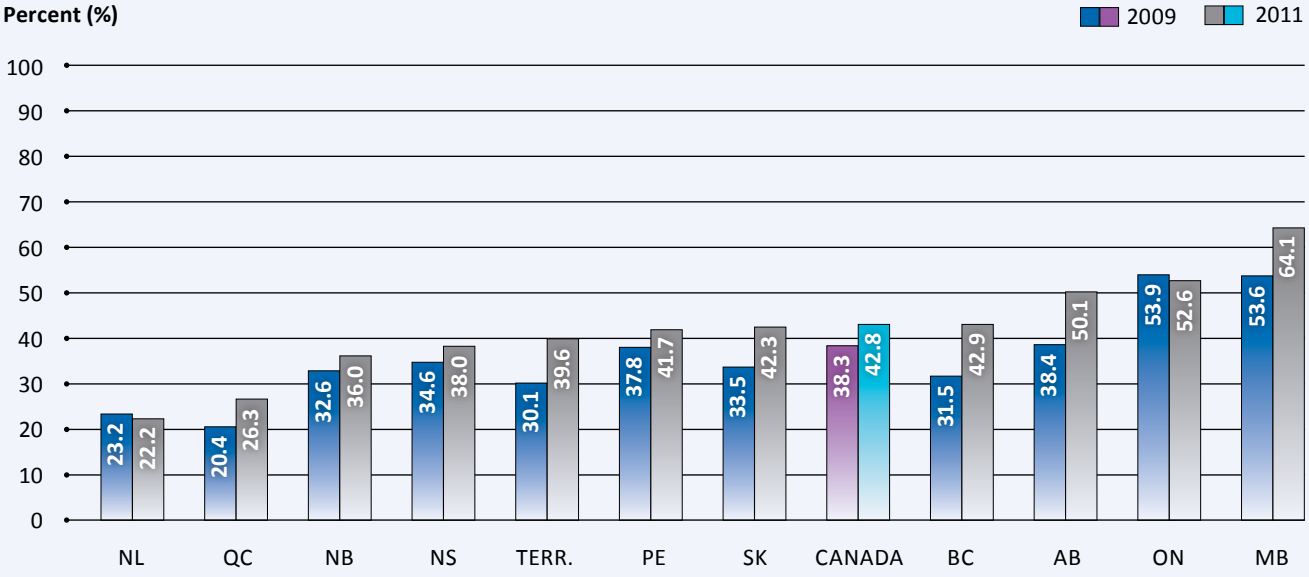
Since the survey data do not distinguish between the time interval for colonoscopy and sigmoidoscopy, the five-year timeframe was used for both modalities. U.S. guidelines recommend screening with colonoscopy every 10 years.[113]

Data are based on Canadians who are at average risk for CRC and therefore excludes those who were diagnosed with Crohn's disease, colitis, polyps or FAP, or have immediate biological family members with CRC. Those with a prior diagnosis of CRC were included in the analysis as it was unknown whether the diagnosis occurred as a result of the most recent screen. When the analysis was run excluding those with a prior diagnosis of CRC, the results were virtually unchanged.

Detailed calculation methodology is provided in the Technical Appendix (see page 177).

FIGURE 6

Percentage of Canadians (aged 50 to 74) at average risk for CRC reporting fecal test in the past two years and/or sigmoidoscopy/colonoscopy in the past five years, by province/territory – 2009 and 2011

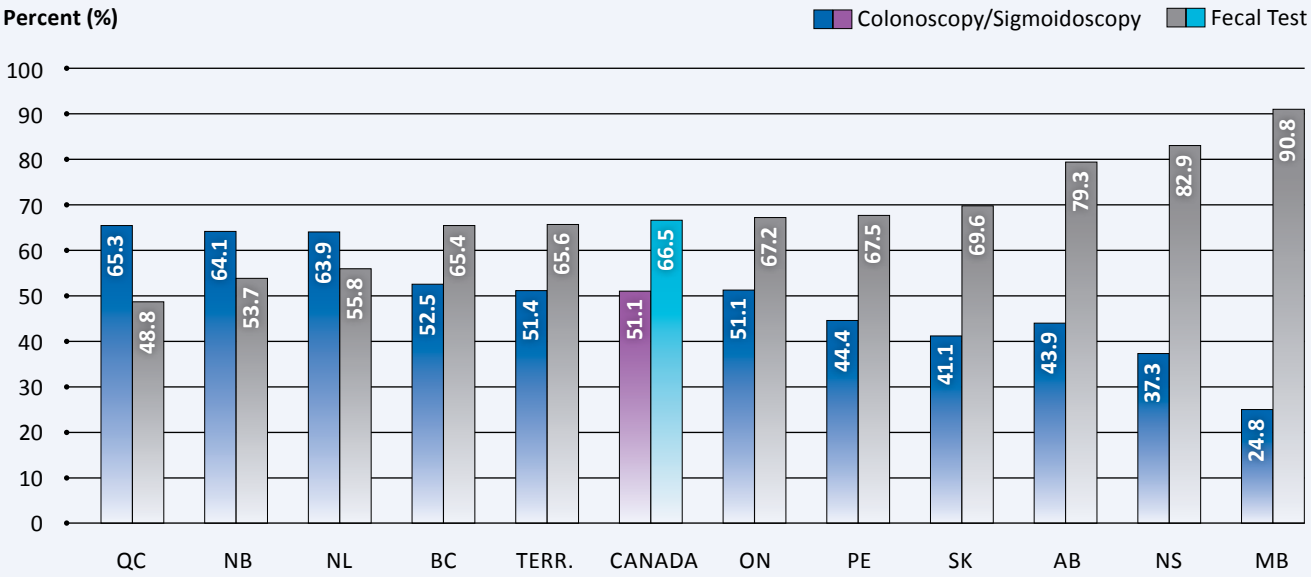


Note: Average risk includes those aged 50 to 74 and not diagnosed with Crohn's disease, colitis, polyps or FAP, and have no immediate biological family member with CRC.

Data source: 2009 and 2011 Colon Cancer Screening in Canada surveys.

FIGURE 7

Type of test taken to check for CRC among Canadians (aged 50 to 74) at average risk for CRC who reported fecal test in the past two years and/or colonoscopy/sigmoidoscopy in the past five years, by province/territory – 2011

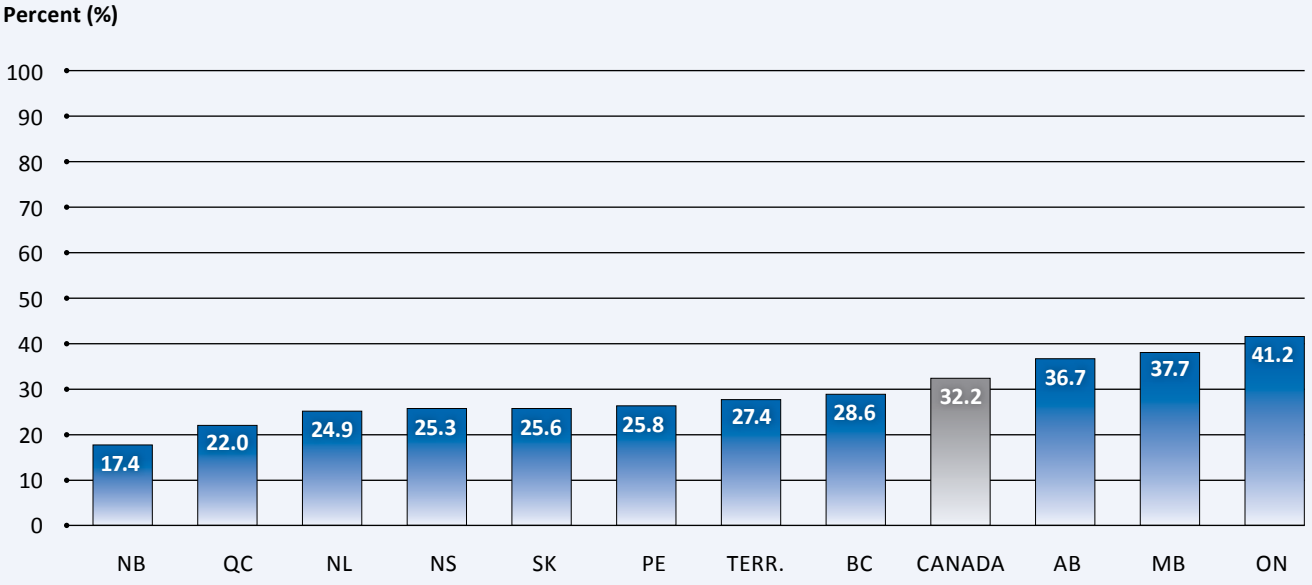


Note: Percentages do not equal to 100 as participants may have reported both tests.

Data source: 2011 Colon Cancer Screening in Canada survey.

FIGURE 8

Percentage of Canadians (aged 50 to 74) who reported that their physician initiated a conversation about CRC screening, by province/territory – 2011



Data source: 2011 Colon Cancer Screening in Canada survey.

Diagnosis

Diagnosis

A more timely and effective diagnostic process can lead to improved patient experience and outcomes.

A timely and accurate diagnosis is critical to early resolution for patients without cancer, and effective treatment for patients who are diagnosed with cancer. As such, any measures that lead to improvements in the diagnostic process could contribute to more appropriate and timely disease treatment and/or management and less unwarranted anxiety during the course of a cancer patient's experience with the disease.

In this Report, data are provided on three select markers of the diagnostic process: availability of stage data as a key input for guiding and evaluating cancer control, wait time for abnormal breast screen to resolution and wait time from abnormal fecal test result to colonoscopy, the last two being measures of timely access to diagnostic services.

The Partnership, working with its partners, is creating an infrastructure to monitor, evaluate and ultimately improve diagnostic services in Canada.

The Partnership's Staging Initiative has helped to facilitate population-based, electronic, collaborative stage data collection for the four major cancer sites in nine provinces. This achievement of population-based staging as of the 2010 diagnosis year will, among other benefits, improve the understanding of cancer diagnosis patterns. The Partnership is also supporting the implementation of synoptic pathology reporting nationally, which will also add substantial value to the ability to evaluate pathological diagnosis patterns and related diagnostic guidelines and standards in Canada. Future measurement efforts will continue to expand use of these emerging data resources.

Diagnosis indicator	Summary of results
Capture of stage data	For 2010, nine of ten provincial registries had stage data on at least 90% of cases in the top four cancer sites, thus achieving the national staging initiative target. The capture of stage data for all cancers has increased steadily from 2007 to 2010.
Wait times for abnormal breast screen to resolution	None of the reporting provinces had achieved the wait time targets for this indicator as of 2010. Patients not requiring a biopsy continued to be more likely to be diagnosed within the target timeframes than those requiring a biopsy to resolve their diagnosis.
Wait time from abnormal fecal test result to colonoscopy	Among the four provinces that reported this data, there is substantial variation in the wait times. Future measurement and analysis efforts will shed more light on this important indicator.

Capture of stage data

What are we measuring?

This indicator measures the percentage of provincial cancer incident cases for the top four disease sites (breast, prostate, colorectal, and lung) and then for all invasive cancers, for which valid stage at diagnosis data are available and collected by the provincial cancer agencies, between the 2007 and 2010 diagnosis years.

New for the 2012 Report, the percentage of cases with stage unknown is reported by province (for the top four sites and all invasive) for the 2010 diagnosis year.

Why are we measuring this?

Stage at diagnosis is a critical prognostic factor that has important clinical value. Moreover, the availability of population-level staging at the provincial registry level allows for the calculation of more meaningful indicators of system performance, adding value to the interpretation of long-term outcome measures such as incidence, mortality and survival, and of treatment pattern indicators such as guideline concordance. Stage is also important for assessing the impact of screening and early detection on reducing the percentage of cases diagnosed with advanced cancer.

The goal of the Partnership's Staging Initiative was to capture stage data for 90% of patients diagnosed in 2010 and beyond for the top four cancer sites (breast, colorectal, lung and prostate).

Cases are designated as stage unknown if the information from all available patient charts does not provide the minimum data required to ascertain stage. If the percentage of stage unknown cases is atypically high, however, that may indicate a problem with the collaborative staging process.

What do the results mean?

For the 2010 diagnosis year, all nine reporting provinces had stage data on at least 90% of cases in the top four cancer sites.

- The national collaborative staging initiative set a target of 90% of incident cases in the top four disease sites being staged by the 2010 diagnosis year. All nine provinces that reported data on stage capture for the 2010 diagnosis year had stage for over 90% of top four disease sites,

compared to only five in 2007 (Figure 1). For all invasive cancers, six of the nine provinces reported having stage data for over 90% of 2010 incident cases (Figure 2).

- The percentage of staged cases for which the final stage value is unknown for the top four disease sites was below 4% for eight of the nine reporting provinces, but was 18.4% for British Columbia (BC), which is a substantially higher rate than would be expected in routine staging (Figure 3). The majority of the unknown stage cases for BC were for prostate cancer (not shown in the figures). For all invasive cancers, the percentage of cases with stage unknown ranged from 1.3% for Prince Edward Island to 6.3% for Alberta (Figure 4). The U.S. SEER program reports 2% of cases with stage unknown.[114] The SEER data is based on a sample of cancer treatment facilities from 18 geographic areas (including 10 states) across the United States.

What is being done?

Statistics Canada is working on incorporating the newly available population-based stage data for the 2010 diagnosis year into the Canadian Cancer Registry. As of 2013, stage-based analysis would be possible for nine of ten provinces (compared to only a few in previous years).

In Québec, work is underway to capture stage in the forthcoming Registre québécois du cancer.

The Canadian Council of Cancer Registries continues to work towards improving the quality of registry data, including stage, and the prevalence of unknown stage cases.

What should you be aware of about data and measurement?

While it is acknowledged that virtually all clinicians stage patients as part of their prognostic assessment and treatment planning, what is being measured in this indicator is the collection and centralized retention of stage data at the cancer registry level.

The stage capture rate includes staging collected through collaborative staging (also some may have been staged by AJCC TNM).

Unknown stage group is assigned in collaborative staging when the data elements abstracted from available patient chart information are not adequate for ascertaining a definitive stage in the provincial registry. An example would be when an inaccessible site has no lymph node assessment indicated in the documentation causing an Nx (missing nodal status) value to be assigned, or in cases identified only through death certificates. This is different from unstaged cases for which an attempt to collect the staging data elements was not made or where coders do not have access to all documentation due to logistical limitations (e.g., charts not available outside cancer centres/clinics).

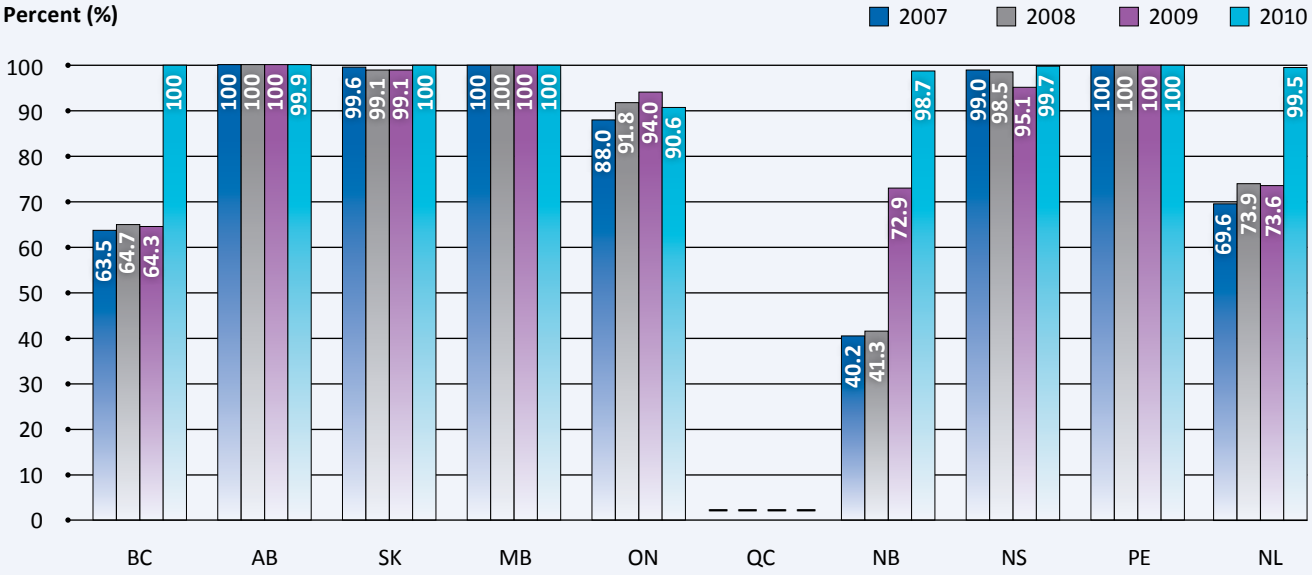
Unstaged cases are included in the denominator but excluded from the numerator.

Several provinces retroactively augment their staging for prior years, so the stage rate for measured years may improve in subsequent measurement.

Detailed calculation methodology is provided in the Technical Appendix (see page 179).

FIGURE 1

Percentage of incident cases for which stage data are available in provincial registries – top four cancers,* by province – 2007 to 2010 diagnosis years



*Top four cancers: Breast, Prostate, Colorectal, and Lung.

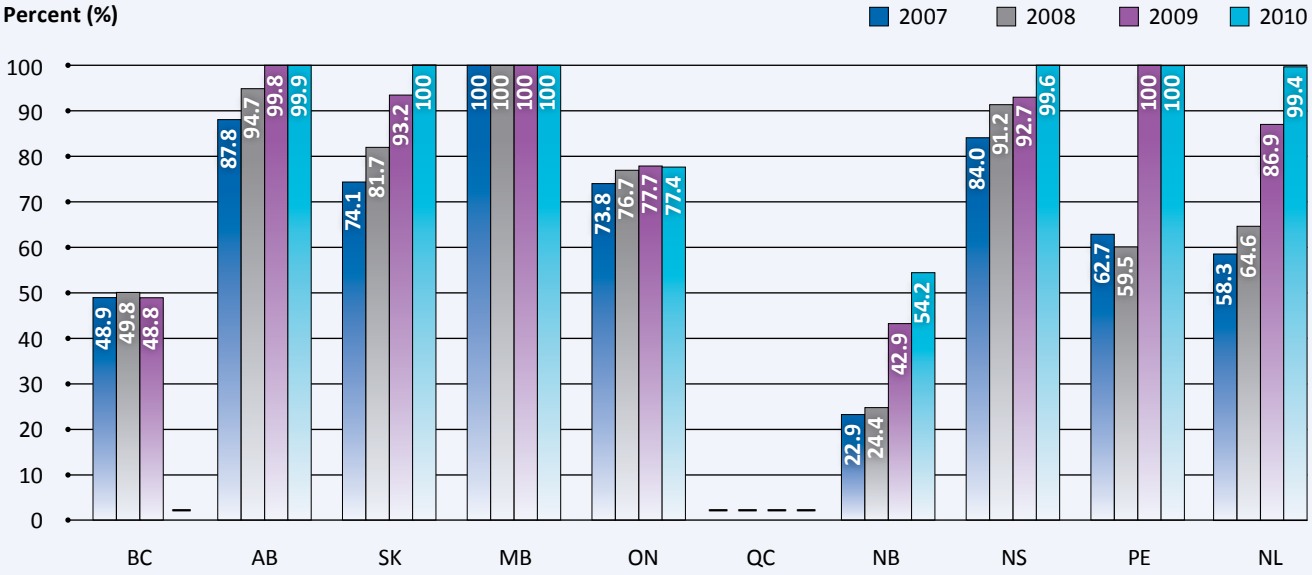
"—" Data are not available for QC (2007 to 2010).

BC's 2010 stage data include a disproportionately high percent of unknown stage cases (particularly for prostate). See stage unknown charts that follow.

Data source: Provincial cancer agencies.

FIGURE 2

Percentage of incident cases for which stage data are available in provincial registries – all invasive cancers, by province – 2007 to 2010 diagnosis years



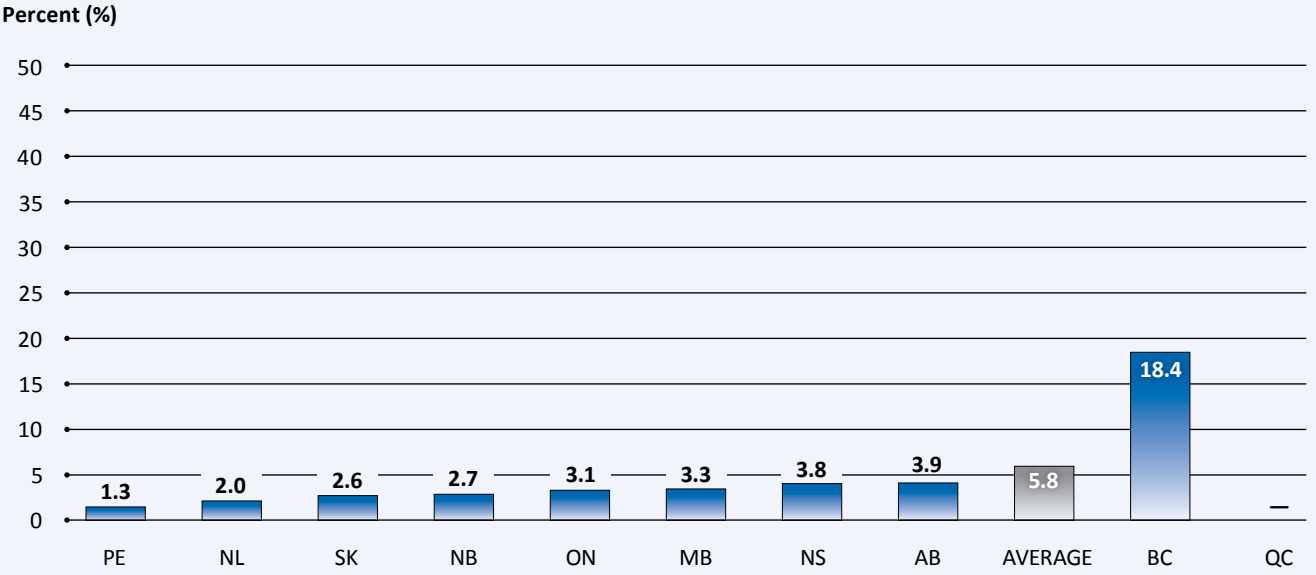
"—" Data are not available for QC (2007 to 2010) and BC (2010).

At the time of production of this chart, BC was still validating their staging data for 2010 for several disease sites and their data are therefore, excluded for that year.

Data source: Provincial cancer agencies.

FIGURE 3

Percentage of incident cases for which stage is unknown* – top four cancers,** by province – 2010 diagnosis year



*Unknown stage is assigned in collaborative staging when the data elements abstracted from available patient chart information are not adequate for ascertaining a definitive stage in the provincial registry.

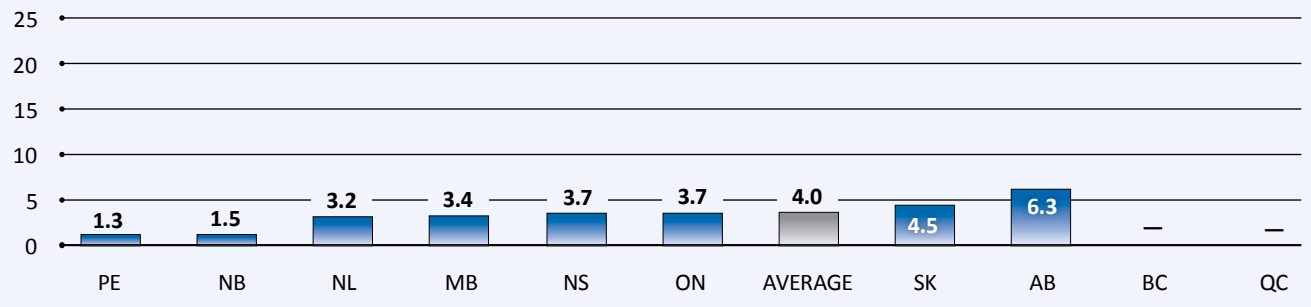
**Top four cancers: Invasive Breast, Prostate, Colorectal, and Lung.

"—" Data are not available for QC.

Data source: Provincial cancer agencies.

FIGURE 4

Percentage of incident cases for which stage is unknown* – all invasive cancer, by province – 2010 diagnosis year



*Unknown stage is assigned in collaborative staging when the data elements abstracted from available patient chart information are not adequate for ascertaining a definitive stage in the provincial registry.

"—" Data are not available for QC and BC.

Data source: Provincial cancer agencies.

Breast cancer diagnosis wait times: abnormal screen to resolution

What are we measuring?

This indicator examines the wait times between an abnormal screen and resolution of the diagnosis through biopsy or other diagnostic modality, by province. The indicator shows the median and 90th percentile wait times as well as the percentage of cases resolved within the target timeframe, for asymptomatic women aged 50 to 69 screened within the provincial breast screening programs in 2010.

Why are we measuring this?

Timely resolution of an abnormal screen through clinical investigation, and a definitive biopsy if required, facilitates prompt initiation of treatment and potentially improved patient outcomes.

Measuring and comparing provincial wait times from abnormal screen to resolution allows for the identification of gaps, which could be addressed through quality improvement strategies.

Guidelines identifying target wait times for abnormal breast screen to resolution were established by the Canadian Breast Cancer Screening Initiative's Working Group on the Integration of Screening and Diagnosis in 2000.[115] The target wait time is seven weeks for women requiring a biopsy and five weeks for those diagnosed by other means. These guidelines apply to asymptomatic women aged 50 to 69 with no prior diagnosis of breast cancer.

What do the results mean?

Patients not requiring a tissue biopsy are more likely to be diagnosed within the target timeframes (following an abnormal screen) than those requiring a biopsy to resolve their diagnosis.

- The provincial wait times range between 2 and 5.1 weeks for the median and between 5.3 and 10 weeks for the 90th percentile for women not requiring a tissue biopsy to resolve diagnosis. For women requiring a biopsy, the provincial median and 90th percentile wait times range between 5 and 7 weeks and between 11.9 and 22 weeks, respectively. (Figures 5 and 6)
- The percentage of women enrolled in the screening program whose diagnosis is resolved following an abnormal screen within the target timeframes ranges from 50% to 89% when a biopsy is not required (Figure 5) and from 52% to 71% when a biopsy is required (Figure 6).
- None of the provinces reporting data for this indicator has achieved the wait time targets of 90% of women waiting 5 weeks or less (without biopsy) and 7 weeks or less (with biopsy) between an abnormal screen and resolution, although two provinces, Saskatchewan and Manitoba, are close to the target wait time for women not undergoing a biopsy.

What is being done?

The National Committee of the Canadian Breast Cancer Screening Initiative (CBCSI) monitors and assesses the performance of screening in Canada every two years. Initial investigations have been done to examine wait times across provinces and territories submitting data.[116]

A working group of the CBCSI has been formed to address strategies to reduce wait times from abnormal breast screen to resolution. Initial steps have been taken to scan practices and assessment programs across the country as well as to analyze more current data in relation to those activities. Key lessons will be shared so that all provinces and territories can benefit from successful strategies.

What should you be aware of about data and measurement?

The data collected for this indicator apply only for women receiving mammograms or clinical breast exams through organized provincial breast screening programs. Program enrolment rates vary widely across provinces (from 6% in Alberta to 56% in Quebec , Manitoba, and New Brunswick in 2009 to 2010) and should be taken into account when interpreting results.

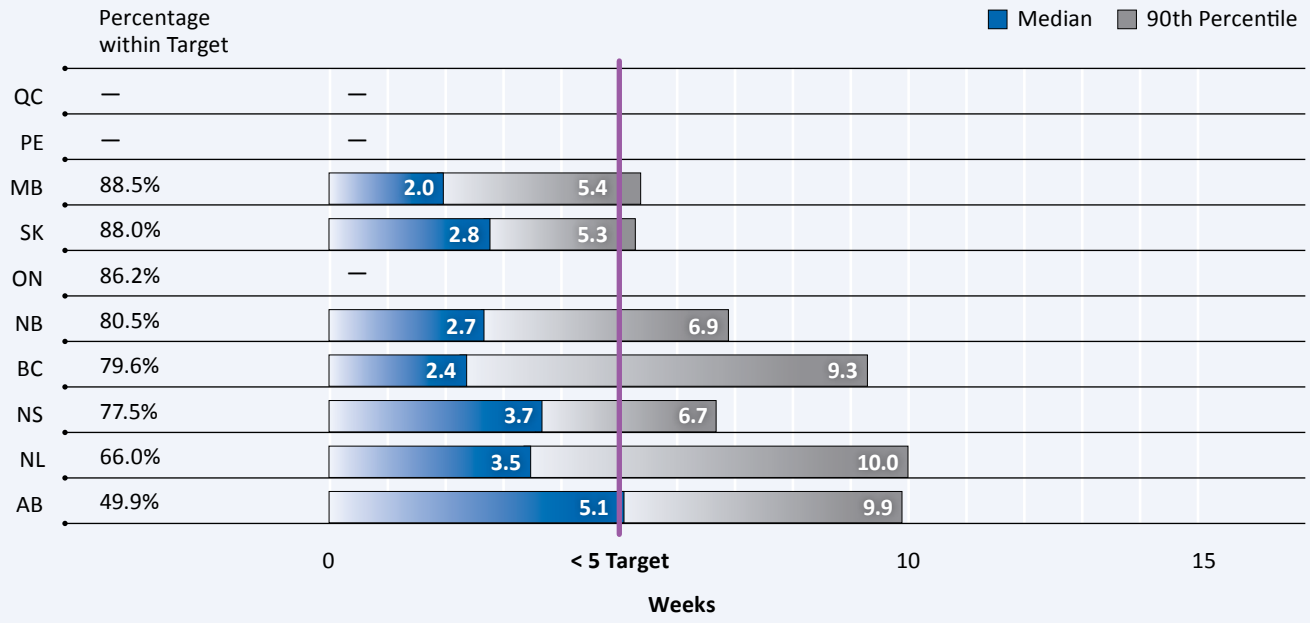
For more information on participation rates in organized breast screening programs, please see the Screening Chapter.

A more detailed discussion of this indicator and breast cancer screening participation rates in general can be found in *Breast Cancer Control in Canada: A System Performance Special Focus Report* published by the Partnership in 2012.

Detailed calculation methodology is provided in the Technical Appendix (see page 180).

FIGURE 5

Median and 90th percentile wait times for resolution of abnormal breast screen for women (aged 50 to 69) not requiring a tissue biopsy, by province – 2010



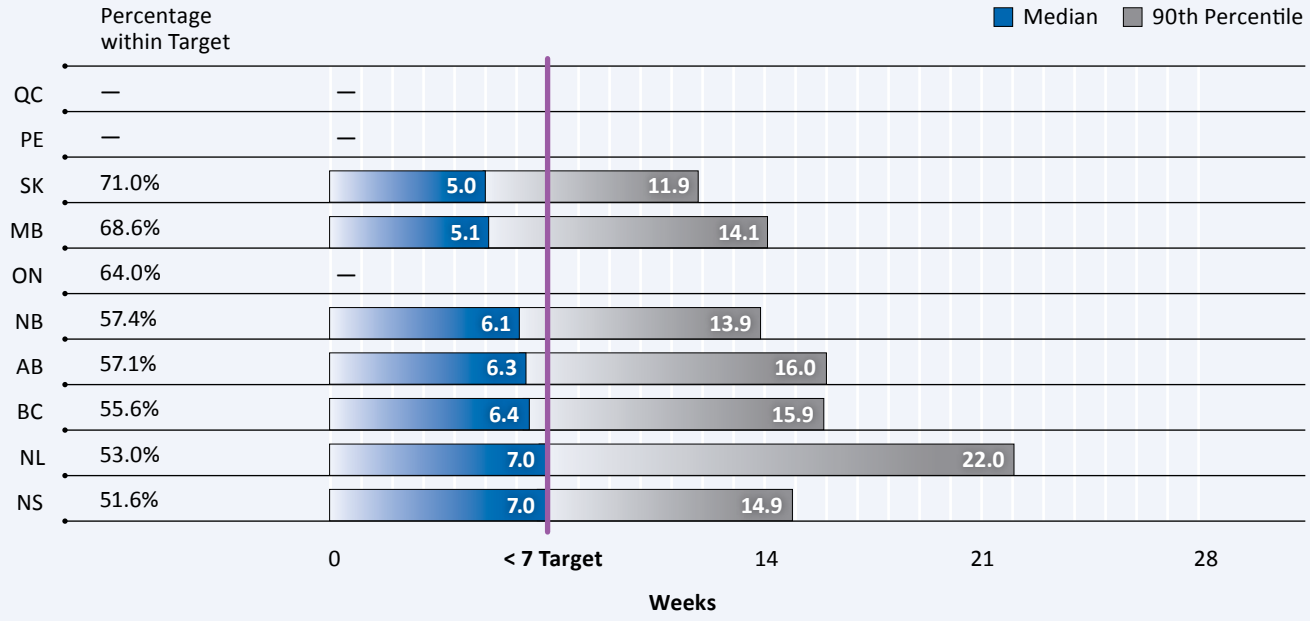
Note: Alberta wait time data are from the Screen Test Program only. Screen Test is an organized program that conducts approximately 10% to 12% of screening mammograms in the province, about 65% of which are performed in mobile screening units in rural areas.

"—" Data for PE and QC are not available for any of the measures. Data for ON are not available for the median and 90th percentile wait times.

Data source: Provincial breast cancer screening programs.

FIGURE 6

Median and 90th percentile wait times for resolution of abnormal breast screen for women (aged 50 to 69) requiring a tissue biopsy, by province – 2010



Note: Alberta wait time data are from the Screen Test program only. Screen Test is an organized program that conducts approximately 10% to 12% of screening mammograms in the province, about 65% of which are performed in mobile screening units in rural areas.

"—" Data for PE and QC are not available for any of the measures. Data for ON are not available for the median and 90th percentile wait times.

Data source: Provincial breast cancer screening programs.

Colorectal cancer diagnosis wait times: abnormal fecal test to colonoscopy

What are we measuring?

This indicator measures the median and 90th percentile elapsed period in days between the time of an abnormal fecal test result for colorectal cancer screening and a follow-up screening colonoscopy procedure. The median and 90th percentile wait time are compared by province for tests conducted between January 2009 and December 2010 (two-year period).

Participating provinces are anonymized for this indicator because at the time of release of this report, these results had not yet been published by Colorectal Cancer Screening Network.

Why are we measuring this?

Timely access to needed care is central to a high-performing health care system. Timely resolution of an abnormal cancer screening result leads to peace of mind for people with a negative diagnosis (no cancer) and early detection and improved treatment outcomes for people with a positive diagnosis (cancer).

As of 2012, all provinces have developed or are developing screening programs using fecal tests (either guaiac or immunochemical) as the entry screening test and recommend screening for average-risk persons age 50 to 74 (see Screening section). One out of every 10 people with an abnormal fecal test are diagnosed with CRC cancer. Early detection of CRC through timely and accurate screening has been shown to improve outcomes in a number of major studies.[84]

Colonoscopy is the diagnostic test typically recommended as a follow-up to an abnormal fecal test result.

The Canadian Association of Gastroenterology (CAG) recommends a colonoscopy be completed within two months (60-days) of an abnormal fecal test based on pan-Canadian consensus on medically acceptable wait times.[117]

What do the results mean?

There is substantial variation in the wait times as reported by four provinces.

- Only four provinces provided data with adequate numbers to report wait times. Median wait times from an abnormal fecal test to follow-up colonoscopy range from 37 to 96 days. Only two provinces reported median wait times below the 60-day benchmark recommended by CAG, and none reported 90th percentile wait times below the benchmark. The 90th percentile wait time ranges from 64 to 151 days (Figure 7).
- The difference between the median and 90th percentile wait times, which indicates the degree of dispersion in wait time in each province, ranges from 27 to 67 days.

Colorectal cancer screening programs are still in the early stages of implementation in most provinces, particularly during the measurement timeframe for this indicator. Strategies and processes for reducing follow-up colonoscopy wait times are in place in many of the screening programs. One example is the use of patient navigators.

What should you be aware of about data and measurement?

Results should be interpreted with caution due to the varying degrees of CRC screening program implementation across the country, as access to follow-up may be limited.

This indicator does not include patients who receive a colonoscopy more than six months following an abnormal fecal test.

The indicator results are based on data reported by the provincial colorectal screening programs through the National Colorectal Cancer Screening Network.

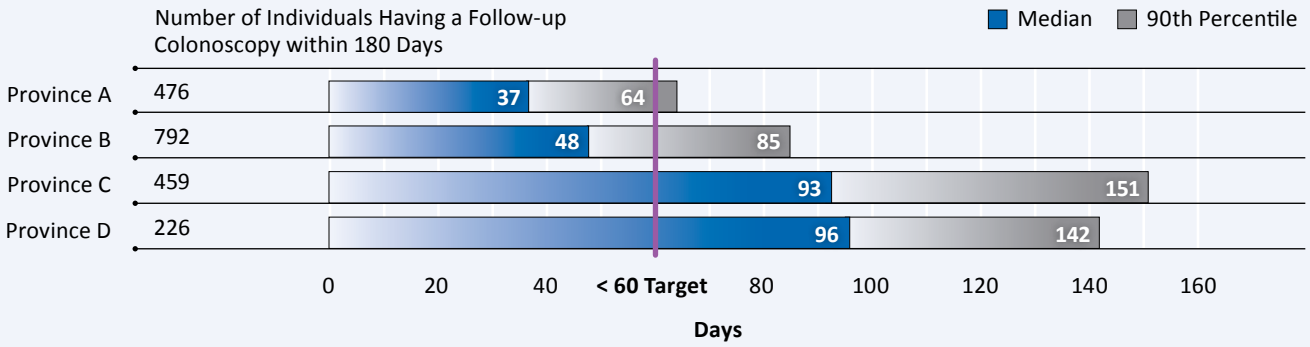
Colonoscopies that occur outside clinics funded by or otherwise associated with the provincial screening programs are not included.

Wait times for follow-up colonoscopy can reflect a patient's personal choice to postpone the first available colonoscopy appointment.

Detailed calculation methodology is provided in the Technical Appendix (see page 180).

FIGURE 7

Median and 90th percentile for wait times from abnormal fecal test to follow-up colonoscopy, by province – Jan 2009 to Dec 2010



Wait times for follow-up colonoscopy vary across reporting provinces. Includes only individuals with an abnormal fecal test who went on to receive a colonoscopy within 180 days of the fecal test result.

Data source: National Colorectal Cancer Screening Network.

Treatment

Treatment

Cancer treatment accounts for the majority of resources in the cancer control system and involves a broad range of modalities including surgery, systemic therapy, and radiation therapy.

The goals of treatment include:

- eliminating the primary tumour(s) and any regional spread;
- preventing local recurrence;
- preventing distant recurrence;
- prolonging survival or preventing deaths; and
- reducing symptoms and minimizing side effects.

This Report includes a number of system indicators of cancer treatment including capacity and utilization, wait times, and treatment patterns compared to evidence-based guidelines.

New this year are mastectomy rates for breast cancer and information on reasons for non-guideline concordant treatment for rectal cancer and non-small cell lung cancer from a recent chart review study.

Some indicators are only available for a subset of provinces that were able to provide the required data. Whereas in previous years, results for provinces that deviated somewhat from the defined indicator methodology were shown in the graphs (albeit identified separately), this year's results include only provinces that conformed materially to the agreed upon definitions and specifications.

Treatment indicator	Summary of results
Radiation therapy wait times	In 2011, nine of ten provinces with available data had achieved the target of 90% of patients treated within the national wait time benchmark of 28 days. Saskatchewan and Ontario had the shortest 90th percentile wait time at 18 days.
Radiation therapy utilization and capacity	Radiation therapy use varied slightly by province and over time. The highest utilization rate was in British Columbia at 33%.
Pre-operative radiation therapy for resected stage II and III rectal cancer (and reasons for non-referral or non-treatment)	The percentage of stage II and III rectal cancer cases undergoing pre-operative radiation therapy has increased over time; however, the percentage is much lower for patients aged 80 and older compared to those younger than 60 years old. The province with the highest guideline treatment rate for 2009 was Saskatchewan at 56.6%. The most common reason for non-referral for radiation therapy among stage II and III rectal cancer cases was the presence of co-morbidities and the most common reason for non-treatment was the patient not being seen by a radiation oncologist.
Adjuvant radiation therapy for stage I and II breast cancer	There was interprovincial variation in the percentage of early stage breast cancer cases treated with radiation therapy. The treatment rate dropped substantially for patients aged 80 and older. The province with the highest guideline treatment rate for 2009 was Newfoundland and Labrador at 93.4%.
Adjuvant chemotherapy for fully resected stage III colon cancer	There was interprovincial variation in the percentage of resected stage III colon cancer cases treated with adjuvant chemotherapy. The treatment rate dropped substantially with patient age and potentially for older women relative to older men. The province with the highest guideline treatment rate for 2009 was Saskatchewan at 81.8%.
Adjuvant chemotherapy for stage II and IIIA non-small cell lung cancer (and reasons for non-referral and non-treatment)	The percentage of stage II and IIIA non-small cell lung cancer patients undergoing post-operative chemotherapy varied by province and the percentage was much lower for older patients. The province with the highest guideline treatment rate for 2009 was Ontario at 58%. The most common reason for both non-referral and non-treatment for chemotherapy among stage II and IIIA non-small cell lung cancer cases was the presence of co-morbidities.
Mastectomy and breast conserving surgery	In 2007 to 2009, slightly fewer than 40% of breast cancer resections were mastectomies, but the provincial rates varied widely. For women under aged 40 and age 80 and older, mastectomy rates were 10 to 15 percentage points higher than for women aged 40 to 79. The province with the lowest use of mastectomy was Quebec at 26.5%.
Removal and examination of 12 or more lymph nodes in colon resections	There was interprovincial variation in the percentage of colon resections where 12 or more lymph nodes were removed. Differences by age and sex were not detected. The province with the highest percentage of cases with 12 or more nodes removed for 2009 was Ontario at 89.4%.

Radiation Therapy

Radiation therapy wait times

What are we measuring?

This indicator measures radiation therapy wait times from the time the patient is ready to treat to start of treatment (for years 2008 to 2011). This is expressed as the percentage of patients treated within the target timeframe (28 days) as well as median and 90th percentile wait times in days.

Why are we measuring this?

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 healthcare priority. National wait time targets have been set and provincial initiatives to reduce wait times have been implemented.

What do the results mean?

In December 2005, the Provincial and Territorial (PT) health ministers established a benchmark for radiation therapy wait times for cancer and all provinces have implemented initiatives to measure and improve their wait times.[118]

The national target is for patients to start radiation therapy within four weeks (28 days) of being ready to treat. Provinces have targeted a reduction in wait times for 90% of patients to below the national four-week benchmark.

Some have proposed shorter targets. For example, the Canadian Association of Radiation Oncologists has set a target of 10 working days (14 calendar days) from the day of consultation or requisition to the start of therapy.[119]

In 2011, seven of eight provinces had achieved the target of 90% of patients treated within the national wait time benchmark (Figure 1).

- In 2011, the lowest 90th percentile wait times are in Saskatchewan and Ontario at 18 days.
- Between 2008 and 2011, the percentage of patients treated with radiation therapy within the target wait time increased in most provinces (Figure 2).

Of the top four disease sites, the highest interprovincial variability in the 90th percentile wait times was for prostate cancer (31 days between shortest and longest provincial 90th percentile wait time) while lung cancer showed the least variability (14 days) (Figure 3). Age and stage (primary tumour size) are risk factors that can contribute significantly to radiation therapy wait times in prostate cancer[120] which may explain these patterns.

What is being done?

All provinces have initiatives in place to reduce wait times and monitor variations within the provinces.

What should you be aware of about data and measurement?

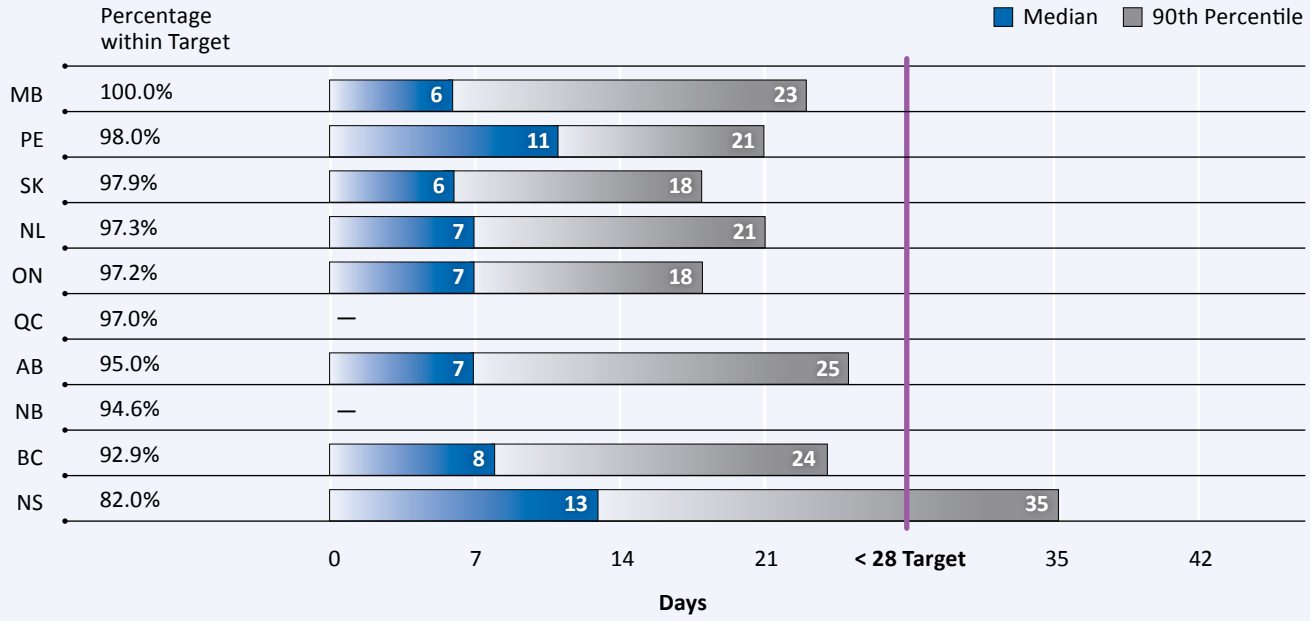
"Ready to Treat" is the starting point for the wait times measurement. While considerable effort has gone into development and adoption of standardized definitions for this, interprovincial variations may persist.

Nova Scotia began measuring and monitoring wait times using the "ready to treat to start of treatment" standard only in 2010.

Detailed definitions and calculation methodology are provided in the Technical Appendix (see page 180).

FIGURE 1

Radiation therapy wait times for all cancers: median and 90th percentile, by province – 2011 treatment year



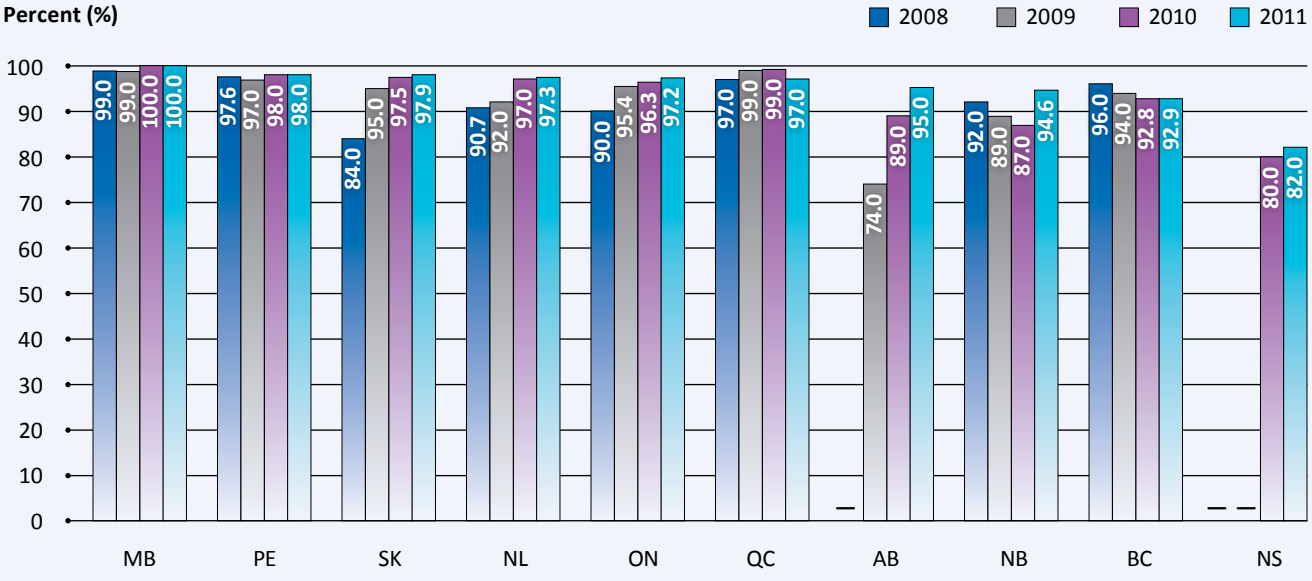
"—" Data for NB and QC are not available for the median and 90th percentile wait times.

NS implemented the collection of Ready to Treat (RTT) data in 2010. A recent audit of the processes used to generate NS Radiation Therapy wait times revealed that RTT dates are not being systematically updated in the case of planned delays. Consequently, the above estimates do not provide an entirely accurate picture of accessibility or system capacity, but somewhat overstate the length of time patients have waited for service. This effect will be most prominent in the 90th percentile estimate.

Data source: Provincial cancer agencies.

FIGURE 2

Radiation therapy wait times for all cancers: percentage of cancer patients treated within wait time target,* by province – 2008 to 2011 treatment years



*Wait time target: four weeks between ready to treat and start of treatment.

"—" Data are not available for AB (2008), NS (2008 to 2009).

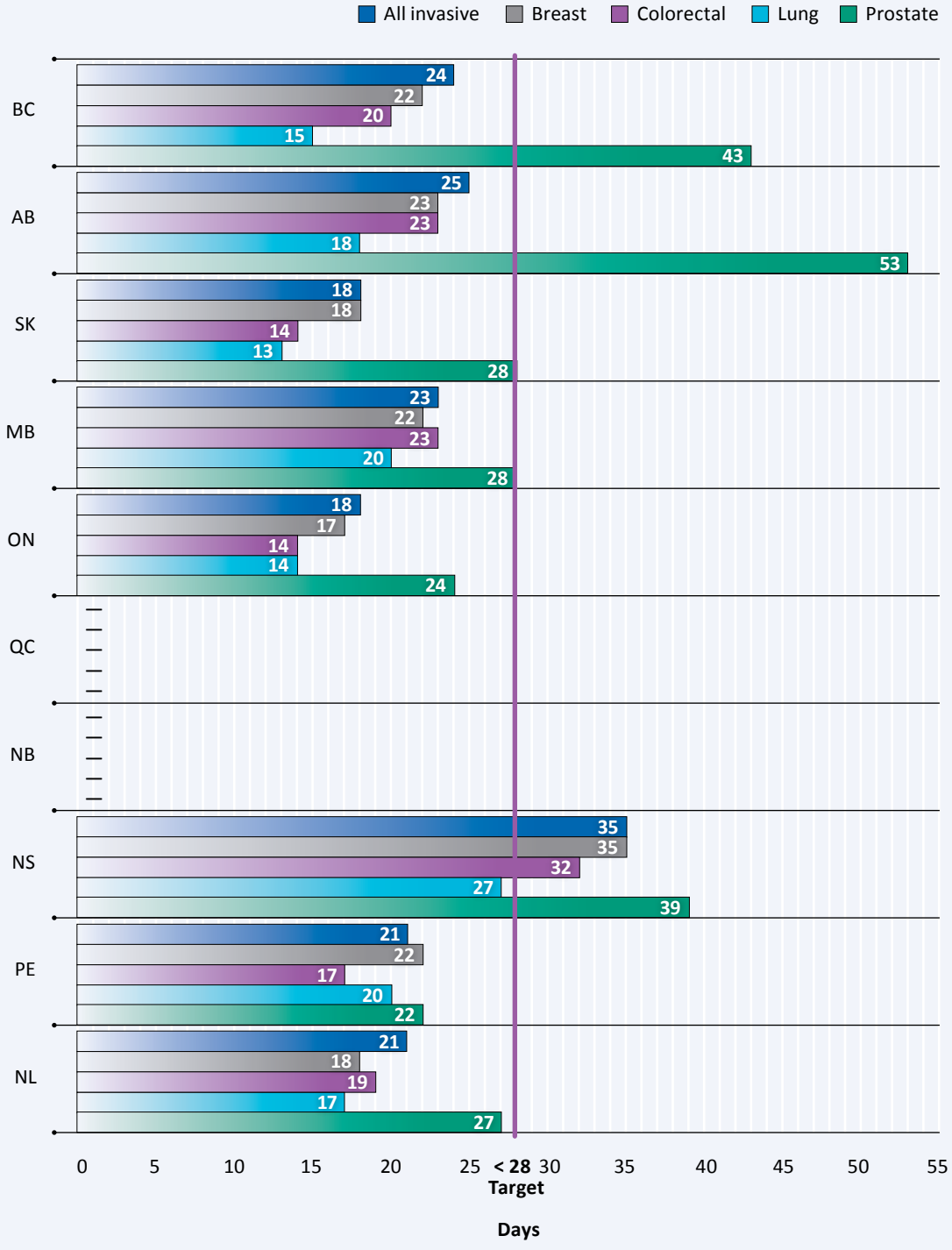
Data for QC (2011) are from April 1, 2011 to March 31, 2012.

NS implemented the collection of Ready to Treat (RTT) data in 2010. A recent audit of the processes used to generate NS Radiation Therapy wait times revealed that RTT dates are not being systematically updated in the case of planned delays. Consequently, the above estimates do not provide an entirely accurate picture of accessibility or system capacity, but somewhat overstate the length of time patients have waited for service. This effect will be most prominent in the 90th percentile estimate.

Data source: Provincial cancer agencies.

FIGURE 3

Radiation therapy wait times by disease site: 90th percentile, by province – 2011 treatment year



"—" Data are not available for NB and QC.

NS implemented the collection of Ready to Treat (RTT) data in 2010. A recent audit of the processes used to generate NS Radiation Therapy wait times revealed that RTT dates are not being systematically updated in the case of planned delays. Consequently, estimates to the left do not provide an entirely accurate picture of accessibility or system capacity, but somewhat overstate the length of time patients have waited for service. This effect will be most prominent in the 90th percentile estimate.

Data source: Provincial cancer agencies.

Radiation therapy utilization and capacity

What are we measuring?

This indicator measures the percentage of incident cases that receive radiation therapy for any intent within two years of diagnosis. Radiation utilization rates are compared by province for the three most recent diagnosis years.

Also presented is the capacity of radiation therapy services by province. Capacity is measured as number of linear accelerators (LINACs) per million people.

Why are we measuring this?

Along with surgery and systemic therapy, radiation therapy forms part of the backbone of cancer treatment services. A patient may receive radiation therapy pre-operatively (neoadjuvant), post-operatively (adjuvant) or alone without surgery or other treatments, or in combination with chemotherapy (chemo-radiation).[121]

Ensuring access to radiation therapy services for all cancer patients who need it is a critical priority in cancer treatment service planning. Relatively low radiation therapy utilization rates in a province, coupled with relatively low LINAC capacity, may indicate potential access limitations.

What do the results mean?

Radiation therapy use varied slightly by province and over time.

- The percentage of cancer incident cases treated with radiation therapy within two years of diagnosis (for 2009) ranged from 25% in Prince Edward Island to 33% in British Columbia (Figure 4).
- There was little change in radiation therapy utilization rates from 2009 to 2011 across most provinces (except in Prince Edward Island where small numbers may contribute to more fluctuation).

The Canadian average number of linear accelerators per capita has increased over the three-year timeframe.

In 2011, the number of LINACs ranged from 5.1 per million persons in Alberta to 13.7 per million persons in Prince Edward Island with a Canadian average of 6.6 per million. The 2011 average per capita capacity represents an increase of 6.1 LINACs per million over 2009 (Figure 5). The more commonly cited international benchmark for radiation therapy use in cancer examines radiation therapy over the lifetime of the patients.[122-123] As has been done elsewhere,[124] plans are to develop methodology for calculating (a modelled) lifetime utilization rate. The results will then be reported in the future system performance reports so that comparisons can be made to the international benchmarks. This utilization will include all treatment intents including second and third line therapy as well as symptom management.

What is being done?

The Partnership's Quality Implementation Initiative uses results of the system performance indicators, among other inputs, to identify opportunities for launching strategies to improve the quality of clinical practice. The Canadian Partnership for Quality Radiotherapy (C-PQR) has been funded by this Initiative to implement a national quality program in radiotherapy.[125] This may include the refinement of standards for equipment and delivery of radiation therapy, the development of a consistent, common taxonomy for measuring concordance to standards and incident reporting, the piloting of an audit tool to measure concordance and a tool for reporting near misses and critical incidents.

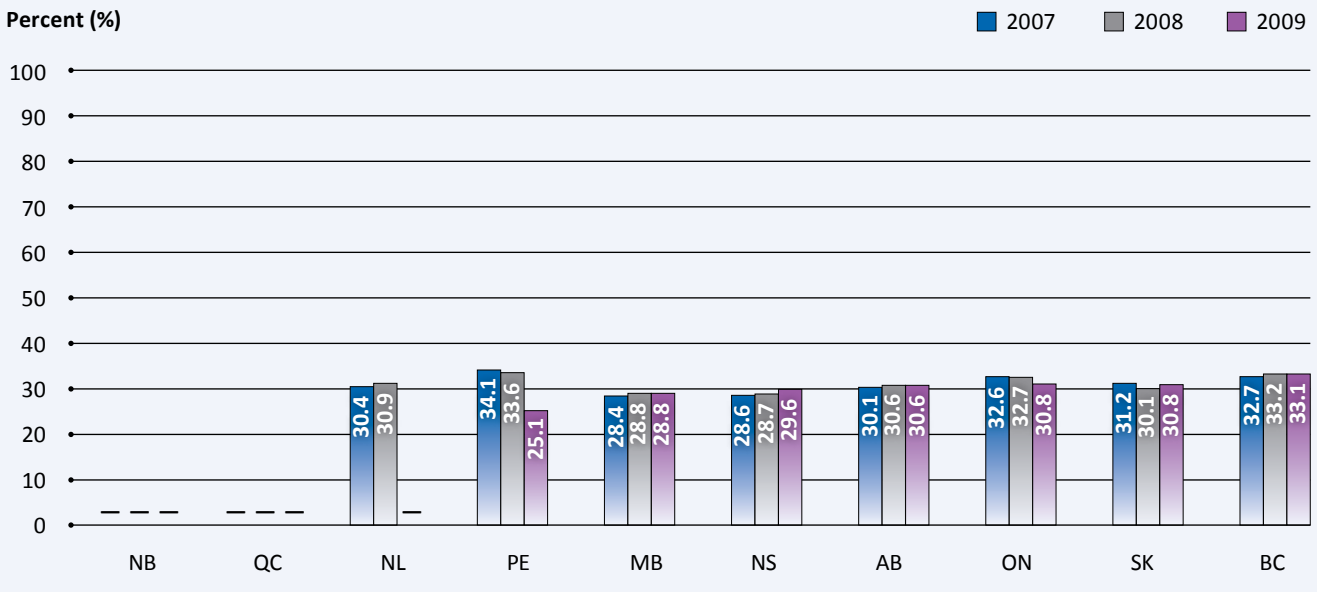
What should you be aware of about data and measurement?

The two-year timeframe (from diagnosis to start of treatment) was chosen to include mainly primary treatment (pre-operative, adjuvant and curative), although palliative radiation does occur for several disease sites within that timeframe. Due to methodological and data limitations, a lifetime radiation therapy rate could not be calculated for this Report. Models to calculate the lifetime rate will be developed for future reports.

Detailed calculation methodology is provided in the Technical Appendix (see page 181).

FIGURE 4

Radiation therapy utilization: percentage of cancer patients receiving radiation therapy within two years of diagnosis, by province – patients diagnosed 2007 to 2009

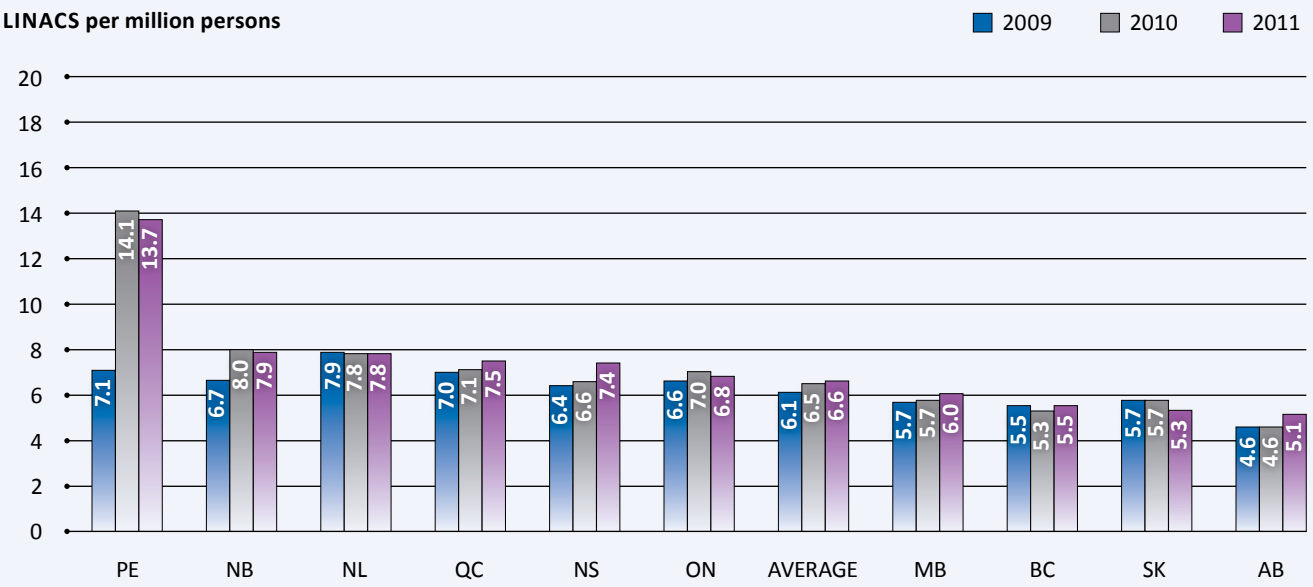


"—" Data are not available for NB (2007 to 2009), NL (2009), QC (2007 to 2009).

Data source: Provincial cancer agencies.

FIGURE 5

Radiation therapy capacity: linear accelerators per million persons, by province – 2009 to 2011



Data source: Provincial cancer agencies.

Pre-operative radiation therapy for stage II and III rectal cancer

What are we measuring?

This indicator measures the percentage of resected stage II or III rectal cancer patients who receive pre-operative radiation therapy as per widely published treatment guidelines.[126-127] This year's indicator compares results for patients diagnosed in 2007, 2008 and 2009 and examines age and sex patterns, as well as interprovincial comparisons.

A chart review conducted in 2011 examined reasons for non-treatment and the use of post-operative versus pre-operative radiation. The results are discussed at the end of this section.

Why are we measuring this?

Over 9,000 people in Canada die from colorectal (CRC) cancer each year.[41] Around 20% of CRC cases are tumours of the rectum.[128] According to pooled analyses from three North American trials, five-year relative survival in stage II and 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.[129]

The delivery of radiation therapy preceding surgical resection (i.e., pre-operative) has been shown to improve surgical outcomes and local control for stage II and III rectal cancer patients.[129] This is particularly the case among

patients who have a large malignancy that is difficult to remove.[130] There is also clinical trial evidence to suggest pre-operative short course radiation leads to improved disease-free survival relative to post-operative radiation.[131]

Measuring national practice patterns relative to this treatment guideline allows for the identification of gaps, which could be addressed through quality improvement strategies.

What do the results mean?

Pre-operative radiation therapy rates as consistent with guidelines have increased steadily over the three-year period.

- There is wide interprovincial variation in the percentage of resected stage II and III rectal cancer cases treated with pre-operative radiation therapy. The rates for the seven provinces submitting data for this indicator for 2009 cases ranged from 42% to 57% (Figure 6). For the five provinces submitting data for each of 2007, 2008 and 2009, the treatment rate increased from each year to the next; for some, this was by considerable amounts. The average treatment rate for the five provinces rose from 40% in 2007 to 45% in 2008 to 49% in 2009. Similarly, there is interprovincial variation in the percentage of patients who had a surgical resection within a year.

The percentage of rectal cancer patients receiving pre-operative radiation therapy is comparable to that in the United States; however, the rates are lower than in Europe. In the U.S., 42% of rectal cancer patients who had surgery received pre-operative therapy between 2002 and 2005[132] while in Sweden, this percentage was just under 70% in 2009;[130] and in South-West France in 2003/2004, 84% of node positive rectal cancer patients who had surgery received pre-operative radiotherapy.[133]

The pre-operative radiation treatment rate drops substantially for older patients.

- The pre-operative radiation treatment rate dropped from an average of around 56% for patients under age 60 to 25% for patients aged 80 and older (Figure 7).
- There does not appear to be a large difference in the treatment rate for males and females (Figure 8).

While pre-operative radiation therapy should be considered for most resectable stage II and III rectal cancer cases, there are no formal Canadian performance targets yet for the actual treatment rate.

There may be cases where pre-operative radiation therapy is not provided for a variety of reasons, in which case post-operative radiation is strongly recommended.[126] While the frequency of cases with contraindications to pre-operative radiation therapy is not known, it is not expected to vary significantly between provinces. The chart review study (see page 82) sheds some light on these issues.

What is being done?

The Partnership conducted a retrospective chart review of resected rectal cancer patients in five provinces to better understand referral and treatment patterns and to help identify the decision rationale for radiation therapy. The results appear in the next section along with a description of what is being done as a result of these findings.

What should you be aware of about data and measurement?

Results for British Columbia are not shown as in previous reports and are not included in the overall average because they include data only for cases referred to the provincial cancer centres (through the 2009 diagnosis year).

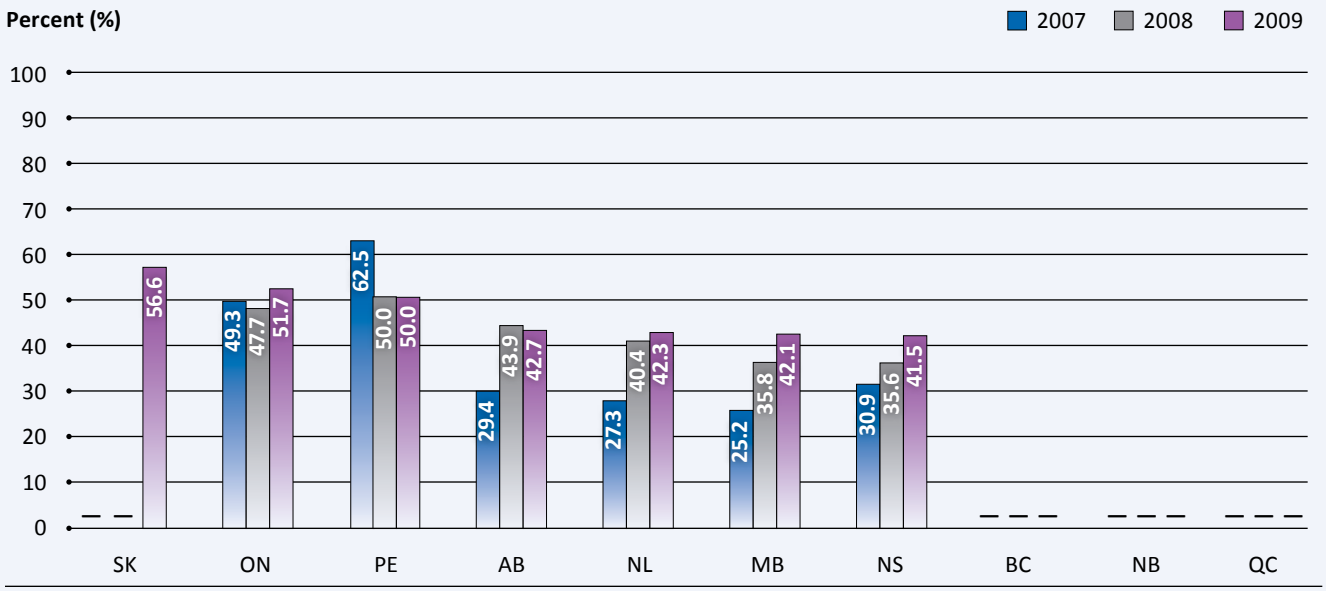
Prince Edward Island's results were derived from patient chart reviews (whereas results in other provinces were based on analysis of administrative data).

In the past, it has been noted that several provinces reported substantial increases in the number of stage II and III rectal cancer cases included in the indicator calculation from year to year. This may reflect improvements in the ability to identify the target cases in the administrative data but may also reflect real trends.

Detailed calculation methodology is provided in the Technical Appendix (see page 182).

FIGURE 6

Percentage of resected stage II or III rectal cancer patients who received radiation therapy before surgery, by province – patients diagnosed 2007 to 2009



Percentage of stage II or III rectal cancer patients who had a surgical resection, by province – patients diagnosed 2007 to 2009

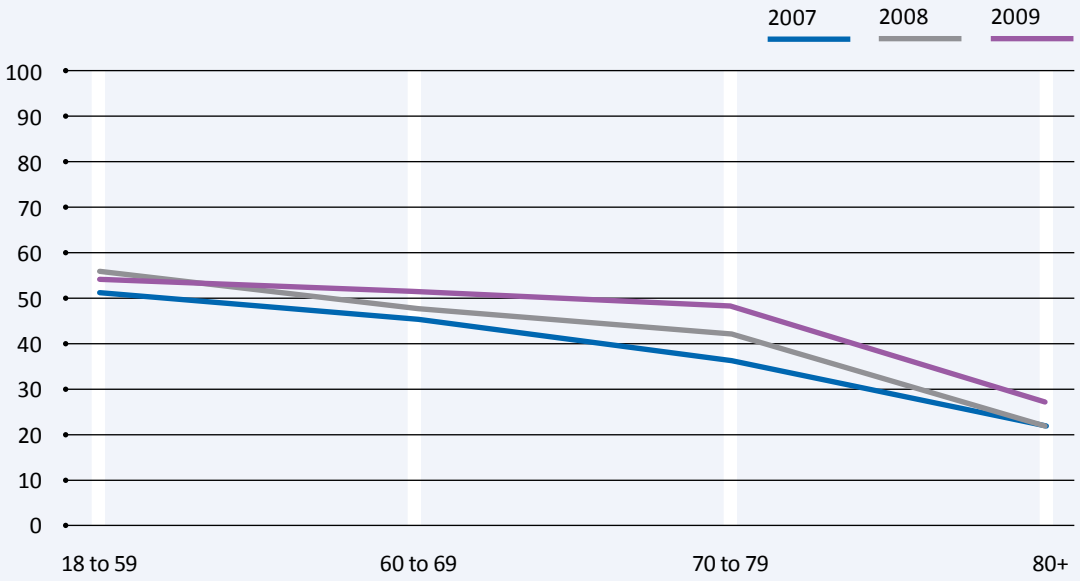
	SK	ON	PE	AB	NL	MB	NS	BC	NB	QC
2007	—	77.0	94.1	93.9	73.3	82.7	94.2	—	—	—
2008	—	70.2	90.9	92.5	74.6	78.3	89.4	—	—	—
2009	80.5	73.5	90.0	91.2	92.9	83.8	93.9	—	—	—

"—" Data are not available for BC (2007 to 2009), NB (2007 to 2009), QC (2007 to 2009), SK (2007 to 2008). Includes radiation therapy started up to 120 days prior to surgery.

Data source: Provincial cancer agencies.

FIGURE 7

Percentage of resected stage II or III rectal cancer patients who received radiation therapy before surgery, by age, Canada – patients diagnosed 2007 to 2009



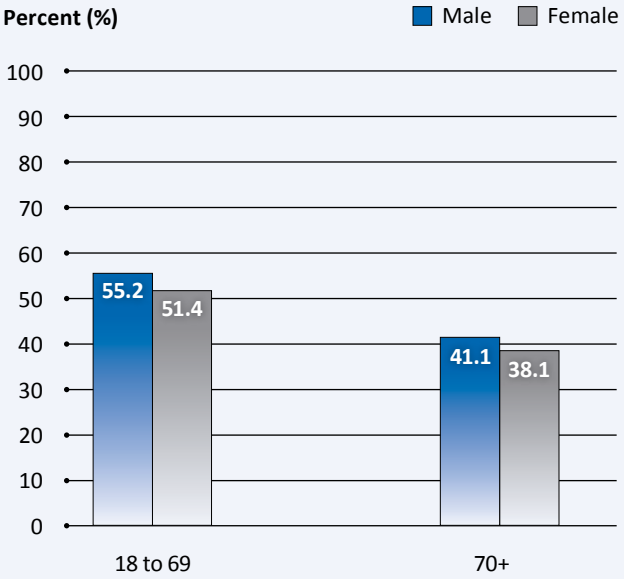
Average includes AB, MB, NL, NS, ON, PE (provinces that submitted comparable data for all three years).

Includes radiation therapy started up to 120 days prior to surgery.

Data source: Provincial cancer agencies.

FIGURE 8

Percentage of resected stage II or III rectal cancer patients who received radiation therapy before surgery, by age group and sex, Canada – patients diagnosed in 2009



Data includes AB, MB, NL, ON, NS, PE, SK.

Includes radiation therapy started up to 120 days prior to surgery.

Data source: Provincial cancer agencies.

Pre-operative Radiation Therapy for Stage II and III Rectal Cancer: Reasons for Non-Referral and Non-Treatment

A SYSTEM PERFORMANCE SPECIAL STUDY

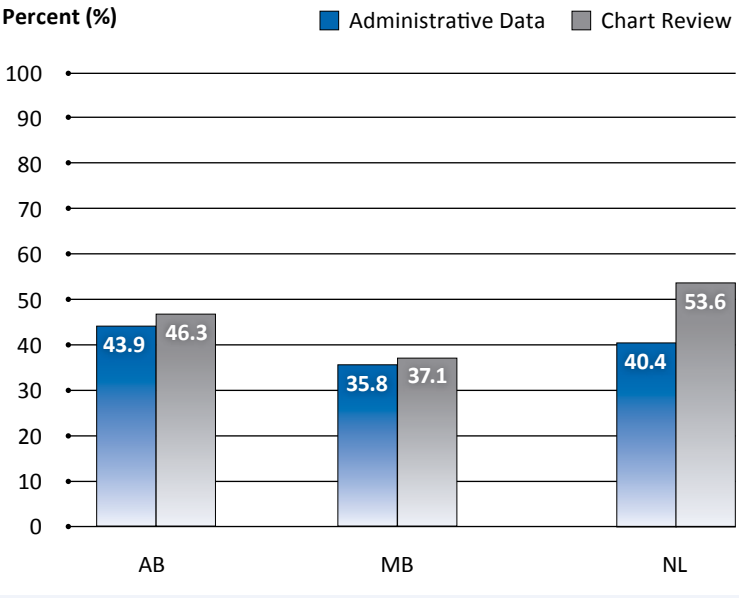
System Performance Reports have shown substantial variation between provinces when looking at the percentage of stage II and III rectal cancer patients receiving pre-operative radiation therapy preceding surgical resection, an evidence-based guideline in rectal cancer care. While care was taken to ensure that each province was abstracting data in the same way, methodological differences may have accounted for some of this discrepancy. That aside, interprovincial variations in the percentage of patients treated according to the guidelines, which are in place to ensure better care, may be due to a number of factors, both patient-specific and practice-specific. Understanding these factors would help clarify the extent to which non-concordance can be explained by clearly documented rationales for non-referral and/or non-treatment including co-morbid conditions, performance status, and other patient-related contraindications for treatment, patient age, patient/family choice, clinician judgement, etc.

The Partnership launched a study in 2011 in collaboration with its provincial partners to look at the factors that may contribute to explaining the difference between the calculated concordance rate and the "expected" rate, which is informed by published studies and the clinical experience. Five provinces were included in the chart review study: Alberta, Saskatchewan, Manitoba, Prince Edward Island and Newfoundland and Labrador. A random sample of 383 patients was included in the study. Data were abstracted from patient charts by two trained registrars in each province. Data analyses were to assess the patient demographics of the study sample, the percentage of cases referred for treatment and treated according to the guidelines overall and by selected patient demographics (age, sex and stage), and the reasons for non-treatment and/or non-referral.

Three provinces (Alberta, Manitoba and Newfoundland and Labrador) had information on the percentage of patients receiving pre-operative radiation therapy from both the administrative data and the medical chart review. The percentage receiving pre-operative radiation therapy from the administrative data (which includes treatment data sources linked to the cancer registry) was not available for 2008 for Saskatchewan and Prince Edward Island. Data from Alberta and Manitoba showed consistency between the administrative data and chart review in the percentage of patients treated with pre-operative radiation therapy (Figure I). Future work will investigate reasons for the varying results between the two data sources for Newfoundland and Labrador.

FIGURE I

Comparison of chart review results and administrative data: percentage of patients diagnosed with stage II or III rectal cancer who underwent resection and received pre-operative radiation therapy within one year of diagnosis, 2008



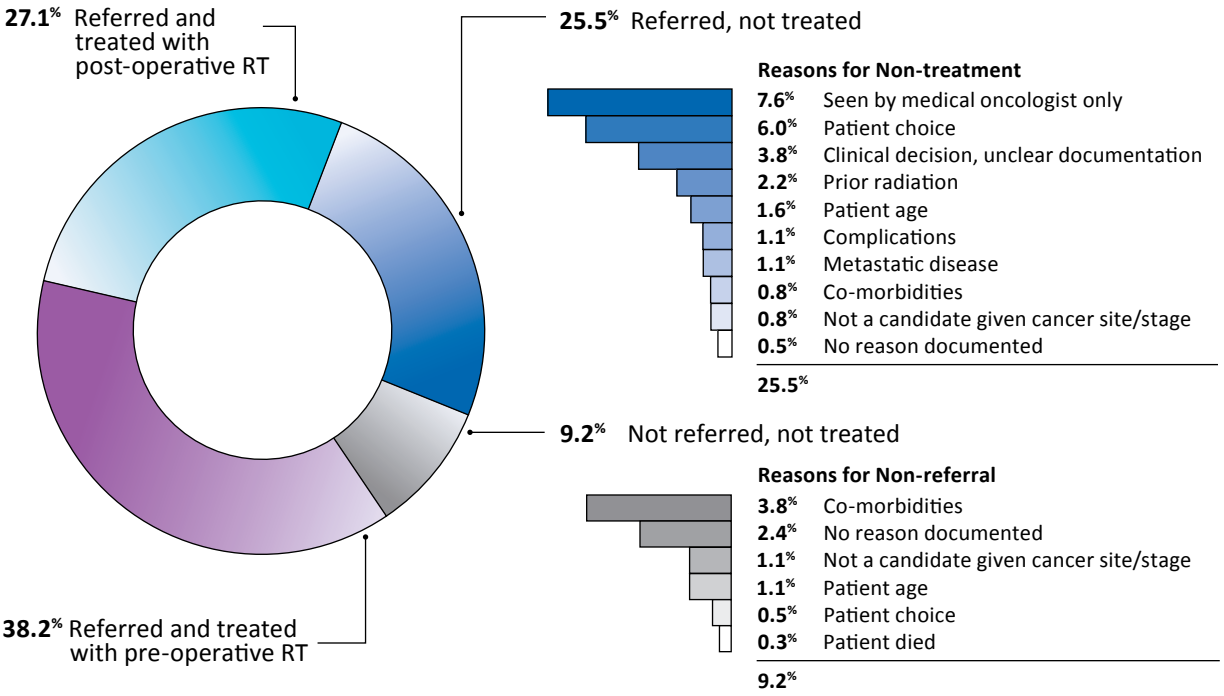
Data source: Provincial cancer agencies.

Of the 383 sample patients, three were excluded when reasons for non-referral and non-treatment were examined as these patients were found to have been diagnosed with a cancer stage/site other than stage II or III rectal cancer. Patients were classified into categories that describe the reasons for non-referral or non-treatment based on review of the documentation in patient charts. A hierarchical algorithm was used to assign a reason when multiple reasons were documented.

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 while the remaining 12% were not (Figure II).

FIGURE II

Referral and treatment status from chart review results: use of radiation therapy preceding or following resection for patients diagnosed with stage II or III rectal cancer, including documented reasons for non-referral or non-treatment



N = 369.

Data include AB, SK, MB, PE, NL.

Referral is by surgeon who performed the resection to a radiation treatment centre.

Data source: Chart review study and provincial cancer agencies.

Data on reasons for non-referral were available for 34 of the 45 patients[d] (Figure II). The most common reason for non-referral was co-morbidity (41% of non-referred patients with reason documented, or 3.8% of all patients in the study). Twelve percent of patients were found not to be a candidate for referral to an oncologist for treatment, 11.8% were not referred because of patient age and in 6% of non-referred patients (or 0.5% of all patients in the study), patient choice was the reason documented for non-referral. Among 27% of the non-referred patients (or 2.4% of all patients in the study), no clear reason for the decision not to refer was documented in the charts.

Among patients whose surgeon did refer them to an oncologist, 42% (or 27.1% of all patients in the study) were treated with pre-operative radiation therapy, 30% (or 38.2% of all patients in the study) were treated with post-operative radiation therapy and 28% (or 25.5% of all patients in the study) received no radiation therapy. Of those who did not receive treatment, the most common documented reason for non-treatment was the patient was not seen by a radiation oncologist and only instead by a medical oncologist (30% non-referred cases, or 7.6% of all patients in the study) followed by patient choice (23%, or 6.0% of all patients in the study). Among 15% of patients not treated (or 3.8% of all patients in the study), the decision not to treat was not clearly documented in the medical chart.

Details on methodology are provided in the Technical Appendix (see page 193).

d) There were 11 cases excluded from the analysis as their medical chart was not reviewed by the study radiation oncologist and had no data available.

Adjuvant radiation therapy for stage I and II breast cancer

What are we measuring?

This indicator measures the percentage of stage I or II breast cancer patients who receive adjuvant radiation therapy following breast conserving surgery (BCS) as per widely published treatment guidelines. This year's indicator compares results for patients diagnosed in 2007, 2008 and 2009 and examines age patterns as well as interprovincial comparisons.

Why are we measuring this?

The five-year recurrence rate for early (stage I and II) breast cancer has been shown to exceed 25% in the absence of standard treatment.[134]

Most women diagnosed with non-metastatic breast cancer are candidates for surgery, either BCS or mastectomy.[135] BCS followed by radiation therapy (referred to as breast conserving therapy, or BCT) is less invasive than mastectomy and associated with lower morbidity and better cosmesis and psychological outcomes, but has comparable recurrence and survival.[136]

What do the results mean?

There was interprovincial variation in the percentage of early stage breast cancer cases treated with radiation therapy following breast conserving surgery.

- Six provinces provided data required to calculate the full guideline treatment rate for 2009 (i.e., post breast conserving surgery); the treatment rates for those ranged from 76% in Manitoba to 93% in Newfoundland and Labrador in 2009 (Figure 9).
- Population-based studies can help put these Canadian findings in context. According to a U.S. study, 94% of women age 66 to 70 received adjuvant radiation therapy for early stage breast cancer following BCS from 2000 to 2002.[137] A national Swiss study reported an adjuvant radiation treatment rate of 92% for women under age 80 with stage I to III breast cancer.[138] Some provincial rates reported here are slightly lower than these published results; however, the years of analysis and study methods (particularly age exclusions) differ, making precise comparisons difficult.

The treatment rate dropped substantially for patients age 70 and older.

- In all years, the average adjuvant radiation rate drops for patients over age 70, and particularly after 80 years of age (Figure 10). Some reduction in use of guideline therapy in older patients might be evidence-based. Several clinical trials suggest that radiation therapy following breast conserving surgery for stage I, Estrogen Receptor positive women over 70 years of age has limited benefits in recurrence and survival.[139]

While adjuvant radiation therapy should be considered for most early stage breast cancer patients who undergo breast-conserving surgery, there are no formal Canadian performance targets for the actual treatment rate. In some patients, the risks associated with radiation therapy may outweigh the benefits (e.g., patients with connective tissue disease or those who have previously received radiation in the same site),[140] although for those patients, mastectomy may be the better treatment option.

Work is underway through the Partnership's System Performance initiative to develop benchmarks and targets for this and other indicators for future reports.

What is being done?

In October 2012, The Partnership collaborated with the Canadian Institute for Health Information (CIHI) and released a special focus report on breast cancer surgery patterns across the country.[141] Relative differences in mastectomy and breast conserving surgery rates were reported compared to radiation treatment rates to identify correlations that may explain the results reported here.

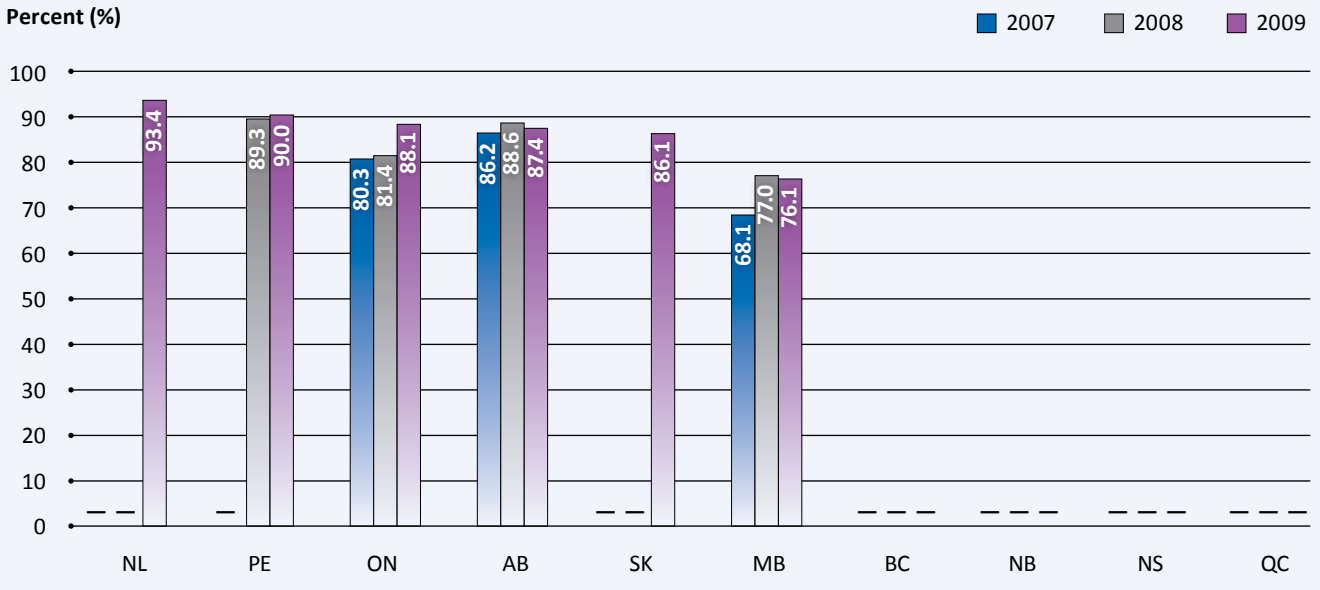
What should you be aware of about data and measurement?

Results for British Columbia are not presented as their data includes only cases referred to the provincial cancer centres (through the 2009 diagnosis year).

Detailed calculation methodology is provided in the Technical Appendix (see page 182).

FIGURE 9

Percentage of stage I or II breast cancer patients receiving radiation therapy following breast conserving surgery, by province and year – patients diagnosed 2007 to 2009



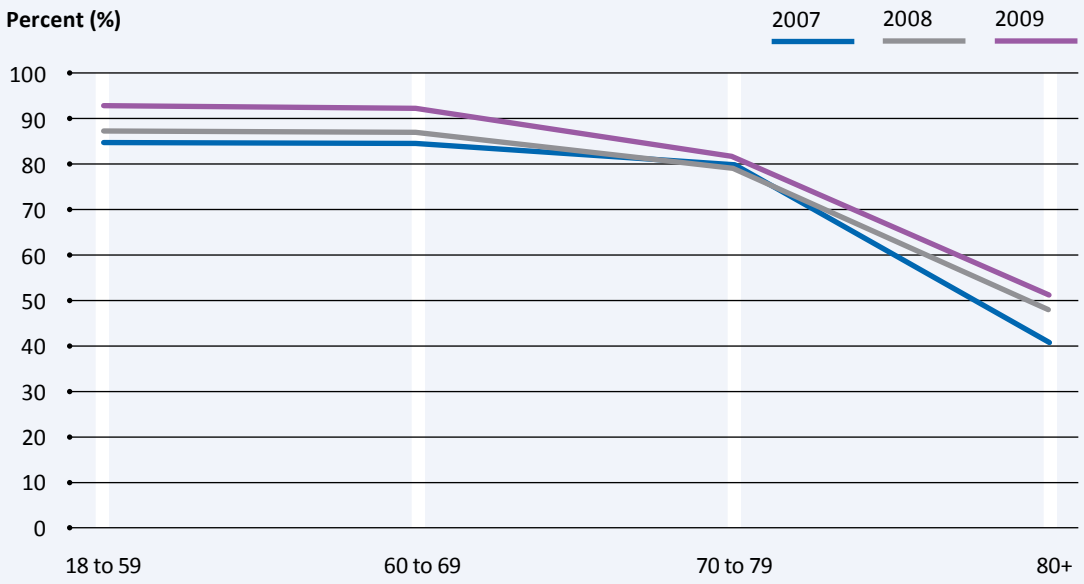
"—" Data are not available for BC (2007 to 2009), NB (2007 to 2009), NL (2007 to 2008), NS (2007 to 2009), QC (2007 to 2009), PE (2007), and SK (2007 to 2008).

Includes radiation therapy started within 270 days following surgery.

Data source: Provincial cancer agencies.

FIGURE 10

Percentage of stage I or II breast cancer patients receiving radiation therapy following breast conserving surgery, by age and year – patients diagnosed 2007 to 2009



Average includes AB, MB, ON (provinces that submitted comparable data for all three years).

Includes radiation therapy started within 270 days following surgery.

Data source: Provincial cancer agencies.

Systemic Therapy

Adjuvant chemotherapy for stage III colon cancer

What are we measuring?

This indicator measures the percentage of stage III colon cancer patients who received adjuvant chemotherapy following resection. This year's indicator compares results for patients diagnosed in 2007, 2008 and 2009 and examines age and sex patterns as well as interprovincial comparisons.

Why are we measuring this?

The role of adjuvant chemotherapy in patients with surgically resected stage III colon cancer has been clearly established. Several large randomized trials have demonstrated that treatment with chemotherapy following surgery improves outcomes.[142-144]

Treatment practice guidelines recommend adjuvant chemotherapy should follow surgery for patients with stage III colon cancer.[145]

Measuring national practice patterns relative to this treatment guideline allows for the identification of gaps and other variations, which could be addressed through quality improvement strategies.

What do the results mean?

There was interprovincial variation in the percentage of resected stage III colon cancer cases treated with adjuvant chemotherapy.

- Data for 2009 show that the percentage of resected stage III colon cancer cases treated with adjuvant chemotherapy ranged from 55.7% in Manitoba to 81.8% in Saskatchewan (Figure 11).
- This interprovincial variation represents a larger range than can be attributed to differences in case mix and in fact may be related to the percentage of stage III colon cancer patients undergoing resection. Among the five provinces submitting data for 2009, the percentage of patients receiving surgical resection within one year of diagnosis ranged from 43% in Saskatchewan to 100% in Newfoundland and Labrador (Figure 11).
- Although the treatment rate appears to have dropped from 2007 to 2009 for three of those provinces, not enough data exist to determine a definitive trend.

The treatment rate drops substantially with patient age and is potentially lower for older women relative to older men.

- The adjuvant chemotherapy rate drops from 90% for patients under 60 years of age to 20% for patients aged 80 and older. (Figure 12). The treatment rate for patients aged 70 and older is 38% for women compared to 46% for men (Figure 13).
- While adjuvant chemotherapy following resection should be considered for most stage III colon cancer patients, there are no formal Canadian performance targets for the actual treatment rate. In some patients, the negative implications of chemotherapy may outweigh the benefits; while the frequency of these cases is not known, it is not expected to vary significantly between provinces.
- A study including colon cancer patients identified from all cancer centres in South-West France in 2003/2004, the year following introduction of regional evidence-based guidelines for CRC management, found that 26% of stage II colon cancer patients and 71% of stage III colon cancer patients received post-operative chemotherapy.[133] In both cases, use of chemotherapy was found to be significantly associated with age < 75 years after controlling for other possible confounding factors.

What is being done?

The results of this indicator will be shared with medical oncologists and provincial oncology drug programs and equivalents to try and identify factors contributing to measured variations. Additional analyses may be warranted to identify influencing factors, including for example the use and extent of capture of oral chemotherapy in the data.

What should you be aware of about data and measurement?

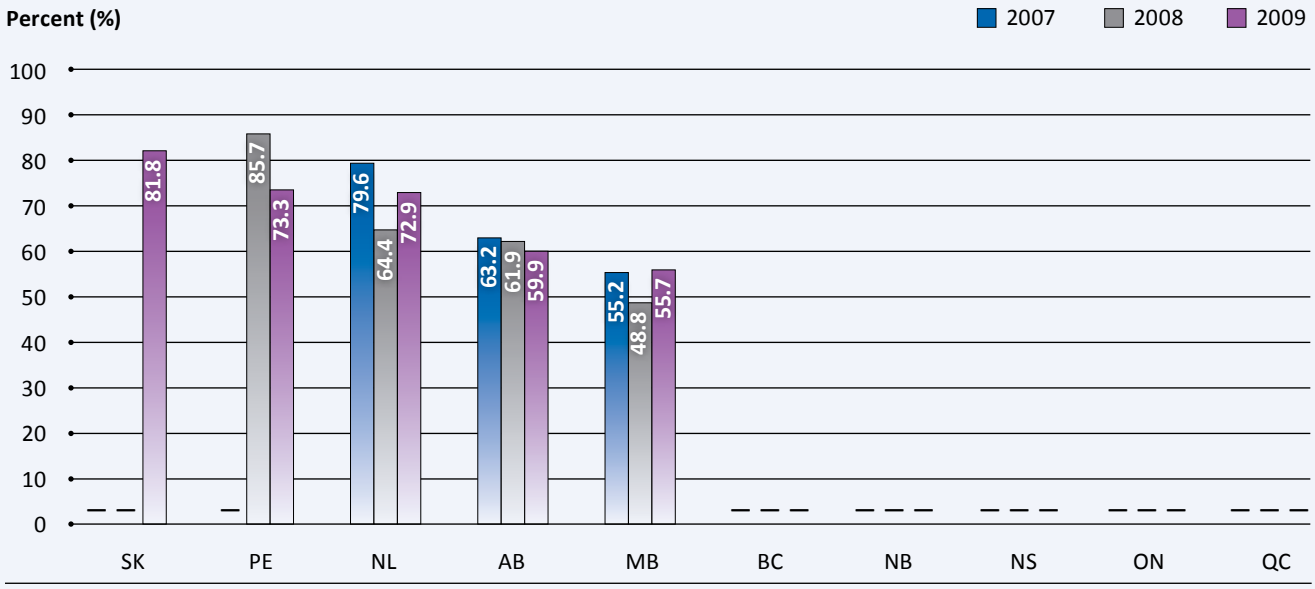
Results for British Columbia, Ontario and Nova Scotia are not shown due to deviations from the indicator specifications that affect their comparability with other provinces. British Columbia and Nova Scotia include data only for cases referred to the provincial cancer centres.

Prince Edward Island's results were derived from patient chart reviews (whereas results of other provinces were based on analysis of administrative data).

Detailed calculation methodology is provided in the Technical Appendix (see page 182).

FIGURE 11

Percentage of stage III colon cancer patients receiving chemotherapy following surgical resection by province, patients diagnosed 2007 to 2009



Percentage of stage III colon cancer patients with a surgical resection, by province – patients diagnosed 2007 to 2009

	SK	PE	NL	AB	MB	BC	NB	NS	ON	QC
2007	—	—	81.8	98.9	85.9	—	—	—	—	—
2008	—	91.3	83.1	96.8	87.4	—	—	—	—	—
2009	43.1	93.8	100.0	98.6	87.1	—	—	—	—	—

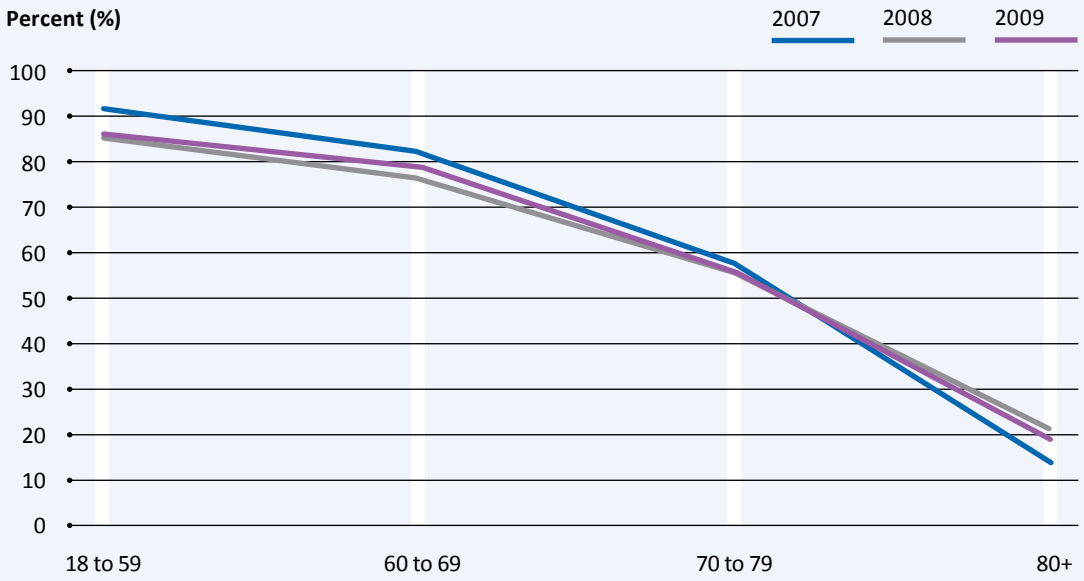
"—" Data are not available for BC (2007 to 2009), NB (2007 to 2009), NS (2007 to 2009), ON (2007 to 2009), PE (2007), SK (2007 to 2008) and QC (2007 to 2009).

Includes chemotherapy started within 120 days following surgery.

Data source: Provincial cancer agencies.

FIGURE 12

Percentage of stage III colon cancer patients receiving chemotherapy following surgical resection, by age, Canada – patients diagnosed 2007 to 2009



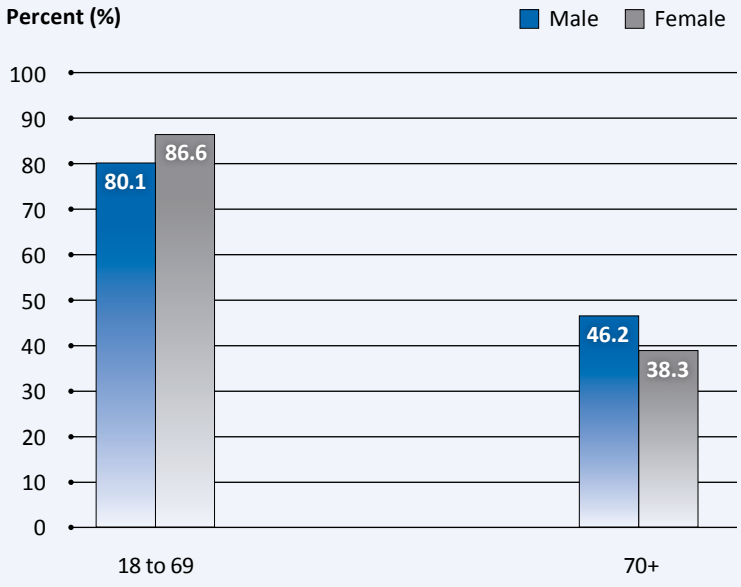
Average includes AB, MB, NL (provinces that submitted comparable data for all three years).

Includes chemotherapy started within 120 days following surgery.

Data source: Provincial cancer agencies.

FIGURE 13

Percentage of stage III colon cancer patients receiving chemotherapy following surgical resection, by age and sex, Canada – patients diagnosed in 2009



Data includes AB, MB, NL, PE, SK.

Includes chemotherapy started within 120 days following surgery.

Data source: Provincial cancer agencies.

Adjuvant chemotherapy for stage II and IIIA non-small cell lung cancer

What are we measuring?

This indicator measures the percentage of resected stage II or IIIA non-small cell lung cancer (NSCLC) patients receiving adjuvant (post-operative) chemotherapy, as per widely published treatment guidelines.

The indicator includes patients diagnosed in each of 2007, 2008 and 2009 and presents treatment patterns by province, age group and sex.

A chart review conducted in 2011 examined reasons for non-treatment including poor performance status, co-morbidities, patient choice, and other factors. The results, which help identify the actual potential for guideline concordance improvement, are discussed at the end of this section.

Why are we measuring this?

Over 20,000 people in Canada die from lung cancer each year; this is more than the next four highest mortality cancer sites combined.[41]

According to stage data in Canada, in 2007 to 2008 nearly half of those diagnosed with lung cancer (47.9%) were diagnosed at a late stage of disease (stage IV) followed by stage III disease (27.4%).[146]

Median survival in non-small cell cancer (NSCLC) is 47, 24 and 17 months for stage IIA, IIB and IIIA, respectively (based on international data from the International Association for the Study of Lung Cancer database).[147]

The delivery of chemotherapy following resection has been shown to improve disease-free and overall survival for locally advanced (stage II and IIIA) NSCLC patients.[148] A recent registry-based observational study in Ontario reported that four-year survival was significantly better among elderly NSCLC patients in that province who received chemotherapy following surgical resection.[149]

Measuring national practice patterns relative to this treatment guideline allows for the identification of gaps and other variations, which could be addressed through quality improvement strategies.

What do the results mean?

There was some interprovincial variation in the percentage of resected stage II and IIIA NSCLC cases treated with adjuvant chemotherapy.

- Adjuvant therapy rates among patients who underwent surgery for the five provinces submitting data compliant with the indicator specifications for 2009 cases ranged from 44% to 58%[e] (Figure 14). The percentage of patients who underwent resection also varied for the five provinces submitting data, from 27% to 47%. Adjuvant therapy rates among stage II and IIIA NSCLC patients regardless of resection status ranged from 38% to 45% (data not shown). Country-level data on the percentage of patients with stage II and III NSCLC receiving adjuvant chemotherapy are scarce; however, one study used data from the Netherlands Cancer Registry to show that 24% of patients with stage II NSCLC who were under the age of 75 received this guideline-recommended treatment.[150]

e) PEI submitted data but their results were suppressed due to small numbers.

The treatment rate for patients age 70 years and older was half that for younger patients; the treatment rate for older females appeared higher than for older males.

- The adjuvant chemotherapy rate dropped from an average of approximately 70% for patients under age 70 to approximately 30% for patients age 70 years and older (Figure 15).
- The treatment rate for women age 70 years and older is 30% compared to 37% for men of the same age group. This difference requires further investigation (Figure 16).

While adjuvant chemotherapy should be considered for most resected stage II and IIIA NSCLC patients, there are no formal Canadian performance benchmarks or targets for the treatment rate.

- Factors such as the patient's performance status and co-morbidity, among others, play a part in the decision to treat with chemotherapy.

What is being done?

In 2011, a chart review was initiated to examine referral and treatment patterns for resected NSCLC patients (as per the treatment guideline assessed in this indicator). A report on the results of the chart review appears on page 95.

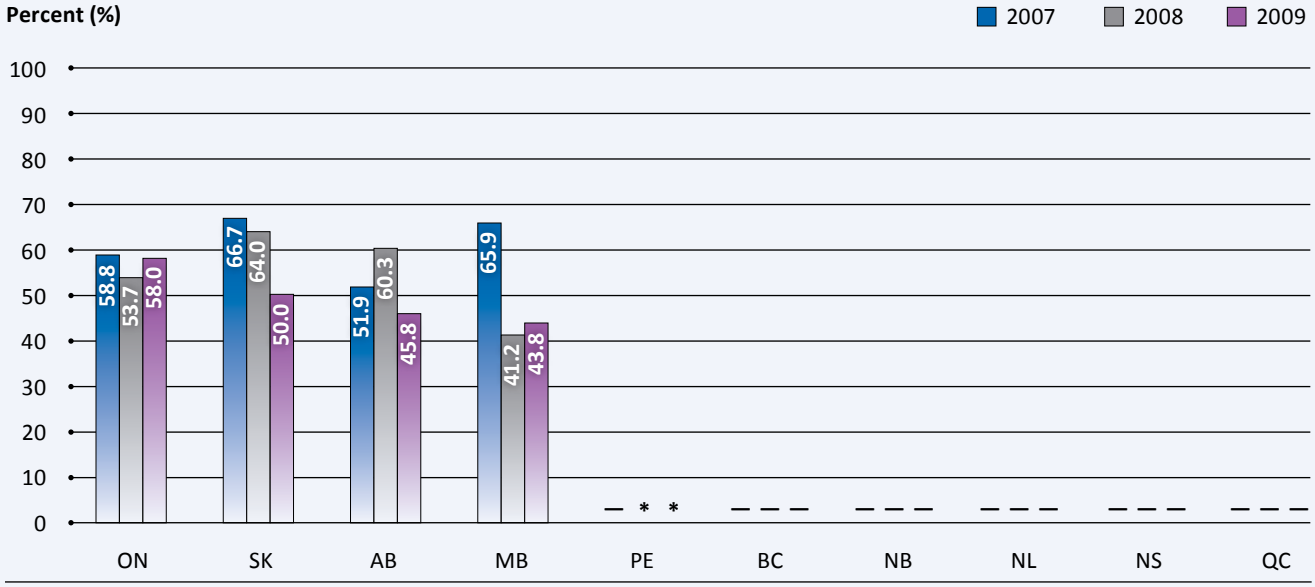
The results of this indicator are being shared and discussed with clinicians, researchers, and policy makers across the country with the objective of understanding the patterns and identifying any potential opportunities for improvements in clinical practice.

What should you be aware of about data and measurement?

Detailed calculation methodology is provided in the Technical Appendix (see page 183).

FIGURE 14

Percentage of resected stage II or IIIA non-small cell lung cancer patients who received chemotherapy following surgical resection, by province – patients diagnosed 2007 to 2009



Percentage of stage II or IIIA non-small cell lung cancer patients with a surgical resection, by province – patients diagnosed 2007 to 2009

	ON	SK	AB	MB	PE	BC	NB	NL	NS	QC
2007	40.6	36.0	31.0	42.7	—	—	—	—	—	—
2008	36.6	38.5	34.3	41.0	*	—	—	—	—	—
2009	36.2	26.9	36.0	47.1	*	—	—	—	—	—

*Suppressed due to small numbers.

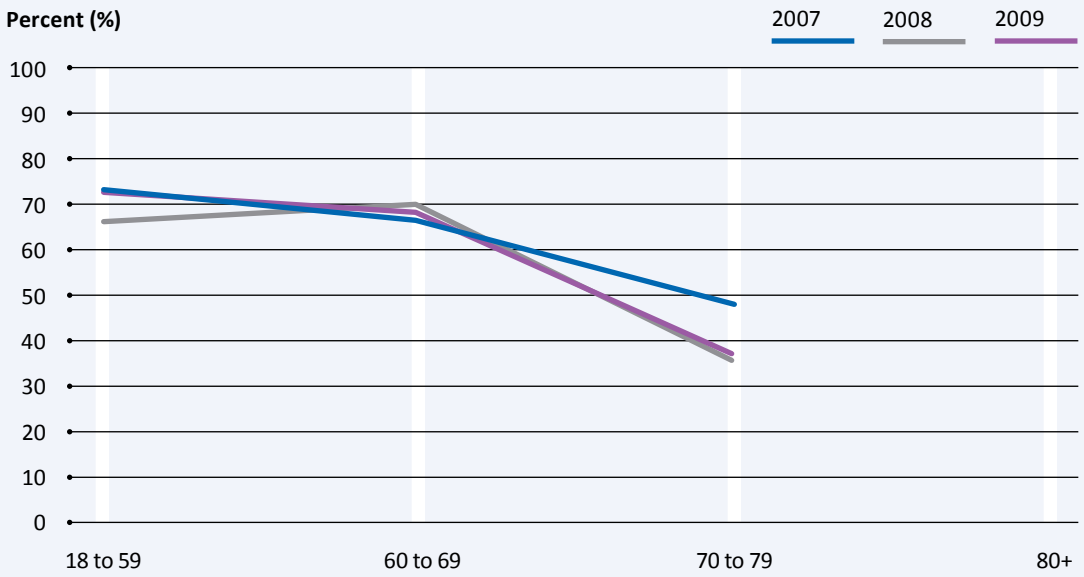
"—" Data are not available for BC, NB, NL, NS, PE (2007), and QC.

Includes chemotherapy started within 120 days following surgery.

Data source: Provincial cancer agencies.

FIGURE 15

Percentage of stage II or IIIA non-small lung cancer patients who received chemotherapy following surgical resection, by age, Canada – patients diagnosed 2007 to 2009



Data suppressed due to small numbers for age group 80+.

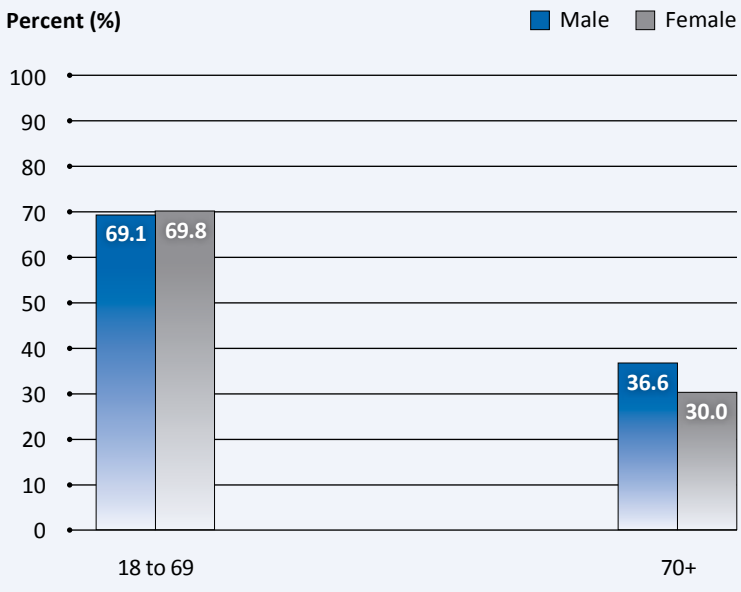
Average includes AB, MB, ON, SK (provinces that submitted comparable data for all three years).

Includes chemotherapy started within 120 days following surgery.

Data source: Provincial cancer agencies.

FIGURE 16

Percentage of stage II or IIIA non-small cell lung cancer patients who received chemotherapy following surgical resection, by age and sex, Canada – patients diagnosed 2007 to 2009



Data includes AB, MB, ON, SK, PE.

Includes chemotherapy started within 120 days following surgery.

Data source: Provincial cancer agencies.

Adjuvant Chemotherapy for Stage II and IIIA Non-small Cell Lung Cancer: Reasons for Non-referral and Non-treatment

A SYSTEM PERFORMANCE SPECIAL STUDY

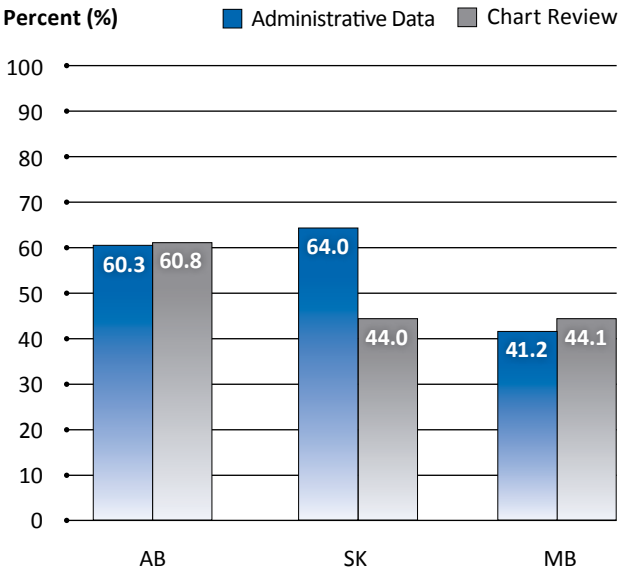
System Performance Reports over the past few years have shown substantial provincial variation in the percentage of patients with stage II and IIIA non-small cell lung cancer (NSCLC) receiving adjuvant chemotherapy. While methodological differences may have accounted for some of this discrepancy, interprovincial variations in the percentage of patients treated according to the guidelines may be due to a number of factors, both patient-specific and practice-specific. Understanding these factors would help clarify the extent to which non-concordance can be explained by clearly documented rationales for non-referral and/or non-treatment including co-morbid conditions, performance status, and other patient-related contraindications for treatment, patient age, patient/family choice, clinician judgement, etc.

As previously described (page 82), a study was launched in 2011 to examine the factors that may contribute to explaining the interprovincial variation. Four provinces were included in the NSCLC portion of the chart review study: Alberta, Saskatchewan, Manitoba, and Prince Edward Island. A random sample of 113 patients was included in this sub-study. Data were abstracted from patient charts by two trained registrars in each province. Data analyses were to assess the patient demographics of the study sample, the percentage of cases referred for treatment and treated according to the guidelines overall and by selected patient demographics (age, sex and stage), and the reasons for non-treatment and/or non-referral.

In 2008, 52% of stage II and IIIA non-small cell lung cancer patients were treated with adjuvant chemotherapy based on the chart review (Figure III). Provincially, treatment rates from the chart review could be compared to those calculated from the administrative data (which includes treatment data sources linked to the cancer registry) for only three provinces participating in the study. The rates for the two data sources were almost identical for Alberta and very similar for Manitoba, but for Saskatchewan there was a difference of 20 percentage points between the two sources. Saskatchewan is reviewing their data and indicator methodology for opportunities to improve quality and consistency.

FIGURE III

Comparison of chart review results and administrative data: percentage of patients diagnosed with stage II or IIIA non-small cell lung cancer receiving post-operative chemotherapy within one year of diagnosis, 2008



Data source: Provincial cancer agencies.

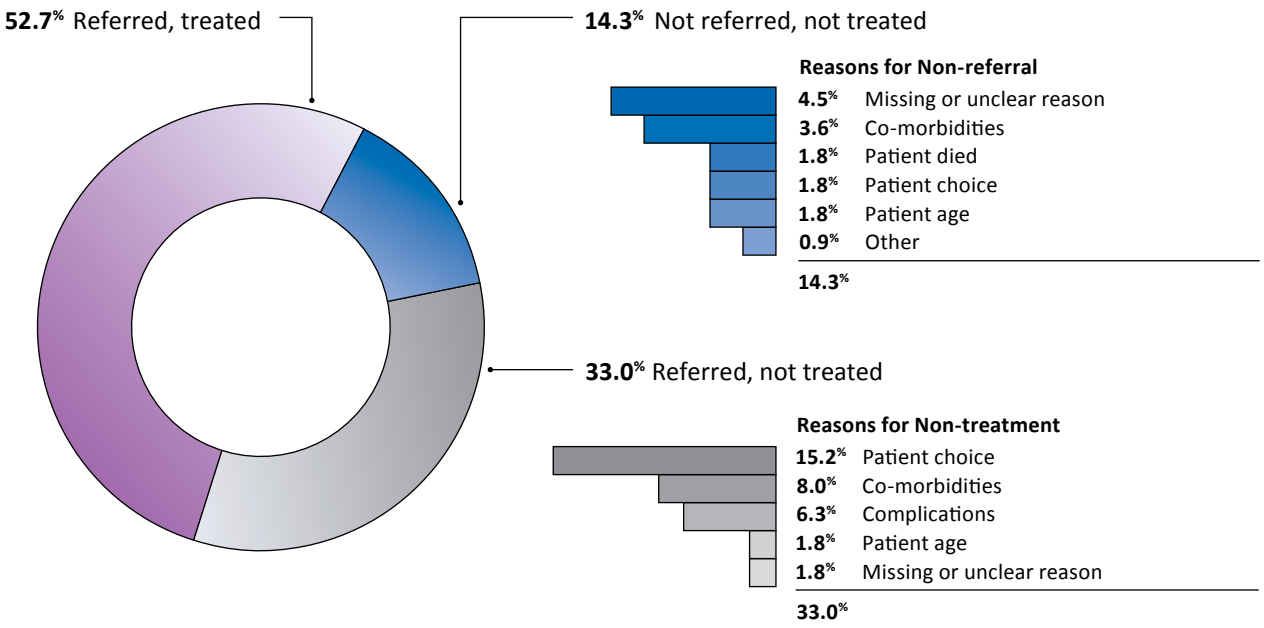
Of the 113 sample patients, one was excluded when reasons for non-referral and non-treatment were examined as these patients were found to have been diagnosed with a cancer stage/site other than stage II or IIIA non-small cell lung cancer. Patients were classified into categories that describe the reasons for non-referral or non-treatment based on review of the documentation in patient charts. A hierarchical algorithm was used when multiple reasons were documented.

In the four participating provinces, 86% of patients diagnosed with stage II or IIIA non-small cell lung cancer were referred to a medical or radiation oncologist by a surgeon while the remaining 14% were not (Figure IV).

Details on methodology are provided in the Technical Appendix (see page 193).

FIGURE IV

Referral and treatment status from chart review results: use of chemotherapy following resection for patients diagnosed with stage II or IIIA lung cancer, including documented reasons for non-referral or non-treatment



N=112.

Data include AB, SK, MB, PE.

Referral is by surgeon who performed the resection to a medical oncologist.

Data source: Chart review study and provincial cancer agencies.

Data on reasons for non-referral were available for all of the non-referred patients (Figure IV). The most common reason for non-referral was co-morbidity (25%, or 3.6% of all patients in the study). Thirteen percent of patients (or 1.8% of all patients in the study) were found to have not been referred because they died, 13% (or 1.8% of all patients in the study) chose not to undergo the guideline treatment, and among 12% of patients (or 1.8% of all patients in the study), patient age was cited as the reason for non-referral. For 31% of non-referred patients (or 5.3% of all patients in the study), no clear reason for the decision not to refer was documented in the charts.

The most common reason for non-treatment with adjuvant chemotherapy was patient choice accounting for 46% of non-treated patients (or 15.2% of all patients in the study), followed by co-morbidities and complications. For 11% of non-treated patients (or 1.8% of all patients in the study), no clear reason for the decision not to treat was documented in the charts.

Surgery

Mastectomy/breast conserving surgery

What are we measuring?

This indicator measures the percentage of breast tumour resections that are done by mastectomy among women with unilateral invasive breast cancer.

This year's indicator looks at patients receiving their index (first) breast cancer resection between April 2007 and March 2010 and compares the results by province and by age.[f]

The interprovincial graph plots both the index rate, which includes women for whom mastectomy was the initial procedure, and the final rate, which also includes women undergoing mastectomy following breast-conserving surgery (BCS).

Why are we measuring this?

Most women diagnosed with non-metastatic breast cancer are candidates for surgery, either BCS or mastectomy.[135]

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

Breast conserving surgery (BCS) followed by radiation therapy (referred to as breast conserving therapy (BCT)) is less invasive than mastectomy and associated with lower morbidity and better cosmesis and psychological outcomes, but has equivalent mortality. BCT is therefore generally recommended for most women with stage I or II breast cancer.[136]

What do the results mean?

In Canada, slightly fewer than 40% of breast cancer resections are mastectomies, but the provincial rates vary widely.

Overall, 39.5% of women with breast cancer who underwent a resection received a mastectomy (60% were treated using breast conserving surgery) (Figure 17).

- The final mastectomy rate ranges from 26.5% in Quebec to 68.7% in Newfoundland and Labrador, suggesting substantial variation in practice across provinces. Interprovincial variation is evident when comparing the index and final rates. The difference between the two rates indicates the proportion of mastectomies that follow unsuccessful BCS versus mastectomies that are the first surgical resection choice. Because the current procedures coding does not differentiate between excisional biopsies and BCS, at least some of the difference may be explained by some provinces having a higher excisional biopsy rate than others.
- While breast conserving therapy (BCT) should be considered for most early stage breast cancer patients, there are no formal Canadian performance targets for the actual treatment rate. Limited access to radiation therapy (e.g., for patients living far from the nearest radiation treatment centre) does influence the rates.[151-155] The choice of BCS versus mastectomy should be one made by the breast cancer patient informed by clear knowledge of the risks, benefits, and practical considerations associated with each choice.

f) For more detailed analysis of factors influencing mastectomy rates, see the Partnership's publications: *Breast Cancer Control in Canada, A System Performance Special Focus Report* and the joint report with the Canadian Institute for Health Information: *Breast Cancer Surgery in Canada: 2007 to 2008 to 2009 to 2010*, both available at: www.cancerview.ca/systemperformancereport.

Work is underway through the Partnership's System Performance initiative to develop benchmarks and targets for this and other indicators for future reports.

For women under aged 40 and aged 80 and older, mastectomy rates are 10 to 15 percentage points higher than for women aged 40 to 79 (Figure 18).

- Among women aged 18 to 39, 51.5% who underwent a resection had a mastectomy. This rate was 49.6% among women aged 80 and older.
- Data from the U.S. show that younger women (less than 50 years old) are opting for mastectomy instead of BCS.[156] It is not clear, however, whether this pattern reflects anxiety about radiation therapy, insufficient provider communication about BCS or other factors.[156]

What is being done?

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 October 2012[141] focused on breast cancer surgery and highlighted variations and other patterns that may constitute opportunities for further analyses, and potential system improvements.

What should you be aware of about data and measurement?

The data for this indicator are based on hospital abstract databases maintained by CIHI or provided to CIHI. There was no linkage with cancer registries and so the data may include some women with recurrent disease (although attempts to minimize this were made through the case selection criteria).

The mastectomy data include women who receive a mastectomy first as well as women who receive a mastectomy within one year of breast conserving surgery.

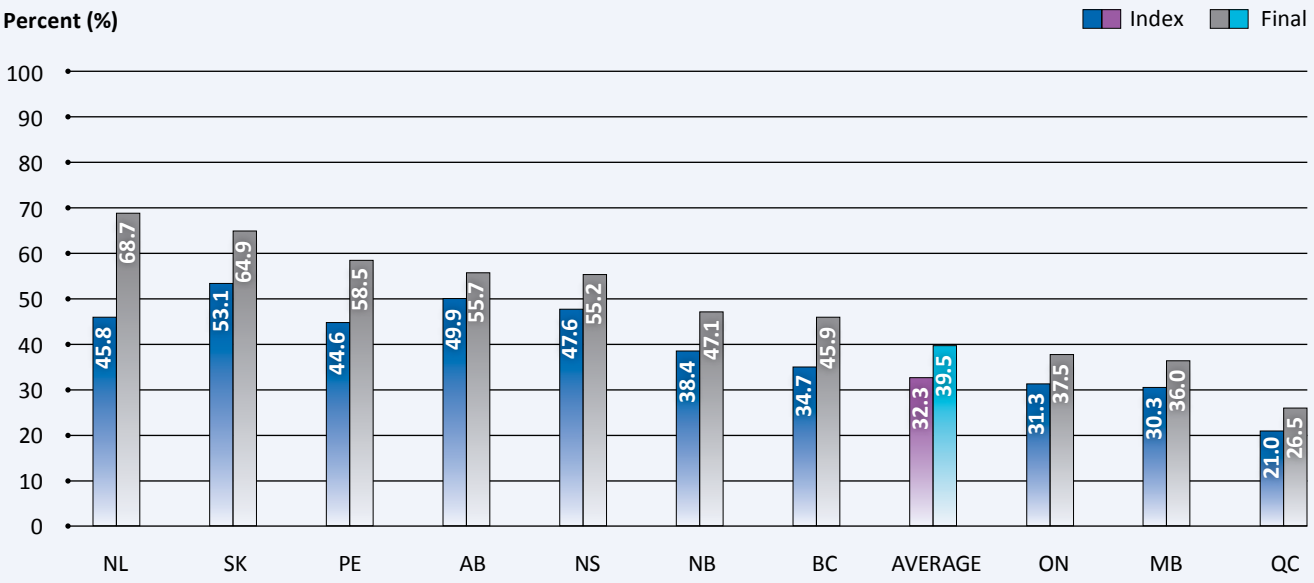
The data include women with unilateral invasive breast cancer whose surgery occurred between April 2007 and March 2010.

The procedure codes used do not differentiate between excisional biopsies and BCS. As such, patients who receive excisional biopsies followed by mastectomy will be grouped in the results with patients who receive BCS first followed by mastectomy.

Detailed calculation methodology is provided in the Technical Appendix (see page 183).

FIGURE 17

Percentage of breast cancer resections that are mastectomies,* by province – 2007 to 2009 combined



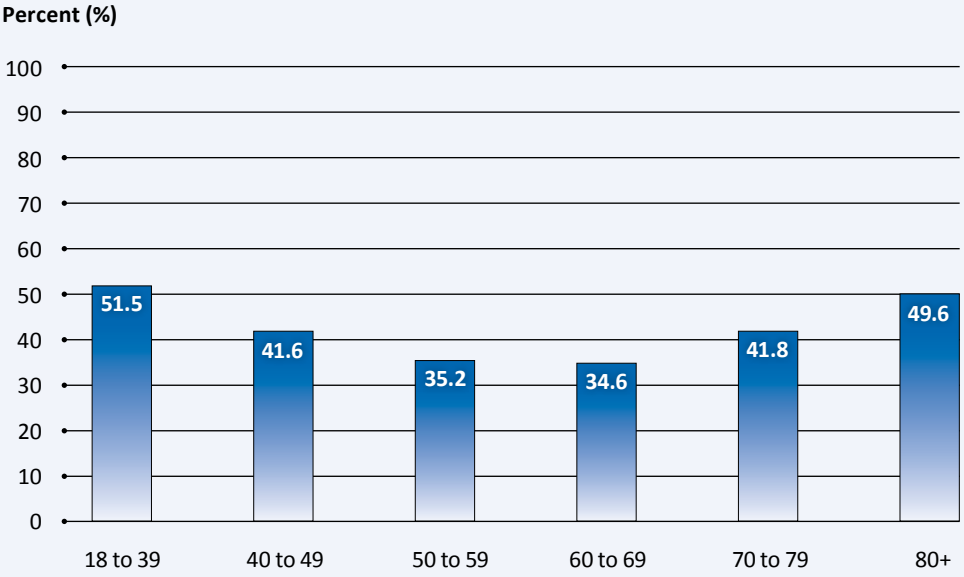
*The mastectomy data includes women who receive a mastectomy first (labeled Index) as well as women who receive breast conserving surgery first followed by a mastectomy within one year (labeled Final).

Includes women with unilateral invasive breast cancer whose surgery occurred between April 2007 and March 2010.

Data source: Hospital Morbidity Database, Canadian Institute for Health Information; National Ambulatory Care Reporting System; Canadian Institute for Health Information; Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec; Alberta Ambulatory Care Reporting System, Alberta Health and Wellness.

FIGURE 18

Percentage of breast cancer resections that are mastectomies* by age group, Canada – 2007 to 2009 combined



*The mastectomy data include women who receive a mastectomy first as well as women who receive breast conserving surgery first but followed by a mastectomy within one year.

Includes women with unilateral invasive breast cancer whose surgery occurred between April 2007 and March 2010.

Data source: Hospital Morbidity Database, Canadian Institute for Health Information; National Ambulatory Care Reporting System, Canadian Institute for Health Information; Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec; Alberta Ambulatory Care Reporting System, Alberta Health and Wellness.

Removal and examination of 12 or more lymph nodes in colon resections

What are we measuring?

This indicator measures the percentage of resections for colon cancer in which 12 or more lymph nodes were removed and examined for cancer spread. Results are presented for cases resected in each of 2007, 2008 and 2009 and compares rates by province, age group and sex.

Why are we measuring this?

The number of lymph nodes removed and examined in resection specimens has been shown to be critical for proper staging and, therefore, subsequent treatment planning.[157]

Most clinical guidelines recommend that a minimum of 12 nodes be removed to more definitively establish N stage[158] (which indicates the extent of cancer spread to lymph nodes). This is because the chance of a false negative diagnosis is reduced to acceptable levels beyond the threshold of 12 nodes examined.

Measuring provincial treatment patterns relative to this guideline can inform opportunities for quality improvements at the provincial level.

What do the results mean?

There was substantial interprovincial variation in the percentage of colon resections with 12 or more nodes removed and examined.

Results for the eight participating provinces ranged from 59% to 89% (Figure 19). Overall rates are slightly higher than those that have been reported in other jurisdictions/studies where reported rates range from 65% to 77%.[130, 133, 159]

- There was relatively little variation across age groups and no obvious trends between data from 2007 to 2009 (Figure 20).

There is relatively little variation across patient age group and sex. (Figure 21). This is largely consistent with the findings of other jurisdictions, although a stronger age trend (older patients with lower rates than younger) has been cited in recent studies.[160-161]

There is currently no national target or benchmark for this indicator. Efforts are underway within the System Performance initiative to develop targets for a number of indicators, including this one, for inclusion in future reports.

What is being done?

The Partnership's National Staging initiative is helping to shed a spotlight on node removal practices for colon cancer (and other disease sites). Recent experience has shown a link between synoptic reporting and improved quality of surgical and pathological practice.[161]

Future system performance measurement reports may compare stage distribution (particularly N stage) for colon cancer with the practice of removing 12 or more nodes to examine relationships that the literature suggests may exist.[133]

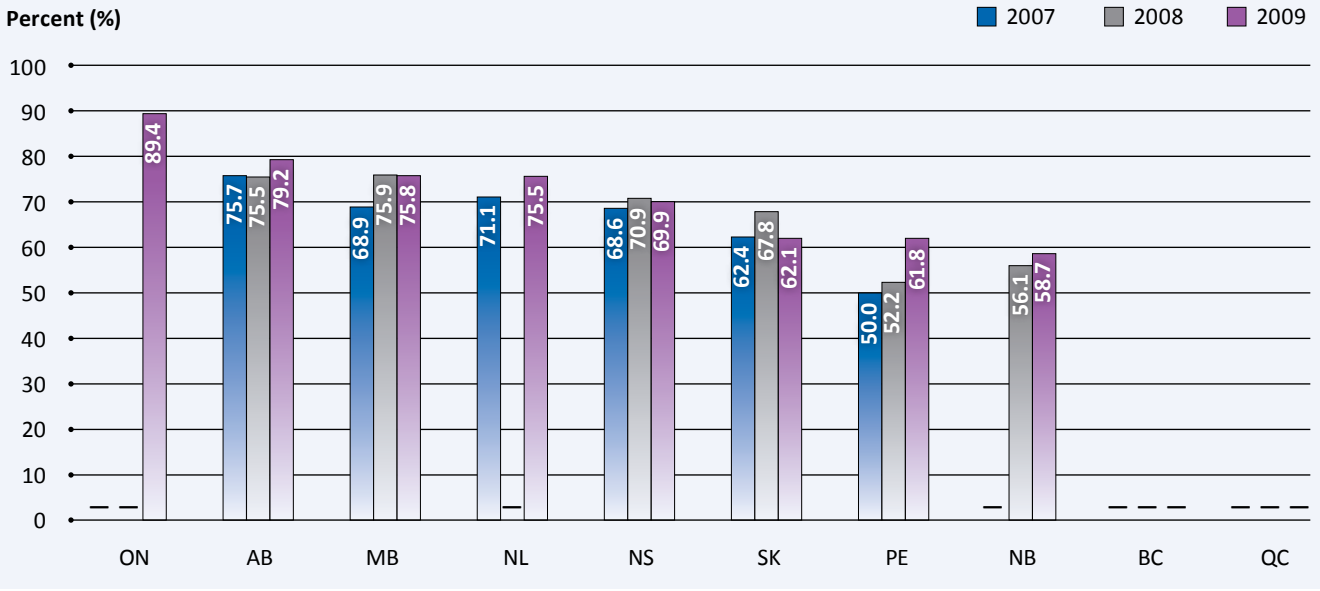
What should you be aware of about data and measurement?

Rates for Ontario reflect data published in the Cancer System Quality Index (CSQI), which uses Pathology Information Management System synoptic pathology report data source to retrieve "Lymph Nodes." Data are for 2010.

Detailed calculation methodology is provided in the Technical Appendix (see page 184).

FIGURE 19

Percentage of colon resections with 12 or more lymph nodes removed and examined, by province – patients diagnosed 2007 to 2009



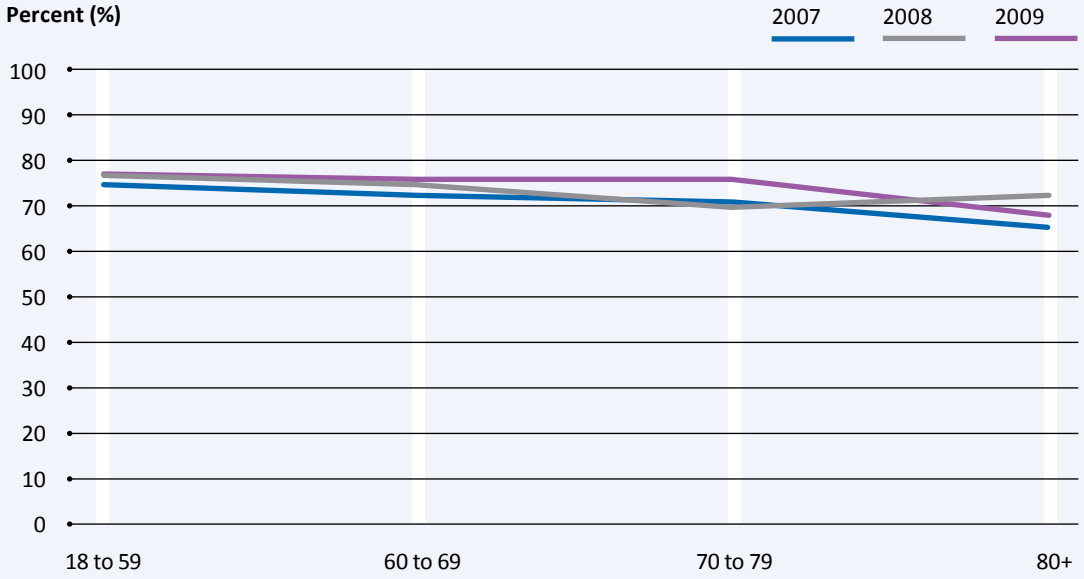
"—" Data are not available for BC (2007 to 2009), NB (2007), NL (2008), ON (2007 to 2008), QC (2007 to 2009).

ON data for 2009 is for 2010/2011.

Data source: Provincial cancer agencies.

FIGURE 20

Percentage of colon resections with 12 or more lymph nodes removed and examined, by age, Canada – patients diagnosed 2007 to 2009

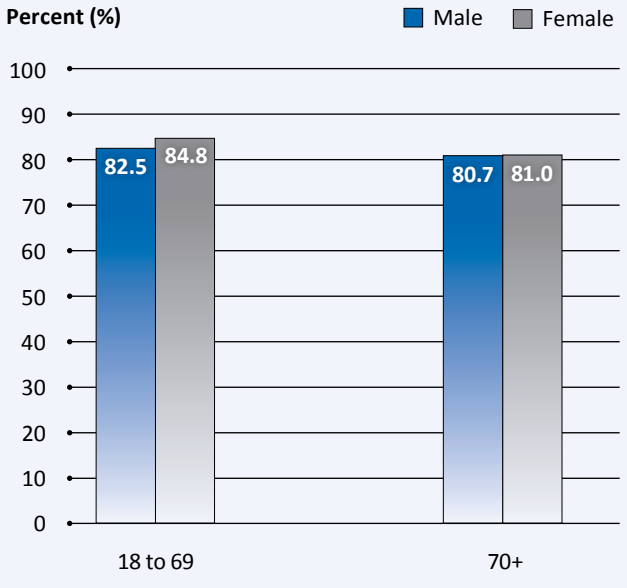


Average includes AB, MB, NS, PE and SK (provinces that submitted comparable data for three years).

Data source: Provincial cancer agencies.

FIGURE 21

Percentage of colon resections with 12 or more lymph nodes removed and examined, by age and sex, Canada – patients diagnosed in 2009



Average includes AB, MB, NB, NL, NS, ON, PE, SK.

ON data are for 2010/2011.

Data source: Provincial cancer agencies.

Patient Experience and End-of-Life Care

Patient Experience and End-of-Life Care

This section presents three indicators for which pan-Canadian data are currently available for describing the patient experience and end-of-life care: Screening for Distress, Patient Satisfaction with selected dimensions of care, and Place of Death.

Throughout the cancer journey, patients experience a range of physical, social, emotional and practical challenges. An important measure of the quality of a cancer control system is the degree to which it provides patients with person-centred care and support as they deal with those challenges.

The cancer care community recognizes the need to develop standardized measures to assess the patient's experience across the cancer journey and to help accelerate improvement in care and outcomes. Identifying survivorship and end-of-life care needs and the extent to which the system is responding to those needs is also essential. This domain continues to be an emerging area of research, and work still needs to be done to collect meaningful pan-Canadian data.

The three indicators provide some understanding of the experience of cancer patients and are another step forward in addressing this under-measured domain in the cancer control continuum. The plan is for future system performance reports to include progressively more detailed indicators on patient-reported outcomes, survivorship and end-of-life or palliative care.

Indicator	Summary of results
Screening for distress	There is variation in the implementation of standardized screening tools across the country. In 2012, seven provinces are using a standardized symptom screening tool for at least a portion of patients at some or all provincial cancer centres; in other provinces, screening tools may be used but data on their use are not available at a provincial level.
Patient satisfaction with physical comfort and emotional support care	Overall satisfaction with physical comfort care, as measured using the standardized Ambulatory Oncology Patient Satisfaction Survey by NRC Picker, ranged from 76% to 84% in the seven provinces from which results are available. Of the five measures related to Physical Comfort, patients ranked the items related to management and control of pain and discomfort the lowest. Overall satisfaction with emotional support care ranged from 40% to 59% in the seven provinces. Of the nine measures related to Emotional Support, patients ranked trusting care providers with confidential information the highest and being referred to a provider in the past six months for issues related to anxiety and fear the lowest.
Cancer patient place of death	In 2009, 71% of cancer deaths in Canada occurred in hospital. The percentage of cancer patients dying outside of hospital ranged from 11% to 47% by province. Most patients who know they are dying from cancer prefer to die at home or in a similar setting.

Screening for distress

What are we measuring?

This indicator measures the extent to which provinces and their cancer programs have implemented standardized tools to screen for patient-reported symptoms such as emotional and physical distress (including pain).

Why are we measuring this?

Research has shown that 35% to 40% of cancer patients feel enough distress that they would benefit from professional support services.[162] Distress among those who have cancer extends along a continuum, ranging from common normal feelings of vulnerability, sadness, and fear, to problems that can become disabling, such as depression, anxiety, panic, social isolation, and existential and spiritual crisis.[163] Negative outcomes associated with heightened distress include poorer adherence to treatment recommendations,[164] worse satisfaction with care,[165] and worse quality of life.[166]

Routine screening for distress, which is referred to as the sixth vital sign,[167] helps to identify any problems early on, so that the appropriate assessment, intervention, and referrals to support services can be offered to address a patient's specific needs.

The Edmonton Symptom Assessment System (ESAS) in combination with the Canadian Problem Checklist (CPC) are the most commonly used screening tools in Canada. The collection of data on the use of these or similar standardized tools for screening for distress at timely intervals allows for nationwide monitoring of roll-out and coverage.

Canada, Australia,[168] the UK,[169] and the U.S.[170] have recommended screening for distress as part of standard oncology care and standards are being or have been incorporated.

What do the results mean?

While all provinces report using standardized screening tools to some extent, there is provincial variation in use and reporting within provincial cancer centres and other cancer care institutions (Table 1).

British Columbia, Ontario, Saskatchewan and Nova Scotia use a standardized symptom screening tool for at least a portion of patients at all provincial cancer centres and report results centrally. While most new patients are screened, the actual proportion varies by province.

Alberta, Manitoba and Prince Edward Island have undertaken standardized symptom screening for at least a portion of patients at selected provincial cancer centres and are in the process of rolling out a standardized screening tool across the province.

In other provinces, there is no provincially implemented standard tool and data are not centrally collected; however, some cancer centres may use symptom screening tools locally but do not submit data centrally.

- Quebec currently uses screening tools such as ESAS and others at treatment facilities in most regions including Quebec City but data collection is not centralized at the provincial level.
- New Brunswick is in the early stages of planning province-wide use of a standardized screening tool, although no standardized symptom screening is undertaken at provincial cancer centres currently and data is not centralized at the provincial level.
- Newfoundland and Labrador uses ESAS for selected palliative and symptom management assessment, but it is not systematically used throughout the province.

Although many provinces have moved to province-wide implementation, most do not have formal targets for symptom and emotional distress screening rates; however, in 2009 the Screening for Distress National Implementation Group, which represented eight provinces, agreed to a target of 90% of patients screened in their roll-outs. In Ontario, the provincial target for screening for symptom severity for all patients entering a regional cancer centre is 70%.[171]

Future reports will include the percentage of cancer patients who are screened through a standardized screening tool, and then begin to report on the screening/assessment results as well as assessment, response and follow-up.

Targets and benchmarks can be developed once pan-Canadian data collection is achieved.

What is being done?

In 2008, screening for distress was endorsed by Accreditation Canada and five professional and patient organizations. In the spring of 2009, the Partnership endorsed a minimum dataset for screening for distress (symptoms and emotional). The data elements identified as part of this minimum dataset are contained in ESAS and CPC.[172] Figure 1 shows a sample of the ESAS and CPC tool.

Recently, the Partnership worked with cancer agencies and treatment centres in eight provinces to implement screening for distress using the ESAS and CPC instruments and clinical practice guidelines related to distress and other symptom assessment.

Improving the ability to measure patient-centred care and patient-reported outcomes has been identified as a priority of the Partnership. A national Patient-Reported Outcomes Steering Committee was formed in 2012 with a plan to identify and implement an expanded set of performance indicators for this topic.

What should you be aware of about data and measurement?

Detailed information is provided in the Technical Appendix (see page 185).

TABLE 1

Extent of usage of standardized symptom screening for distress tools across clinics within the provincial cancer agencies and programs

Province	Province-wide implementation (provincially co-ordinated and centrally reported)	Partial implementation (provincially coordinated)	Not provincially coordinated (some local use possible)
BC	X		
AB		X	
SK	X		
MB		X	
ON	X		
QC			X
NB			X
NS	X		
PE		X	
NL			X

Symptom screening tool means any standardized instrument used to screen for symptom and emotional distress, not necessarily ESAS or CPC.

Province-wide implementation means standardized symptom screening undertaken for at least a portion of patients at each provincial cancer centre and data collected centrally.

Partial implementation (provincially coordinated) means standardized symptom screening undertaken for at least a portion of patients at selected provincial cancer centres.

Not provincially coordinated (some local use possible) means provincially managed implementation of symptom screening does not exist; however, some individual centres/regions may use a screening tool but do not report data at a provincial level.

FIGURE 1

ESAS Screening Tool and the Canadian Problem Checklist

Edmonton Symptom Assessment System (Revised Version, ESAS-R*)

Patient's Name: _____

Date of Completion: _____

Time: _____

Please circle the number that best describes:

Completed by:

- ☐ Patient
- ☐ Family
- ☐ Health Professional
- ☐ Assisted by family or health professional

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 3 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 wellbeing *(wellbeing = how you feel overall)*	0 1 2 3 4 5 6 7 8 9 10	Worst possible wellbeing
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. www.palliative.org

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:

Practical
- ☐ Work/School
- ☐ Finances
- ☐ Getting to and from appointments
- ☐ Accommodation

Emotional
- ☐ Fears/Worries
- ☐ Sadness
- ☐ Frustration/Anger
- ☐ Changes in appearance
- ☐ Intimacy/Sexuality

Social/Family
- ☐ Feeling a burden to others
- ☐ Worry about family/friends
- ☐ Feeling alone

Informational
- ☐ Understanding my illness and/or treatment
- ☐ Talking with the health care team
- ☐ Making treatment decisions
- ☐ Knowing about available resources

Spiritual
- ☐ Meaning/Purpose of life
- ☐ Faith

Physical
- ☐ Concentration/Memory
- ☐ Sleep
- ☐ Weight

*Source: Canadian Partnership Against Cancer (CPAC), 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: CPAC; 2009.

Patient satisfaction with care

What are we measuring?

This indicator examines patient satisfaction scores from seven provinces that have implemented the Ambulatory Oncology Patient Satisfaction Survey (AOPSS) developed by NRC Picker. The survey results are organized into several dimensions of the patient experience. Previous System Performance reports have shown results on overall satisfaction and on the Integration and Continuity of Care dimensions. This report presents patient satisfaction rates on overall satisfaction and for two other dimensions: Emotional Support and Physical Comfort.

Why are we measuring this?

The degree to which cancer patients feel that they are well supported and cared for throughout their cancer care journey is a crucial requirement of a high-quality cancer control system.[173-174]

A lack of access to supportive care services can add to the distress of cancer patients and compromise their ability to adjust to changes brought about by cancer.[175] Among all the dimensions that are covered by the AOPSS, patient satisfaction was lowest for the emotional support dimension.

What do the results mean?

Among all dimensions covered in the survey, emotional support received the lowest patient satisfaction score in all reporting provinces (Figure 2).

- There was some variation in the way patients from different provinces ranked their satisfaction with the dimensions of care covered in the survey.
- For most provinces, "respect for patient preferences" and "physical comfort" received the highest satisfaction scores, while two provinces ranked "access to care" with the highest overall satisfaction score. "Emotional support" received the lowest satisfaction scores in all provinces, with satisfaction ranging from 40.0% in Saskatchewan and 58.6% in Nova Scotia.
- Patients overwhelmingly reported that they could trust their provider with confidential information (approximately 90% for all provinces); however, satisfaction results for many of the other questions in this domain were below 50% (Figure 3). Questions relating to providing help with anxiety and fears and information about relationship changes scored the lowest ranging from 20.4% to 46.4% and 25.6% to 44.4%, respectively.

Overall, patients across provinces were satisfied with the dimension related to physical comfort relative to others.

- For each province, most questions within this dimension scored at least over 74%, sometimes reaching 90% for some. The exception was "Staff did everything to control pain/discomfort," which received the lowest scores across all provinces ranging from 66% to 76% (Figure 4).
- In a national cancer experience survey in the United Kingdom, cancer inpatients reported high satisfaction (approximately 85%) with the hospital staff's help to control their pain and side effects from radiotherapy and chemotherapy.[176]

There are currently no national targets or benchmarks for patient satisfaction rates based on the AOPSS. Work is underway to develop such targets and benchmarks for System Performance report indicators, including potentially for patient satisfaction.

What is being done?

The Partnership is working with the provincial cancer agencies and NRC Picker to obtain data from the patient satisfaction surveys that allow for the development of more meaningful indicators to include in future System Performance reports.

Jurisdictions across Canada continue to implement customized local, provincial and territorial navigation programs designed to connect cancer patients and their families with specially trained professionals or volunteers who offer proactive, practical help to negotiate the maze of treatments, services and challenges on their cancer journey. A Person-Centred Care toolkit is available on cancerview.ca containing tools and resources for implementing screening for distress and navigation programs.

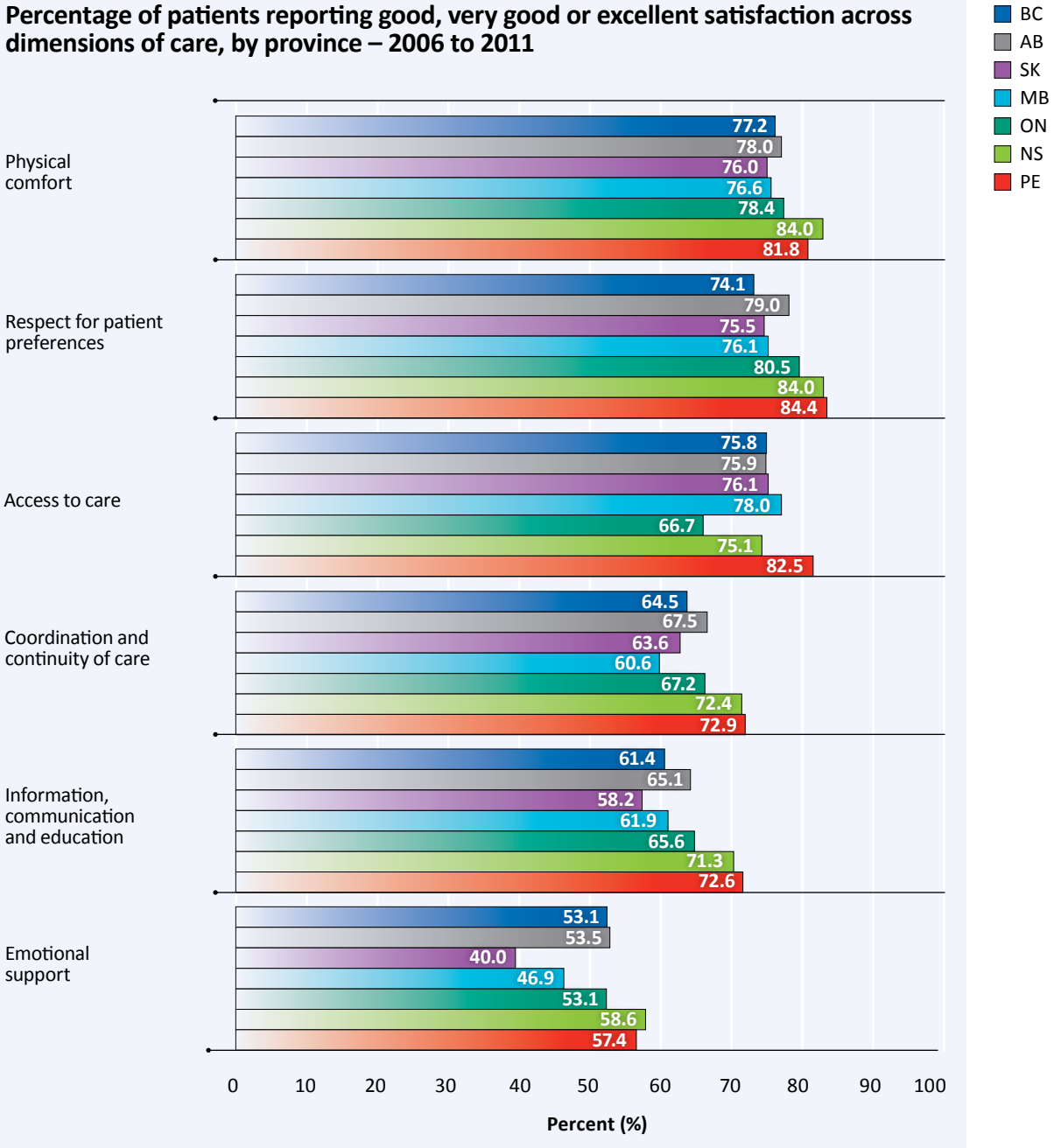
What should you be aware of about data and measurement?

While the provincial surveys used to produce the patient satisfaction results are all based on the NRC Picker AOPSS tool, there may be some variation in application of the tool between provinces. Also, the results presented in this Report are based on the latest surveys conducted in each province, but the years the surveys were conducted vary between provinces.

Detailed calculation methodology is provided in the Technical Appendix (see page 185).

FIGURE 2

Percentage of patients reporting good, very good or excellent satisfaction across dimensions of care, by province – 2006 to 2011



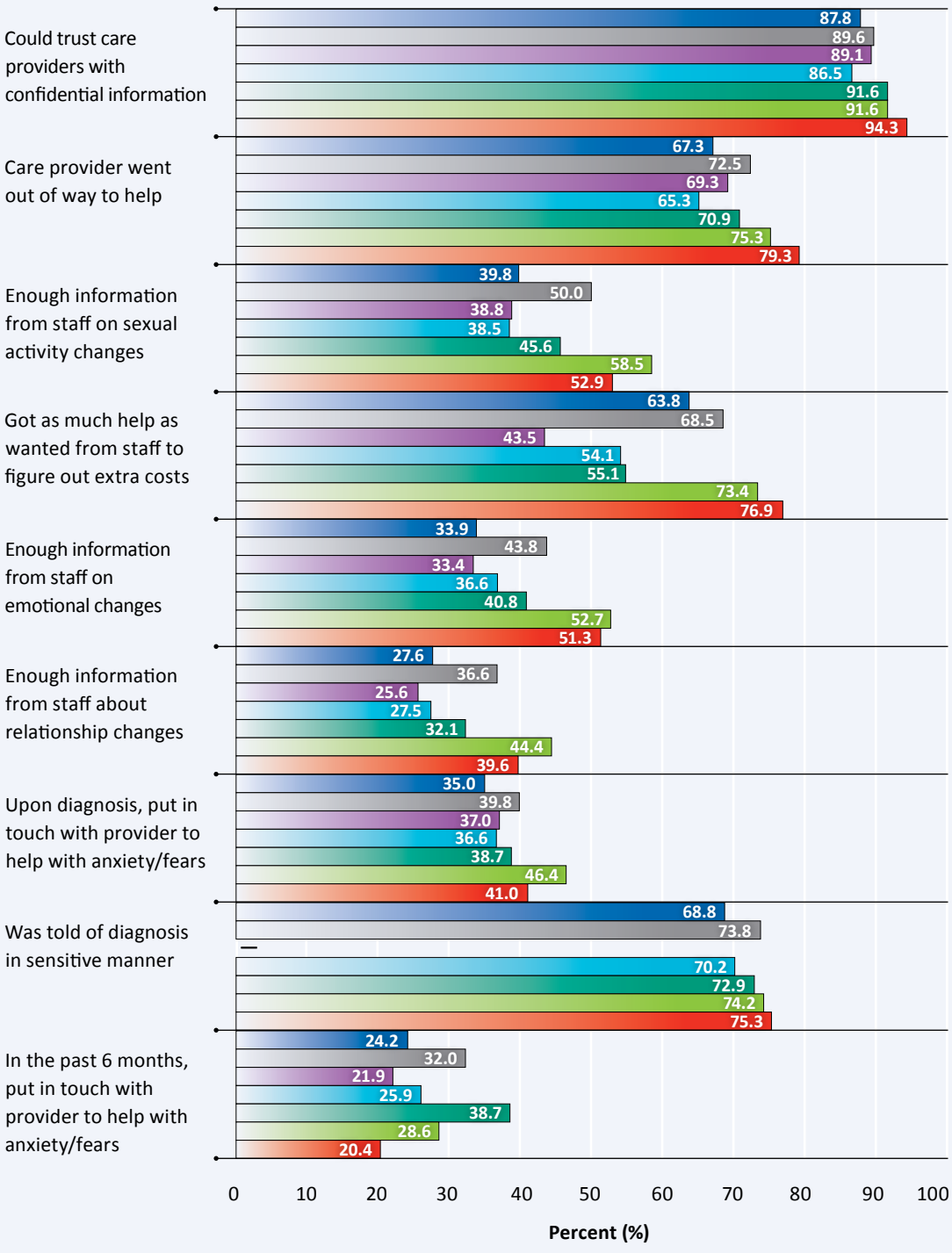
Survey dates vary by province and range from 2006 to 2011.

Data source: NRC Picker Ambulatory Oncology Patient Satisfaction Survey results.

Data provided by individual provincial cancer agencies.

FIGURE 3

Emotional support dimension: percentage of patients reporting good, very good or excellent satisfaction, by characteristic of care and province – 2006 to 2011



"—" Data are not available for SK for the measure of "was told of diagnosis in sensitive manner."

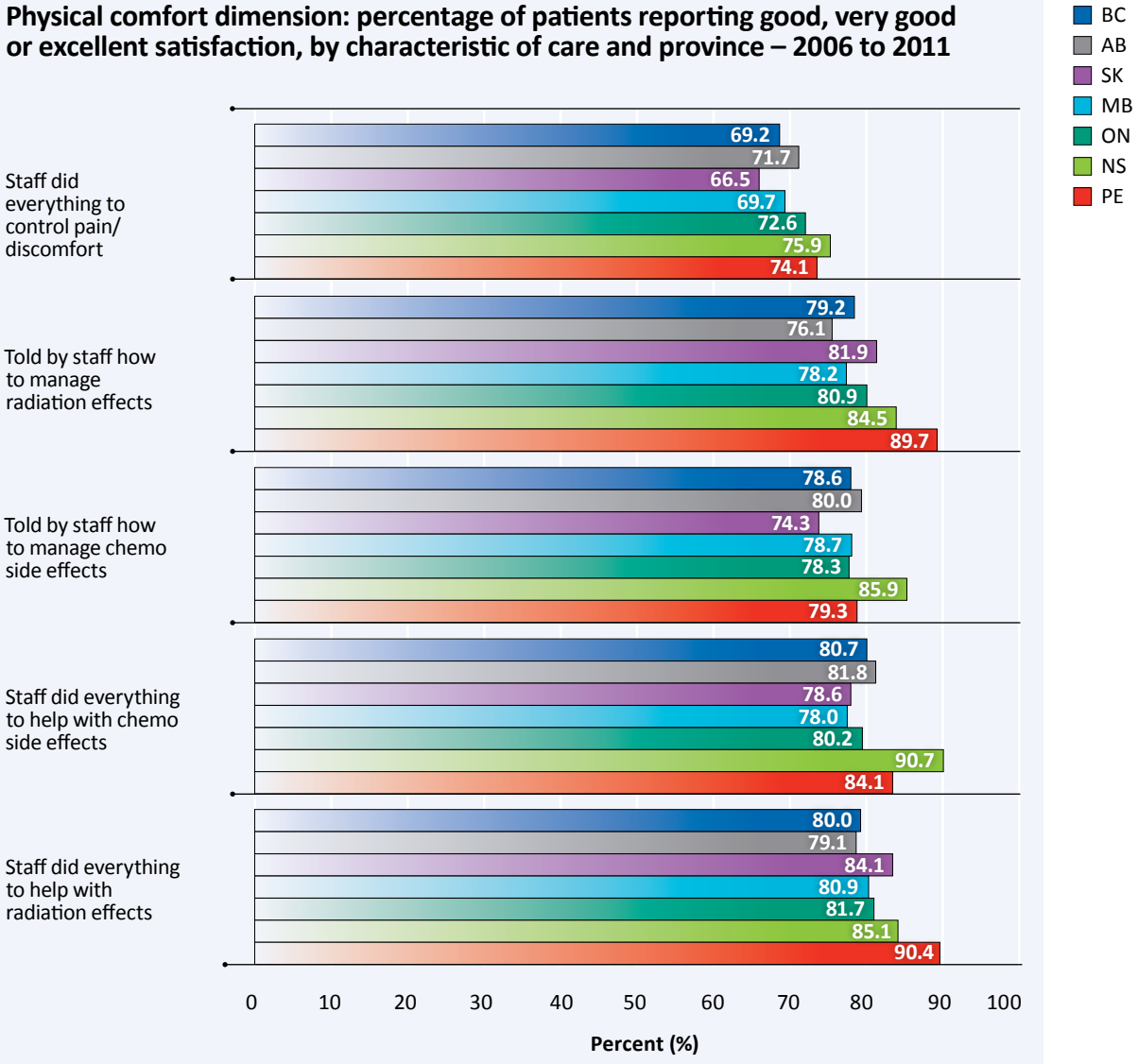
Survey dates vary by province and range from 2006 to 2011.

Data source: NRC Picker Ambulatory Oncology Patient Satisfaction Survey results.

Data provided by individual provincial cancer agencies.

FIGURE 4

Physical comfort dimension: percentage of patients reporting good, very good or excellent satisfaction, by characteristic of care and province – 2006 to 2011



Survey dates vary by province and range from 2006 to 2011.

Data source: NRC Picker Ambulatory Oncology Patient Satisfaction Survey results.

Data provided by individual provincial cancer agencies.

Place of death

What are we measuring?

This indicator examines the percentage of cancer patients who die in hospital versus non-hospital locations based on the national vital statistics database.

Why are we measuring this?

Many surveys have suggested that patients who know they are dying of cancer would prefer to die at home or in home-like settings, such as hospices or other residential facilities.[90]

In its special topic on end-of-life care, the 2010 Canadian Cancer Statistics publication confirmed that measures are still needed to refine end-of-life care systems and to address the uneven access to end-of-life services both within and among provinces.[90, 177]

While a crude measure, the indicator presented in this section allows for the identification of potential gaps that could be further investigated through more detailed data collection and analysis.

What do the results mean?

Data suggest that a majority of cancer patients in all provinces are dying in hospital.

- Based on available vital statistics data from the ten provinces, the percentage of cancer patients who die in hospitals ranged from 53% to 88.8% (Figure 5). Inconsistencies exist, however, in how provincial databases categorize the various locations of death.

In Canada from 2005 to 2009, approximately 70% of patients who died of cancer died in hospital. (Figure 6).

A 2005 to 2009 trend analysis revealed fluctuations that were more likely the result of year-to-year variations in reporting practice rather than actual trends in patient care.

In the United States, according to the Dartmouth Atlas of Healthcare, the percentage of cancer deaths occurring in hospital was 28% in 2007, with state numbers ranging from 38% in New York to 17% in Utah,[178] which is much lower than percentages reported for Canada for that year; however, the U.S. has a formal palliative care program under which hospice care is covered.[179]

In Canada from 2005 to 2009, approximately 11% of patients who died of cancer died at home. (Figure 6).

- While this is a low rate, there is some evidence from other studies suggesting that cancer-related deaths are increasingly occurring out of hospital. In Nova Scotia, for example, out-of-hospital deaths among adults dying of cancer rose from 19.8% in 1992 to 30.2% in 1997 (a 52% increase).[180] In Ontario, however, the percentage of cancer-related deaths occurring out of hospital remained relatively constant from 2000 to 2006 (56% and 55%, respectively).[181]

An analysis of death certificate data from several European countries showed that the percentage of cancer deaths occurring at home was as high as 45.4% (in the Netherlands).[182]

The Partnership established the Canadian Hospice Palliative End-of-Life (HPEOL) Care Surveillance Team Network in 2009 to improve the quality and use of existing data to better understand the characteristics of terminally ill cancer patients.[183] This initiative developed new methods to measure and report on the use of hospice and palliative care using data from British Columbia.

There are a number of other initiatives that the Partnership supports, including: Education in Palliative and End-of-Life Care for Oncology (EPEC™-O Canada), a palliative and end-of-life care training program for oncology; Speak UP, the Canadian Hospice Palliative Care Association's advanced care planning campaign; and, the Canadian Virtual Hospice, an online resource for patient caregivers and health professionals.

The Partnership has recently embarked on a new Palliative and End-of-Life Care Initiative, which will help advance and accelerate jurisdictional initiatives and support coordinated pan-Canadian planning in this important domain.

What should you be aware of about data and measurement?

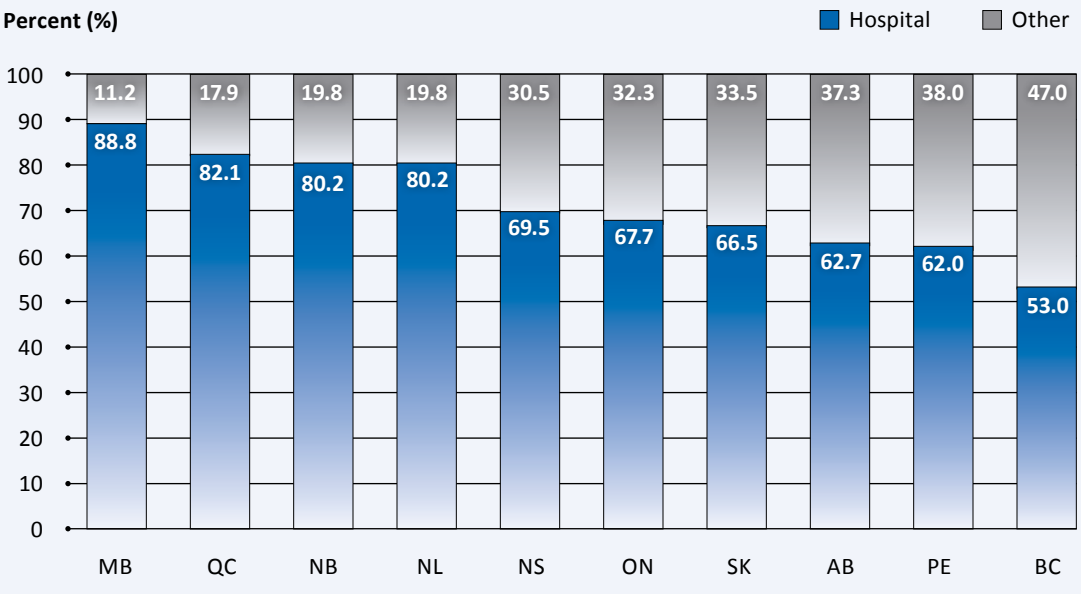
Data for this indicator are submitted by the provinces to Statistics Canada. The vital statistics database includes a data element identifying location of death grouped into the following categories: hospital, other health care facility (e.g., long-term care or chronic care facility), private home, other specified locality and unknown.

As discussed above, there are various discrepancies in the vital statistics data used to calculate these indicators, particularly around interpretation of the location categories described above. For example, a hospice can be categorized as an "other health care facility" or as an "other specified locality." It is hoped that reporting on these results will provide an incentive to improve data quality and standardization.

Detailed calculation methodology is provided in the Technical Appendix (see page 186).

FIGURE 5

Cancer patient place of death, by province – 2009

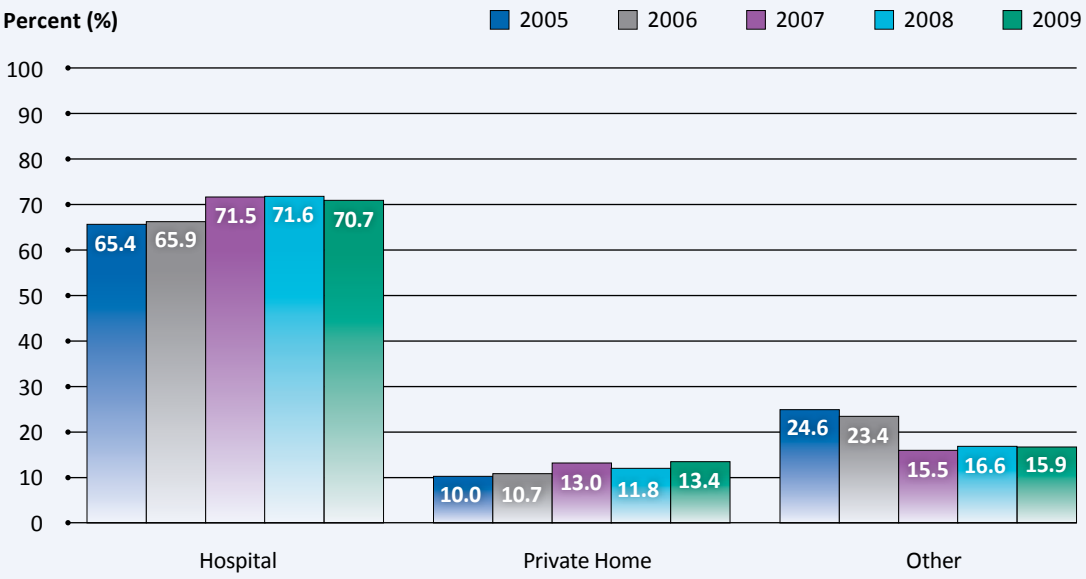


"Other" includes: Other specified locality, other health care facility and private home (excludes unknown locality).

Data source: Statistics Canada, Vital Statistics Death Database.

FIGURE 6

Cancer patient place of death, by location, Canada – 2005 to 2009



"Other" includes: Other health care facility, other specified locality, unknown locality.

Data source: Statistics Canada, Vital Statistics Death Database.

Research

Clinical trial participation
P. 122

Cancer research investment
P. 127

Research

Although Canada has an active cancer research community, the ability to measure the performance and impact of cancer research activity is limited by the lack of readily available data measuring the process, output, and outcome of clinical research activity at a pan-Canadian level (e.g., impact on clinical outcomes). This chapter presents data on two indicators that can be considered proxy system performance indicators of cancer research activity: clinical trial accrual ratios for adult and pediatric cancers, and the breakdown of cancer research funding by disease site. The latter utilizes information on research spending reported to the Canadian Cancer Research Alliance (CCRA).[184]

Research that evaluates the safety and efficacy of emerging treatments paves the way for best practices.

Clinical trials are essential for evaluating the safety and efficacy of emerging cancer therapies and protocols. Therefore, participation by the patient population in clinical trials could enable the development and evolution of best practice treatments, presents patients with enhanced treatment options, which in turn could improve outcomes for future patients. A number of studies have shown that treatment centres that participate in clinical trials tend to have better patient outcomes (survival and quality of life) than those that do not, possibly due to a correlation between high clinical trial activity and high adherence to evidence-based treatment guidelines.[185-187]

Because data are not available to calculate the actual clinical trial participation or accrual rate for all Canadian cancer patients, a proxy indicator is presented measuring the ratio of the total number of patients newly enrolled in Phase I to IV clinical trials (cancer-related therapeutic trials or clinical research studies) in 2011 to the total number of new cancer cases diagnosed at cancer centres in the same year. This ratio is calculated for adult and pediatric patients. For the purposes of registration, a cancer clinical trial is any cancer-related research study that prospectively assigns human participants to a health-related intervention to evaluate the effects on health outcomes. Data include Phase I to IV clinical trials and exclude enrolments in biology studies. Refer to the Technical Appendix for details on the data submitted by each of the provinces.

CCRA is a collaboration of 33 Canadian research funding organizations and affiliated parties who work with the Canadian Partnership Against Cancer to initiate, coordinate and document research activity at a pan-Canadian level.

Adequate funding of research activity and its balanced distribution to various types of cancer is essential to a successful research environment. Another indicator estimates the level and breakdown of support for cancer research in 2009 according to information on research spending reported to the CCRA.

Research indicator	Summary of results
Adult clinical trial participation	The ratio of adult patients enrolled in clinical trials to newly registered cancer centre patients ranged from 0.02 to 0.10 across reporting provinces in 2011 and from 0.04 to 0.08 across disease sites. There was no consistent trend in the overall ratio from 2009 to 2011.
Pediatric clinical trial participation	The ratio of pediatric patients enrolled in clinical trials to newly registered cancer centre patients in 2011 ranged from 0.13 to 0.47 across the eight provinces that have pediatric cancer centres. There was no consistent trend in the ratio from 2009 to 2011.
Cancer research investment	Breast cancer has a proportionately higher share of disease site-specific research funding relative to its burden of illness (incidence and mortality) while lung cancer has a proportionately lower share.

The Partnership is working to support coordination and continuation of cancer research funding across Canada.

The CCRA, funded by the Partnership, is a coalition of 33 cancer research funding organizations and affiliated partners representing the majority of taxpayer dollars and donations devoted to investment in research that will lead to better ways to prevent, diagnose, and treat cancer and improve survivor outcomes. The CCRA has developed the Pan-Canadian Cancer Research Strategy to maximize the impact of targeted funding in cancer research and accelerate progress in cancer control for the ultimate benefit of Canadians affected by cancer. The strategy represents collaboration among the 33 member organizations coordinating efforts on large research initiatives and other joint activities. It is the first initiative of its kind in Canada.

Clinical trial participation

What are we measuring?

Clinical trial participation for adults is measured as the ratio of the total number of patients 19 years and older newly enrolled in cancer-related therapeutic trials or clinical research studies in 2009, 2010, and 2011 to the total number of cancer patients aged 19 years and older newly referred to provincial cancer centres in 2009, 2010 and 2011. The ratio is also calculated by disease site.

The pediatric indicator examines the same ratio as adults but for patients aged 18 years and younger.

Why are we measuring this?

Participation in Phase I to IV clinical trials is a crucial enabler of the development and evolution of best practice treatments, which could lead to improved treatment and outcomes. It has also been shown that the outcomes of patients treated at centres with active clinical trials programs are better than those who are not, likely due to increased adherence to best practice guidelines for treating patients.[185-187]

Cancers affecting children and adolescents are different from those affecting adults. Therefore, research into how these cancers develop and what causes them in the pediatric population is crucial to understanding how to prevent or halt their progress in this population. Findings from pediatric clinical trials have led to dramatic improvements in the survival of children with cancer, from less than 10% in the 1950s to almost 80% now.[188]

Comparing the percentage of patients enrolled in clinical trials across the country could highlight opportunities for enhanced efforts in encouraging increased clinical trial participation. Given current data limitations, a proxy was used to estimate this percentage: a ratio of patient registrations in clinical trials to new patient registrations in cancer centres.

What do the results mean?

There was some variation in adult and pediatric clinical trial participation between provinces and between the top four disease sites.

- For 2011, the ratio of adult patients enrolled in clinical trials to newly registered cancer centre patients ranged from 0.02 in Prince Edward Island to 0.10 in Alberta with an overall average of 0.05 among the eight provinces providing data for 2011. There is no consistent trend in the ratio between 2009 and 2011 (Figure 1).
- The 2011 adult clinical trial participation ratio for the top four disease sites ranged from a low of 0.03 for lung cancer to a high of 0.08 for prostate cancer (Figure 2). Overall, the ratio has remained relatively constant from 2009 to 2011. For breast cancer, the ratio has increased from 2009 to 2011, and for lung cancer, the ratio has decreased in the last three years (Figure 3).

There are currently no national targets or benchmarks for clinical trial participation. Efforts are underway within the System Performance initiative to develop targets for a number of indicators, including this one, for inclusion in future reports.

Standards for designated cancer programs set by the American College of Surgeons' Commission on Cancer require a minimum clinical trial accrual rate ranging from 4% to 6% (of annual analytic cases).[189] A more aggressive goal for cancer clinical trial accrual was set in the UK over a decade ago, leading to the establishment of the National Cancer Research Network in 2001, which by 2011 was reporting that 23% of newly diagnosed cancer patients were participating in cancer studies.[190]

In the United States, the National Cancer Institute reports that less than 5% of adults diagnosed with cancer participate in a clinical trial.[191]

- For 2011, the ratio of pediatric patients enrolled in clinical trials to newly registered pediatric cancer centre patients ranged from 0.12 in Saskatchewan to 0.46 in Manitoba, with an overall average ratio of 0.27 among the eight provinces providing data for 2011 (Figure 4). In Manitoba, the ratio has increased since 2009; however, for many of the other provinces, the ratio has decreased and for some there was no consistent pattern.

Data from the National Cancer Institute (NCI) Cooperative Group in the United States show that 50% of children age zero to 14 years treated for cancer from 1998 to 1999 were enrolled in a clinical trial.[192] Furthermore, over 90% of children diagnosed with cancer in the United States are being treated in organizations that are members of Children's Oncology Group (COG). The COG, which is NCI supported, was created in 2000 with the merger of four national pediatric cancer research organizations.[193]

In the United Kingdom, 70% of all children diagnosed with cancer are currently enrolled in clinical trials, which are coordinated either by the UK Children's Cancer Study Group (UKCCSG) (solid tumours) or the Medical Research Council (leukemia).[194]

What is being done?

The Report on the State of Cancer Clinical Trials in Canada developed by the CCRA Clinical Trials Working Group recommended that a pan-Canadian infrastructure program that links to and builds on the strengths of existing clinical trial groups be created to support cancer clinical trials.[195] In response to this recommendation, the Partnership has taken the lead in creating a vision for a Canadian Cancer Clinical Trials initiative to address current weaknesses, with the goal of increasing patient accrual within an expanding portfolio of cancer clinical trials developed by the academic oncology community. This multi-year pan-Canadian initiative will require the engagement of a consortium of funding partners. Interested organizations have been identified and work is progressing to launch the initiative in the 2012/2013 fiscal year.

In 2009, the Canadian Cancer Research Alliance and the Partnership released a report that found that $1 out of every $30 invested in cancer research in Canada was focused on childhood/adolescent cancers. It also found that annual investments in childhood/adolescent cancer research increased from $12.4 million in 2005 to $13.2 million in 2007.[187, 196]

The C[17] Research Network holds a two-stage, peer-reviewed grant competition twice a year to fund research into cancer, serious hematological childhood diseases and bone marrow transplantation, including all phases of clinical trials.[197]

In March 2010, the "Workshop on Adolescents and Young Adults with Cancer, Towards Better Outcomes in Canada" was held in Toronto, Ontario. The Adolescent and Young Adult (AYA) Task Force has a goal to improve outcomes and health-related quality of life for adolescents and young adults with cancer and adolescent and young adult survivors of childhood cancer. This task force has developed recommendations for care and strategies for implementing and identifying research priorities for these groups.[198]

The Canadian Pediatric Cancer Genome Consortium funded by Genome Canada, the Canadian Institutes of Health Research (CIHR), and partners provided $2.8 million in 2011 towards the study of the four most challenging to treat forms of childhood cancers.[199]

Four team grants funded by CIHR and partners in October 2011 under the "Late Effects of Childhood Cancer Treatments" initiative provided a total of $12M over five years. The funded research is designed to prevent/mitigate the biological late effects of pediatric and adolescent cancer treatments.[200]

What should you be aware of about data and measurement?

For both the adult and pediatric indicators, the numerator is the total number of cases (≥19 years for adults, ≤18 for pediatrics), whether incident or previously diagnosed, newly enrolled in therapeutic clinical trials at provincial cancer centres or pediatric cancer treatment centres from 2009 to 2011. The denominator is the total number of cancer centre cases, whether incident or previously diagnosed, newly registered in provincial cancer centres or pediatric cancer treatment centres in 2009, 2010 and 2011.

The denominator, new referrals to cancer centres, was specifically chosen as a proxy for those patients receiving active treatment only, and as such, excludes those patients on the cancer centre roster who were not receiving active treatment and who by definition would be ineligible to participate in therapeutic clinical trials.

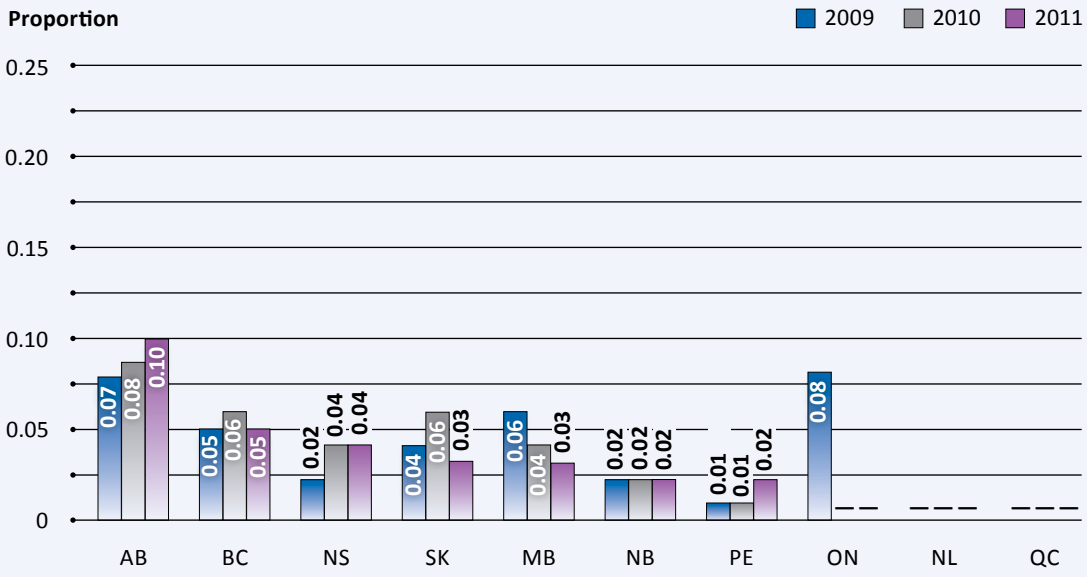
Data for pediatric clinical trial ratios for 2011 were available for the eight provinces that have pediatric cancer centres in Canada treating children under age 14 years, as well as many 15 to 18 year olds. Individual pediatric cancer programs within each province are known to vary in size, and some programs are affiliated with larger, multi-centre, international pediatric clinical trial cooperative groups that coordinate the majority of oncology clinical trials for children. This may explain a portion of the provincial variation in pediatric clinical trial enrolment.

Adolescents (age 15 to 18 years) are typically treated in either pediatric centres or adult centres, based on their medical needs, local referral patterns and overall availability of services. The proportion of adolescents with cancer treated in pediatric centres is known to differ from province to province, and the likelihood of adolescents being enrolled in a clinical trial is known to be higher in pediatric centres. That said, according to the Canadian Childhood Cancer Surveillance and Control Program, as many as 80% of Canadian adolescents diagnosed with cancer between 1995 and 2000 were known not to have participated in a clinical trial.[201]

For further details on data inclusions and exclusions among provinces, refer to Table 1 in the Technical Appendix (see page 187).

FIGURE 1

Ratio of patients enrolled in clinical trials to new registrations at cancer centres, by province – adults seen in provincial cancer centres in 2009 to 2011

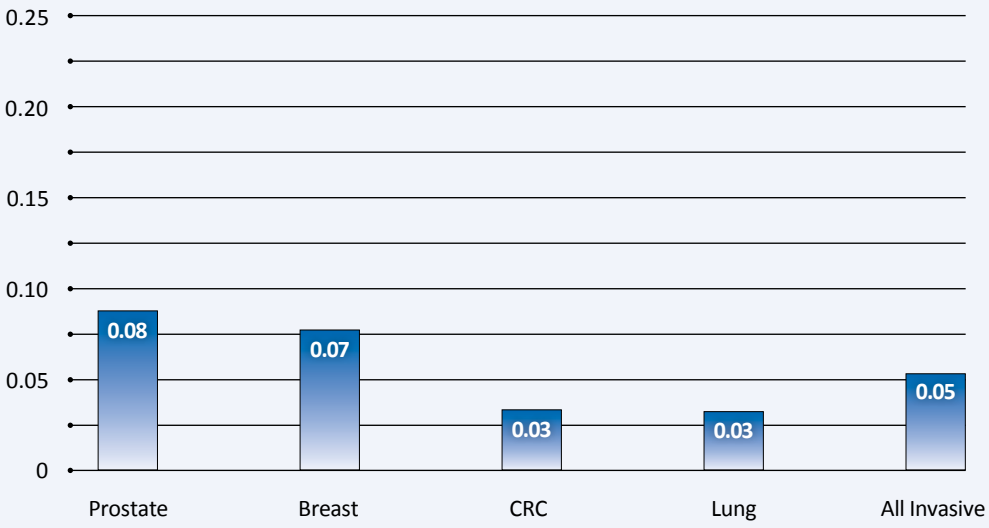


"—" Data not available for NL (2009 to 2011), ON (2010 to 2011), QC (2009 to 2011).

Data source: Provincial cancer agencies.

FIGURE 2

Ratio of patients enrolled in clinical trials to new registrations at cancer centres, by disease site, reporting provinces combined – adults seen in provincial cancer centres in 2011



This is a proxy measure for clinical trial participation.

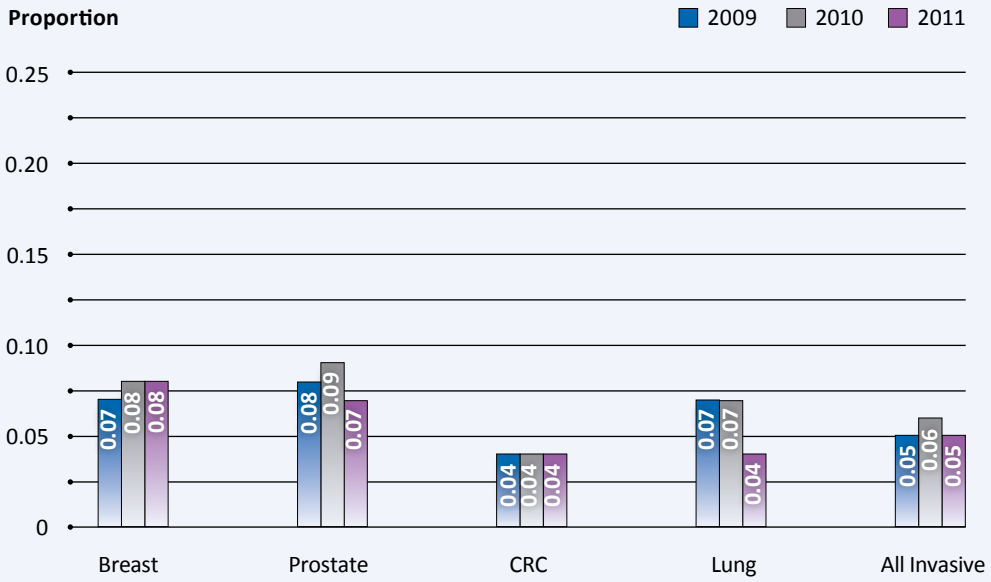
Includes all cancer clinical trials (all phases and intervention types).

Average of provinces that submitted comparable data (disease site breakdown includes AB, BC, MB, NB, NS, SK; All Invasive includes AB, BC, MB, NB, NS, PE, SK).

Data source: Provincial cancer agencies.

FIGURE 3

Ratio of patients enrolled in clinical trials to new registrations at cancer centres, by disease site, reporting provinces combined – adults seen in provincial cancer centres in 2009 to 2011



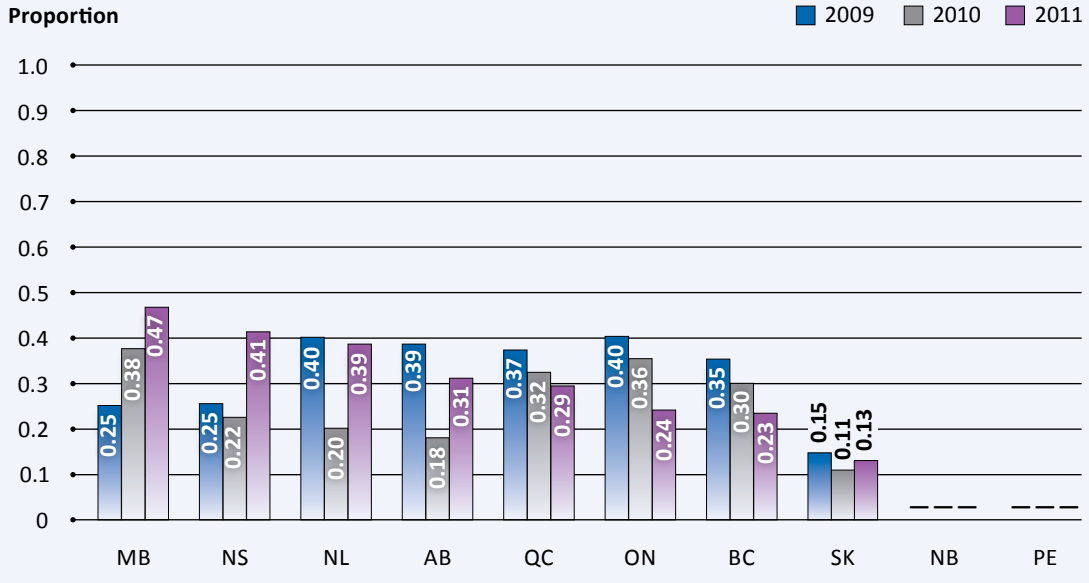
The 2011 ratios are different from those in the previous figure because these include only provinces that submitted comparable data for all three years (AB, NS, SK).

Disease site breakdown includes AB, NS, SK; All Invasive includes AB, BC, MB, NB, NS, PE, SK.

Data source: Provincial cancer agencies.

FIGURE 4

Ratio of patients enrolled in clinical trials to new registrations at cancer centres, by province – patients seen in pediatric cancer centres in 2009 to 2011

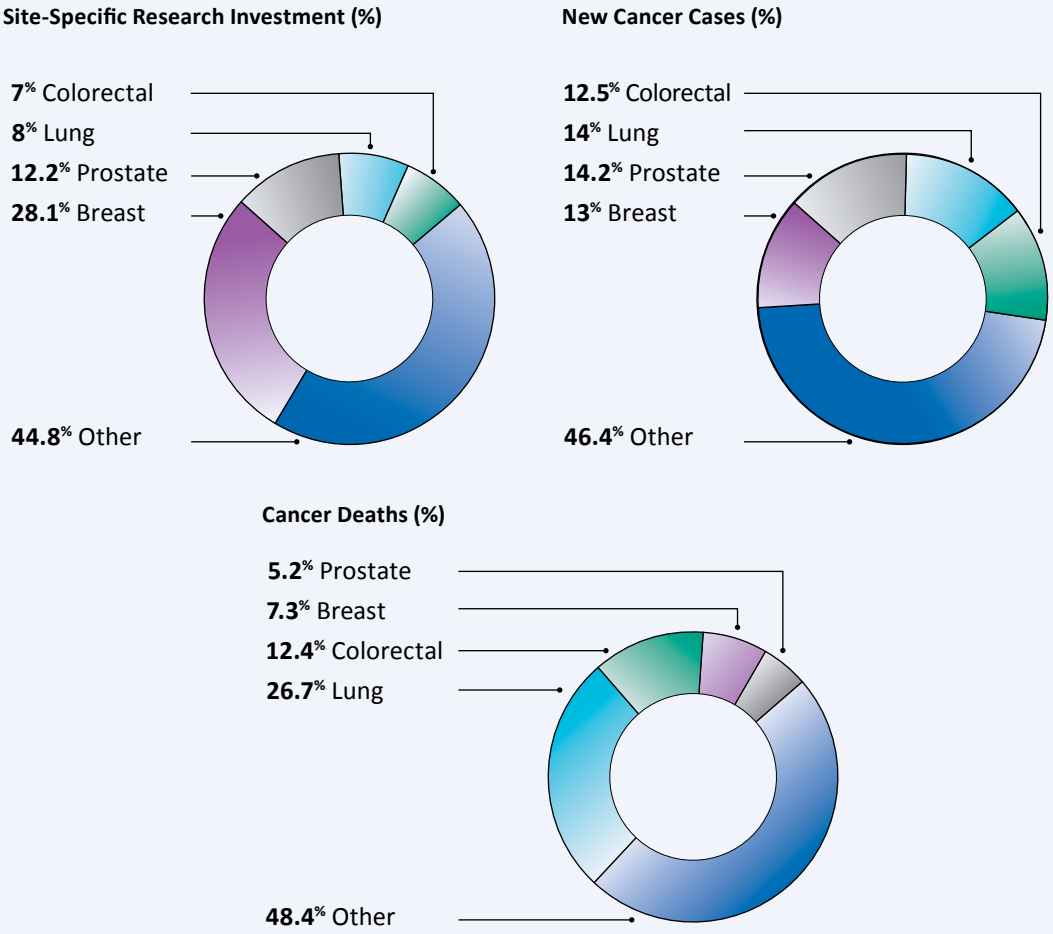


"—" Data are not available for NB (2009 to 2011), PE (2009 to 2011).

Data source: C[17] Council, collected September 2012.

FIGURE 5

Distribution of cancer research investment (2009), new cancer cases (2007) and cancer deaths (2007), by disease site, Canada



Data source for cancer research investment: Canadian Cancer Research Alliance database.

Data source for new cancer cases: CANSIM Table 103-0550 New cases for ICD-0-3 primary sites of cancer (based on the July 2010 CCR tabulation file), by age group and sex, Canada, provinces and territories, annual, Canadian Cancer Registry - 3207.

Data source for cancer deaths: CANSIM Table 102-0522 Deaths, by causes, Chapter II: Neoplasms (C00 to D48), age group and sex, Canada, annual (number). Vital Statistics - Death Database - 3223.

BOX A

The distribution of site-specific research investment varies among the top four cancer sites.

Research investment by disease site varies, with 28.1% for breast cancer to 7.0% for colorectal cancer (Figure 5), while the distribution of incident cases by cancer site is more similar, ranging from 12.5% for colorectal cancer and 14.2% for prostate cancer. Distribution of cancer deaths by site also varies, with 26.7% for lung cancer to 7.3% for breast cancer.

Long-Term Outcomes

Long-Term Outcomes

Cancer surveillance statistics help in understanding the cancer burden.

Much of the work in the cancer control domain is aimed at improving long-term outcomes, measured primarily as reductions in incidence and mortality, and improvements in survival. These outcomes are measured using indicators defined for the purposes of this Report as follows:

- The age-standardized incidence rate (ASIR) represents the number of newly diagnosed cancer cases per 100,000 people that would occur in a particular area/jurisdiction if it had the same age distribution as a standard reference population.[202]
- The age-standardized mortality rate (ASMR) represents the number of deaths from cancer per 100,000 people that would occur in a particular area/jurisdiction if it had the same age distribution as a standard reference population.[202]
- Relative survival represents the ratio of observed survival for a group of individuals, typically those diagnosed with a specified disease, to the expected survival for members of the general population that have the same main factors affecting survival (such as age, sex and place of residence) as the individuals with the disease.[202]

As in previous reports, this chapter presents incidence, mortality, and relative survival statistics for the top four cancer sites: lung, breast, prostate, and colorectal cancer. This year, however, the chapter includes long-term outcomes for a number of cancers which, over the past two decades, have shown notable trends in incidence and/or mortality and these are: pancreas, thyroid, liver, oropharynx, head and neck, non-Hodgkin lymphoma, and melanoma.

BOX A

There are a number of technical details relevant to understanding the indicators in this chapter.

Incidence and mortality

Trends in age-standardized incidence rates (ASIR) (1992 to 2007) and age-standardized mortality rates (ASMR) (1992 to 2009) for Canada were described using piecewise linear regression analysis. The resulting trends are described by the annual percent change (APC) with a positive or negative APC corresponding to an increasing or decreasing trend respectively, for most recent years.

For provincial analyses, incidence and mortality statistics were calculated on the basis of multiple years of data to allow for the determination of more stable rates. For incidence, data years 2007 to 2009 were used (2007 for Quebec). For mortality, data years 2007 to 2009 were used for the top four cancers, and 2005 to 2009 for the emerging cancers.

The ASIRs and ASMRs presented in this section are age-standardized to the 1991 Canadian population. Age-standardization allows for comparisons to be made over time and across provinces by removing the effect of the age structure of the population from the rate estimates.[203] Age-standardized rates are not "real" and should not be used for the purposes of resource planning, but are meant for interprovincial/territorial comparison.

Incidence rates may be calculated differently in other reports for various jurisdictions within and outside Canada, and age-standardization may have used different base populations. Therefore, rates may not be directly comparable between Canada and other countries and regions unless as part of a study in which all country rates are standardized to the same population. Long-term outcome statistics are available for countries around the world but are not directly comparable unless collected using the same definitions and standardized against the same population. Therefore, rather than present these statistics for other countries and regions, trend data are presented where available to provide a sense of patterns and directionality.

Relative survival

Relative survival is defined as the ratio of the observed survival in a group of patients to the survival expected in the general population with the same characteristics, such as sex and age. The relative survival ratio (RSR) can be interpreted as the proportion of patients alive after a certain number of years in a hypothetical situation where the cancers of interest are the only possible cause of death.

Both cohort and period analysis were used to estimate the relative survival. While the estimates from the former describe the survival experience of a well-defined cohort of patients, the estimates from the period analysis method predict an up-to-date survival that would be observed for a hypothetical cohort of patients who were actually at risk during the specified calendar period.

In this Report, the RSR for 'Canada' represents all provinces and territories except for Quebec (due to data limitations). Those younger than age 15 and those older than 74 at the time of diagnosis were excluded from the analysis of relative survival for cancers of the lung, colorectal, pancreas, thyroid, liver, head and neck, non-Hodgkin lymphoma, and melanoma. For breast cancer survival, those younger than age 15 and older than age 79 at the time of diagnosis were excluded. The older ages were excluded because some provinces had elevated survival in this group suggesting a bias in their data due to incomplete capture of death information. Including the older ages would inflate the relative survival estimates for Canada as a whole as well as reduce the comparability of survival across provinces. Survival analysis includes data on all primary cancer diagnoses (i.e., if patient has more than one primary, each is included).

Comparison between provinces of relative survival for cancers with very high fatality (e.g. pancreatic and liver) should be made with caution. In some provinces, it has been seen that incompleteness of death ascertainment and lack of linked sources for immigration and emigration status leads to overestimates of survival as patients lost to follow-up are assumed to be alive at the cut-off date. This will have a greater impact on estimates for younger and middle age groups.

The RSR by province presented in this section are not age-standardized. Please refer to the Technical Appendix for the age-standardized RSRs. Note that age-standardized RSRs were not calculated for all provinces for all cancers as sparse data in some of the age groups would result in unstable age-standardized rates.

Incidence, Mortality and Relative Survival for the Top Four Disease Sites

Breast cancer

Why are we measuring this?

Breast cancer is the most common cancer diagnosed among women, accounting for more than one quarter of new projected incident cases for women in 2012.[41, 114, 204]

What do the results mean?

The age-standardized mortality rate (ASMR) for breast cancer in Canada has been dropping from 1992 to 2007 (Figure 1) while the age-standardized incidence rate (ASIR) has remained stable.

- The ASIR hovered at around 100 cases per 100,000 females over the time period investigated. One international study that looked at three-year moving-average world-standardized incidence and mortality rates from 1985 to 2005 found that for breast cancer, unlike in Canada, incidence rates increased in the UK and Australia.[205] In the United States, data suggest that breast cancer incidence rates decreased from 1999 to 2005, and have since stabilized.[206]

The ASMR decreased from 30.4 deaths per 100,000 in 1992 to 21.7 deaths per 100,000 cases in 2007 (Annual Percent Change (APC) = -2.4% from 1992 to 2009, p-value < 0.01). This likely reflects improvements in screening mammography rates leading to reductions in late stage incidence as well as advances in diagnosis and treatment effectiveness over that time period.

Mortality rates from breast cancer have been shown to be on the decline in the United States,[206] Australia and the United Kingdom.[205]

The ASIR and ASMR of invasive breast cancer vary by province.

- The overall ASIR for Canada in 2007 to 2009 was 99 cases per 100,000 females and ranged from 87.3 cases per 100,000 females in Newfoundland and Labrador to 100.6 cases per 100,000 females in Ontario (Figure 2).
- The overall ASMR for Canada in 2007 to 2009 was 21 per 100,000 females and ranged from 18.7 per 100,000 females in British Columbia to 22.8 per 100,000 females in Manitoba (Figure 3).
- There is a general correlation in how provinces rank on incidence and mortality rates although the correlation is not consistent; for example, Nova Scotia has an above average incidence rate but a below average mortality rate.

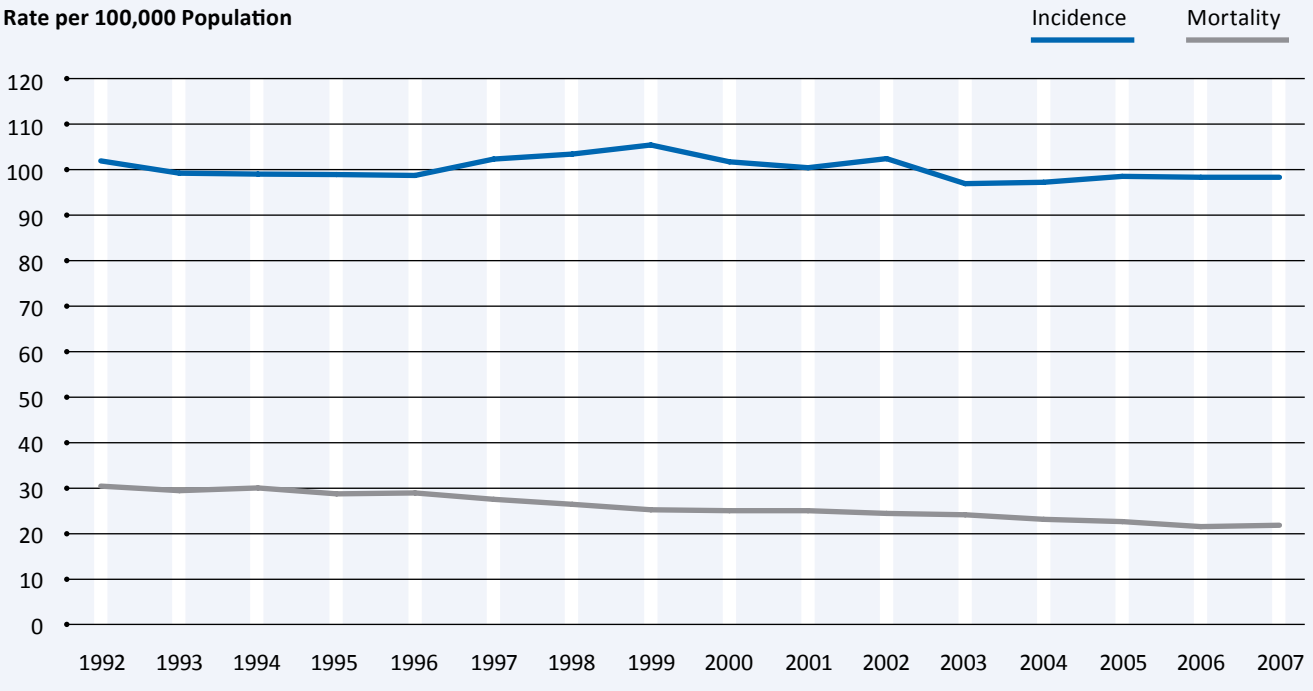
The five-year crude relative survival ratio (RSR) for breast cancer in Canada did not vary substantially by province in 2005 to 2007, and has increased since 1992 to 1994 across all age groups.

- The five-year RSR for Canada (excluding Quebec) was 89% and ranged from 87% in Prince Edward Island, Newfoundland and Labrador, Nova Scotia and Manitoba to 90% in New Brunswick (Figure 4).

- In the United States, the five-year RSR rose from 75% in 1975 to 90% in 2003.[207] A shorter-term age-specific trend analysis in Canada showed that the five-year RSR rose between 1992 to 1994 and 2005 to 2007 across all age groups with the largest increase from 75% to 85% seen among those aged 15 to 39 and the smallest increase of 83% to 87% seen among those aged 70 to 79 (see Technical Appendix on page 191).
- Future system performance reports will present relative survival by stage at diagnosis.

FIGURE 1

Age-standardized incidence and mortality rates of breast cancer in women, Canada – 1992 to 2007

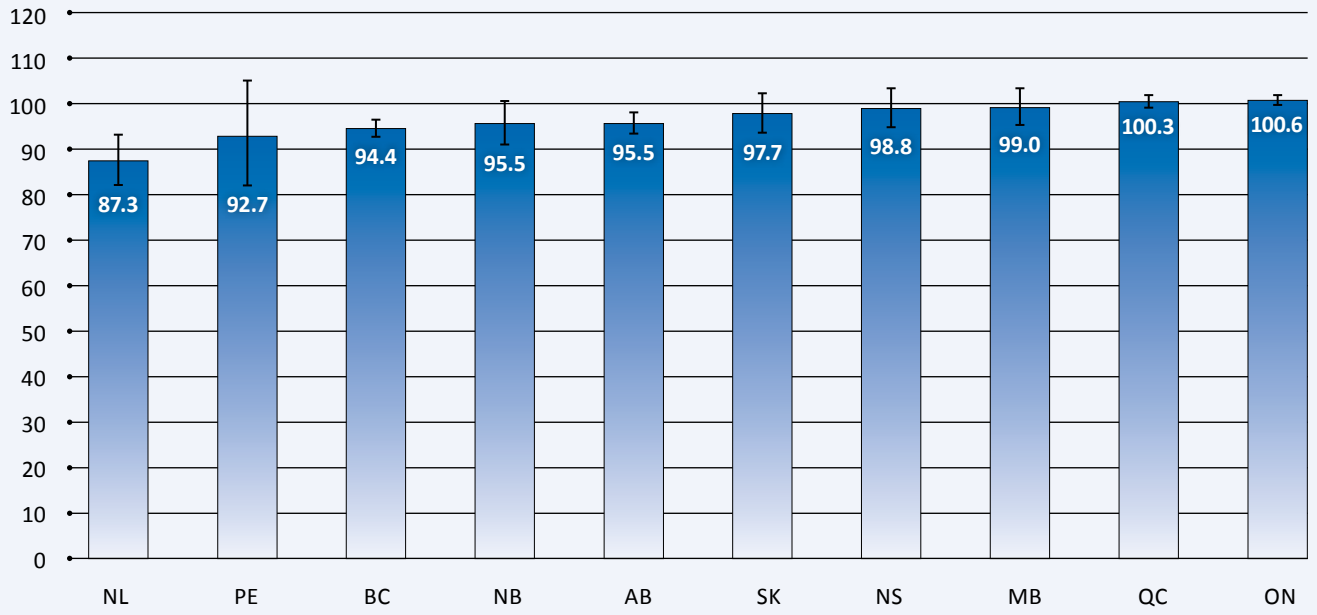


Data source: Statistics Canada, Canadian Cancer Registry, Vital Statistics Death Database.

FIGURE 2

Age-standardized incidence rates of breast cancer in women, by province/territory – 2007 to 2009

Rate per 100,000 Population



95% confidence intervals are indicated on figure.

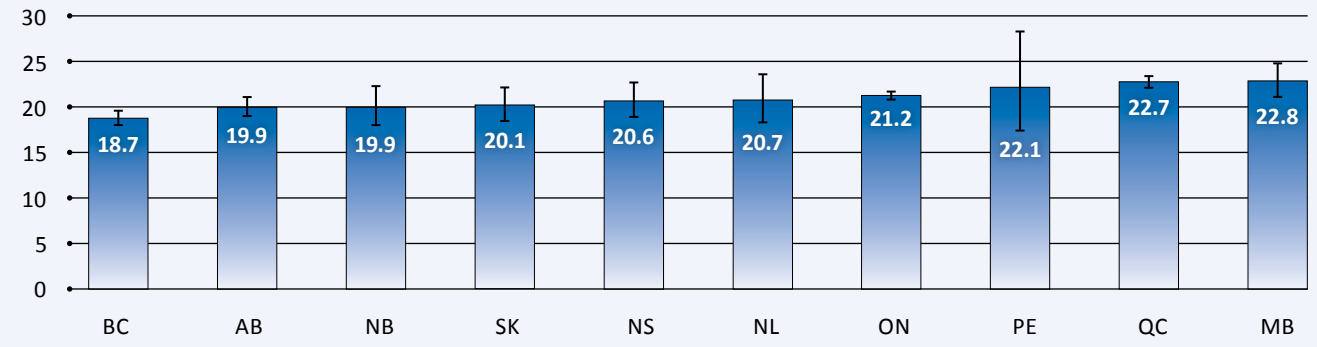
Note: Data for QC are for 2007.

Data source: Statistics Canada, Canadian Cancer Registry.

FIGURE 3

Age-standardized mortality rates of breast cancer in women, by province/territory – 2007 to 2009

Rate per 100,000 Population

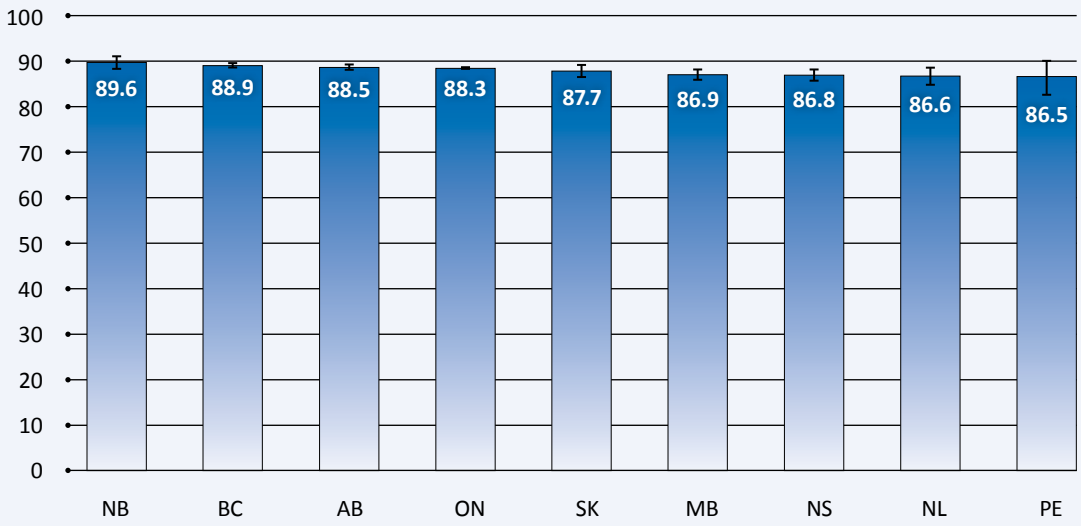


95% confidence intervals are indicated on figure.

Data Source: Statistics Canada, Vital Statistics Death Database.

FIGURE 4

Five-year relative survival ratios (age 15 to 79) for breast cancer in women, by province – 2005 to 2007



95% confidence intervals are indicated on figure.

Data source: Statistics Canada, Canadian Cancer Registry.

Lung cancer

Why are we measuring this?

Among Canadian adults, lung cancer is the leading cause of death due to cancer and the second most commonly diagnosed cancer, with an estimated 25,600 new cases and 20,100 deaths in 2012.[41] In Canada, the number of lung cancer deaths exceed deaths due to prostate, breast and colorectal cancers combined.[41]

What do the results mean?

In Canada, the age-standardized incidence rate (ASIR) between 1992 and 2007 and age-standardized mortality rate (ASMR) between 1992 and 2009 for lung cancer have consistently decreased among males but continued to increase among females, which is likely due to differences in smoking trends between the sexes.

- The ASIR for lung cancer in Canada decreased significantly for males from approximately 90 cases per 100,000 in 1992 to approximately 68 cases per 100,000 in 2007 (Annual Percentage Change (APC) = -1.9%, p-value < 0.01), while for females, it increased significantly from approximately 40 cases per 100,000 in 1992 to approximately 47 cases per 100,000 in 2007 (APC = 1.32%, p-value < 0.01) in the same time period (Figure 5).
- The ASMR for lung cancer in Canada decreased significantly for males from approximately 78 deaths per 100,000 in 1992 to approximately 54 deaths per 100,000 in 2009 (APC = -2.18%, p-value < 0.01) while for females, it increased significantly from approximately 30 deaths per 100,000 in 1992 to approximately 36 deaths per 100,000 in 2009, with a steeper increase from 1992 to 1999 (APC = 1.93%, p-value < 0.01) than from 1999 to 2009 (APC = 0.53, p-value < 0.01) (Figure 5).
- These striking differences between male and female incidence and mortality trends are almost certainly due to differences in smoking rate trends between men and women in the last 50 years or so. Tobacco consumption among males began to decrease in the mid-1960s preceding the decline in lung cancer rates by roughly 20 years, while consumption among females began to decline in the mid-1980s.[41]
- Data from the Surveillance Epidemiology and End Results (SEER) program suggest that there are similar trends in lung cancer incidence among males and among females in the United States as in Canada, with rates decreasing among males over time and fluctuating for females.[208]
- Trend data available internationally suggest that lung cancer incidence and mortality rates have peaked and are now declining among males in many countries, including the United States, Canada, England, Denmark and Australia, Finland and the Netherlands.[204, 209] Rates among females continue to rise, having not yet peaked in most countries, with the exception of the United States where recent evidence shows rates to be declining.[204, 210]

Using data from Canada for 2007 to 2009, there were interprovincial differences in the age-standardized lung cancer incidence and mortality rates, which may reflect different smoking trends across jurisdictions.

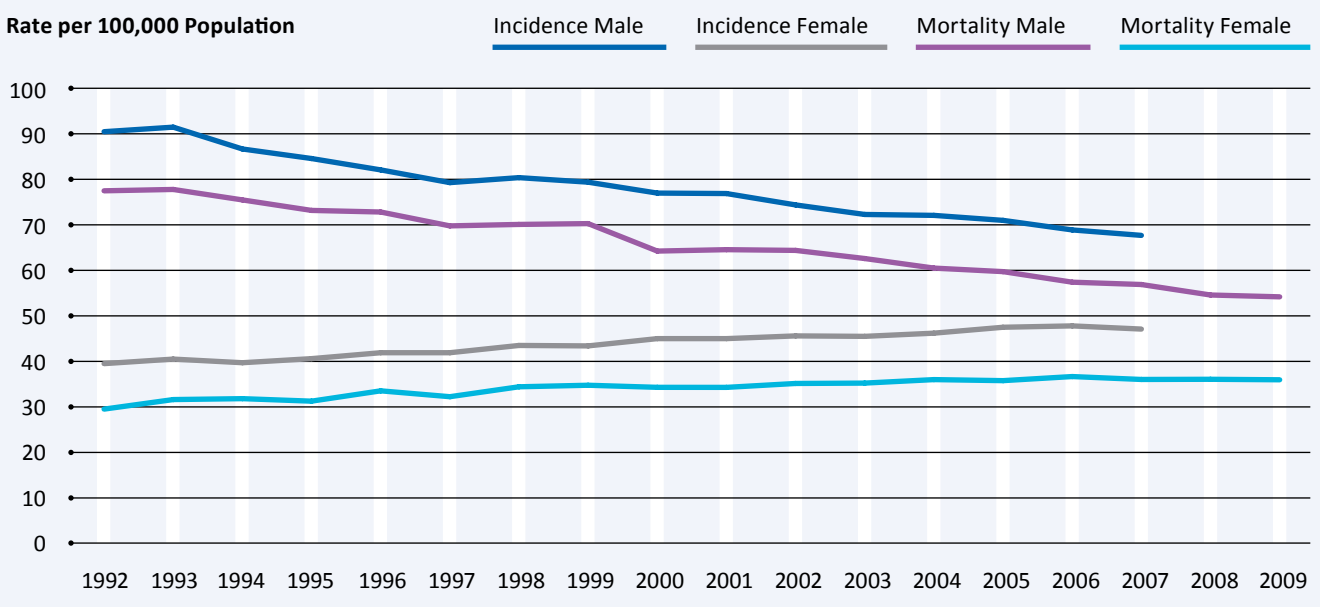
- Overall and across provinces, the ASIR for males was higher than for females but to varying proportions. This may reflect varying differences between provinces in the smoking rate and related trends for men and women (Figure 6).
- ASMRs ranged from 38 per 100,000 people in British Columbia to 56 per 100,000 people in New Brunswick and Quebec (Figure 7).

The five-year crude relative survival ratio (RSR) for lung cancer in Canada (excluding Quebec) for 2005 to 2007 was 18.4% and ranged from 15.5% in Nova Scotia to 20.4% in Manitoba (Figure 8).

- Overall five-year survival for lung cancer was 18.4% in Canada (excluding Quebec). Lung cancer survivability remains a challenge in all countries. Data from the United States show that five-year RSR for those diagnosed in 2008 was 17%, which has been increasing since the late 1970s.[208]
- An analysis comparing cancer registry data from several countries showed that five-year relative survival for lung cancer was higher in Australia and Canada and lower in Denmark and the United Kingdom.[211]
- The data show that the five-year RSR for lung cancer increased from 1992 to 1994 to 2005 to 2007 across all age groups, particularly for individuals aged 15 to 44 where the ratio increased by 30.4% (see Technical Appendix on page 191).

FIGURE 5

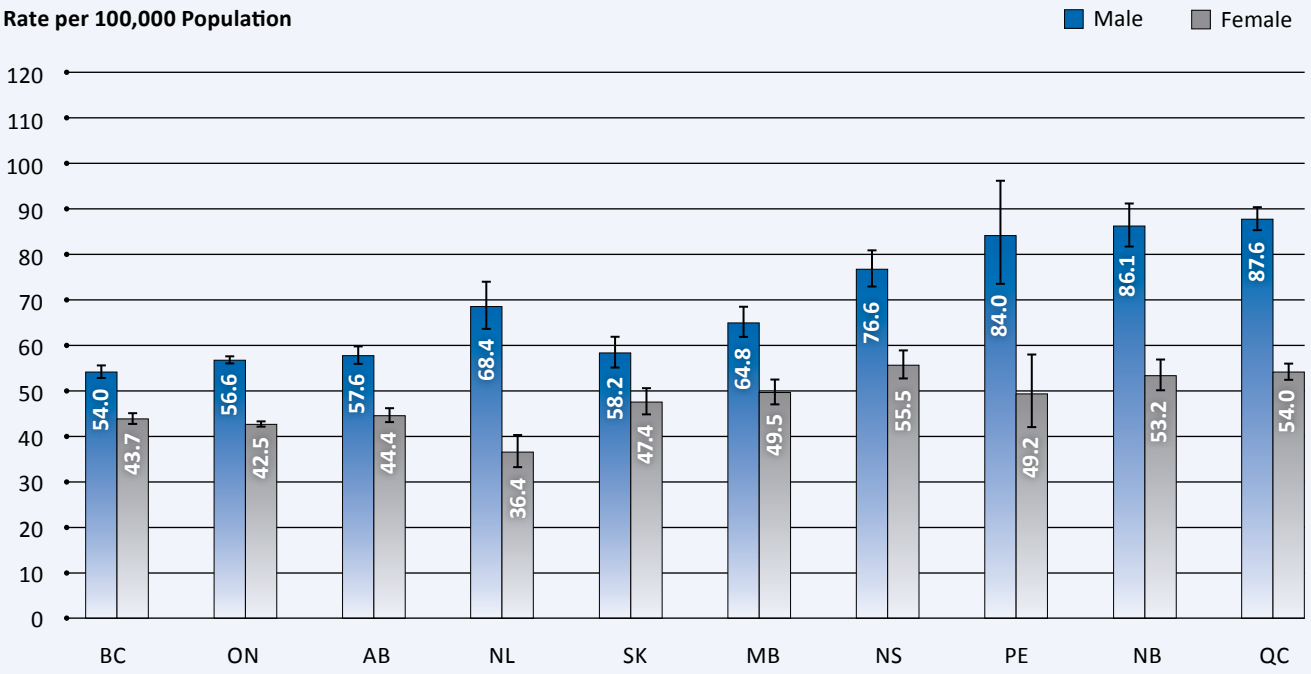
Age-standardized incidence and mortality rates of lung cancer, by sex, Canada – 1992 to 2009



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

FIGURE 6

Age-standardized incidence rates of lung cancer, by province – 2007 to 2009



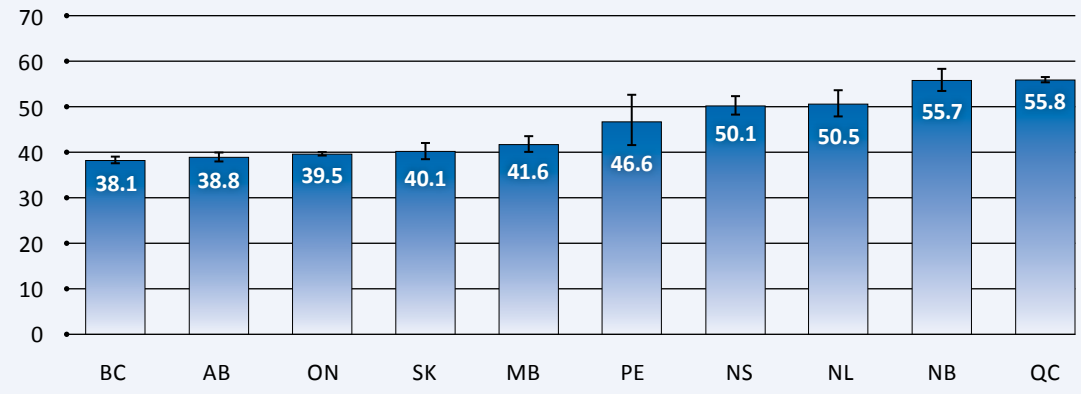
95% confidence intervals are indicated on figure.

QC data are for 2007.

Data Source: Statistics Canada, Canadian Cancer Registry.

FIGURE 7

Age-standardized mortality rates of lung cancer, by province – 2007 to 2009

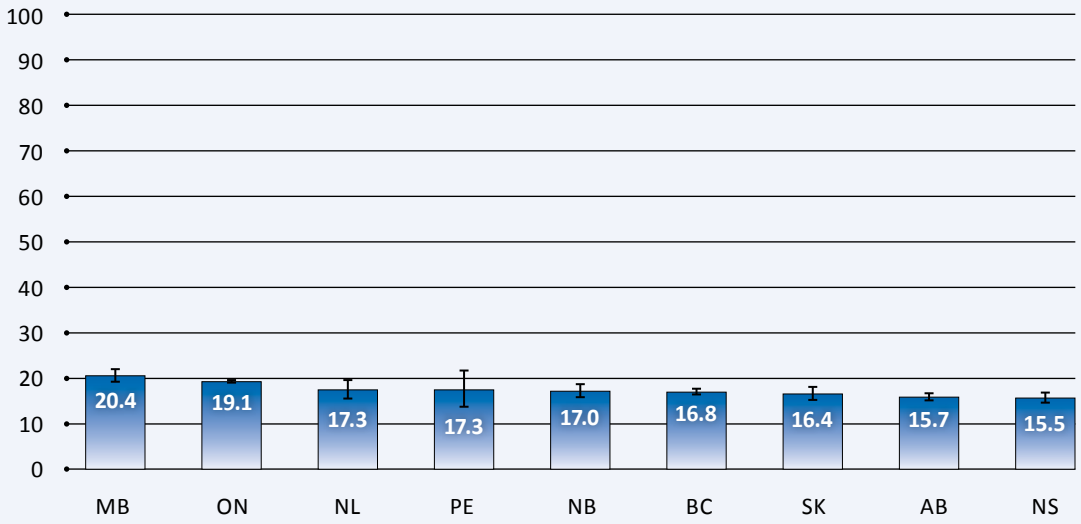


95% confidence intervals are indicated on figure.

Data Source: Statistics Canada, Vital Statistics Death Database.

FIGURE 8

Five-year relative survival ratios (age 15 to 74) for lung cancer, by province – 2005 to 2007



95% confidence intervals are indicated on figure.

Data source: Statistics Canada, Canadian Cancer Registry.

Colorectal cancer

Why are we measuring this?

Colorectal cancer is the second leading cause of cancer death and the third most commonly diagnosed cancer in Canada, with an estimated 9,200 deaths and 23,300 new cases in 2012.[41]

Colorectal cancer screening can reduce both incidence (by identifying and removing precancerous polyps) and mortality from colorectal cancer. As of 2012, all provinces were currently running or have announced organized screening programs for colorectal cancer.

What do the results mean?

The age-standardized incidence rate (ASIR) for colorectal cancer in Canada was fairly stable for both males and females from 1992 to 2007, although there are indications of a downward trend in the age-standardized mortality rate (ASMR) (Figure 9).

- The ASIR for colorectal cancer in Canada did not significantly change for males from 1992 to 2007, hovering at approximately 60 cases per 100,000, and for females it decreased barely significantly (Annual Percent Change (APC) = -0.26%, p-value p=0.05) from 43 to 41 cases per 100,000.
- Meanwhile, the ASMR for colorectal cancer in Canada decreased for males from 1992 to 2004 from approximately 31 to about 27 cases per 100,000 (APC = -1.19%, p-value < 0.01), with a steeper decline from 2004 to 2009 where the ASMR dropped to 23 per 100,000 in 2009 (APC = -2.53%, p-value < 0.01). The ASMR also declined for females from approximately 20 cases per 100,000 in 1992 to about 15 cases per 100,000 in 2009 (APC = -1.69%, p-value < 0.01) (Figure 9).

A decline in colorectal cancer mortality has also been noted in the United States, where incidence rates are also declining among both males and females.

- Data from the United States show that the age-standardized incidence and mortality rates for colorectal cancer declined from 1999 to 2008 for both males and females.[206]
- Compared to other developed countries, data from GLOBOCAN for 2008 show that CRC mortality rates tend to be lower in North America, which includes Canada and the United States, than in Australia and New Zealand.[204]

In 2007 to 2009, the lowest colorectal cancer incidence rate for both males and females was in British Columbia (tied with Alberta among females).

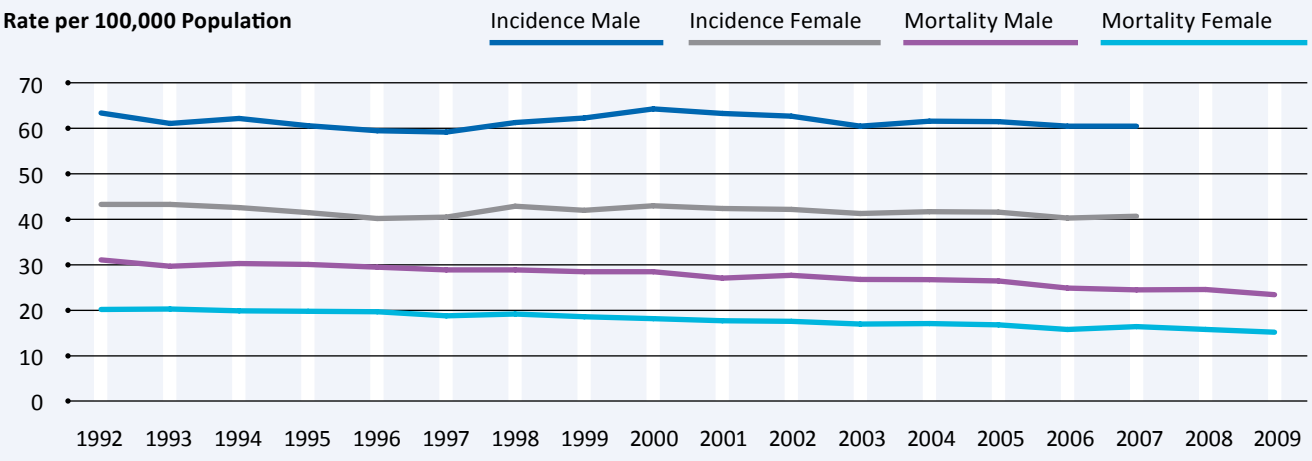
- The ASIR for colorectal cancer among males ranged from 53.0 per 100,000 in British Columbia to 83.7 per 100,000 in Newfoundland and Labrador. The range for females was 36.0 to 53.5 per 100,000 in British Columbia and Newfoundland and Labrador, respectively (Figure 10).
- The ASMR for colorectal cancer ranged from 17 per 100,000 people in Alberta and British Columbia to 30.6 per 100,000 people in Newfoundland and Labrador (Figure 11).

The five-year crude relative survival ratio (RSR) for colorectal cancer did not vary widely across provinces in 2005 to 2007, and has increased since 1992 to 1994 in all age groups.

- The overall RSR for Canada (excluding Quebec) was 66.5% and ranged from 62.9% in Saskatchewan to 66.7% in Ontario (Figure 12).
- The data show that the RSR for colorectal cancer increased from 1992 to 1994 to 2005 to 2007 in all age groups, particularly those aged 55 to 64 where the RSR increased from 57% in 1992 to 1994 to 67% in 2005 to 2007 (see Technical Appendix on page 191).

FIGURE 9

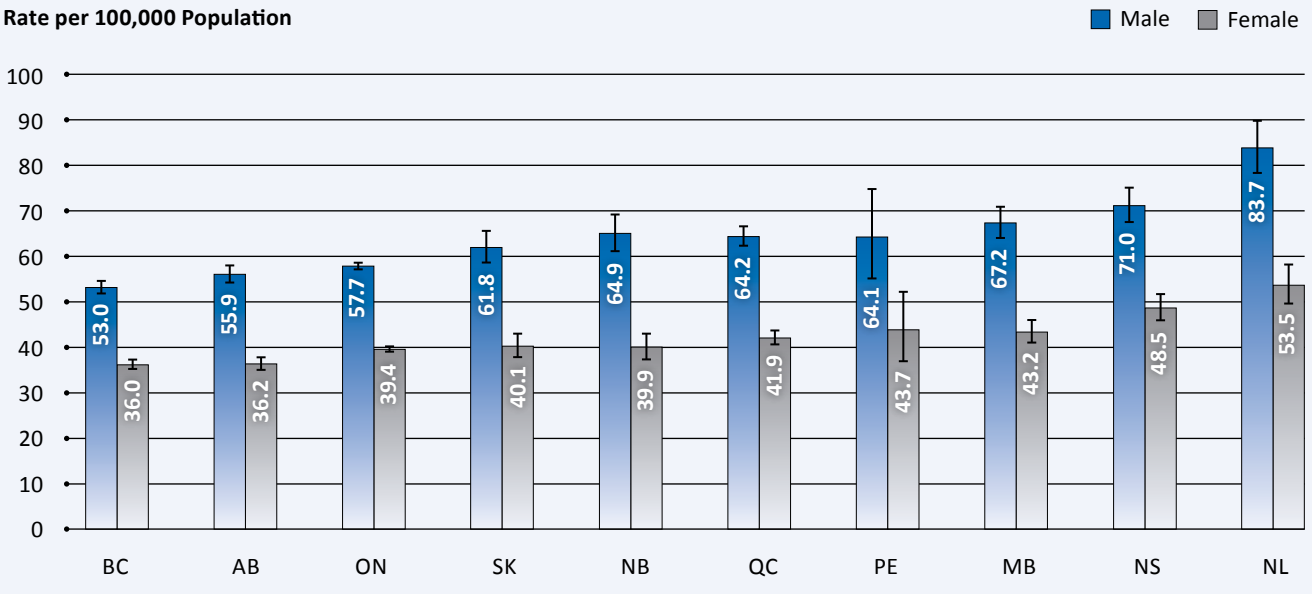
Age-standardized incidence and mortality rates of colorectal cancer by sex, Canada – 1992 to 2009



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

FIGURE 10

Age-standardized incidence rates of colorectal cancer, by province – 2007 to 2009



95% confidence intervals are indicated on figure.

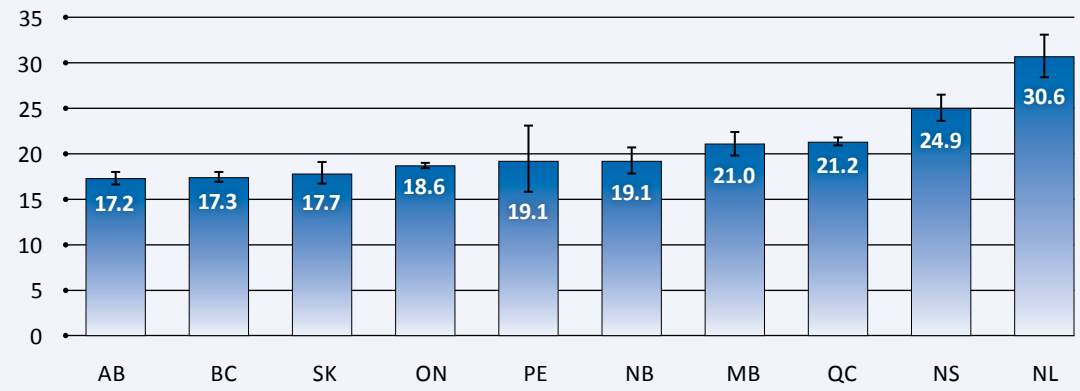
QC data are for 2007.

Data Source: Statistics Canada, Canadian Cancer Registry.

FIGURE 11

Age-standardized mortality rates of colorectal cancer, by province – 2007 to 2009

Rate per 100,000 Population



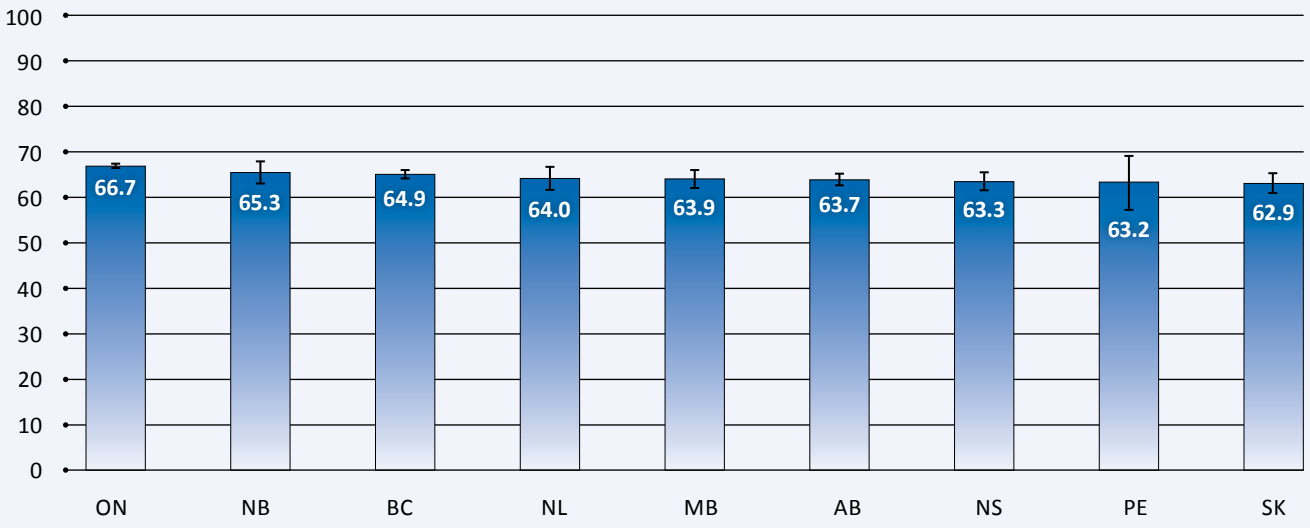
95% confidence intervals are indicated on figure.

Data Source: Statistics Canada, Vital Statistics Death Database.

FIGURE 12

Five-year relative survival ratios (age 15 to 74) for colorectal cancer, by province – 2005 to 2007

Relative Survival (%)



95% confidence intervals are indicated on figure.

Data source: Statistics Canada, Canadian Cancer Registry.

Prostate cancer

Why are we measuring this?

Prostate cancer is the most commonly diagnosed cancer among Canadian men, accounting for more than one quarter of all new male cancer cases expected in 2012.[41]

What do the results mean?

The age-standardized incidence rate (ASIR) for prostate cancer in Canada did not significantly change from 1992 to 2009 while the age-standardized mortality rate (ASMR) has been dropping slowly but steadily.

- The ASIR for prostate cancer remained stable at around 125 cases per 100,000 males, while the ASMR decreased significantly from 31 to 20 cases per 100,000 males (Annual Percent Change (APC) = -2.2% from 1992 to 2001, p-value < 0.01; APC = -3.9% from 2001 to 2009, p-value < 0.01) (Figure 13).
- Research suggests that increases in incidence in the past have likely been due to the introduction and subsequent uptake of the PSA test for early prostate cancer detection. Incidence trends in countries with a high uptake of PSA testing, including the United States, Canada and Australia, have followed a similar pattern with an increase around the time of introduction of the test.[212-213] Meanwhile, in the UK and Japan, rates have increased more slowly over time. In the UK, this is most likely due to a reduced uptake of PSA testing compared with countries like the U.S. and Canada. Between 1979 and 2005, statistically significant reductions in mortality were identified for men aged 50 to 79 years in 15 out of 24 developed countries.[212]

In 2007 to 2009 for prostate cancer, the percentage difference between lowest and highest provincial rate was 71% for age-standardized incidence and a 65% for age-standardized mortality.

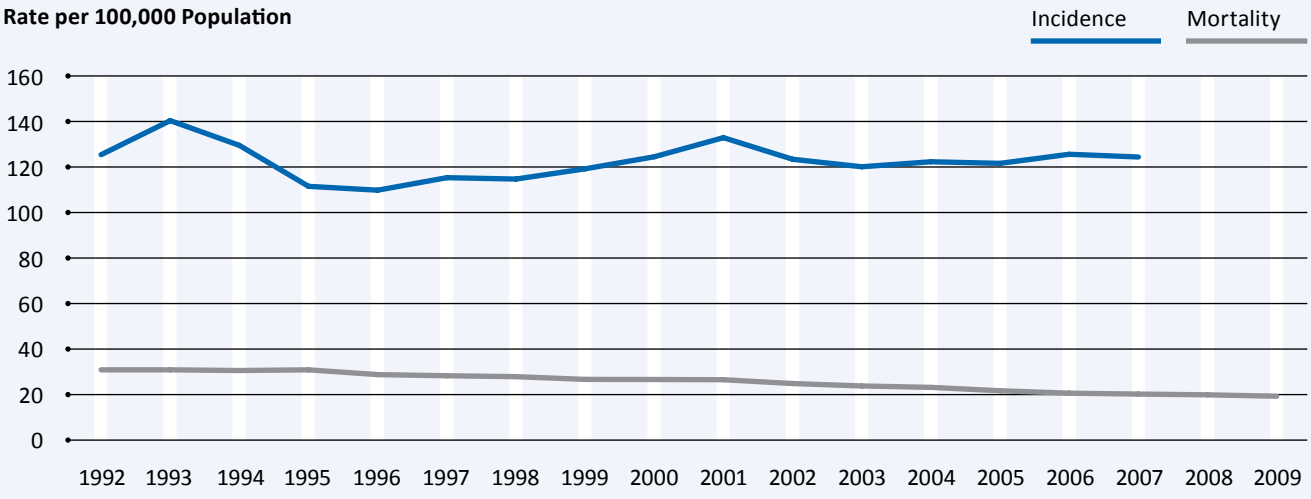
- There is substantial difference between provinces in prostate cancer incidence (and consequently, mortality). Again, the high incidence rates probably coincide provincially with high PSA test rates. The ASIR for prostate cancer ranged from 92.6 per 100,000 males in Quebec to 158.1 per 100,000 males in Manitoba (Figure 14).[g]
- The overall ASMR for Canada was 20 per 100,000 males and ranged from 17 per 100,000 males in Quebec to 28 per 100,000 males in Saskatchewan (Figure 15).[g]

The decrease in mortality rates and improvement in survival likely reflects improved treatment rather than increased early detection.[212] An Anticipatory Science expert panel convened by the Partnership in 2009 published a PSA Toolkit, which provides background information regarding PSA screening and testing (opportunistic screening, case-finding or ad-hoc testing). It also includes screening practices to be considered as well as those to be avoided. The panel concluded that expansion of PSA screening practices beyond the current ad hoc situation is not justified and indeed may produce net harm.[214] The United States Preventive Services Task Force recommends against PSA-based screening for prostate cancer (a grade D recommendation) for men in the general population, regardless of age given the evidence of very small potential benefits and significant potential harms.[215]

g) Quebec has identified potential data issues that may influence comparability of their incidence and mortality data for this timeframe.

FIGURE 13

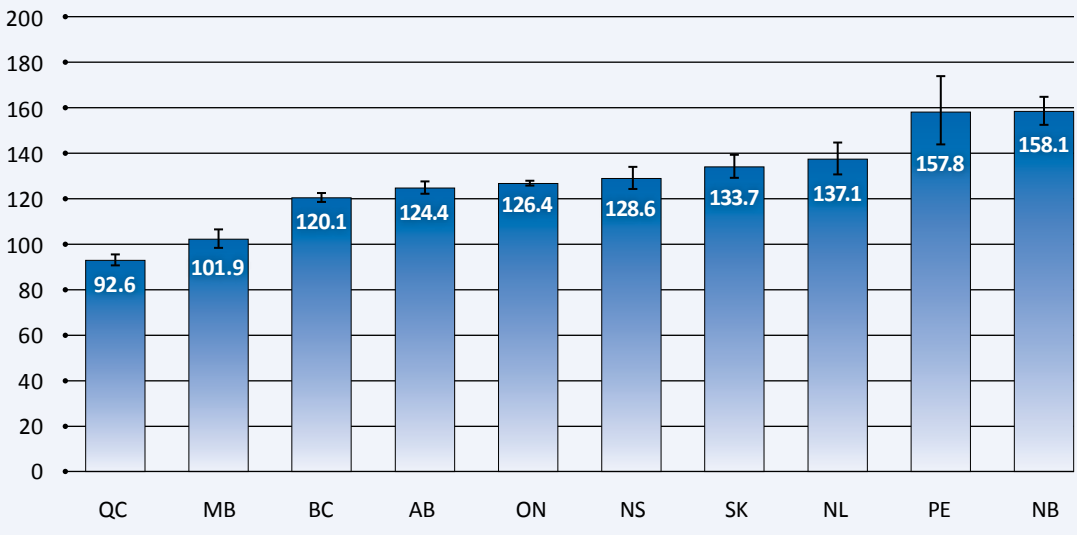
Age-standardized incidence and mortality rates of prostate cancer, Canada – 1992 to 2009



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

FIGURE 14

Age-standardized incidence rates of prostate cancer, by province – 2005 to 2007



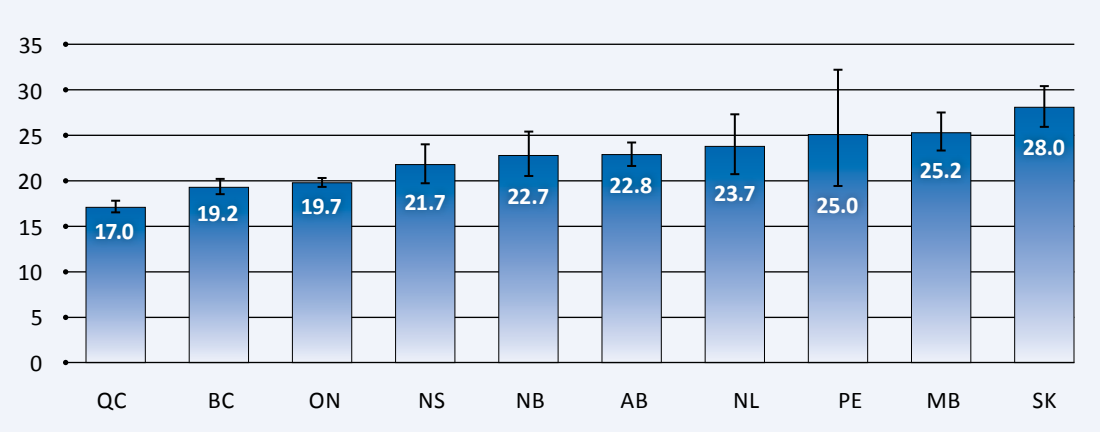
95% confidence intervals are indicated on figure.

QC data are for 2007.

Data Source: Statistics Canada, Canadian Cancer Registry.

FIGURE 15

Age-standardized mortality rates of prostate cancer, by province – 2007 to 2009



95% confidence intervals are indicated on figure.

Data Source: Statistics Canada, Vital Statistics Death Database.

Trends in Emerging Cancers

In contrast to the declining or stable trend in the age-standardized incidence of some of the most common cancers in Canada (lung, breast and colorectal) there have been notable increases over the past two decades in the incidence rates of certain other cancers and cancer subtypes. Reasons for the increasing incidence trends are not always understood although changes over time in diagnostic patterns and/or prevalence of risk factors may explain at least part of the increase in the incidence rates of some cancers.

The following section presents the age-standardized incidence rate (ASIR), age-standardized mortality rate (ASMR) and survival statistics for cancers of the pancreas, thyroid, liver, oropharynx, head and neck, non-Hodgkin lymphoma and melanoma. Also discussed are possible reasons for these observed trends and comparisons to trends observed in other countries.

The following sections present the relative survival ratios (RSR) by province not age-standardized (i.e., crude) and the age-specific relative survival trends from 1992 to 1994 and 2005 to 2007. Please refer to the Technical Appendix (see pages 191 and 192) for the age-standardized RSR and the RSR since time of diagnosis (for cancers of the pancreas, thyroid, liver, non-Hodgkin lymphoma, and melanoma). Note that age-standardized RSRs were not calculated for all provinces for all cancers because sparse data in some of the age groups would cause unstable age-standardized rates. For additional technical details relevant to understanding the indicators in this chapter, please see Box A on page 130.

Future system performance reports may present indicators that help shed further light on the factors behind the notable trends for these and other cancers.

Pancreatic cancer

Why are we measuring this?

Pancreatic cancer is the 12th most common cancer in Canada with an estimated 4,600 new cases.[41] It is the fourth leading cause of cancer death with an estimated 4,000 deaths in 2012.[41]

Data from Canada is matched by measures from other countries suggesting that the incidence trends for pancreatic cancer are changing.[216] Incidence, mortality and survival rates for pancreatic cancer are shown here in order to begin to assess the impact of this cancer and its contribution to the overall cancer burden in Canada.

What do the results mean?

Between 1992 and 2007 the age-standardized incidence rate (ASIR) and age-standardized mortality rate (ASMR) decreased significantly for males but stayed relatively constant for females.

- The ASIR for pancreatic cancer in Canada for males decreased significantly from 11.2 cases per 100,000 in 1992 to 10.5 cases per 100,000 in 2007 (Annual Percent Change (APC) = -0.46%, p-value = 0.01) (Figure 16). During the same time period there was no significant trend in the ASIR of cancer for females which hovered around 8.5 cases per 100,000. In contrast, in the United States, data from the North American Association of Central Cancer Registries used to examine trends in incidence rates from 1999 through to 2008 found a statistically significant increase in pancreatic cancer among both males and females (the average APC from 1999 to 2008 among males was 0.8% and among females was 0.9%, p<0.05).[216]
- Smoking, obesity, diabetes and genetic predisposition are all known risk factors for pancreatic cancer.[41] While the causes of the observed increases in pancreatic cancer incidence in the United States are not known, researchers suggest that the increase in obesity is likely to play a significant role.[216] Obesity is also on the rise in Canada;[33] however, pancreatic cancer incidence is on the decline in Canada.
- The ASMR for pancreatic cancer overall in Canada decreased significantly for males (p-value < 0.01) from 1992 to 2009 (APC = -0.61%) and remained relatively stable for females during that same time period (APC = -0.2%).
- Case-fatality was over 89% for women and over 94% for men between 1992 and 2007.

There was interprovincial variability in the ASIR of pancreatic cancer across provinces, ranging from 6.1 cases per 100,000 in Newfoundland and Labrador to 10.4 cases per 100,000 in Prince Edward Island.

In 2007 to 2009 for pancreatic cancer, the percentage difference between lowest and highest provincial rate was 26% for age-standardized mortality.

- The overall ASMR for Canada was 9 per 100,000 cases and ranged from 8.0 per 100,000 cases in Newfoundland and Labrador to 10.1 per 100,000 cases in New Brunswick (Figure 17).

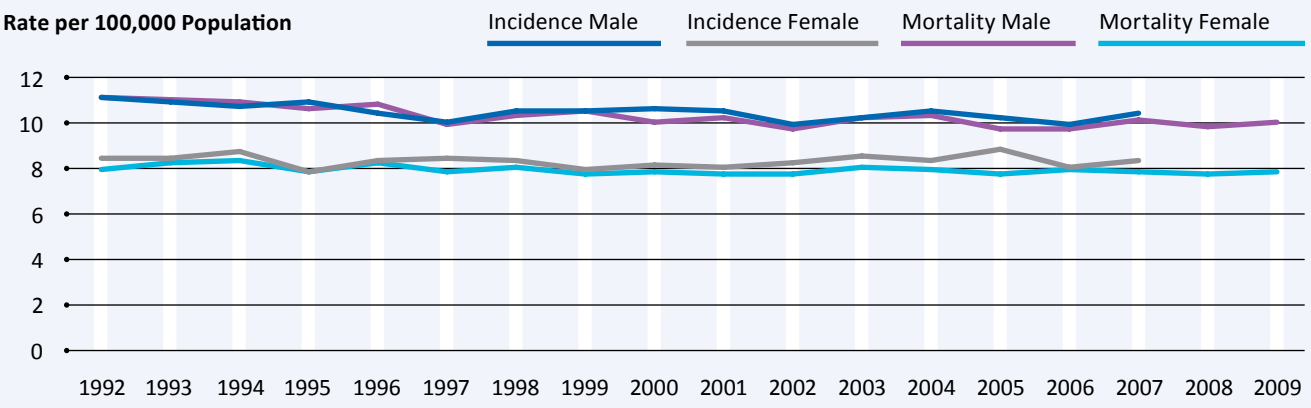
Five-year crude relative survival ratios (RSR) for pancreatic cancer in Canada varied by province in 2005 to 2007, and have increased since 1992 to 1994 across all age groups.

- The five-year RSR for Canada (excluding Quebec) was 9% and ranged from 3% in Manitoba to 12% in Newfoundland and Labrador (Figure 18). Age-standardizing the rates changed the range of RSRs from 5% in Nova Scotia to 11% in Ontario, with age-standardized RSRs unavailable for Prince Edward Island, New Brunswick and Manitoba (see Technical Appendix on page 190). The survival rates for pancreatic cancer in the United States are also poor.[216]

- With that said, the five-year RSR rose between 1992 to 1994 and 2005 to 2007 across all age groups with the largest increase of 63% seen among those aged 45 to 54 and the smallest increase of 40% seen among those aged 70 to 79 (see Technical Appendix on page 191).

FIGURE 16

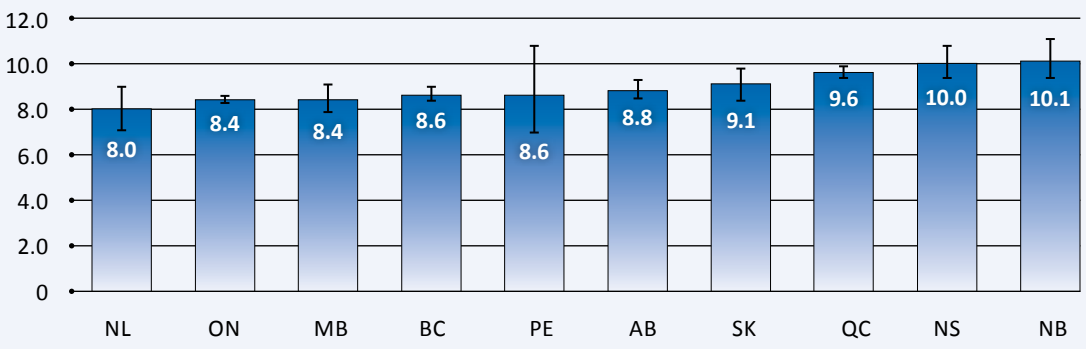
Age-standardized incidence and mortality rates – pancreatic cancer, by sex, Canada, 1992 to 2009



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

FIGURE 17

Age-standardized mortality rates – pancreatic cancer, by province, 2005 to 2009

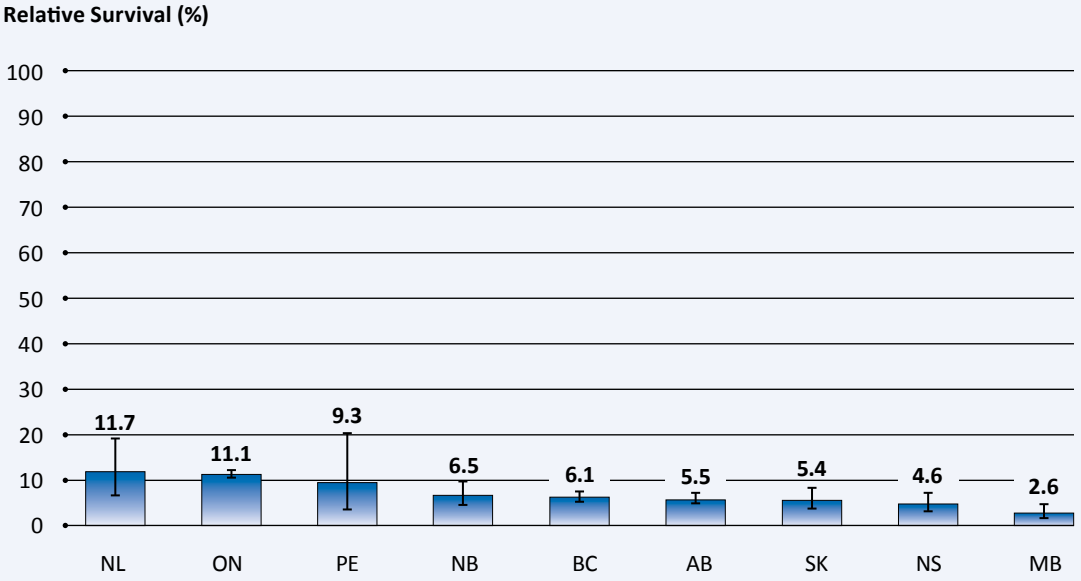


95% confidence intervals are indicated on figure.

Data Source: Statistics Canada, Vital Statistics Death Database.

FIGURE 18

Five-year relative survival ratios (age 15 to 74) for pancreatic cancer, by provinces – 2005 to 2007



95% confidence intervals are indicated on figure.

Data source: Statistics Canada, Canadian Cancer Registry.

Non-Hodgkin lymphoma

Why are we measuring this?

Non-Hodgkin lymphoma is the 5th most common cancer in Canada with an estimated 7,800 new cases in 2012, and the 6th most common cause of cancer death with an estimated 2,800 deaths in 2012.[41]

Over the past four decades, the incidence and mortality of non-Hodgkin lymphoma has been on the rise in Europe and the United States. Some studies suggest, however, that this trend has now changed.[217] Obtaining a current picture of the trends in non-Hodgkin lymphoma incidence and mortality as well as survival will assist public health practitioners in deciphering the relative importance of this disease in the overall cancer burden.

What do the results mean?

Between 1992 and 2007 the age-standardized incidence rate (ASIR) increased significantly for both sexes and the age-standardized mortality rate (ASMR) decreased significantly for both sexes.

- The ASIR for non-Hodgkin lymphoma (NHL) cancer in Canada increased significantly (p-value < 0.001) for both sexes, from 17.2 cases per 100,000 in 1992 to 20.4 cases per 100,000 in 2007 (Annual Percent Change (APC) =0.81%) for males and from 12.5 cases per 100,000 in 1992 to 13.9 cases per 100,000 in 2007 (APC = 0.73%) for females (Figure 19).
- The increase in incidence of NHL over time may in part be due to improved diagnosis and access to medical care;[218] however, several risk factors for the various subtypes of NHL have been identified and may also explain the increasing incidence.[219] Yet, the causes of most NHL are largely unknown.[217] Also, the introduction of anti-retrovirals for human immunodeficiency virus (HIV) in the 1990s has been cited as the reason for a decline in incidence of NHL attributable to HIV infection.[41]
- The ASMR for NHL cancers overall in Canada decreased significantly for both sexes. The APC for males was -0.75% (p-value < 0.01) and -1.07% (p-value < 0.01) for females from 1992 to 2009. For females, the ASMR increased slightly from 1992 to 2000 but the overall trend was decreasing (Figure 19). Using death certification data from countries across Europe for the period 1980 to 2004, NHL mortality has been found to decline in many European countries over the past decade considered.[217] Over the whole of the EU, rates declined from 4.3 per 100,000 to 4.1 among men and 2.7 per 100,000 to 2.5 among women between the late 1990s and 2004. In the United States, rates were also found to decrease from 6.5 per 100,000 to 5.5 among men and 4.2 per 100,000 to 3.5 among women.

There was some interprovincial variability in the ASIR of NHL across provinces, ranging from 14.4 in Prince Edward Island to 17.5 in Ontario.

In 2007 to 2009 for NHL, the percentage difference between lowest and highest provincial ASMR was 38%.

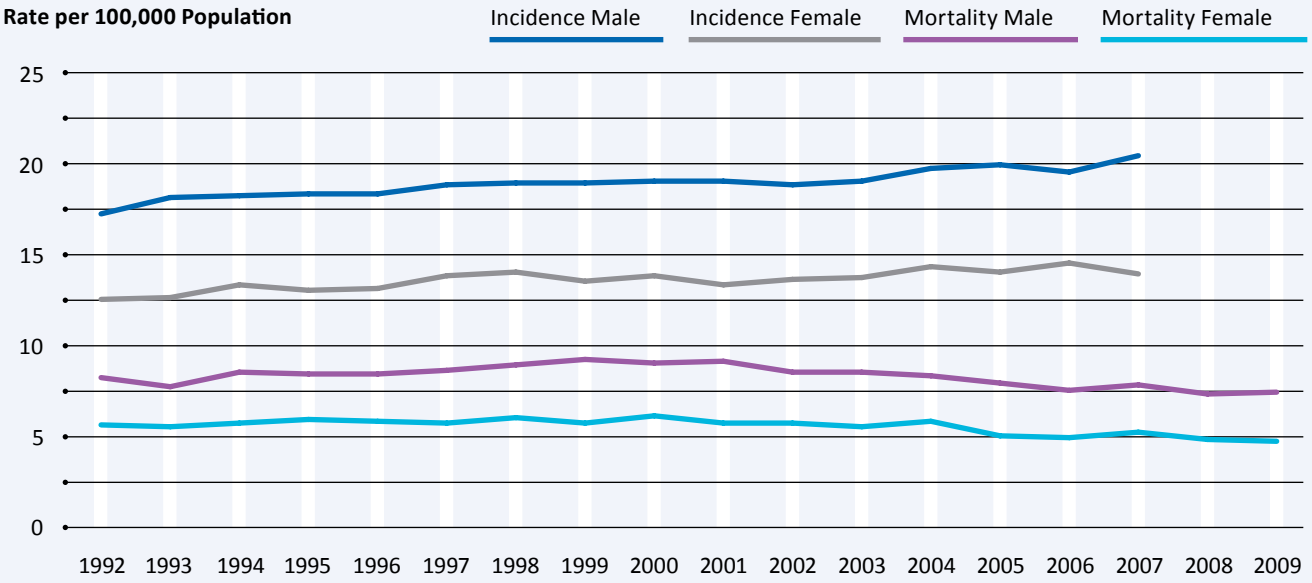
- The overall ASMR for Canada was 6 per 100,000 cases and ranged from 5 per 100,000 cases in Newfoundland and Labrador to 7 per 100,000 cases in Nova Scotia (Figure 20).

The five-year crude relative survival ratio (RSR) for NHL in Canada varied by province in 2005 to 2007.

- The five-year RSR for Canada (excluding Quebec) was 71% and ranged from 62% in Prince Edward Island to 74% in New Brunswick (data not shown). Improvements in treatment – such as the introduction of immunotherapy – have been cited as a reason for improved survival among patients diagnosed with NHL.[41]

FIGURE 19

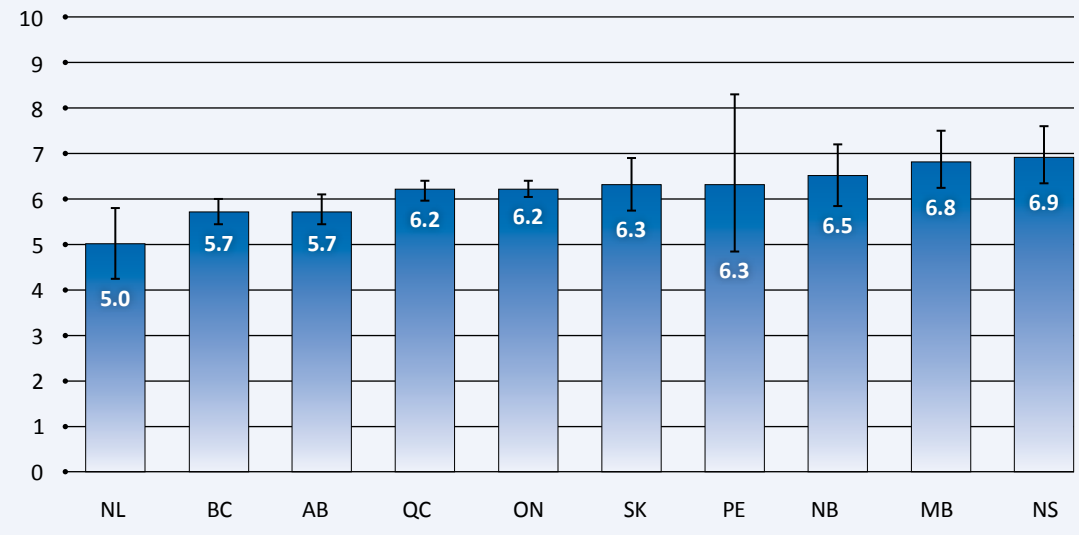
Age-standardized incidence and mortality rates – non-Hodgkin lymphoma, by sex, Canada – 1992 to 2009



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

FIGURE 20

Age-standardized mortality rates – non-Hodgkin lymphoma by province – 2005 to 2009



95% confidence intervals are indicated on figure.

Data Source: Statistics Canada, Vital Statistics Death Database.

Thyroid cancer

Why are we measuring this?

In recent years, thyroid cancer has been one of the most rapidly increasing cancers (in terms of incidence) in Canada with an estimated 5,600 new cases in 2012.[41]

What do the results mean?

Between 1992 and 2007, the age-standardized incidence rate (ASIR) has increased significantly for both sexes (Figure 21) and the age-standardized mortality rate (ASMR) has decreased significantly for females but stayed relatively stable for males (data not shown).

- The ASIR for thyroid cancer in Canada increased significantly (p-value < 0.001) for both sexes, from 2 cases per 100,000 in 1992 to 5.2 cases per 100,000 in 2007 (Annual Percent Change (APC) = 5.94%) for males and from 6.8 cases per 100,000 in 1992 to 17.9 cases per 100,000 in 2007 (APC = 7.53%) for females. In particular, there was a dramatic increase from 1998 and 2002, when the APC was 12.2% (Figure 21).
- While the ASMR for thyroid cancers overall in Canada decreased significantly for females (p-value = <0.01) (APC =-1.82%), the overall mortality as a result of thyroid cancer is low. For males, there was a slight increase in ASMR (APC = 0.61) from 1992 to 2009 (data not shown).

There were variations across provinces in the ASIR of thyroid cancer with rates lowest in Saskatchewan and British Columbia and highest in Ontario and New Brunswick.

- For years 2007-2009 combined, the ASIR for thyroid cancer ranged from 6.0 cases per 100,000 in Saskatchewan to 16.3 cases per 100,000 in Ontario (Figure 22).

Mortality rates by province were not available because of small numbers.

The five-year crude relative survival ratio (RSR) for thyroid cancer in Canada (excluding Quebec) for 2005 and 2007 was 98.5% and was relatively consistent among provinces ranging from 99.9% in Saskatchewan to 95.5% in New Brunswick (data not shown).

- The data show that the RSR for thyroid cancer increased from 1992-1994 to 2005-2007 across all age groups, particularly for older age groups where the ratio increased by 8.9% for people aged 55 to 64 and by 10.7% for people aged 65 to 74 (see Technical Appendix on page 191).

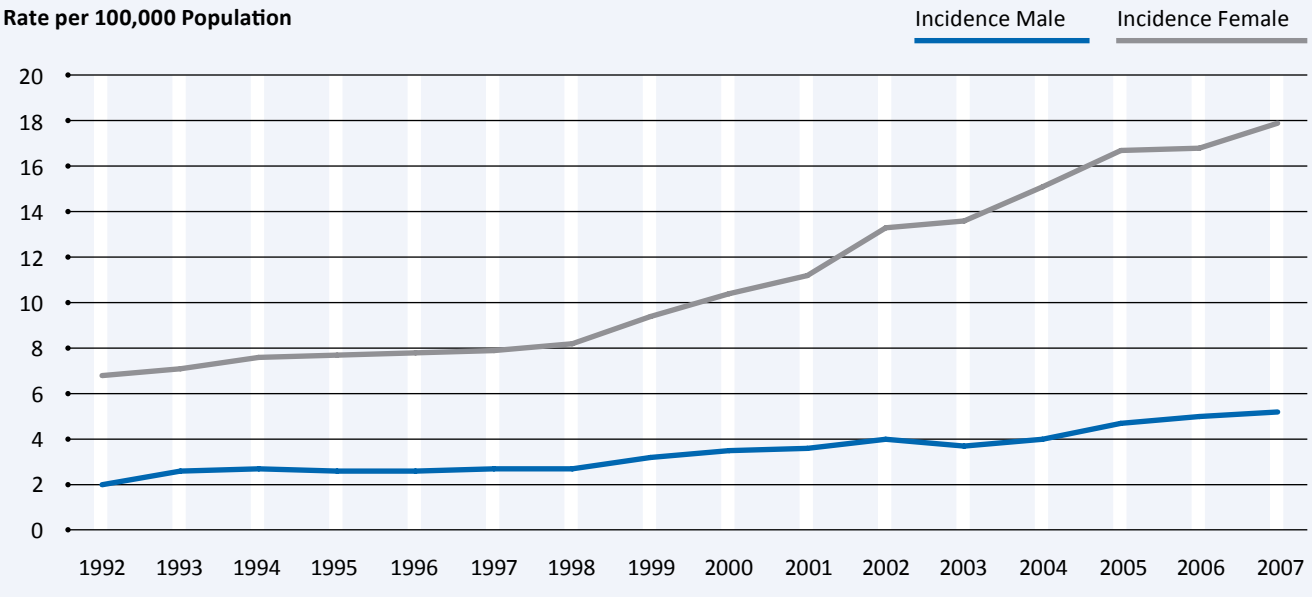
Increases in the incidence of thyroid cancer have also been reported in other developed countries, although it is suspected that these increases are mostly due to more testing being done and the use of newer technologies.

- Increased incidence of thyroid cancer has been reported worldwide.[220] In the United States, significant increases in ASIR were also seen.[208] From 1997 to 2009, the overall APC was 6.6%. The APCs among females and males were 7.0% and 5.9%, respectively, and both results were significant increases.
- There are known and suspected genetic and environmental risk factors for thyroid cancer, including: exposure to polybrominated diphenyl esters (used in flame retardants), exposure to diagnostic x-rays involving the head and neck, iodine deficiency and obesity.[221] However, it has been suggested that much of the increase in new cases is a result of increased diagnostic testing of thyroid masses and the use of more sophisticated and accessible techniques, including fine needle aspiration and ultrasound, which have identified more earlier stage cancers with smaller-sized tumours.[222-225]

- Thyroid cancer has been found to exist in a subclinical form and it has been suggested that if even smaller sections of the thyroid gland were examined, virtually every person would be diagnosed with thyroid cancer.[226]
- However, it has recently been reported that not all of the rise in incidence can be explained by the increase in small tumours. Several studies have reported that a higher incidence of larger tumours are being diagnosed.[220, 227-228]

FIGURE 21

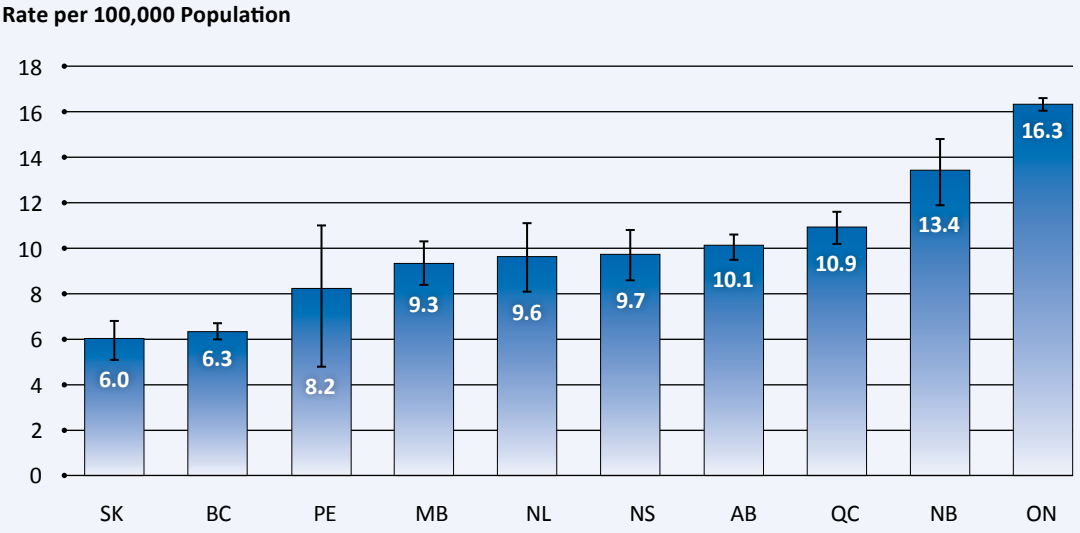
Age-standardized incidence rates – thyroid cancer, by sex, Canada – 1992 to 2007



Data Source: Statistics Canada, Canadian Cancer Registry.

FIGURE 22

Age-standardized incidence rates – thyroid cancer, by province – 2007 to 2009



95% confidence intervals are indicated on figure.

QC data are for 2007.

Data source: Statistics Canada, Canadian Cancer Registry.

Liver cancer

Why are we measuring this?

In recent years, there has been an increasing incidence of liver cancer in Canada, particularly among males. In Canada, it is estimated that there were 2,000 new cases overall and 900 deaths in 2012.[41]

What do the results mean?

The age-standardized incidence rate (ASIR) between 1992 and 2007 and the age-standardized mortality rate (ASMR) between 1992 and 2009 increased significantly for both sexes (Figure 23).

- The ASIR for liver cancer in Canada increased significantly (p-value < 0.01) for both sexes, from 3.5 cases per 100,000 in 1992 to 6.2 cases per 100,000 in 2007 (Annual Percentage Change (APC) = 3.38%) for males and from 1.3 cases per 100,000 in 1992 to 1.7 cases per 100,000 in 2007 (APC = 2.14%) for females.
- While the ASMR for liver cancer overall increased significantly for both sexes between 1992 and 2009 (p-value < 0.01), the increase was not as large as that seen for incidence. From 1992 to 2009, the APC for the female mortality rate was 1.4%, while the APC for male mortality was 2.3%.
- Case-fatality ranged between 44% to 70% for women and 48% to 62% for men between 1992 and 2007.

For 2007 to 2009, there were interprovincial differences in the ASIR of liver cancer.

- The overall ASIR for liver cancer ranged from 1.9 cases per 100,000 in Newfoundland and Labrador to 4.4 cases per 100,000 in British Columbia (data not shown).
- Across all provinces, the ASIR for males was considerably higher than for females. Among males, the ASIR ranged from 3.0 per 100,000 in New Brunswick and Newfoundland and Labrador to 6.9 per 100,000 in British Columbia. Among females, the ASIR ranged from 0.9 per 100,000 in Newfoundland and Labrador to 2.2 per 100,000 in British Columbia (Figure 24).

For 2005 to 2009, there were interprovincial differences in the ASMR of liver cancer.

- The combined ASMR for liver cancer ranged from 0.8 cases per 100,000 people in Saskatchewan to 2.1 cases per 100,000 in British Columbia (Figure 25).

The five-year crude relative survival ratio (RSR) for liver cancer in Canada (excluding Quebec) for 2005 to 2007 was 22.1% and ranged from 26.8% in Ontario to 7.3% in Newfoundland and Labrador and Manitoba (Figure 26) and has increased across all age groups since 1992 to 1994.

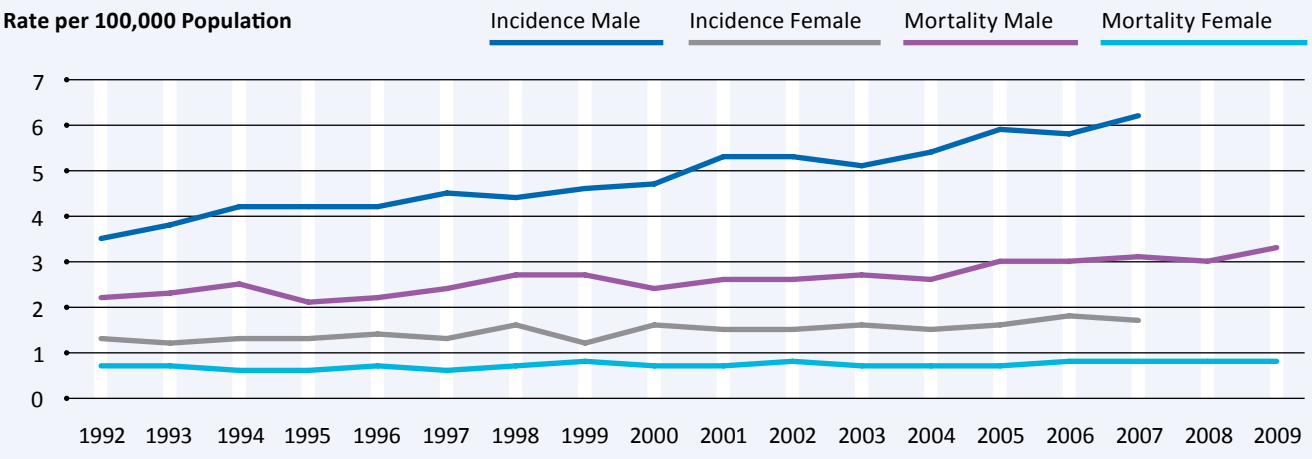
- The data show that the RSR for liver cancer substantially increased from 1992 to 1994 to 2005 to 2007 across all age groups, particularly for individuals aged 15 to 44 where the ratio increased by 164.7% (see Technical Appendix on page 191).

There are various potential reasons for the increasing incidence, which has also been seen in the United States, including higher rates of chronic hepatitis B and C infection and more immigration from countries where hepatitis is endemic.

- Worldwide, liver cancer is the fifth most common type of cancer among males; however, incidence is relatively low in more developed countries.[204]
- Several factors have been associated with liver cancer, such as chronic infection with hepatitis B or hepatitis C, cirrhosis from excessive alcohol consumption and obesity. Increased immigration from countries with endemic hepatitis B infection and higher exposure to aflatoxins may also partly explain the rising incidence.[41, 216] While these and other factors could be associated with the recent rise in liver cancer, data are still emerging and further investigation is required.

FIGURE 23

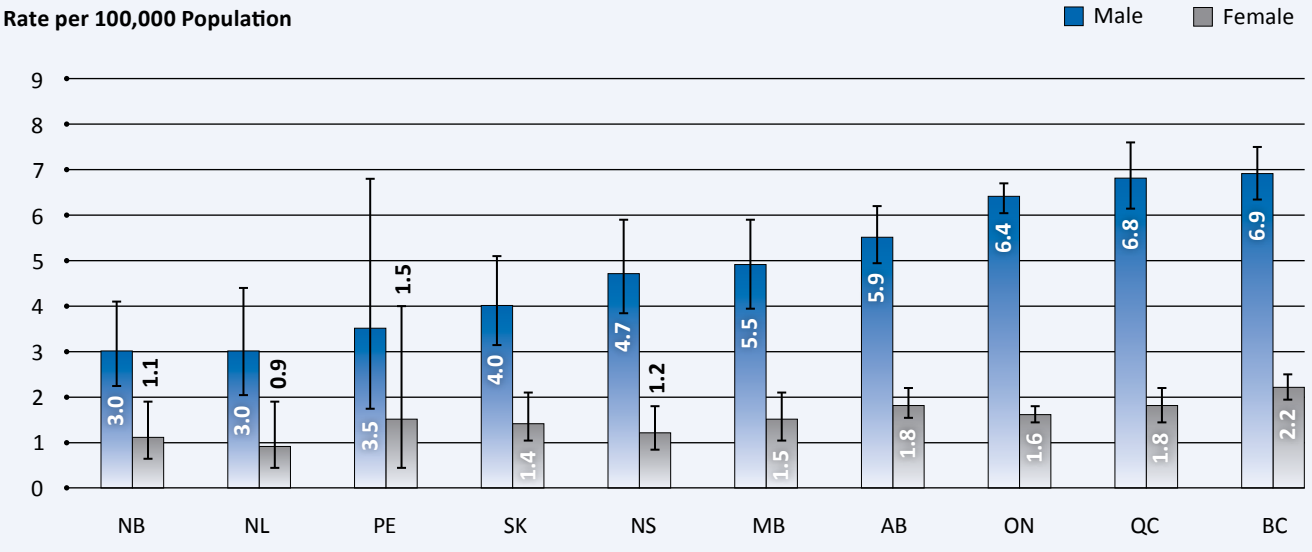
Age-standardized incidence and mortality rates – liver cancer, by sex, Canada – 1992 to 2009



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

FIGURE 24

Age-standardized incidence rates – liver cancer, by province and sex – 2007 to 2009



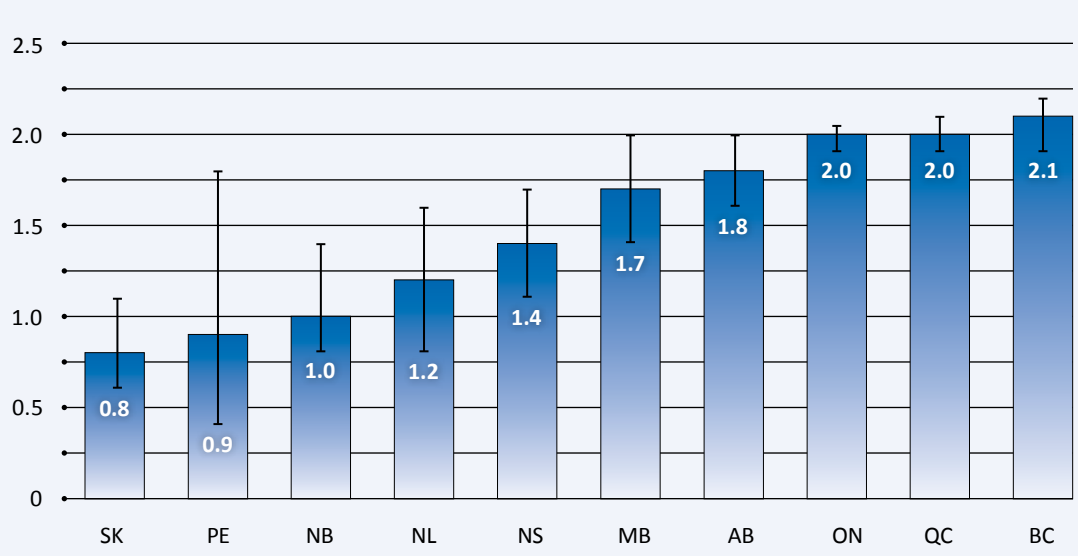
95% confidence intervals are indicated on figure.

QC data are for 2007.

Data source: Statistics Canada, Canadian Cancer Registry.

FIGURE 25

Age-standardized mortality rates – liver cancer, by province – 2005 to 2009

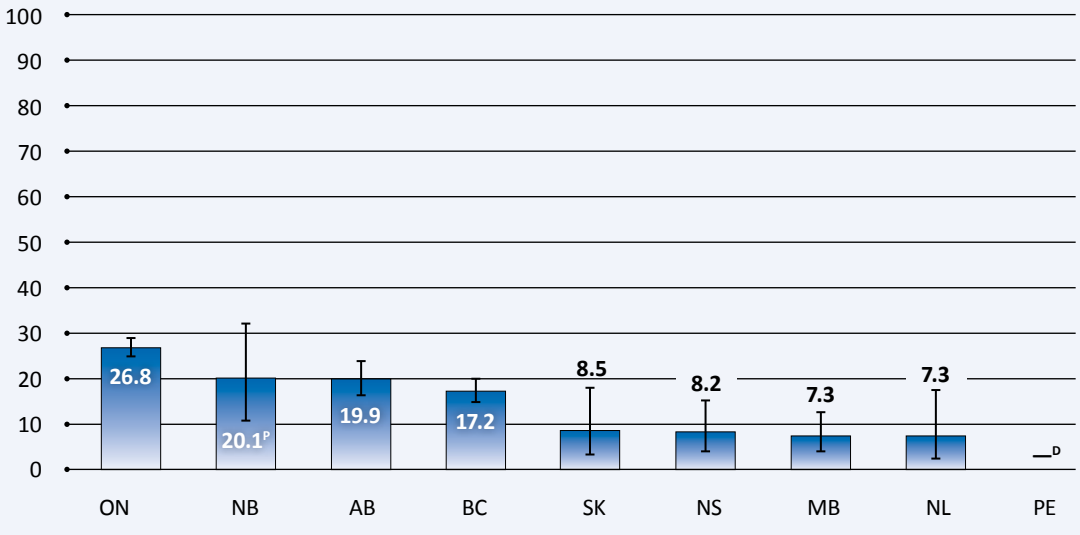


95% confidence intervals are indicated on figure.

Data Source: Statistics Canada, Vital Statistics Death Database.

FIGURE 26

Five-year relative survival ratios (age 15 to 74) for liver cancer, by province – 2005 to 2007



[P] The ratio is potentially unstable.

[D] All patients died before 5 years follow-up.

95% confidence intervals are indicated on figure.

Data source: Statistics Canada, Canadian Cancer Registry.

Melanoma

Why are we measuring this?

Malignant melanoma is the 6th most common cancer in Canada with an estimated 5,800 new cases and 970 deaths in 2012.[41]

The main risk factor for melanoma is exposure to ultraviolet radiation (UVR), including ultraviolet A and B. UVR emitted from the sun and tanning beds is a major cause of melanoma.[229] (See page 30 of this report for artificial tanning equipment use in Canada.)

According to the International Agency for Research on Cancer (IARC), there is sufficient evidence from studies showing that UVR is a human carcinogen and a cause of melanoma and other skin cancers.[230]

What do the results mean?

Between 1992 and 2007 the age-standardized incidence rate (ASIR) of melanoma increased significantly for both sexes.

- The ASIR of melanoma increased from 10.4 cases per 100,000 in 1992 to 13.7 cases per 100,000 in 2007 (Annual Percent Change (APC) = 1.82%, p< 0.01) for males and from 8.7 cases per 100,000 in 1992 to 11.3 cases per 100,000 in 2007 (APC = 1.5%) for females. There was a slight decrease in ASIR between 2000 and 2003 for females (Figure 27).

The age-standardized mortality rate (ASMR) for melanoma increased significantly for males and stayed relatively stable for females.

- From 1992 to 2009, the ASMR of melanoma increased significantly for males (p-value < 0.01) (APC =0.91%) whereas the ASMR for females remained stable (data not shown).

Across Canada in 2007 to 2009, there were interprovincial differences in the ASIR and ASMR of melanoma.

- From 2007 to 2009, the ASIR for melanoma ranged from 6.5 cases per 100,000 in Quebec to 19.3 cases per 100,000 in Nova Scotia (Figure 28). Melanoma is known to be largely under-reported in Quebec so their figures should be interpreted with caution.[231]
- Interprovincial differences in the ASMR for melanoma were also noted during the same time period, with rates ranging from 1.7 per 100,000 in Quebec to 2.7 per 100,000 in Nova Scotia (Figure 29).

The five-year crude relative survival ratio (RSR) for melanoma in Canada (excluding Quebec) was 90.3% and varied by ten percentage points between provinces with the lowest and highest rates in 2005 to 2007.

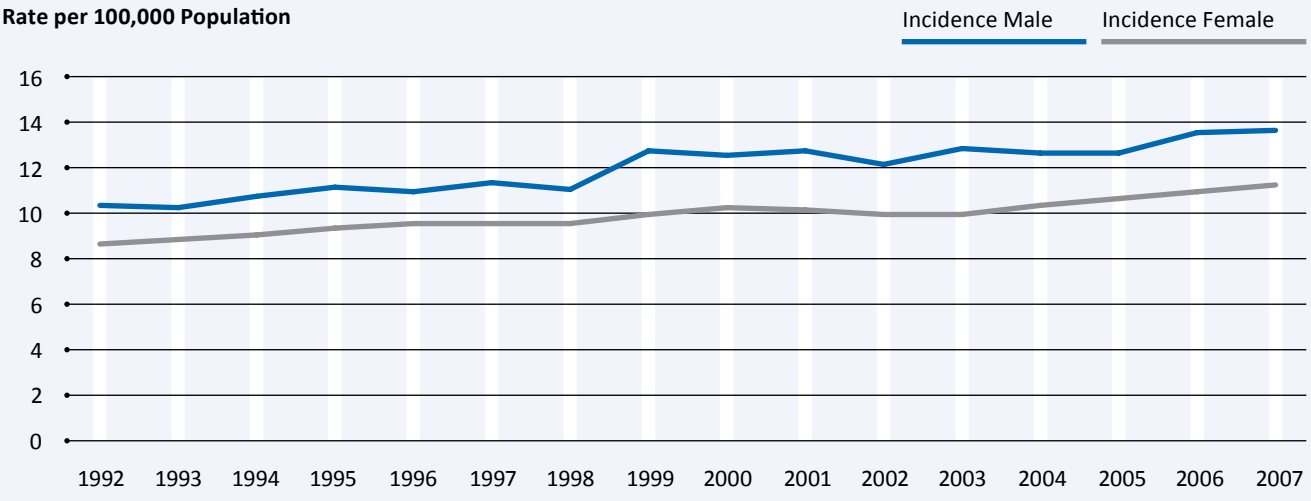
- For Canada (excluding Quebec) the RSR was 90.3% in 2005 to 2007 and ranged from 85.4% in Newfoundland and Labrador to 95.4% in Prince Edward Island (data not shown).
- The relative survival of melanoma increased from 1992 to 1994 to 2005 to 2007 in all age groups, particularly in the oldest age group (65 to 74) where the RSR increased from 81% to 87% from 1992 to 1994 to 2005 to 2007, respectively (see Technical Appendix on page 191).

Reported incidence of melanoma is much higher in the United States and Australia than in Canada.

- A global ranking of the incidence and mortality rates of melanoma, age-standardized to the world population, showed that Canada was behind Australia, New Zealand and the United States in the incidence of melanoma for both males and females. A similar pattern was seen for mortality.[232]

FIGURE 27

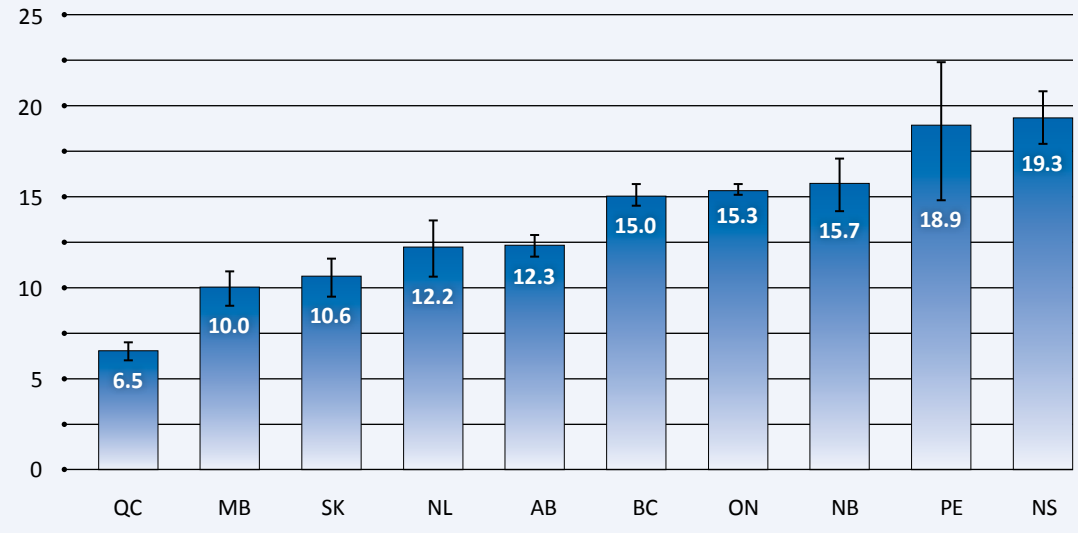
Age-standardized incidence rates – melanoma, by sex, Canada – 1992 to 2007



Data Source: Statistics Canada, Canadian Cancer Registry.

FIGURE 28

Age-standardized incidence rates – melanoma, by province – 2007 to 2009



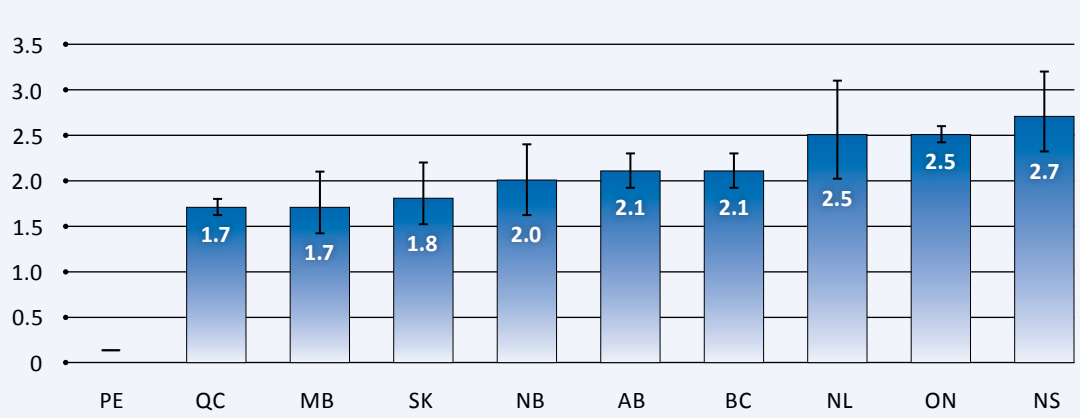
95% confidence intervals are indicated on figure.

QC data are for 2007.

Data source: Statistics Canada, Canadian Cancer Registry.

FIGURE 29

Age-standardized mortality rates – melanoma, by province – 2005 to 2009



95% confidence intervals are indicated on figure.

Data for PE are suppressed due to small cell count.

Data Source: Statistics Canada, Vital Statistics Death Database.

Head and neck cancer and oropharyngeal cancer

Why are we measuring this?

Head and neck cancer includes tumours arising in the upper aerodigestive tract including the oral cavity, oropharynx, larynx, and hypopharynx.

In 2011, head and neck cancer was the 13th most common cancer in Canada with an estimated 3,600 new cases and an estimated 1,150 deaths.[111]

Accumulating evidence suggests that human papillomavirus (HPV), the agent responsible for cervical cancer,[62] is causally associated with a subset of head and neck cancers. We have designated these as oropharyngeal cancer.

In 2007, the International Agency for Research against Cancer (IARC) acknowledged HPV, in addition to smoking and alcohol, as a risk factor for head and neck cancer,[233] particularly squamous cell tumours arising from the tonsils, base of tongue, and oropharynx (hereafter referred to as selected oropharyngeal cancers).

What do the results mean?

Between 1992 and 2007, the age-standardized incidence rate (ASIR) for head and neck cancer decreased significantly for males and stayed stable for females (Figure 30).

- Among males, the ASIR for head and neck cancer decreased from 16.8 cases per 100,000 in 1992 to 12.8 cases per 100,000 in 2007 (Annual Percent Change (APC) = -1.93%, $p < 0.01$).

- There was no significant trend in the ASIR for head and neck cancer for females.
- The sharp decline in the incidence of head and neck cancer in males but not in females may reflect past differences in tobacco use patterns, with use declining more sharply among males than among females beginning in the 1960s.[24]

From 1992 to 2007, the ASIR for selected oropharyngeal cancers increased significantly for both sexes (Figure 30).

- The ASIR for oropharyngeal cancer increased from 2.5 cases per 100,000 in 1992 to 3.9 cases per 100,000 in 2007 (APC = 2.55, p-value < 0.01) for males and from 0.71 per 100,000 in 1992 to 1.09 per 100,000 in 2007 for females (APC = 2.05, p-value < 0.01).
- The most dramatic increase in the incidence of selected oropharyngeal cancers is seen among those aged 50 to 59.[234]

Head and neck cancer overall and selected oropharyngeal cancers show contrasting incidence patterns.

- Cancer reporting systems typically group HPV-associated oropharyngeal cancer within other cancers of the head and neck region.[41, 114, 204] Their contrasting incidence patterns, however, suggest that oropharyngeal cancer be surveyed separately from other cancers of the head and neck region.[234]

The age-standardized mortality rate (ASMR) decreased significantly for both sexes for head and neck cancer (Figure 30).

- For head and neck cancer, the APC in the ASMR was -2.3% (p-value < 0.01) for males and -1.2% for females (p-value < 0.01) (data not shown).
- Mortality for the selected oropharyngeal cancers could not be calculated as cause of death in the Canadian Vitals Statistics – Death Database is classified using ICD-10 which does not specify histology which is required to classify selected oropharyngeal cancers.

Across Canada in 2005 to 2009, there were interprovincial differences in the ASIR of head and neck and selected oropharyngeal cancers (Figure 31).

- The ASIR for head and neck cancer ranged from 7.4 cases per 100,000 in Saskatchewan to 12 cases per 100,000 in Prince Edward Island.
- The ASIR for selected oropharyngeal cancers ranged from 2.1 cases per 100,000 in Saskatchewan to 3.4 cases per 100,000 in Nova Scotia.

In 2005 to 2009, there were some interprovincial differences in the ASMR of head and neck cancer overall (Figure 32).

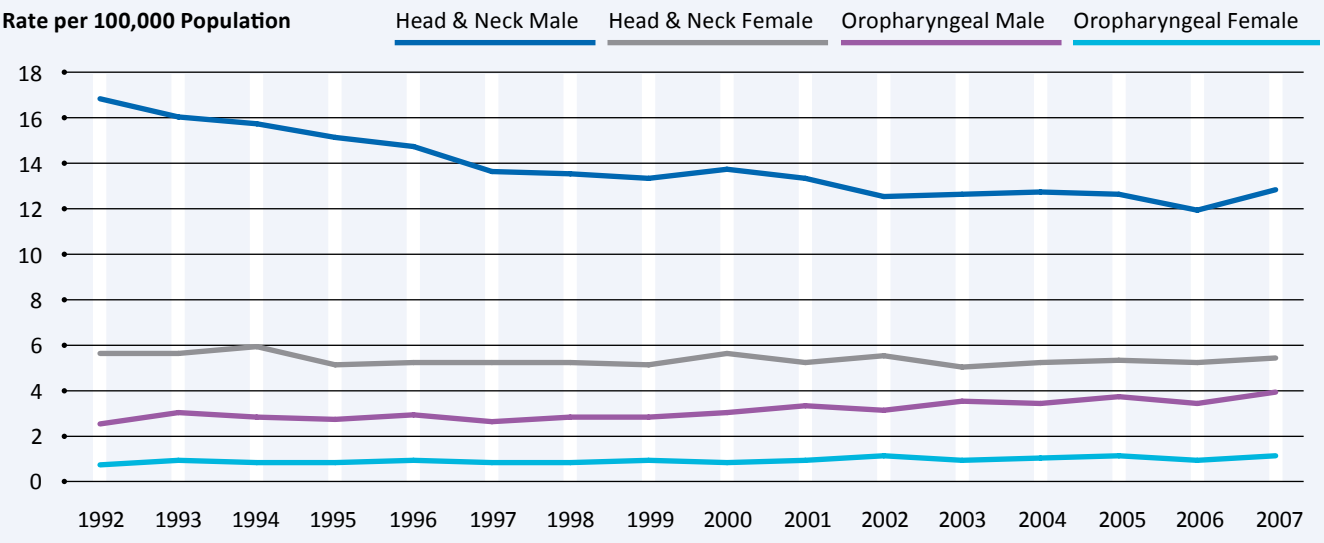
- The ASMR for head and neck cancer ranged from 2.0 cases per 100,000 people in Saskatchewan to 2.9 cases per 100,000 in Prince Edward Island.

Increases in the incidence of oropharyngeal cancer, particularly tonsillar cancer, have also been noted in other countries.

- Data from the United States, Scotland, Sweden, the United Kingdom, the Netherlands, Finland, and Australia[235-243] also show a rise in the subset of head and neck cancers linked to HPV infection.

FIGURE 30

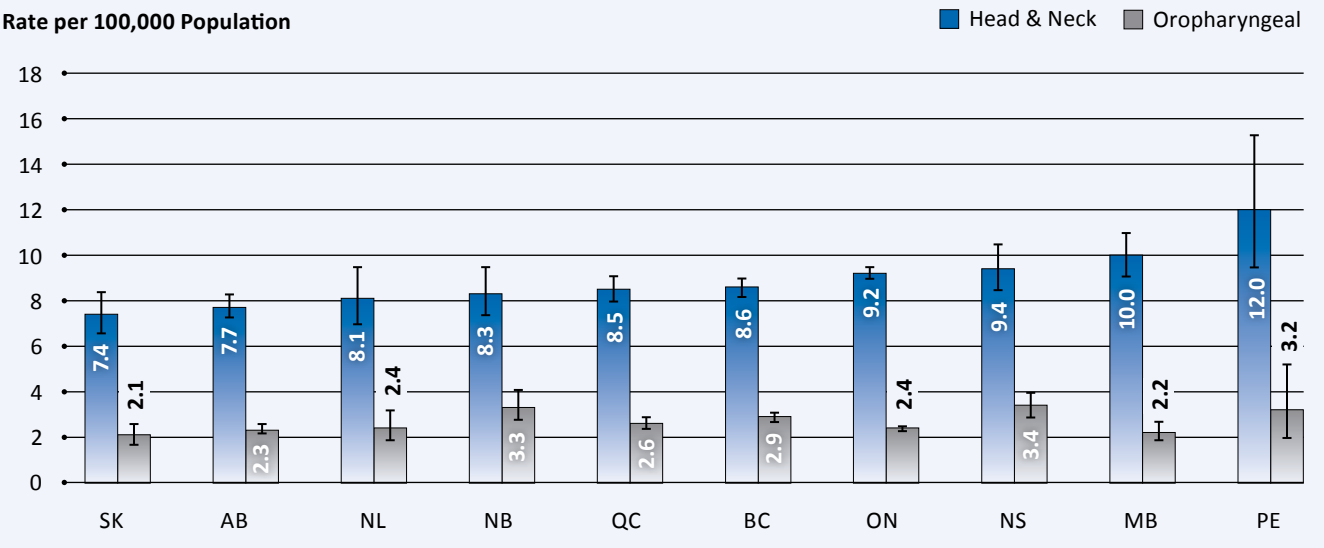
Age-standardized incidence rates – head and neck and selected oropharyngeal cancers, by sex, Canada – 1992 to 2007



Data Source: Statistics Canada, Canadian Cancer Registry.

FIGURE 31

Age-standardized incidence rates – head and neck and selected oropharyngeal cancers, by province – 2007 to 2009



95% confidence intervals are indicated on figure.

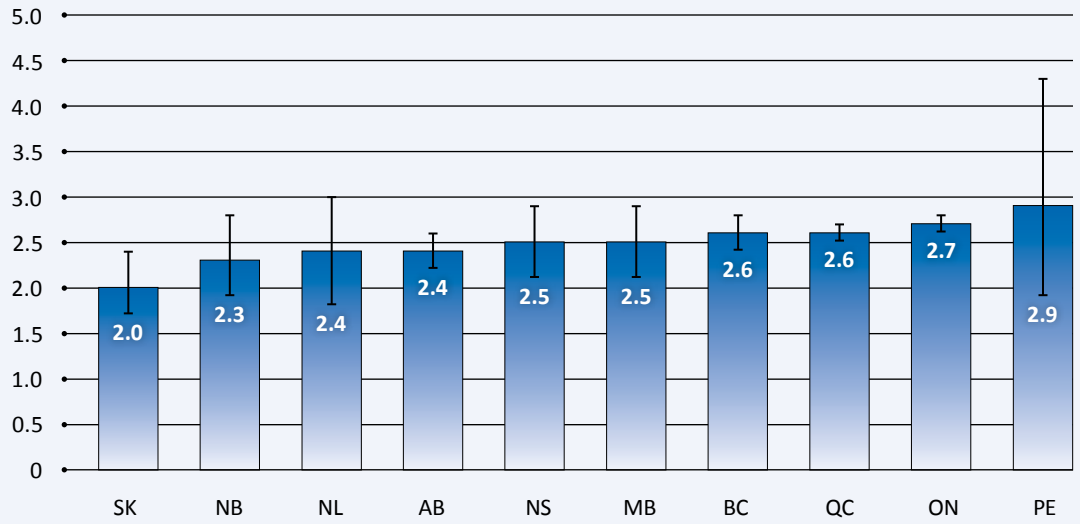
QC data are for 2007.

Data source: Statistics Canada, Canadian Cancer Registry.

FIGURE 32

Age-standardized mortality rates – head and neck cancer, by province – 2005 to 2009

Rate per 100,000 Population



95% confidence intervals are indicated on figure.

Data Source: Statistics Canada, Vital Statistics Death Database.

Moving Forward

The 2012 Canadian Cancer System Performance Report is the fourth annual compendium of indicators measuring the performance of Canadian cancer control systems. It represents another step forward in the ongoing effort that was started by the Partnership in 2008 and that aims to make available meaningful information to inform performance improvements at the system level across the country. As always, the reports and analyses were produced in close collaboration with partners at the provincial and national levels, and have been further informed by consultations with experts and knowledge leaders from across Canada.

Looking ahead, plans are in place to expand indicator development and reporting to address performance domains that are yet unmeasured, or under-measured. These will include:

Indicators that measure cancer system efficiency, which may include:

- cost-effectiveness and utility indicators (e.g., average cost per Quality Adjusted Life Year for newly approved drugs);
- over-utilization of services (e.g., over-screening, redundant or duplicate diagnostics, radical treatment in last weeks of life, etc.); and
- operational efficiency (e.g., day surgery vs. inpatient procedures, machine utilization including PETS, LINACs, etc.).

Expanded indicators of the patient experience and patient reported outcomes, which may include:

- additional measures of patient satisfaction based on data from the NRC Picker Ambulatory Oncology Patient Satisfaction Survey;
- indicators examining percentage of patients screened using symptom assessment tools and, potentially, follow up rates.

Also in 2013, a special focus report will more closely assess the impacts of *socio-economic status* (income and education level) and highlight issues related to patient residence geography (including *rural, remote, and northern communities*) and *new immigrants*. These themes will continue to be explored in subsequent studies and analyses and results will be presented in future System Performance Reports.

Another focus of efforts in 2013 and beyond will be the development of *performance targets and benchmarks* for a number of the indicators reported on. This will be done through a consensus-based process incorporating available evidence. The targets and benchmarks will help identify the direction and magnitude of potential improvements based on indicator results.

Another aspect of System Performance work is conducting *special studies* that help shed light on aspects relevant to indicator results. In 2012, a chart review study was conducted to help explain referral and treatment decisions that help shed light on treatment guideline concordance rate results. In 2013, a special study will be conducted on the use of PET scanners in the diagnosis and treatment of non-small cell lung cancer. This will help identify opportunities for more consistent and evidence-based use of this resource-intensive technology across the country.

Finally, the system performance team, working with the provincial partners, has initiated a concerted *knowledge translation and exchange (KTE)* strategy aimed at enhancing the reach and impact of system performance information across a broad range of target audiences in the Canadian cancer control systems. This includes wider publication of system performance findings in scientific and medical journals and associate conference presentations. But it also includes strategies to enhance the capacity of provincial agencies, through training, analytical tools, and other supports, to use system performance data to inform system improvements. The KTE efforts and other enhancements to the system performance work are informed by *independent evaluations* conducted on the 2010 and 2011 reports; an evaluation of this 2012 report is planned for Spring 2013.

If you would like to participate in the evaluation of this report, or wish to provide feedback or suggestions, please email us at: sp-info@partnershipagainstcancer.ca.

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Technical Appendix

Prevention

Indicator: smoking prevalence

Definition:
Percentage of population aged 12 years and older in each specified group – daily, occasional, former or never smokers

Numerator:
Number of daily, occasional, former, or never smokers, aged 12 years and older

Denominator:
Total population, aged 12 years and older

Data Source:
Canadian Community Health Survey

Measurement timeframe:
2003 (CCHS Cycle 2.1); 2011 (CCHS 2011)

CCHS variables:
- Have smoked 100 or more cigarettes during lifetime
- Ever smoked a whole cigarette
- Type of smoker at present time
- Ever smoked cigarettes daily

Stratification variables:
Province/territory, age, sex

Provinces/territories with data available:
All

Notes:
1. CCHS data are based on representative sample which is then extrapolated to the overall population.

Indicator: smoking cessation

Definition:
Percentage of recent smokers aged 20 and older that quit smoking in the previous 2 years

Numerator:
Recent quitters: former smokers who were no longer smoking at the time of the survey who have quit in the last 2 years

Denominator:
Recent quitters plus current smokers (those who are currently daily or occasional smokers), aged 20 years and older

Data source:
Canadian Community Health Survey

Measurement timeframe:
2003 (CCHS Cycle 2.1); 2011 (CCHS 2011)

CCHS variables:
- Current smoking status
- Number of years stopped smoking daily
- Number of years stopped smoking completely

Stratification variables:
Province/territory, age, sex

Provinces/territories with data available:
All

Notes:
1. CCHS data are based on representative sample which is then extrapolated to the overall population.
2. When the coefficient of variation is between 16.6% and 33.3% (denoted by E on the figure), there is a large amount of relative variation; therefore, estimate should be interpreted with caution.

Indicator: second-hand smoke exposure

Definition:
Percentage of non-smokers aged 12 years and older regularly exposed to second-hand smoke at home, in vehicles, or in public spaces

Numerator:
- Number of non-smokers aged 12 years and older who reported someone smoking inside the home every day or almost every day
- Number of non-smokers aged 12 years and older who reported being exposed to second-hand smoke in private vehicles every day or almost every day in the past month
- Number of non-smokers aged 12 years and older who reported being exposed to second-hand smoke in public places every day or almost every day in the past month

Denominator:
Non-smokers, aged 12 years and older

Data source:
Canadian Community Health Survey

Measurement timeframe:
2003 (CCHS Cycle 2.1); 2005 (CCHS Cycle 3.1); 2007 (CCHS 2007); 2008 (CCHS 2008); 2009 (CCHS 2009); 2010 (CCHS 2010); 2011 (CCHS 2011)

CCHS variables:
- Including both household members and regular visitors, does anyone smoke inside your home, every day or almost every day?
- In the past month, were you exposed to second-hand smoke every day or almost every day, in a car or other private vehicle?
- In the past month, were you exposed to second-hand smoke, every day or almost every day, in public places?

Stratification variables:
Province/territory, age

Provinces/territories with data available:
All provinces

Notes:
1. CCHS data are based on representative sample which is then extrapolated to the overall population.
2. When the coefficient of variation is between 16.6% and 33.3% (denoted by E on the figure), there is a large amount of relative variation; therefore, estimate should be interpreted with caution.

Indicator: alcohol consumption – low-risk drinking guideline

Definition:
Percentage of adults aged 18 years and older that reported exceeding the low-risk drinking guideline as defined below:

Low-risk drinking guideline: An AVERAGE of no more than 2 drinks per day for males, and an AVERAGE of no more than 1 drink per day for females. The daily average was calculated based on the total number of drinks the respondent reported consuming in the week prior to the CCHS interview, divided by 7 days

Numerator:
Number of adults (aged 18 years and older) who reported exceeding the low-risk drinking guideline

Denominator:
Total population (aged 18 years and older)

Data source:
Canadian Community Health Survey

Measurement timeframe:
2003 (CCHS Cycle 2.1); 2011 (CCHS 2011)

CCHS variables:
- During the past 12 months, have you had a drink of beer, wine, liquor or any other alcoholic beverage?
- Thinking back over the past week, did you have a drink of beer, wine, liquor or any other alcoholic beverage?
- How many drinks did you have on each day during the past week?

Stratification variables:
Province/territory

Provinces/territories with data available:
NL, QC, ON, MB, SK

Notes:
1. The word drink means: 1 bottle or can of beer or a glass of draft, 1 glass of wine or a wine cooler, or 1 drink or cocktail with 1 1/2 ounces of liquor.
2. CCHS data is based on representative sample which is then extrapolated to the overall population.
3. Low-risk drinking guideline is based on Canadian Cancer Society/World Cancer Research Fund guidelines.

Indicator: alcohol consumption – no alcohol

Definition:
Percentage of adults aged 18 years and older that reported no alcohol drinking in the past 12 months

Numerator:
Number of adults aged 18 years and older who reported drinking no alcohol in the past 12 months

Denominator:
Total population aged 18 years and older

Data source:
Canadian Community Health Survey

Measurement timeframe:
2003 (CCHS Cycle 2.1); 2011 (CCHS 2011)

CCHS variables:
During the past 12 months, have you had a drink of beer, wine, liquor or any other alcoholic beverage?

Stratification variables:
Province/territory

Provinces/territories with data available:
All

Notes:
1. The word drink means: 1 bottle or can of beer or a glass of draft, 1 glass of wine or a wine cooler, or 1 drink or cocktail with 1 1/2 ounces of liquor.
2. CCHS data are based on representative sample which is then extrapolated to the overall population.

Indicator: overweight and obesity rates – adults

Definition:
Percentage of adults aged 18 years and older at each BMI and in the BMI groups – underweight (BMI < 18.50); normal weight (BMI 18.50 – 24.99); overweight (BMI 25.00 – 29.99); obese (BMI 30.00+); obese II (BMI 35.00 – 39.99); or obese III (BMI 40.00+)

Numerator:
Number of adults aged 18 years and older at each BMI and in each BMI group – underweight, normal weight, overweight or obese

Denominator:
Total number of adults aged 18 years and older with valid height and weight responses

Data source:
Canadian Community Health Survey

Measurement timeframe:
2003 (CCHS Cycle 2.1); 2011 (CCHS 2011)

CCHS variables:
- Self-reported weight (kg)
- Self-reported height (m)
- Calculated BMI values: BMI=weight/(height)^2

Stratification variables:
Province/territory, sex

Provinces/territories with data available:
All

Notes:
1. CCHS data are based on representative sample which is then extrapolated to the overall population.
2. Excludes pregnant women, lactating women, persons less than 3 feet tall or greater than 6 feet 11 inches.

Indicator: use of artificial tanning equipment

Definition:
Percentage of Canadians who reported using artificial tanning equipment over the last year

Numerator:
Respondents who reported using artificial tanning equipment over the last year

Denominator:
Total number of survey respondents

Data source:
Second National Sun Survey (NSS2) 2006

Measurement timeframe:
August 2 to November 22, 2006

NSS2 variables:
How frequently have you used artificial methods of tanning in the past 12 months?

Stratification variables:
Sex, age

Notes:
1. The Second National Sun Survey was given to 7,121 Canadians aged 16 years or older. Among respondents, 1,437 adults also reported on sun exposure in relation to one of their children (1 to 12 years). The survey population did not include residents from the Territories, people living in institutions, those not fluent in English or French and those who did not have a phone line (land or cell). Response rate was 63%.
2. Rates are age standardized to the 2001 Canadian population.
3. Study population included all provinces and excluded the territories.
4. When the coefficient of variation is between 16.6% and 33.3% (denoted by E on the figure), there is a large amount of relative variation; therefore, estimate should be interpreted with caution.

Indicator: HPV vaccination program uptake

Definition:
The proportion of females in the targeted cohort to receive the first of 3 doses of the HPV vaccination

Numerator:
Number of females who have received the first dose of the HPV vaccination through the provincially/territorially organized program

Denominator:
Number of females in the target grade/age

group in schools where the provincial HPV vaccination program has been offered

Data Source:
Pan-Canadian Cervical Screening Initiative

Measurement timeframe:
2008/2009 school year (approximately September 1st, 2008 to August 31st, 2009)

Stratification variables:
Province/territory

Provinces/territories submitting data:
AB, BC, MB, NB, NL, NS, NT, ON, PE, QC, SK

Province specific notes:
AB: Data are for 3rd dose of HPV vaccine.
NT: Data reported are based on estimates.
ON: Data are for 3rd dose of HPV vaccine.
PE: Data reported are based on estimates.

General notes:
1. The target grade and age group varies by province/territory.
2. Provincial/territorial programs have different target populations, different implementation/roll-out plans (phase in) and different phases of implementation. As provinces continue with the implementation of the vaccine programs, it is expected that percentages will increase and interprovincial variation will decrease.

Indicator: Hepatitis B virus infection

Definition:
1. Rate of reported acute/indeterminate infections with the hepatitis B virus (HBV) in Canada
2. Rate of reported chronic/carrier infections with HBV in Canada

Numerator:
1. Reported cases of acute/indeterminate infection with HBV
2. Reported cases of chronic/carrier HBV

Denominator:
Total Canadian population

Data sources:
Canadian Notifiable Disease Surveillance System, Public Health Agency of Canada – Data as of April 2011

Public Health Agency of Canada (2011). Population data from CANSIM table 051-0001, estimates of population by age group and sex for July 1, provinces and territories, Canada, annual, Statistics Canada

Measurement timeframe:
1. For acute/indeterminate cases: 1990 to 2008
2. For chronic/carrier cases: 2004 to 2008

Notes:
1. All clinically diagnosed and laboratory-confirmed HBV infection cases are officially reported to public health authorities in all provinces and territories. Aggregate data are sent to the Public Health Agency.
2. Reporting practices vary across jurisdictions as some report only acute infections, while others report both acute and indeterminate infections.
3. Beginning in 2004, chronic infections are reported by some jurisdictions.
4. Depending on the jurisdiction, efforts to remove duplicates vary (Reference: Public Health Agency of Canada. Epi-Update: Brief Report: Hepatitis B infection in Canada. 2011. Available from: http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/06vol32/32s3/4epi-eng.php).

Indicator: Hepatitis C virus infection

Definition:
Rate of reported infections with the hepatitis C virus (HCV) in Canada

Numerator:
Reported cases of infection with HCV

Denominator:
Total Canadian population

Data sources:
Hepatitis C and STI Surveillance and Epidemiology Section, Community Acquired Infections Division, Centre for Communicable Diseases and Infection Control, Public Health Agency of Canada, 2010

Population estimates provided by Statistics Canada (Statistics Canada, Demography Division, Demographic Estimates Section, July Population Estimates, 1997 – 2005 final intercensal estimates, 2006 final postcensal estimates, 2007 – 2008 updated postcensal estimates, 2009 preliminary postcensal estimates)

Measurement timeframe:
2005 to 2009

Stratification variables:
Sex, age

Notes:
1. Does not distinguish between acute and chronic hepatitis C infections.
2. 2009 data are preliminary and changes are anticipated. Data were verified by the Public Health Agency of Canada with provinces and territories as of November, 2010.

Screening

Indicator: cervical cancer screening – participation

Definition:
Percentage of women aged 20 – 69 who had at least 1 Papanicolau (Pap) test from 2006 to 2008

Numerator:
Number of women aged 20 – 69 who had at least 1 Pap test in the last 3 years

Denominator:
Total number of women aged 20 – 69 at year two

Data Source:
Cervical Cancer Screening in Canada: Monitoring Program Performance 2006 – 2008

Measurement timeframe:
2006 to 2008

Stratification variables:
Province, age, hysterectomy correction

Provinces submitting data:
AB, MB, NL, NS, SK (non-hysterectomy corrected) and BC, ON (hysterectomy corrected)

Province specific notes:
AB provided data for the areas in which the organized program operated during these years (approximately 40% of the population).

BC excluded all non-cervical cytology tests (e.g. vaginal vault tests) and adjusted the denominator based on historical hysterectomy rates within the province.

NL provided historical data from 2005 to 2007.

ON provided participation rates corrected for hysterectomy; method used administrative data to identify women who had a prior hysterectomy and previously published hysterectomy rates to adjust participation.

Indicator: cervical cancer screening – retention

Definition:
Percentage of women aged 20 – 69 who had a Pap test within 3 years after a negative Pap test between 2004 and 2005

Numerator:
Number of women who had a Pap test within 3 years after a negative Pap test

Denominator:
Number of women aged 20 – 69 with a negative pap in a 12 month period

Data source:
Cervical Cancer Screening in Canada: Monitoring Program Performance 2006 – 2008

Measurement timeframe:
2004 and 2005

Stratification variables:
Province

Provinces submitting data:
SK, BC, ON, MB, NL, NS, AB

Province specific notes:
AB provided data for the areas in which the organized program operated during these years (approximately 40% of the population).

NL provided historical data for 2004.

ON data are for 2003 and 2006 for approximately 85% of all Pap tests performed in the province.

Indicator: program-based breast cancer screening – participation

Definition:
Percentage of women aged 50 – 69 who participated in an organized breast cancer screening program across Canada in the last 2 years based on biennial recall

Numerator:
Women aged 50 – 69 who underwent breast cancer screening through an organized program in 2009 and 2010

Denominator:
Women aged 50 – 69 in Canada

Data source:
Provincial breast cancer screening program

Measurement timeframe:
2009 and 2010

Stratification variables:
Province

Provinces/territories submitting data:
AB, QC, MB, NB, NS, BC, SK, NL, ON

Data from ON are from the CSQI

Province Specific Notes
MB: Data are for 2008 – 2010.
QC: Data are for 2009.

Notes:
1. Denominator values are slightly different from the denominators used in previously published reports, and therefore the participation rates are not identical to those published.
2. Excludes women with a prior diagnosis of breast cancer.

Indicator: self-reported breast cancer screening – asymptomatic

Definition:
Percentage of asymptomatic females aged 40 – 49, 50 – 69 receiving a mammogram within the past 2 years and percentage of asymptomatic females aged 35 and over, by single year of age receiving a mammogram within the past year, where asymptomatic is defined as: Respondents who indicated going for a mammogram for any of the following reasons:

- Family history; Routine screen/check-up; Age; HRT; and,

NOT for any of the following reasons: Lump; Breast problem; Follow-up to breast cancer treatment; Other

Numerator:
Asymptomatic females aged 40 – 49 or 50 – 69 who indicated going for a mammogram within the past 2 years

Denominator:
Total number of asymptomatic females aged 40 – 49 or 50 – 69

Data Source:
Canadian Community Health Survey

Measurement timeframe:
2008 (CCHS 2008)

CCHS Variables
- Ever had a mammogram
- Reasons for having mammogram (mark all that apply): Family history; Routine screen; Age; HRT; Lump; Follow-up to breast cancer treatment; Breast problem; Other
- Last time respondent had undergone a mammogram

Stratification variables:
Province

Provinces/territories submitting data:
All

Notes:
1. This indicator is presented for 2008 as data are not available for all provinces/territories in later survey cycles.
2. CCHS data are based on representative sample which is then extrapolated to the overall population.

Indicator: self-reported colorectal cancer screening – average-risk

Definition:
Percentage of Canadians aged 50 – 74 at average-risk for CRC reporting FOBT in the past 2 years and/or sigmoidoscopy/colonoscopy in the past 5 years by province/territory

Average-risk:
Average risk includes those aged 50 – 74 and not diagnosed with Crohn's disease, colitis, polyps or FAP, and has no immediate biological family members with CRC

Numerator:
Number of average-risk individuals aged 50 – 74 reporting having had an FOBT within the past 2 years and/or a colonoscopy/sigmoidoscopy within the past 5 years

Denominator:
Total number of average-risk individuals aged 50 – 74

Data sources:
2009 Colon Cancer Screening in Canada Survey and the 2011 Colon Cancer Screening in Canada Survey, commissioned by the Canadian Partnership Against Cancer and its National Colorectal Cancer Screening Network

Measurement timeframe:
2009 and 2011

Survey variables:
- Have you ever had an FOBT test? When was the last time?
- Have you ever had a colonoscopy or sigmoidoscopy? When was the last time?

Stratification variables:
Province/territory

Provinces/territories with data available:
All

Notes:
1. Data were weighted to ensure that the sample's regional and age/sex/education composition reflects that of the actual Canadian population according to Census data.
2. FOBT is used as an inclusive term to include both guaiac tests and fecal immunochemical tests (FIT).
3. Since the survey data do not distinguish between the time interval for colonoscopy and sigmoidoscopy, the 5-year time frame was used.
4. Those with a prior diagnosis of CRC were included in the analysis as it was unknown whether the diagnosis occurred as a result of the most recent screen. When the analysis was run excluding those with a prior diagnosis of CRC, the results were virtually unchanged.

Indicator: colorectal cancer screening – type of Test

Definition:
The type of test mentioned to check for CRC among Canadians aged 50 – 74 reporting FOBT in the past 2 years and/or sigmoidoscopy/colonoscopy in the past 5 years by province/territory

Numerator:
Number of average-risk individuals aged 50 – 74 who reported having had 1) an FOBT within the past 2 years; 2) colonoscopy/sigmoidoscopy within the past 5 years

Denominator:
Total number of average-risk individuals aged 50 – 74 who were up to date on their CRC screening. That is, they reported having had an FOBT within the past 2 years and/or a colonoscopy/sigmoidoscopy within the past 5 years

Data sources:
2011 Colon Cancer Screening in Canada Survey, commissioned by the Canadian Partnership Against Cancer and its National Colorectal Cancer Screening Network

Measurement timeframe:
2011

Survey variables:
- What tests have you had?

Stratification variables:
Province/territory

Provinces/territories with data available:
All

Notes:
1. Data were weighted to ensure that the sample's regional and age/sex/education composition reflects that of the actual Canadian population according to Census data.
2. FOBT is used as an inclusive term to include both guaiac tests and fecal immunochemical tests (FIT).
3. Since the survey data do not distinguish between the time interval for colonoscopy and sigmoidoscopy, the 5-year time frame was used for both modalities.
4. Those with a prior diagnosis of CRC were included in the analysis as it was unknown whether the diagnosis occurred as a result of the most recent screen. When the analysis was run excluding those with a prior diagnosis of CRC, the results were virtually unchanged.

Indicator: physician initiated conversation about CRC screening (patient-reported)

Definition:
Percent of Canadians aged 50 – 74 who reported that their physician initiated a conversation about CRC screening

Numerator:
Number of individuals aged 50 – 74 who reported that their physician initiated a conversation about CRC screening

Denominator:
Total number of individuals aged 50 – 74

Data source:
2011 Colon Cancer Screening in Canada Survey, commissioned by the Canadian Partnership Against Cancer and its National Colorectal Cancer Screening Network

Measurement timeframe:
2011

Survey variables
- Who brought up colorectal cancer screening, you or your doctor?

Stratification variables:
Province, territory

Provinces/territories with data available:
All

Notes:
1. Data were weighted to ensure that the sample's regional and age/sex/education composition reflects that of the actual Canadian population according to Census data.
2. FOBT is used as an inclusive term to include both guaiac tests and fecal immunochemical tests (FIT).
3. Since the survey data do not distinguish between the time interval for colonoscopy and sigmoidoscopy, the 5-year time frame was used for both modalities.
4. Those with a prior diagnosis of CRC were included in the analysis as it was unknown whether the diagnosis occurred as a result of the most recent screen. When the analysis was run excluding those with a prior diagnosis of CRC, the results were virtually unchanged.

Diagnosis

Indicator: stage availability

Definition:
Percentage of stageable incident cases for which stage data are available in provincial cancer registries

Numerator:
Number of stageable incident cases for which stage data are available in the provincial cancer registry

Denominator:
Total number of stageable incident cases

Data source:
Reported by provincial cancer agencies or equivalents to the Canadian Partnership Against Cancer

Measurement timeframe:
2007, 2008, 2009, 2010 diagnosis years

Stratification variable:
Province, cancer type:
1. All invasive cancers
2. Breast
3. Colorectal
4. Lung
5. Prostate

Provinces submitting data:
AB, BC, MB, NB, NL, NS, ON, PE, SK

Province specific notes:
NB: Data submission contains stage data only for prostate cases that underwent radical prostatectomy.

BC: Stage data for all invasive cancers are not available for 2010.

AB: Breast indicates female breast only. Excludes data for females under 18 years old.

MB: Breast indicates female breast only.

ON: Prior to diagnosis year 2010, (i.e. 2007, 2008, 2009), stage information included data from both TNM and Collaborative Staging (CS). Starting with diagnosis year 2010, TNM stage data were no longer included, stage information only included CS.

General notes:
1. The source data for this indicator were submitted by the provincial cancer agencies based on definitions provided by the Canadian Partnership Against Cancer for the distribution of cases by stage.
2. Invasive incident cases that are stageable as per AJCC Cancer Staging Manual 7th Edition are included in denominator. Data submission for some provinces includes incident cases that are stageable as per AJCC Cancer Staging Manual 6th edition (AJCC 7th edition did not come into effect until January 1, 2010). Cases with unknown stage are included in the numerator. Incident cases that can be staged but were not because coding was incomplete or data not available are included in the denominator (i.e. Not available).
3. Indicator is based on data reported directly by the provinces for this Report. No separate validation or verification of the submitted data was done.
4. Staging can be based on AJCC TNM staging reported directly by clinicians and/or based on the Collaborative Staging methodology. Data from other staging systems or standards were not included as valid stage data in the indicator.
5. The Canadian Partnership Against Cancer has recently launched an initiative to support the implementation of Collaborative Staging across the country. Upon the conclusion of this initiative, complete staging is expected to be available from the participating provinces for the top four disease sites: breast, prostate, lung and colorectal.
6. All cancer sites (except breast) included stage 0 cases.

Indicator: stage unknown

Definition:
Percentage of stageable incident cases for which stage is recorded as "unknown" in the provincial cancer registry

Numerator:
Number of stageable incident cases for which stage is recorded as "unknown" in the provincial cancer registry

Denominator:
Total number of stageable incident cases

Data source:
Reported by provincial cancer agencies or equivalents to the Canadian Partnership Against Cancer

Measurement timeframe:
2010 diagnosis year

Stratification variable:
Province, cancer type:
1. All invasive cancers
2. Breast
3. Colorectal
4. Lung
5. Prostate

Provinces submitting data:
AB, BC, MB, NB, NL, NS, ON, PE, SK

Province specific notes:
NB: Data submission contains stage data only for prostate cases that underwent radical prostatectomy.

BC: Percentage of incident cases for which stage data is unknown was not available for cancer types other than the top 4 cancers for 2010 diagnosis year.

AB: Breast indicates female breast only. Excludes data for females under 18 years old.

General notes:
1. The source data for this indicator were submitted by the provincial cancer agencies based on definitions provided by the Canadian Partnership Against Cancer for the distribution of cases by stage.
2. Invasive incident cases that are stageable as per AJCC Cancer Staging Manual 7th Edition are included in denominator. Data submission for some provinces includes incident cases that are stageable as per AJCC Cancer Staging Manual 6th edition (AJCC 7th edition did not come into effect until January 1, 2010). Cases with unknown stage are included in the numerator. Incident cases that can be staged but were not because coding was incomplete or data not available are included in the denominator (i.e. Not available).
3. Indicator is based on data reported directly by the provinces for this Report. No separate validation or verification of the submitted data was done.
4. Staging can be based on AJCC TNM staging reported directly by clinicians and/or based on the Collaborative Staging methodology. Data from other staging systems or standards were not included as valid stage data in the indicator.
5. The Canadian Partnership Against Cancer has recently launched an initiative to support the implementation of Collaborative Staging across the country. Upon the conclusion of this

initiative, complete staging is expected to be available from the participating provinces for the top four disease sites: breast, prostate, lung and colorectal.

6. All cancer sites included stage 0 cases (except breast).

Indicator: wait times, abnormal breast screen to resolution

Definition:
1. The median and 90th percentile elapsed time (in weeks) from abnormal breast screen to resolution (test date of definitive diagnosis)
2. The percentage of women for which the above wait time was within target timeframes

Population:
Women aged 50 – 69 participating in the organized breast screening program with an abnormal breast screen result (mammogram or clinical breast examination):
1. Requiring a tissue biopsy
2. Not requiring a tissue biopsy

Measures:
1a. Median wait time (weeks)
1b. 90th percentile wait time (weeks)
2. Percentage with resolution within the target wait time – targets are 7 weeks for women requiring a tissue biopsy and 5 weeks for women not requiring a tissue biopsy

Data source:
Provincial breast cancer screening programs

Measurement timeframe:
2010

Data reported:
AB, BC, MB, NB, NL, NS, SK, ON

Province specific notes:
AB: Data reported are from the Screen Test program only. Screen Test is an organized program that conducts approximately 10 – 12% of screening mammograms in the province, about 65% of which are performed in mobile screening units.

ON: Median and percentile not available.

General notes:
1. Indicator excludes tests beyond 6 months post screen.
2. Time to diagnosis is based on the date of the first pathological biopsy result of breast cancer (excludes fine needle aspiration and all inconclusive procedures) or the date of the last benign test or pathological biopsy.
3. Definitive diagnosis of cancer is the first core or open surgical biopsy that confirms cancer. In rare occasions fine needle aspiration (FNA) biopsy may also be used as a definitive diagnosis of cancer. Definitive diagnosis of benign cases is the last benign test up to 6 months following an abnormal screen.
4. Tissue biopsy includes open and core needle biopsy.
5. The wait times presented must be evaluated in the context of the overall participation in organized breast cancer screening programs.

Indicator: wait times, abnormal fecal test to colonoscopy

Definition:
Time (in days) between an abnormal colorectal cancer screening fecal test result and a follow-up screening colonoscopy procedure

Population:
Individuals with an abnormal fecal test (for CRC screening) who went on to receive a colonoscopy within 180 days of the fecal test result

Measures:
1. Median
2. 90th percentile
3. Number of individuals having a follow-up colonoscopy within 180 days

Data Source:
Reported by the provincial colorectal screening programs through the National Colorectal Cancer Screening Network

Measurement Timeframe:
Tests conducted between January 2009 and December 2010 (2-year period)

Data Reported:
The four participating provinces are anonymized for this indicator because at the time of release of this report, these results had not yet been published by colorectal cancer screening network

General Notes:
1. Five provinces provided data but one had too few cases for the results to be meaningful and was therefore excluded.
2. This indicator does not include patients who receive a colonoscopy more than 6 months following an abnormal fecal test.
3. The colonoscopy may have been performed inside or outside the Program but only includes individuals whose abnormal fecal test was performed in the screening Program.

Treatment

Indicator: radiation therapy wait times

Definition:
1. The median and 90th percentile elapsed time from ready to treat to start of radiation therapy, measured in days
2. The percentage of radiation therapy cases for which the above wait time was within target timeframes

Included population:
All cancer patients receiving radiation therapy who have wait time data collected as consistent with the specifications of this indicator

Measures:
1a. Median wait time (days)
1b. 90th percentile wait time (days)
2. Percentage of patients starting treatment within target timeframe (4 weeks after being ready to treat)

Data source:
Reported by provincial cancer agencies or equivalent to the Canadian Partnership Against Cancer

Measurement timeframe:
2008, 2009, 2010 and 2011 treatment years

Stratification variables:
Province, by disease site (prostate, lung, colorectal, breast)

Provinces submitting data:
AB, BC, MB, NB, NL, NS, ON, QC, PE, SK

Province specific notes:
AB: Province began reporting data for 2009.

QC: Median and 90th percentile data were not available.

NB: Median and 90th percentile data were not available.

New Brunswick Cancer Network reports wait times for radiation therapy for the following areas: brain and CNS, breast, gastro-intestinal, genitourinary, gynecology, head & neck, leukemia, lung, lymphoma, malignant melanoma, sarcoma, skin, benign cancer.

NS: Did not collect the ready to treat date prior to 2010. The wait times reported for 2008 and 2009 are based on a proxy developed by the province.

General notes:
1. All behavior codes are included.
2. Cases with treatment done in 2011 are included.
3. The source data for this indicator were submitted by the provincial cancer agencies based on definitions provided by the Canadian Partnership Against Cancer.
4. Of note for breast cancer data, if the province obtains this data from a wait times database as opposed to a registry, then breast cancer cases were to be included per the database definition.
5. There are known discrepancies in the ways in which different provinces measure wait times. One of the key sources of variation is the way the "Ready to Treat" timeframe is defined. Efforts are underway to standardize these definitions.

The following section outlines the definitions used by the different provinces.

Definition of ready to treat for the radiation wait time indicator.

AB: The date when the patient is physically ready to commence treatment.

BC: The date at which both oncologist and patient agree that treatment can commence. Being ready to treat requires that all diagnostic tests and procedures required to assess the appropriateness of, indications for, and fitness to undergo radiation therapy are complete.

MB: The date when a decision has been made by the radiation oncologist and is agreed to by the patient that radiation therapy is appropriate and should commence AND the patient is medically ready to start treatment AND the patient is willing to start treatment.

NB: The date when any planned delay is over and the patient is ready to begin treatment from both a social/personal and medical perspective.

NL: The date when all pre-treatment investigations and any planned delay are over, and the patient is ready to begin the treatment process from both a social/personal and medical perspective.

NS: The date when all pre-treatment investigations and any planned delay are over, and the patient is ready to begin the treatment process from both a social/personal and medical perspective. Nova Scotia did not have a ready to treat date until February 2010; a proxy date was used prior to this time.

ON: The time from when the specialist is confident that the patient is ready to begin treatment to the time the patient receives treatment.

PE: The date when all pre-treatment investigations and any planned delay are over, and the patient is ready to begin the treatment process from both a social/personal and medical perspective.

QC: At consultation, the radiation oncologist enters the date at which the patient will be ready to treat on a formulary requesting treatment.

SK: The date when the patient is ready to receive treatment, taking into account clinical factors and patient preference. In the case of radiation therapy, any preparatory activities (e.g., simulation, treatment planning, dental work) do not delay the ready to treat date.

Indicator: LINAC capacity

Definition:
Per capita linear accelerator availability

Numerator:
Number of operational linear accelerators (available for radiation therapy) in province

Denominator:
Total provincial population

Data source:
Reported by provincial cancer agencies or equivalent to the Canadian Partnership Against Cancer

Population from CANSIM table 051-0001 – Estimates of population, by age group and sex for July 1, Canada, provinces and territories, annual (persons) accessed from www.statcan.gc.ca

Measurement timeframe:
2009, 2010 and 2011 calendar years

Stratification variables:
Province

Provinces submitting data:
AB, BC, MB, NB, NL, NS, ON, PE, QC, SK

Province specific notes:
MB 2009 and 2010 data are for fiscal year 2010/2011.

General notes:
1. LINACS were pro-rated for partial availability.

Indicator: radiation therapy utilization

Definition:
Percentage of cancer cases receiving radiation therapy within 2 years of diagnosis

Numerator:
Total number of cancer incident cases diagnosed during the year who have received radiation therapy within two years of diagnosis

Denominator:
Total number of cancer incident cases diagnosed during the year

Denominator exclusions:
- In situ cases
- Non-melanoma skin cancer

Data source:
Reported by provincial cancer agencies or equivalent to the Canadian Partnership Against Cancer

Measurement timeframe:
2007, 2008 and 2009 diagnosis years

Stratification variables:
Province

Provinces submitting data:
AB, BC, MB, NL, NS, ON, PE, SK

Province specific notes:
AB: Cannot confirm site of RT treatment (used all initial or post-initial RT treatments within timeframe).

NS: DCO cases removed for the denominator. For 2007 and 2008, cases from Cumberland Health Authority were excluded because they may be receiving treatment in New

Brunswick, and Nova Scotia does not have out-of-province treatment data. For 2009, cases from Cumberland Health Authority are included even though it is likely that many of these cases receive their treatment out of province and that information is not captured in the numerator.

MB: Treatment not limited to primary site.

General notes:
1. Treatments associated with brachytherapy treatment are included.
2. The "incident case" is at the patient/primary disease level as per Canadian Cancer Registry. The same person with 2 separate primaries would be treated as 2 incident cases (within applicable CCR/NAACCR rules; Reference: Thornton M (Editor). Standards for Cancer Registries Volume II Data Standards and Data Dictionary, 17th Edition. Springfield: North American Association of Central Cancer Registries; 2012 [accessed on 2012 October 25]. Available at: http://www.naaccr.org/Applications/ContentReader/Default.aspx?c=3).
3. Cases for patients under 18 years of age were excluded.

Indicator: pre-operative radiation for stage II and III rectal cancer

Definition:
Percentage of resected stage II and III rectal cancer cases receiving pre-operative (neoadjuvant) radiation therapy

Numerator:
Stage II and III rectal cancer cases diagnosed during the year receiving pre-operative radiation therapy up to 120 days before resection

Denominator:
Stage II and III rectal cancer cases diagnosed in the province during the year and having a rectal resection within one year of diagnosis

Data source:
Reported by provincial cancer agencies or equivalent to the Canadian Partnership Against Cancer

Measurement timeframe:
2007, 2008 and 2009 diagnosis year

Stratification variables:
Province, age, sex

Provinces submitting data:
AB, MB, NL, NS, ON, PE, SK

Province specific notes:
AB: Resections not necessarily limited to the specified types (complete rectum).

MB: Radiation therapy was not limited to primary tumour site.

ON: Radiation therapy was not limited to primary tumour site.

NS: For 2007 and 2008, cases from Cumberland Health Authority were excluded as they may be receiving cancer care in New Brunswick, and Nova Scotia does not have out-of-province treatment data. For 2009, cases from Cumberland Health Authority were included.

- In the event of synchronous primaries, analysis restricted to a single disease.

NL: Treatment intent filter was used to identify neoadjuvant therapy.

PE: Treatment intent filter was used to identify neoadjuvant therapy.

General notes:
1. Rectal cases defined as ICDO3 codes: C19.9 or C20.9, AJCC Group Stage at Diagnosis = II or III. Exclude lymphoma codes: (M-95 to M-98).
2. Rectal resections defined as CCI codes 1NQ59 or 1NQ87 or 1NQ89.
3. Resected cases included regardless of margin status (due to data limitations).
4. Last resection date (if multiple) – diagnosis date <=365 days.
5. Cases for patients under 18 years of age were excluded.

Indicator: adjuvant radiation therapy for stage I and II breast cancer

Definition:
Percentage of stage I and II breast cancer cases receiving adjuvant radiation therapy following breast conserving surgery

Numerator:
Stage I and II breast cancer cases diagnosed in the province during the year and starting radiation therapy within 270 days following breast conserving surgery

Denominator:
Stage I and II breast cancer cases diagnosed in the province during the year and receiving breast conserving surgery within one year of diagnosis

Exclusions:
Cases receiving a mastectomy

Data source:
Reported by provincial cancer agencies or equivalent to the Canadian Partnership Against Cancer

Measurement timeframe:
2007, 2008 and 2009 diagnosis years

Stratification variables:
Province, age

Provinces submitting data:
AB, MB, ON, NL, PE, SK

Province specific notes:
AB: Segmental resections were included as lumpectomy.

ON: Radiation therapy was not limited to primary tumour site.

NL: Treatment intent filter applied.

PE: Treatment intent filter applied.

SK: Date of surgery is not available for cases diagnosed in 2009.

General notes:
1. Breast cases identified as ICDO3 codes: C50.0 to C50.9, AJCC Group Stage at Diagnosis = I or II. Exclude lymphoma codes: (M-95 to M-98).
2. Breast-conserving surgery cases are identified using CCI codes 1YM87 or 1YM88.
3. Cases with a subsequent mastectomy within one year of lumpectomy are excluded, using CCI codes 1YM89 to 1YM92 in the specified time period.
4. Resected cases included regardless of margin status (due to data limitations).
5. Timeframe: Last resection date (if multiple) <= 365 days from diagnosis date.
6. Cases for patients under 18 years of age were excluded.

Indicator: adjuvant chemotherapy for stage III colon cancer

Definition:
Percentage of stage III colon cancer cases receiving chemotherapy following surgical resection

Numerator:
Stage III colon cancer cases diagnosed during the year starting adjuvant chemotherapy within 120 days of surgery

Denominator:
Stage III colon cancer cases diagnosed in the province during the year and having a colon resection within one year of diagnosis

Data source:
Reported by provincial cancer agencies or equivalent to the Canadian Partnership Against Cancer

Measurement timeframe:
2007, 2008 and 2009 diagnosis years

Stratification variables:
Province, age, sex

Provinces submitting data:
AB, MB, NL, PE, SK

Province-specific notes:
MB: Oral drugs given at CancerCare Manitoba are included; however patients who receive oral chemotherapy through prescription (i.e. completed at community pharmacies) may be missed in the reported data.

NL: Treatment intent filter was used to identify adjuvant therapy.

PE: Treatment intent filter was used to identify adjuvant therapy.

AB: Did not limit data to complete resections (colectomy).

ON: Chemotherapy data excluded most oral chemotherapy since those data are not reliably reported to Cancer Care Ontario.

General notes:
1. No filter for treatment intent was used, unless otherwise specified by province.
2. Colon cases defined as ICDO3 codes: C18.0 to C18.9, AJCC Group Stage at Diagnosis = III. Exclude lymphoma codes: (M-95 to M-98).
3. Colon resections defined as CCI codes: 1NM87 or 1NM89 or 1NM91.
4. Resected cases included regardless of margin status (due to data limitations).
5. Last resection date (if multiple) – diagnosis date <=365 days.
6. Cases for patients under 18 years of age were excluded.

Indicator: adjuvant chemotherapy for stage II and IIIA non-small cell lung cancer

Definition:
Percentage of stage II and IIIA non-small cell lung cancer cases receiving chemotherapy following surgical resection

Numerator:
Stage II and IIIA non-small cell lung cancer cases diagnosed during the year starting adjuvant chemotherapy within 120 days of surgery

Denominator:
Stage II and IIIA non-small cell lung cancer cases diagnosed in the province during the year and having a lung resection within one year of diagnosis

Data source:
Reported by provincial cancer agencies or equivalent to the Canadian Partnership Against Cancer

Measurement timeframe:
2007, 2008 and 2009 diagnosis years

Stratification variables:
Province, age, sex

Provinces submitting data:
AB, MB, ON, SK, PE

Province specific notes:
AB: Resections not necessarily limited to the specified types (lobectomy, pneumonectomy or segmentectomy).

PE: Treatment intent filter was used to identify adjuvant therapy.

ON: Chemotherapy data excluded most oral chemotherapy since those data are not reliably reported to Cancer Care Ontario.

MB: Oral drugs given at CancerCare Manitoba are included; however patients who receive oral chemotherapy through prescription (i.e. completed at community pharmacies) may be missed in the reported data.

General notes:
1. Non-small cell lung cases defined as ICDO3 codes: C34.0 to C34.9. Exclude histology codes: 8002, 8041, 8043, 8044, 8045, 8073, 8803. Exclude lymphoma codes: (M-95 to M-98).
2. AJCC Group Stage at Diagnosis = II or IIIA.
3. Resections defined as CCI codes: 1GR87, 1GR89, 1GR91, 1GT59, 1GT87, 1GT89 or 1GT91.
4. All resected cases are included regardless of margin status (due to data limitations).
5. Cases included where last resection date (if multiple) is <=365 days from diagnosis date.
6. No filter for treatment intent was used, unless otherwise specified by province.
7. Cases for patients under 18 years of age were excluded.

Indicator: mastectomy/breast conserving surgery

Definition:
The percentage of surgical resections among women with unilateral invasive breast cancer that are mastectomies

Numerator:
Women in the denominator who received a mastectomy first as well as women who received breast conserving surgery (BCS) first followed by a mastectomy within one year

Denominator:
Women with unilateral invasive breast cancer who received breast conserving surgery and/or a mastectomy between April 2007 and March 2010

Data sources:
Hospital Morbidity Database, Canadian Institute for Health Information (CIHI); National Ambulatory Care Reporting System, CIHI; Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec; Alberta Ambulatory Care Reporting System, Alberta Health and Wellness

Measurement timeframe:
The analysis incorporated FY 2006 – 2007 to 2010 – 2011

Data relate to patients who received their index procedure between 2007 – 2008 and 2009 – 2010

Stratification variables:
Province, age (18 – 39, 40 – 49, 50 – 59, 60 – 69, 70 – 79, 80+), neighbourhood income quintile, one-way travel time from place of residence to closest cancer centre (in minutes)

General notes:
1. The following surgical and diagnostic codes, as documented in hospital patient records and reported to CIHI, were used to identify diagnoses and procedures per the following:

a. In order to identify a breast cancer diagnosis, the following ICD-10-CA codes were used: C50.00, C50.01, C50.09, C50.10, C50.11, C50.19, C50.20, C50.21, C50.29, C50.30, C50.31, C50.39, C50.40, C50.41,

C50.49, C50.50, C50.51, C50.59, C50.60, C50.61, C50.69, C50.80, C50.81, C50.89, C50.90, C50.91, C50.99. Women with unilateral invasive breast cancer were the focus of this analysis (comprising 98% of women with invasive breast cancer).

b. In order to identify a mastectomy, the following surgical codes were used according to CCI: 1.YM.89 to 1.YM.92.

c. The following CCI codes were used to identify a breast conserving surgery: 1.YM.87, 1.YM.88.

2. The index surgical interventions and the subsequent treatment episodes were constructed using the following steps:

a. Select all inpatient and day surgery records from 2006 – 2007 to 2010 – 2011 meeting the inclusion/exclusion criteria for surgical treatment of breast cancer.

b. Link records to identify all inpatient and day surgery records associated with individual patients.

c. Identify patient's index surgery. Sort records by: procedure, location of care (inpatient, day surgery), admission date, discharge date.

i. When multiple procedures are coded in the same record, mastectomy was prioritized over BCS.

ii. When multiple procedures of the same type occurred on the same day in different locations of care, inpatient records were prioritized over day surgery records.

d. Remove patients who do not meet the criteria for first treatment:

i. Exclude patients with a discharge in fiscal year 2006 – 2007.

ii. Exclude patients whose first discharge indicates a past history of breast cancer.

e. Select all index records from the treatment episodes.

i. The index record contains each patient's first surgical intervention for breast cancer.

f. Extract all records linked to index patient that include admission dates on or after the date of the index surgery.

g. Exclude records with discharge dates greater than 365 days after the discharge date for the index surgery.

Indicator: removal of 12 or more lymph nodes for colon cancer resections

Definition:
The number of colon cancer resections for which 12 or more lymph nodes were removed and examined

Numerator:
Colon cancer cases diagnosed during the year and resected within 1 year of diagnosis for which 12 or more lymph nodes were removed and examined

Denominator:
All colon cancer cases diagnosed in the province during the year and resected within 12 months of diagnosis

Exclusions:
Cases with unknown number of nodes removed and examined were excluded from both numerator and denominator.

Data source:
Reported by provincial cancer agencies or equivalent to the Canadian Partnership Against Cancer, typically from collaborative staging data

Measurement timeframe:
2007, 2008 and 2009 diagnosis years

Stratification variables:
Province, age, sex

Provinces submitting data:
AB, MB, NB, NS, NL, ON, PE, SK

Province specific notes:
AB: Did not limit data to complete resections (colectomy).

NL: Did not limit data to complete resections (colectomy).

ON: Data are generated by the CSQI methodology. Data are for 2010 – 2011.

PE: Resections identified through CS Extension Evaluation code (=3) which was used to meet AJCC pathological criteria for staging.

General notes:
1. Colon cases defined as ICDO3 codes: C18.0 to C18.9. Exclude lymphoma codes: (M-95 to M-98).

2. Colon resections identified as CCI codes: 1NM87 or 1NM89 or 1NM91.

3. Resected cases included regardless of margin status (due to data limitations).

4. Last resection date (if multiple) – diagnosis date <=365 days.

5. Cases for patients under 18 years of age were excluded.

Patient experience and end-of-life care

Indicator: screening for distress

Definition:
Extent to which provincial cancer agencies undertake centralized data collection of screening for distress results. Examples of such tools include the Edmonton Symptom Assessment System (ESAS), the Canadian Problem Checklist (CPC) and the Psychosocial Screen for Cancer (PSSCAN)

Information requested:
- Identify if any cancer centres in the province implemented standardized screening for distress tools at time of data request (February 2012)
- Identify total number of unique patients assessed using such tools
- Identify total number of assessments completed
- Description of the role of the provincial cancer agency in managing the implementation of standardized symptom assessment and screening for distress tools
- Information on the number of centres in each province using standardized tool(s). This will include only instances where the tool has been implemented centrally, on behalf of the provincial cancer agency
- Who gets screened?
- What percentage of patients is screened?
- How often are they screened?

Information sources:
Reported by provincial cancer agencies or equivalent to the Canadian Partnership Against Cancer for this Report, as well as from the Canadian Partnership Against Cancer's Person-Centred Perspective Group

Information availability:
Information was collected on a free-form basis based on the general questions posed above. Provinces were free to select a timeframe of their choosing

Provinces submitting data:
BC, AB, SK, MB, ON, QC, NB, NS, PE, NL

Most provinces provided descriptive information but did not provide numerical data

Indicator: patient reported outcomes – overall satisfaction with care

Definition:
NRC Picker AOPSS Survey (self-reported data) – provincial % positive score (% of valid respondents that replied "good," "very good" or "excellent"), summary indicator for the dimensions surveyed:
1. Physical Comfort
2. Respect for Patient Preferences
3. Access to Care
4. Coordination and Continuity of Care
5. Information, Communication & Education
6. Emotional Support

Data source:
Reported by provincial cancer agencies or equivalent to the Canadian Partnership Against Cancer

Measurement timeframe:
Most recent year available
AB 2008
BC 2006
MB 2008
NS 2009
ON 2011
PE 2009
SK 2011

Notes:
1. Depending on the survey used, a summary indicator may be available for the Surgery-Specific Dimension; however the majority of provinces did not have results for this dimension, so it was excluded from this Report.

Indicator: patient reported outcomes – physical comfort

Definition:
NRC Picker AOPSS Survey (self-reported data) – provincial % positive score (% of valid respondents that replied "good", "very good" or "excellent") for the 5 dimensions of physical comfort:

1. Do you think the staff did everything they could to control your pain or discomfort?
2. Did someone tell you how to manage any side effects of radiation therapy?
3. Did someone tell you how to manage any side effects of chemotherapy?
4. Do you think the staff did everything they could to help you with your chemotherapy side effects?
5. Do you think the staff did everything they could to help you with your radiation therapy side effects?

Data source:
Reported by provincial cancer agencies or equivalent to the Canadian Partnership Against Cancer

Measurement timeframe:
Most recent year available
AB 2008
BC 2006
MB 2008
NS 2009
ON 2011
PE 2009
SK 2011

Indicator: patient reported outcomes – emotional support

Definition:
NRC Picker AOPSS Survey (self-reported data) – provincial % positive score (% of valid respondents that replied "good", "very good" or "excellent") for the 9 dimensions of emotional support:

1. Did you feel you could trust your care providers with confidential information?
2. Did a care provider go out of his or her way to help you or make you feel better?
3. Did you get enough information about possible changes in your sexual activity?
4. Did you get as much help as you wanted in figuring out how to pay for any extra costs for your cancer care?
5. Did you get enough information about possible changes in your emotions?
6. Did you get enough information about possible changes in your relationship with your spouse or partner?
7. When you were first told of your illness, were you referred to a provider who could help you with anxieties and fears?
8. Were you told of your diagnosis in a sensitive manner?
9. In the past 6 months, has someone at Alpha Hospital put you in touch with other care providers who could help you with anxieties and fears?

Data source:
Reported by provincial cancer agencies or equivalent to the Canadian Partnership Against Cancer

Measurement timeframe:
Most recent year available
AB 2008
BC 2006
MB 2008
NS 2009
ON 2011
PE 2009
SK 2011

Indicator: place of death

Definition:
Percentage of deaths of cancer patients by location: hospital, other health care facility, private home, or other location

Numerator:
1. By province: Number of cancer deaths in: hospital; other
2. Canada: Number of cancer deaths in hospital; private home; other

Denominator:
Number of cancer deaths

Data source:
Canadian Vital Statistics – Death Database (annual file)

Measurement timeframe:
2005 to 2009

Stratification variables:
Province

Notes:
1. All deaths in British Columbia in 2005 and 2006 were recorded as unknown location.
2. In the figure, Cancer patient place of death, by province – 2009, unknown location was excluded. "Other" included other specified locality, other health care facility and private home.
3. In the figure, Cancer patient place of death, Canada – 2005 to 2009, "Other" included other specified locality, other health care facility and unknown locality.
4. Includes data from all provinces and territories.

Research

Indicator: adult clinical trial participation ratio

Definition:
The ratio of the total number of all patients (≥19 years) newly enrolled in cancer-related therapeutic trials or clinical research studies in 2011 to the total number of cancer cases (≥19 years) newly registered to provincial cancer centres in 2011

Numerator:
Number of cancer patients (≥19 years), whether incident or previously diagnosed, newly enrolled in therapeutic clinical trials at provincial cancer centres during the year

Denominator:
Number of cancer centre patients, whether incident or recurrent, newly registered to provincial cancer centres for the first time during the year

Data source:
Reported by provincial cancer agencies or equivalent to the Canadian Partnership Against Cancer

Measurement timeframe:
2009, 2010 and 2011 calendar year

Stratification variables:
Province, cancer type:
1. All invasive cancers
2. Breast
3. Colorectal
4. Lung
5. Prostate

Provinces submitting data:
All invasive cancers:
2010 and 2011: AB, BC, MB, NB, NS, PE, SK
2009: AB, BC , MB, NB, NS, ON, PE, SK

By cancer type:
2011: AB, BC, MB, NB, NS, SK
2009 and 2010: AB, NS, SK

Province specific notes:
AB:
- For 2011 data: A new centralized reporting methodology was used for 2011 reported volumes. This is different than the site reporting used in 2010.
- For 2010 data: Disease site groupings for 2009 may vary for 2010 due to use of tumour groups (i.e., GI, GU, etc.), whereas for 2010, data use the same AJCC groupings.
- For 2009 data: Data are from the 2 tertiary centres only. Clinical trial accrual does not generally occur at the associate cancer centres in the province.
- Breast includes both males and females for both numerator and denominator.

MB:
- Several patients were entered into more than 1 clinical trial. These patients were counted for each trial they participated in.
- In situ trials were excluded, with the exception of 1 trial that accrued a large number of patients with both in situ and invasive tumours.

NS:
- Data are from Nova Scotia Cancer Centre only.

PE:
- Data by cancer disease site for the denominator are not available.

SK:
- All invasive includes patients from the following disease sites: breast, colorectal, lung, prostate, brain, melanoma, renal cell, hematologic, and head & neck cancers.
- Includes symptom control trials.

General notes:
See table on the next page for indicator inclusion and exclusion by province.

TABLE 1

Provincial indicator inclusions and exclusions for adult clinical trial participation ratio

	AB	BC	MB	NB	NL	NS	PE	SK
Numerator: Cancer cases (≥19 years), whether incident or previously diagnosed, newly enrolled in therapeutic clinical trials at provincial cancer centres in 2010								
Cases for non-therapeutic trials are EXCLUDED from the numerator	Yes (with caveat that some IGAR studies appeared interventional)	Yes	Yes	Yes	Yes	No	Yes	Yes
Cases registered for longer-term follow-up are EXCLUDED from the numerator	No	Yes	Yes	Yes	Yes	No	Yes	Yes
Questionnaire/ interview studies without intervention are EXCLUDED	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Cases identified but did not commence intervention in 2010 are EXCLUDED	Yes (Patients who had consented but not randomized would be excluded)	Yes	Yes	Yes	Yes	No	Yes	Yes
Persons who did NOT have a cancer diagnosis are EXCLUDED from the numerator	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Persons with borderline tumours are EXCLUDED from the numerator	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Persons with *in situ* cancer are EXCLUDED from the numerator	Yes	Yes	Yes (except for enrolment to a trial that allowed both in situ and invasive cancers)	No†	Yes	Yes	Yes	Yes
Denominator: Cancer centre cases, whether incident or previously diagnosed, newly referred to provincial cancer centres in 2010								
Persons who did NOT have a cancer diagnosis are EXCLUDED from the denominator	Yes	Yes	Yes	No	Yes	Yes	No	Yes
Persons with borderline tumours are EXCLUDED from the denominator	Yes	Yes	Yes	No	Yes	No*	No	Yes
Persons with *in situ* cancer are EXCLUDED from the denominator	Yes	Yes	Yes	No	Yes	No*	No	Yes

†2 of 3 centres excluded persons with in situ cancers from the numerator.

*If answered "unsure," response displayed as "No" (i.e. no exclusion process was undertaken).

Indicator: pediatric clinical trial participation ratio

Definition:
The ratio of the total number of all patients (≤18 years) enrolled in cancer-related therapeutic trials or clinical research studies in 2011 to the total number of new cancer cases (≤18 years) diagnosed at pediatric cancer centres in 2011

Numerator:
All patients (≤18 years) newly enrolled in cancer-related therapeutic trials or clinical research studies during the year

Denominator:
New cancer cases (≤18 years) newly registered at pediatric cancer centres during the year

Data source:
Reported by C[17] Council to the Canadian Partnership Against Cancer, collected September 2012

Measurement timeframe:
2009, 2010 and 2011 calendar years

Provinces submitting data:
AB, BC, MB, NL, NS, ON, QC, SK

Notes:
1. For the purposes of registration, a clinical trial is any cancer-related research study that prospectively assigns human participants to a health-related intervention to evaluate the effects on health outcomes.

2. Data exclude enrolments in biology studies and include Phase I to Phase IV clinical trials.

Indicator: research funding

Definition:
1. Distribution of site-specific cancer research funding in the calendar year 2009, as reported by 33 organizations/programs in Canada.

2. Distribution of new cancer cases in Canada

3. Distribution of cancer deaths in Canada

Numerator:
1. Total research funding devoted to specific sites in the calendar year 2009

2. Total new cancer cases for special sites in 2007

3. Total cancer deaths for special sites in 2007

Denominator:
1. Total site-specific cancer research funding in the calendar year 2009

2. Total new cancer cases in 2007

3. Total cancer deaths in 2007

Stratification variables:
Cancer site

Exclusions:
Analysis included only site-specific research project funding, which comprised 50% of cancer research funding in 2009. Therefore, non-site specific research funding was excluded from the figure

Data source:
Cancer research investment: Canadian Cancer Research Survey (CCRS)

New cancer cases: CANSIM Table 103-0550 New cases for ICD-O-3 primary sites of cancer (based on the July 2010 CCR tabulation file), by age group and sex, Canada, provinces and territories, annual, Canadian Cancer Registry – 3207

Cancer deaths: CANSIM Table 102-0522 Deaths by causes, Chapter II: Neoplasms (C00 to D48), age group and sex, Canada, annual (number), Vital Statistics – Death Database – 3223

Measurement timeframe:
Cancer research investment: January 1, 2009 to December 31, 2009

New cancer cases: 2007

Cancer deaths: 2007

Provinces submitting data:
Cancer research investment:
33 organizations/programs across all jurisdictions

General notes:
1. While CCRS does include data from major cancer research funders, it does not include data on funding from the following:

a. Federal government organizations (ex., Canadian Foundation of Innovation, NSERC, SSHRCC);

b. Other non-governmental/voluntary sector organizations (ex., CARO, Rethink Breast Cancer);

c. Hospital foundations (ex., Princess Margaret Hospital Foundation);

d. Provincial government organizations (ex., Change Foundation, Saskatchewan Health Research Foundation);

e. Organizations from outside Canada that fund Canada-based researchers, such as NCI; and

f. Business/industry.

Long-term outcomes

Indicator: age-standardized incidence rates

Definition:
The incidence rate that would have occurred if the age distribution in the population of interest was the same as that of the standard, where incidence rate is defined as the number of cases of cancer (malignant neoplasms) newly diagnosed during a year, per 100,000 people at risk

Numerator:
Number of new cancer cases (all ages)
1. Breast (female)
2. Colorectal
3. Lung
4. Prostate (male)
5. Pancreas
6. Non-Hodgkin lymphoma
7. Thyroid
8. Liver
9. Melanoma
10. Head and neck
11. Oropharyngeal

Denominator:
1. Annual female population estimate in hundreds of thousands

2 – 11. (except 4.) Annual population estimates in hundreds of thousands

4. Annual male population estimate in hundreds of thousands

Age standardization:
Direct method using the 1991 Canadian Census population

Data sources:
Canadian Cancer Registry (CCR) Database (annual file, release date 2011) – cancer incidence data

Demography Division of Statistics Canada – population estimates

Measurement timeframe:
For overall trends, Canada – 1992 to 2007

By province: For breast, colorectal, lung, prostate: 3-year combined (2007 – 2009), except QC (2007 only)

Stratification variables:
Province, sex

Notes:
1. World Health Organization, International Classification of Diseases for Oncology, Third Edition (ICD-O-3) and the International Agency for Research on Cancer (IARC) rules for determining multiple primaries sites were used: colorectal (ICD-O-3: C18.0 to C18.9, C19.9, C20.9, C26.0), lung and bronchus (ICD-O-3: C34.0 to C34.9), female breast (ICD-O-3: C50.0 to C50.9), prostate (ICD-O-3: C61.9), pancreas (ICD-O-3: C25.0-C25.9), non-Hodgkin lymphoma (ICD-O-3: M-9590 to M-9596, M-9670 to M-9719, M-9727 to M-9729; M-9823, all sites except C42.0, C42.1, C42.4; M-9827, all sites except C42.0, C42.1, C42.4.), thyroid (ICD-O-3: C73.9), liver (ICD-O-3: C22.0), melanoma (ICD-O-3: C44.0-C44.9, M-8720- M-8790), head and neck (ICD-O-3: C00.0-C14.8) and oropharyngeal cancer (ICD-O-3: C1.9, C2.4, C9.0-C9.9, C10.0-C10.9, C14.2 with histology 8085-8076, 8078, 8083, 8084, 8094). The above categories except non-hodgkin lymphoma are excluding morphology types M-9050 to M-9055, M-9140, and M-9590 to M-9989.

Indicator: age-standardized mortality rates

Definition:
The mortality rate that would have occurred if the age distribution in the population of interest was the same as that of the standard, where mortality rate is defined as the number of deaths due to cancer (malignant neoplasms) in a year per 100,000 people at risk

Numerator:
Number of deaths from cancer (all ages)
1. Breast (female)
2. Colorectal
3. Lung
4. Prostate (male)
5. Pancreas
6. Non-Hodgkin lymphoma
7. Thyroid
8. Liver
9. Melanoma
10. Head and Neck

Denominator:
1. Annual female population estimate in hundreds of thousands

2 – 10. (except 4.) Annual population estimates in hundreds of thousands

4. Annual male population estimate in hundreds of thousands

Age standardization:
Direct method using the 1991 Canadian Census population

Data sources:
Canadian Vital Statistics – Death Database (annual file, release date 2012) – cancer mortality data, except for colorectal cancer data from 1992 – 1999, which is taken from Canadian Cancer Statistics 2012

Demography Division of Statistics Canada – population estimates

Measurement timeframe:
For overall trends, Canada – 1992 to 2009

By province:
For breast, colorectal, lung, prostate: 3-year combined (2007 – 2009).
For all others: 5-year combined (2005 – 2009)

Stratification variables:
Province, sex

Notes:
1. Up to the year 1999, causes of death were coded according to World Health Organization (WHO), International Classification of Diseases, Ninth Revision (ICD-9): Colorectal (ICD-9 153-154), lung (ICD-9: 162), female breast (ICD-9: 174), prostate (ICD-9: 185), pancreas (ICD-9: 157), non-Hodgkin lymphoma (ICD-9: 200, 202), thyroid (ICD-9: 193), melanoma (ICD-9: 172), liver (ICD-9: 1550), and head and neck (ICD-9: 140 – 149).

2. After the year 1999, causes of death were coded according to the World Health Organization (WHO), International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10): Colorectal (ICD-10:C18-C20, C26), lung (ICD-10 : C34), female breast (ICD-10: C50), prostate (ICD-10: C61), pancreas (ICD-10: C25), non-Hodgkin lymphoma (ICD-10: C82-C85), thyroid (ICD-10: C73), melanoma (ICD-10: C43), liver (ICD-10: C22.0, C22.2-C22.7), head and neck (ICD-10: C00.0-C14.8.

3. Mortality for oropharyngeal cancer could not be calculated as cause of death in the Canadian Vitals Statistics – Death Database is classified using ICD-10 which does not specify histology which is required to classify oropharyngeal cancers.
4. Cells with small counts were suppressed as well as any cell that could result in the disclosure of a previously suppressed cell by using the column or row total. For example, if the variables that defined the rows and columns were province and age group, then the program suppressed low counts first within each province. If any province contained only 1 suppressed cell, the next lowest count in that province was suppressed.

Indicator: relative survival ratios

Definition:
Relative survival is the ratio of the observed survival for a group of cancer patients (malignant neoplasms) to the expected survival for members of the general population who have the same main factors affecting survival (sex, age, place of residence) as the cancer patients (referred to as the comparison population)

Numerator:
For period analysis method (2005-2007):

Observed cumulative survival probabilities of cancer patients after diagnosis with follow-up in 2005 to 2007

For cohort analysis method (1992-1994):

Observed cumulative survival probabilities of cancer patients who were diagnosed during 1992-1994

1. Breast (female, aged 15 – 79)
2. Colorectal
3. Lung
4. Pancreas
5. Non-Hodgkin lymphoma
6. Thyroid
7. Liver
8. Melanoma

Denominator:
Expected survival of comparison population that was alive for 1, 2, 3, 4 and 5 years for patients with follow-up in 2005 to 2007
1. Females
2 – 8. Both sexes

Population exclusions:
- Age <15 or >74 at time of diagnosis for cancers listed above except breast cancer (age < 15 or > 79 at time of diagnosis)
- Subjects diagnosed through autopsy only or death certificate only
- Subjects with an invalid date and invalid sequences of date of birth, diagnosis and death

Data sources:
Canadian Cancer Registry
(annual file, release date 2011)
Provincial life tables (provided from Statistics Canada, 2012)

Measurement timeframe:
For period analysis method, patients with follow-up during 2005 to 2007. For cohort analysis method, patients diagnosed during 1992 to 1994

Stratification variables:
Province, age

Notes:
1. World Health Organization, International Classification of Diseases for Oncology, Third Edition (ICD-O-3) and the International Agency for Research on Cancer (IARC) rules for determining multiple primaries sites were used: colorectal (ICD-O-3 C18.0 to C18.9, C19.9, C20.9, C26.0), lung and bronchus (ICD-O-3 C34.0 to C34.9), female breast (ICD-O-3 C50.0 to C50.9), pancreas (ICD-O-3: C25.0-C25.9), non-Hodgkin lymphoma (ICD-O-3: M-9590 to M-9596, M-9670 to M-9719, M-9727 to M-9729; M-9823, all sites except C42.0, C42.1, C42.4; M-9827, all sites except C42.0, C42.1, C42.4.), thyroid (ICD-O-3: C73.9), liver (ICD-O-3: C22.0) and melanoma (ICD-O-3: C44.0-C44.9, M-8720-M-8790). The above categories except non-hodgkin lymphoma are excluding morphology types M-9050 to M-9055, M-9140, and M-9590 to M-9989.
2. All primary cancers were included in the analysis. Patients aged >75 (or >80 for breast cancer) are excluded from the analysis because there was empirical evidence of systematic bias in provincial survival estimates for older patients.
3. "Canada" represents all provinces and territories, except Quebec. Data from Quebec have been excluded, in part, because the method of ascertaining the date of cancer diagnosis differs from the method used by other registries and because of issues in correctly ascertaining the vital status of cases.
4. The analysis was conducted using both cohort and period analysis methods (Reference: Brenner H, Gefeller O. An alternative approach to monitoring cancer patient survival. Cancer. 1996;78:2004 – 10).
5. Expected survival proportions were derived from sex-specific complete provincial life tables produced by Statistics Canada, using the Ederer II approach. (Reference: Ederer F, Heise H. The effect of eliminating deaths from cancer on general population survival rates (methodological note 11, End Results Evaluation section). National Cancer Institute; August 1959).
6. Period analysis was used to estimate the survival for the cases diagnosed 2005 – 2007. Relative survival ratios for 1992 to 1994 were calculated using cohort analysis.
7. Patients aged >75 (or >80 for breast cancer) are excluded from the analysis because there was empirical evidence of systematic bias in provincial survival estimates for older patients.

TABLE 2

Estimated age-specific five-year relative survival ratios (%) for selected cancers – 1992 to 1994 vs. 2005 to 2007

	Relative survival (%), 1992 – 1994				Relative survival (%), 2005 – 2007			
	Age group (years)				Age group (years)			
Disease site	**15 – 44**	**45 – 54**	**55 – 64**	**65 – 74**	**15 – 44**	**45 – 54**	**55 – 64**	**65 – 74**
Colorectal	60	60	57	57	68	66	67	66
Liver	17	17	13	8	45	26	22	16
Lung	23	19	16	14	30	21	19	16
Melanoma	90	87	86	81	93	91	89	87
Non-Hodgkin lymphoma	62	63	55	49	80	78	73	60
Pancreas	18	8	5	5	28	13	8	7
Thyroid	99	97	90	84	100	99	98	93

	1992 – 1994					2005 – 2007				
	Age group (years)					Age group (years)				
Disease site	**15 – 39**	**40 – 49**	**50 – 59**	**60 – 69**	**70 – 79**	**15 – 39**	**40 – 49**	**50 – 59**	**60 – 69**	**70 – 79**
Breast	75	83	83	84	83	85	90	89	90	87

Note: Cohort analysis method and period analysis method were conducted for 1992 to 1994 and 2005 to 2007, respectively.

Data source: Statistics Canada, Canadian Cancer Registry.

TABLE 3

Estimated age-standardized five-year relative survival ratios (%) for the top and emerging cancers, by province – 2005 to 2007

Disease Site	CANADA	AB	BC	MB	NB	NL	NS	ON	PE	SK
Breast % (95% CI)	88.5 (88.1-88.8)	88.5 (87.7-89.3)	88.9 (88.2-89.5)	87.0 (85.6-88.3)	89.4 (87.8-90.9)	86.5 (84.2-88.5)	86.7 (85.2-88.1)	88.3 (87.9-88.7)	86.6 (82.5-90.1)	87.7 (86.2-89.2)
Colorectal % (95% CI)	66.5 (65.8-67.1)	63.6 (62.1-65.1)	64.9 (63.7-66.1)	63.6 (61.4-65.8)	65.0 (62.3-67.6)	63.9 (61.1-66.7)	63.2 (61.0-65.4)	66.7 (66.0-67.4)	63.2 (56.9-68.9)	62.8 (60.4-65.2)
Liver % (95% CI)	21.7 (20.0-23.5)	19.3 (15.5-23.4)	17.2 (14.5- 20.1)	7.5 (3.6-13.4)	.	.	.	26.0 (23.9-28.1)	.	.
Lung % (95% CI)	18.4 (18.0-18.9)	15.8 (14.8-16.8)	16.9 (16.1-17.8)	20.5 (18.9-22.1)	17.2 (15.6-18.8)	17.4 (15.1-19.8)	15.6 (14.2-17.0)	19.1 (18.6-19.6)	.	16.7 (15.0-18.5)
Melanoma % (95% CI)	90.2 (89.5-90.9)	88.4 (86.6-90.1)	92.2 (90.9-93.3)	90.9 (87.6-93.7)	92.8 (89.7-95.3)	85.6 (80.1-90.1)	93.0 (90.5-95.0)	89.5 (88.6-90.3)	96.1 (88.9-100.0)	85.9 (82.1-89.1)
Non-Hodgkin lymphoma % (95% CI)	70.8 (69.9-71.7)	71.0 (68.8-73.1)	70.2 (68.4-71.9)	64.6 (61.1-67.9)	72.5 (68.4-76.2)	71.8 (65.9-77.1)	69.6 (65.9-73.0)	68.8 (67.7-69.8)	63.5 (53.0-72.6)	69.0 (65.2-72.5)
Pancreas % (95% CI)	9.1 (8.3-10.0)	5.5 (4.1-7.2)	6.2 (4.9-7.7)	.	.	9.2 (4.9-15.0)	4.7 (2.8-7.2)	10.9 (9.9-12.0)	.	5.9 (3.6-8.9)
Prostate % (95% CI)	97.6 (97.2-97.9)	96.0 (95.2-96.8)	95.5 (94.8-96.1)	95.4 (93.8-96.8)	98.7 (97.1-100.0)	96.0 (93.7-98.1)	97.8 (96.4-99.2)	98.4 (98.0-98.7)	98.0 (94.5-100.0)	94.5 (93.0-95.9)
Thyroid % (95% CI)	98.5 (98.1-98.9)	97.2 (96.0-98.3)	95.7 (94.2-96.9)	97.9 (95.2-99.7)	95.4 (91.8-97.7)	97.2 (92.8-99.7)	96.9 (93.7-99.0)	99.0 (98.6-99.4)	97.2 (84.7-100.0)	99.8 (97.1-100.0)

CI = confidence interval

. For the cancers which had sparse data in some of the age groups, results were not presented since the estimate would be unstable.

The upper confidence limits of the age-standardized relative survival ratios were truncated to 100%.

Data source: Statistics Canada, Canadian Cancer Registry.

FIGURE 1

Relative survival ratio (age 15 to 74) by follow up year – 2005 to 2007

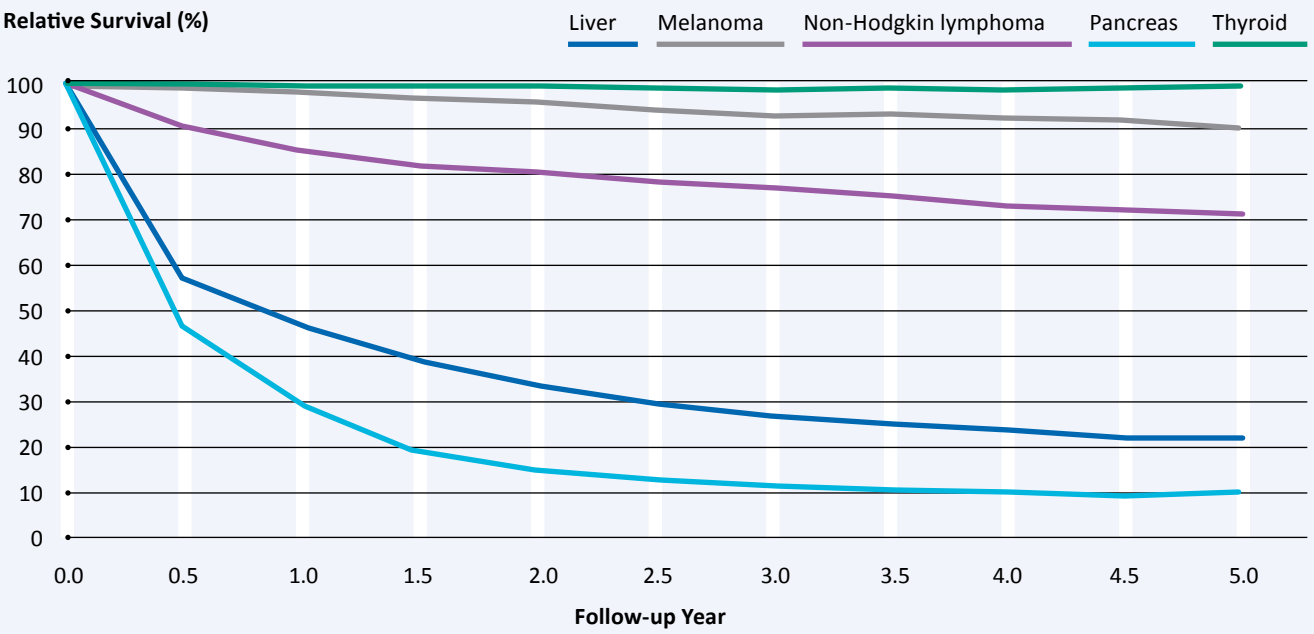

Chart review methodology for Review of reasons for non-referral and non-treatment

Patient selection

In order to select cases to be reviewed for this study, each participating province identified the full list of patients belonging to the study population in their province.

1. The rectal cancer population included all patients with stage II or III cancer of the rectum who were diagnosed in participating provinces in calendar year 2008 and had a surgical resection of their primary tumor within one year of diagnosis. Rectal cancer cases were defined using ICDO-3 site codes of C19.9 or C20.9 with AJCC group stage at diagnosis of II or III.
2. The lung cancer population included all non-small cell lung cancer patients with stage II or IIIA non-small cell lung cancer who were diagnosed in participating provinces in calendar year 2008 and had a surgical resection of their primary tumor within one year of diagnosis. Non-small cell lung cancer cases were defined using ICDO-3 site codes of C34.0 to C34.9 with AJCC group stage at diagnosis of II or IIIA.

The following exclusions were applied: cases where the last resection date was equal to or greater than 365 days beyond the diagnosis date; cases for patients under 18 years of age; ICDO-3 histology codes of M-95 to M-98 (lymphoma); and for lung cancer, ICDO-3 histology codes of 8002, 8041, 8043, 8044, 8045, 9073, and 8803.

Provinces that were unable to identify resected cases from the available administrative data identified resections through the chart review. Only resected cases moved to the full abstraction phase.

Upon selection of cases, a list of patient study IDs was sent from the participating provinces to CPAC where a random sample was selected. The CPAC team calculated the estimated number of charts to be included in the provincial sample for each of rectal and lung cancer. The sample size was modified somewhat for the final implementation as demonstrated in the table below (Table 4). The numbers provided below are based on a precision of ±5% at 95% confidence interval.

TABLE 4

Estimated sample size and actual number of cases abstracted for each province participating in the rectal and lung cancer chart review study

	Sample size with 5% precision at 95% CI			Actual number of cases abstracted		
Province	Rectum	Lung	Total	Rectum	Lung	Total
AB	157	48	205	175	51	226
SK	59	26	85	81	25	106
MB	89	34	127	89	34	123
PE	9	4	13	10	3	13
NL	22	13	34	28	-	28
Total	336	125	464	383	113	496

Once a random sample was identified at CPAC, a list of patient study IDs was then sent back to participating provinces so that selected cases could be identified and abstraction could begin.

For provinces that could not identify resected cases from the administrative data, a list of all cases was provided to CPAC from which an over-sample was selected which took into account the expected proportion of un-resected cases.

Data collection

The chart review required access to charts that were likely to contain information on referral and treatment decisions. The methods for accessing the charts varied by province and by the patient's path of treatment.

Two registrars in each province were trained by CPAC on how to enter data into the data collection tool and inter-rater reliability was tested by way of independently abstracting data on the same ten cases.

Information abstracted from the charts focused on patient demographics (age, sex and optionally the Forward Sortation Area (FSA) of the postal code of patient residence) and treatment details such as location of treatment, and dates. Provinces may have populated the demographic and diagnosis/staging information from their administrative data, but caution was taken to check the data because discrepancies between the information in the registry and that in the charts were possible (e.g., a reviewer may find, through careful review of the charts, that the patient was actually diagnosed out of province 5 years earlier and that the treatment delivered was for a recurrence even though the registry may indicate a 2008 diagnosis date). In cases where the patient was not referred to receive guideline treatment, the reason(s) for non-referral were collected. Likewise, where the patient was referred but did not undergo the guideline treatment, the reason(s) for non-treatment were collected.

In many cases, the information needed was contained in the narrative notes documented by the clinician to describe the rationale or circumstances relevant to the referral and/or treatment decision (e.g., "Patient had poor performance status including significant weight loss so not candidate for chemotherapy. Discharged home with follow up in 2 months.").

While dates (Month, Year at a minimum and Day, Month, Year optional) were to be collected and maintained within the database within provinces, the database sent to CPAC contained only the time interval in days between key dates (e.g., days from surgery to chemotherapy start).

Detailed instructions for the data collection tool were provided by way of a detailed data dictionary describing in detail each data element to be collected.

Data analysis

Though multiple reasons may have been selected by registrars within the data abstraction tool and additional information entered into free text fields as to why a patient was not referred or treated, a clinician reviewed all information at the end of the abstraction phase and assigned one reason for non-referral among patients who were not referred, and one reason for non-treatment among patients who were referred but not treated. Final possible reasons for non-referral included: rectal cancer patient seen by a medical oncologist only (for the rectal cancer sub-study), patient choice, patient age, complications, metastatic disease, co-morbidity, not a candidate based on cancer site/stage, and missing or unclear reason. Final possible reasons for non-treatment included: patient choice, patient age, patient died, co-morbidity, not a candidate based on cancer site/stage, and missing or unclear reason.

Inter-rater reliability and data quality checks were conducted to ensure the datasets were of high quality. Abstractors within the province were contacted to check any data that appeared out of range.

Data analyses were conducted in SAS version 9.2 (SAS Institute, Cary, NC) to assess the patient demographics of the study sample, the percentage of cases referred for and treated according to the guidelines overall and by selected patient demographics (age, sex and stage), and the reasons for non-treatment and non-referral.

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