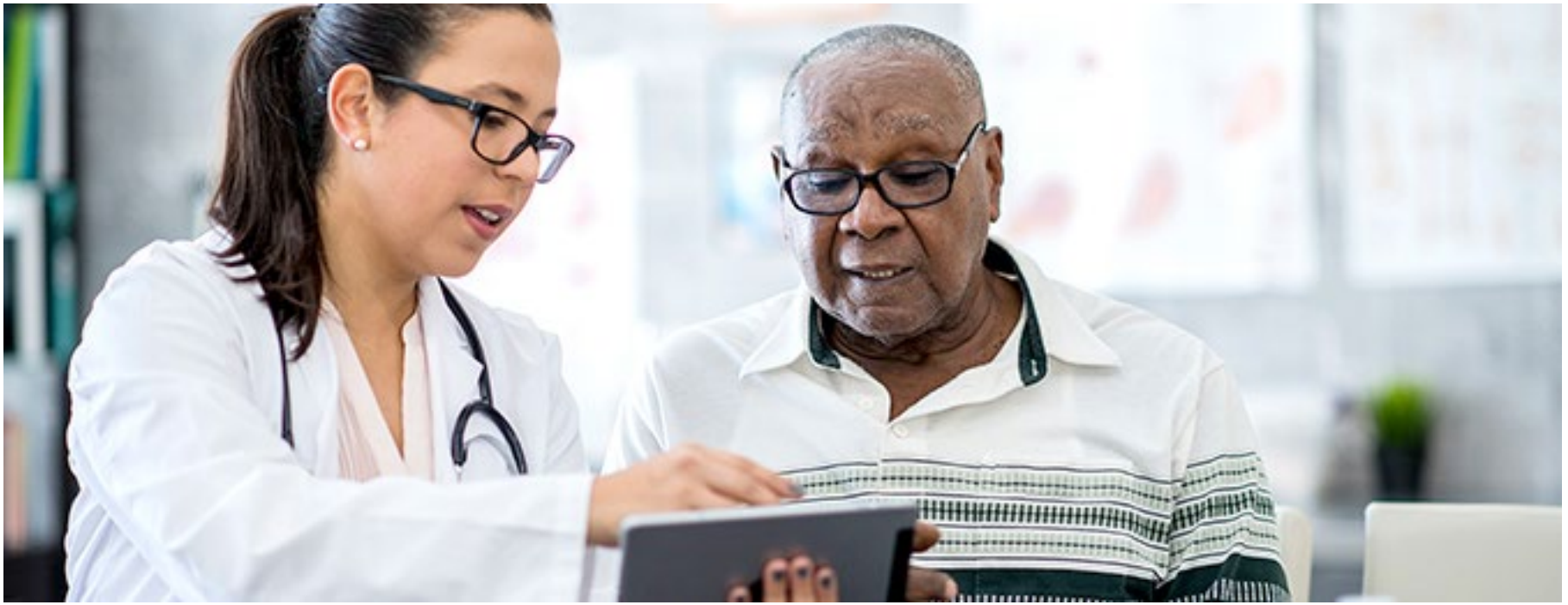
# Cancer System Quality Index 2021

## Ontario Cancer System Performance

November 2021



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# Acknowledgements


### Lead Author

Dr. Munaza Chaudhry

### Co-Authors

Sharmilaa Kandasamy, Dr. Steven Habbous, Catherine Chan, Andriana Barisic, Afifa Faisal, Dr. Meghan Walker, Mohammad Haque, Dr. Amanda Sheppard, Eleeyah Uri, Dr. Eta Ashu, Naomi Schwartz, Stephanie Young, Bronwen McCurdy

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### Content Development and Analytics Leads

Clinical Programs

- Ontario Cancer Leads: Dr. Andrea Eisen (Ontario Breast Cancer Lead), Dr. Girish Kulkarni (Ontario Genito-Urinary Cancers Lead), Dr. Erin Kennedy (Ontario Gastro-Intestinal Cancers Lead), Dr. Sarah Ferguson (Ontario Gynecological Cancers Lead), Dr. Gail Darling (Ontario Thoracic Cancers Advisory Committee)
- Provincial Program Heads and Quality Leads: Susan Blacker and Dr. Darren Cargill (Ontario Palliative Care Network), Dr. Michael Brundage and Dr. Jason Pantarotto (Radiation Treatment), Dr. Julian Dobranowski (Cancer Imaging), Dr. Kathryn Enright and Dr. Leta Forbes (Systemic Treatment), Dr. Anand Govindarajan (Survivorship Care), Dr. Jonathan Irish and Dr. Frances Wright (Surgical Oncology), Dr. Aaron Pollett (Pathology and Laboratory Medicine)
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Prevention and Cancer Screening

- Provincial Clinical and Scientific Leads: Dr. Anna Chiarelli and Dr. Samantha Fienberg (Ontario Breast Screening Program), Dr. Catherine Dube and Dr. Jill Tinmouth (ColonCancerCheck), Dr. Rachel Kupets and Dr. Joan Murphy (Ontario Cervical Screening Program)
- Dr. Chamila Adhihetty, Dr. Eta Ashu, Simon Chen, Melissa Coulson, Gabriela Espino-Hernandez, Julia Gao, Mohammad Haque, Dan He, Tina Karapetyan, Vicki Lee, Bronwen McCurdy, Rebecca Truscott, Dr. Meghan Walker, Li Wang. Stephanie Young.

Indigenous Cancer Control Unit

- Usman Aslam, Alethea Kewayosh, Dr. Amanda Sheppard, Eleeyah Uri

## Reviewers

- Vice-Presidents, Clinical Institutes and Quality Programs: Dr. Jonathan Irish, Elaine Meertens, Dr. Linda Rabeneck
- Breast Cancer Advisory Committee: Dr. Andrea Eisen (Chair), Dr. Angel Arnaout, Dr. Anita Bane, Dr. Anne Koch, Dr. Brian Pinchuk, Dr. Elaine Innes, Dr. Francisco Perera, Dr. Glykeria Martou, Dr. Harriet Feilotter, Ms. Kathleen Bell (Genetic Counsellor), Dr. Leta Forbes, Dr. Maureen Trudeau, Dr. Petrina Causer, Dr. Samantha Fienberg
- Genito-Urinary Cancers Advisory Committee: Dr. Girish Kulkarni (Chair), Dr. Ryan Carlson, Dr. Andrew Evans, Dr. Andrew Feifer, Dr. Antonio Finelli, Dr. Trevor Flood, Dr. Sangheet Ghai, Dr. Arthur Grabowski, Dr. Sebastien Hotte, Dr. John Kachura, Dr. Andrew Loblaw, Dr. Julie Lebert, Dr. Arsh Sidhu
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- Thoracic Cancers Advisory Committee: Dr. Gail Darling (Chair), Dr. Peter Ellis, Dr. Medhat El-Mallah, Dr. Rick Malthaner, Amy Boucher (RN), Dr. Dimitrios Divaris, Dr. Meredith Giuliani, Dr. Lisa Del Giudice, Dr. Harmon Sekhon , Dr. Yee Ung, Dr. Sameena Uddin, Dr. Shona Smith, Dr. Mohammad Rassouli, Dr. Wiley Chung , Dr. Andrew Burkett, Dr. Anuj Dixit, Dr. Julian Dobranowski

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- Cancer Quality Council of Ontario: Dr. Darren Larsen (Chair), Ruthe Anne Conyngham (Vice-Chair), Bonnie Adamson, Dr. Chaim Bell, Cholly Boland, Dr. Michael Brundage, Kirsten Burgomaster (Ex-officio), Jenny Cockram, Winnie Doyle, Debbie Galet, Sandani Hapuhennedige, Janice Kaffer, Michelle Karker, Konrad Kucheran, Dawn Powell, Andy Smith, Farah Tayabali, Joy Wakefield

**Communications**

- Michelle Archibald, Meredith Grove, Sharon Lau, Patrick Morton, Tonja Mulder

# Executive Summary

The purpose of the Cancer System Quality Index (CSQI) is to report on the performance of Ontario's cancer system and to inform Ontario Health's cancer-specific strategic objectives and action plans. In contrast, other scorecards and reports are produced by Ontario Health to support quality improvement within the provincial cancer system at the region, facility and clinician level.

The CSQI 2021 includes indicators across the continuum of care for breast, cervical, colorectal, lung and prostate cancers. Indicators were rated based on comparisons to other jurisdictions, time trends, and whether Ontario targets were met, if they existed. Indicators without appropriate jurisdictional comparators were not rated but were included to promote use of these indicators by other jurisdictions. Priorities for each disease site were identified through consultation with the relevant provincial Cancer Advisory Committee. Themes and common patterns across the disease sites were also identified.

The CSQI 2021 special focus story "Impact of the COVID-19 Pandemic on the Ontario Cancer System," which is based on Phase 1 of the COVID-19 Impact Evaluation, will be released in 2022.

Highlights from the CSQI 2021:

- The prevalence of modifiable risk factors for cancer is generally high and higher in First Nations, Inuit and Métis peoples compared to non-Indigenous people. Tobacco smoking is decreasing except among First Nations women, for whom rates are increasing. However, these data are a decade old and may not reflect the current situation.
- Participation in breast cancer screening from 2012–2013 to 2018–2019 and the proportion of people overdue for colorectal cancer screening from 2016 to 2019 were stable. Participation in cervical screening decreased from 2008-2010 to 2017-2019. The positive predictive value of screening mammography, hospitalization for bowel perforation within 7 days of outpatient colonoscopy, and follow-up of abnormal breast, cervical and colorectal screening results were all rated as bright spots as performance was consistently high.
- Incidence rates have been stable for breast cancer, are decreasing for colorectal and lung cancers, and are increasing for cervical and prostate cancers.
- Five-year relative survival has improved for breast, cervical, colorectal and lung cancers, and is declining for prostate cancer.
- The time interval from diagnosis to treatment was rated as "room for improvement" across all disease sites. Although Ontario has longer times to first treatment compared to other jurisdictions, we also have the highest survival rates, and we

need to understand this better. The need to increase appropriate use of imaging (e.g., to inform treatment decisions) and reduce inappropriate imaging (e.g., imaging to detect metastases in early-stage cancers) was highlighted.

- The majority of treatment indicators were rated as "bright spot[s]." It appears that once patients start treatment, they receive high-quality care. Indicators that measure adherence to new evidence and guidelines suggest that Ontario has rapid uptake. Indicators that measure concurrent or sequential treatments or consultations across treatment modalities/specialties suggest that these treatments and consultations are occurring, particularly in chemoradiation.
- Improving end-of-life care was identified as a priority across disease sites, not only for the cancer system, but for the health care system as a whole.
- The conclusions drawn from the CSQI are only based on the indicators that were included. Cancer recurrence and patient quality of life are important cancer outcomes; however, we lack these data. In addition, the two-year time lag for staging data makes it difficult to assess how the system is performing when treatment protocols, evidence and practice are changing rapidly.
- The data for First Nations, Inuit and Métis peoples are limited and about a decade old. This currently limits our ability to assess health equity for these priority populations.
- Making better use of our symptom management data was identified as important across all disease sites.

Further analyses and engagement with clinical and program leadership are required to understand the areas for improvement and to prioritize those that should become strategic priorities.

# Table of Contents

# Abbreviations

| Abbreviation | Meaning |
|---|---|
| ADT | Androgen Deprivation Therapy |
| AICR | American Institute for Cancer Research |
| AJCC | American Joint Committee on Cancer |
| ALND | Axillary Lymph Node Dissection |
| ARAT | Androgen Receptor Axis-Targeted Therapies |
| ASIR | Age-Standardized Incidence Rate |
| ASMR | Age-Standardized Mortality Rate |
| BMI | Body Mass Index |
| CAC | Cancer Advisory Committee |
| CCC | ColonCancerCheck |
| CCHS | Canadian Community Health Survey |
| CCO | Cancer Care Ontario |
| CCS | Canadian Cancer Society |
| CPAC | Canadian Partnership Against Cancer |
| CQCO | Cancer Quality Council of Ontario |
| CRC | Colorectal Cancer |
| CSQI | Cancer System Quality Index |
| CT | Computed Tomography |
| ED | Emergency Department |

| Abbreviation | Meaning |
|---|---|
| EOL | End-of-Life |
| ESGO | European Society of Gynaecological Oncology |
| ER/PR/HER2 | Estrogen Receptor (ER)/ Progesterone Receptor (PR)/ Human Epidermal Growth Factor Receptor 2 |
| EUSOMA | European Society of Breast Cancer Specialists |
| FIT | Fecal Immunochemical Test |
| FNIM | First Nations, Inuit and Métis |
| FOBT | Fecal Occult Blood Test |
| HPV | Human Papillomavirus |
| IARC | International Agency for Research on Cancer |
| ICBP | International Cancer Benchmarking Partnership |
| MRI | Magnetic Resonance Imaging |
| mCSPC | Metastatic Castration-Sensitive Prostate Cancer |
| N | Number |
| ng/ml | Nanograms per millilitre |
| NHS | National Health Service |
| NSCLC | Non-Small Cell Lung Cancer |
| NSQIP | National Surgical Quality Improvement Program |
| OBSP | Ontario Breast Screening Program |
| OH | Ontario Health |
| OHIP | Ontaro Health Insurance Plan |
| PEBC | Program in Evidence-Based Care |
| PET-CT | Positron Emission Tomography-Computed Tomography |

| Abbreviation | Meaning |
|---|---|
| PPV | Positive Predictive Value |
| PSA | Prostate-Specific Antigen |
| QBP | Quality-Based Procedure |
| SABR | Stereotactic Ablative Radiotherapy |
| SCLC | Small Cell Lung Cancer |
| SEER | Surveillance, Epidemiology, and End Results |
| SLNB | Sentinel Lymph Node Biopsy |
| SLND | Sentinel Lymph Node Dissection |
| SQI | Surgical Quality Indicators |
| SURVMARK-2 | Cancer Survival in High Income Countries (International Cancer Benchmarking Partnership) |
| TME | Total Mesorectal Excision |
| TRUS | Transrectal Ultrasound |
| US | United States |
| WCRF | World Cancer Research Fund |

# 1. Introduction

## About the Cancer System Quality Index

What is it about?

The Cancer System Quality Index (CSQI) reports on the performance of Ontario's cancer system. It is intended to compare Ontario's performance to performance in other provinces and countries, with a focus on indicators that directly affect patient/clinical outcomes.

Who is it for?

- The primary audience is health care leaders and senior executives.

What is its purpose?

- The CSQI compares Ontario's performance with other jurisdictions, where possible. It highlights areas for improvement and celebrates our successes by identifying what we are doing well. A second purpose of the CSQI is to share information with other jurisdictions to enable national and international benchmarking.
- In the CSQI, we identify and prioritize areas for improvement to inform Ontario Health's cancer-specific strategic priorities. The intent is not to solve identified issues. Additional analyses are required to examine performance on the indicators in more detail and to understand where variation exists (e.g., across populations, regions, or facilities). Further engagement with Ontario Health leadership, clinical leaders and programs is required to discuss these additional analyses, understand root causes and develop plans to drive local quality improvement.

How does it relate to our other reporting and scorecards?

- The CSQI is an outward-facing report that provides information on how Ontario compares to other jurisdictions, whereas other reports and scorecards produced within Ontario Health provide comparative data across regions, hospitals and cancer centres. These inward-facing reports are produced more frequently to support quality improvement and performance management efforts. They are focussed on quality improvement indicators that we expect to change more rapidly. Although the indicators in these reports and scorecards may be similar to those reported in the CSQI, they may be defined differently given the differing purposes of the reports; in particular, the need for the indicators in the CSQI to be aligned with those reported by other jurisdictions where possible.

What is included in CSQI 2021?

- This year, the CSQI includes breast, cervical, colorectal, lung and prostate cancers.
- The indicators for each disease site span the continuum of care: prevention, cancer burden, screening, diagnosis, treatment, survivorship care and end-of-life care.
- The indicators were selected through engagement with the Ontario Cancer Leads, Ontario Health program heads and the relevant provincial Cancer Advisory Committees.
- Clinical Council, Ontario Health's clinical cancer system leadership table, endorsed the final list of indicators.
- The indicators were rated based on consensus from the Cancer Advisory Committee for each disease site.
- The Cancer Quality Council of Ontario provided final approval for the selected indicators and their ratings.

## Notes about the CSQI 2021

Indicator Measurement Methods

- Measurement methods for the indicators are available in the Technical Supplement at https:/www.csqi.on.ca/sites/csqipub/files/assets/CSQI2021TechnicalSupplement.pdf.

Jurisdictional Comparators

- Finding comparable population-level measures from other jurisdictions is a challenge, especially for newer indicators. Indicator definitions and measurement methods, including inclusion and exclusion criteria and time periods, often differ between jurisdictions. Interpreting comparisons between jurisdictions with different health care systems is also difficult. However, these comparisons are still useful for providing a general indication of how Ontario is performing relative to other jurisdictions.
- Given the audience and purpose of this report, we do not provide details or commentary on the differences in the methods between jurisdictions. We included comparators that seemed reasonable and cite sources for readers requiring additional information.
- If studies included Ontario, we report Ontario rates from the study so we can compare rates based on the same methods. This is particularly important for cancer burden indicators and survival as the same methods and standard populations must be used to make these comparisons.
- Due to time constraints, we were unable to do a systematic review to identify jurisdictional comparators for each indicator; despite our best efforts, some reports and studies may have been missed.
- If no appropriate comparators were found, no reference to comparators is made.

Equity Analyses

- The equity analyses in this report are limited due to time and data constraints.
- Data for Indigenous people were included where possible, although they are not current. Efforts are underway to obtain more contemporary data.
- Future versions of the CSQI will include equity analyses.

Gender Inclusivity

- Efforts have been made to make this document as gender inclusive as possible.
- Where historical data sources such as the Canadian Community Health Survey collected data for only some genders, we report on those genders as they are in the source data.
- For breast cancer, the indicators refer to breast cancer in people assigned female at birth.

Accessibility

- The formatting of this report was adjusted to maximize accessibility.
    - Arabic numerals are used for cancer stage at diagnosis rather than the usual Roman numerals to improve accessibility.
    - Data tables corresponding to the graphs are included in the Technical Supplement.

    - Each graph includes alternative text conveying the key message or finding.
- A condensed version of this report is available in French.

COVID-19 Impact and Recovery

- The most recent data in this report are from the year 2019, which is the most recent year that we have complete data for cancer stage at diagnosis.
- Thus, these analyses reflect Ontario's cancer system performance prior to the COVID-19 pandemic and we do not discuss the impact of COVID-19 on these indicators.
- The CSQI Special Focus Story for 2021 is "Impact of the COVID-19 Pandemic on the Ontario Cancer System," which will be available on the CQCO website (csqi.on.ca) in early 2022.

Report Layout

- This report contains a chapter for each of the five included disease sites: breast, cervical, colorectal, lung and prostate. Each disease site chapter begins with a performance summary that includes priorities identified by the relevant Cancer Advisory Committee.
- The prevention and end-of-life chapters are presented as separate chapters because the indicators and results apply to all of the disease sites.
- The concluding chapter provides an analysis across the disease sites and the continuum of care, identifies themes, and outlines next steps.
- To reduce redundancy, particularly in the performance summaries, if no time period is included for indicator values, the time period is 2019, the most recent data available.

# 2. Prevention

## Prevention Performance Summary

- Evidence confirms strong associations between modifiable risk factors and the risk of many types of cancer, including breast, cervical, colorectal, lung and prostate cancers.
- In 2017, the prevalence of modifiable risk factors among Ontario adults was estimated using self-reported data:
    - 62.8% of adults ages 20 and older were overweight or obese;
    - 50.9% of adults ages 18 and older were physically inactive;
    - 78.1% of adults ages 18 and older had inadequate levels of vegetable and fruit consumption;
    - 9.4% of adults ages 19 and older exceeded the cancer prevention recommendations for alcohol consumption;
    - 17.0% of adults ages 20 and older smoked tobacco.
- Men were more likely than women to be overweight or obese, have inadequate vegetable and fruit consumption and smoke tobacco, while women were more likely to be physically inactive compared to men.
- Rural residents were more likely than urban residents to be overweight or obese, consume alcohol exceeding cancer prevention recommendations and smoke tobacco, while urban residents were more likely to be physically inactive compared to rural residents.
- People with less than secondary education and secondary graduates were more likely than post-secondary graduates to be overweight or obese, be physically inactive, have inadequate vegetable and fruit consumption and smoke tobacco.
- Canadian-born residents were more likely than immigrants to be overweight or obese, consume alcohol exceeding cancer prevention recommendations and smoke tobacco, while immigrants were more likely to be physically inactive compared to Canadian-born residents.
- People in the lowest household income quintile were more likely than those in the highest income quintile to be physically inactive, have inadequate vegetable and fruit consumption and smoke tobacco, while people in the highest income quintile were more likely to consume alcohol exceeding cancer prevention recommendations compared to those in the lowest income quintile.
- Indigenous people in Ontario suffer disproportionately from chronic diseases and, due to historic and present-day inequities, are more likely to have risk factors for cancer and other chronic diseases than non-Indigenous people in Ontario.
- Human papillomavirus (HPV) vaccination coverage in school-based programs has remained relatively consistent at about 60% between 2013-2014 and 2018-2019.

## Modifiable Risk Factors for Cancer

- Modifiable risk factors are behaviours and exposures that can raise or lower a person's risk of developing a disease or condition. They are considered modifiable as they can, theoretically, be changed.
- About half of all cancers can be prevented by reducing exposures to carcinogens in the environment and at work and adopting healthy behaviours such as not smoking, drinking less alcohol, eating healthier foods and increasing physical activity.[1]
- Targeting these risk factors may also reduce the burden of other chronic diseases, including diabetes, cardiovascular disease and chronic respiratory disease as they share the same risk factors as cancer.
- Reporting on risk factor prevalence in Ontario is important for effectively monitoring trends over time, supporting the development of health promotion strategies, and evaluating outcomes of provincial and local interventions.
- Exhibit 2.1 provides a summary of the strength of evidence for the association of modifiable risk factors with breast, cervical, colorectal, lung and prostate cancers from two sources: the International Agency for Research on Cancer (IARC)[2] and the World Cancer Research Fund/American Institute for Cancer Research (WCRF/AICR).[3]
- The prevention indicators were not rated, except for HPV vaccination, since risk factor prevalence in Ontario as captured in the indicators is influenced by a myriad of social and demographic factors, many of which are beyond the purview of Ontario Health.

Exhibit 2.1 Strength of evidence for modifiable risk factors for breast, cervical, colorectal, lung, and prostate cancers[2,3]

| Modifiable risk factor | Breast | Cervical | Colorectal | Lung | Prostate |
|---|---|---|---|---|---|
| Overweight or Obesity | Convincing | | Convincing | | Probable |
| Physical Inactivity | Probable | | Convincing | | |
| Inadequate Vegetable and Fruit Consumption | | | Probable | | |
| Alcohol Consumption (Excess) | Convincing | | Convincing Sufficient | | |
| Tobacco Smoking | | Sufficient | Sufficient | Sufficient | |
| HPV vaccination | | Sufficient | | | |

Note: The IARC describes the strength of evidence for causal relationships between risk factors and cancer in humans as "sufficient" and probable relationships as "limited"; the WCRF uses the terms "convincing" and "probable."

## Chapter Notes

Time periods and data source for modifiable risk factors:

- First Nations people: First Nations Regional Health Survey 2007-2013
- Métis people: Canadian Community Health Survey half-survey annual waves 2007–2014
- Inuit: Aboriginal Peoples Survey 2012 (Comparison to non-Indigenous people in Ontario is from the 2012 Canadian Community Health Survey)

For the modifiable risk factors analyses, Inuit identity was defined as follows:

- Inuit in Nunangat: respondents of the Aboriginal Peoples Survey (APS) who identified as Inuit and were residing in the Inuit Nunangat region (Nunatsiavut, Nunavik, Nunavut and Inuvialuit regions) at the time of the 2011 National Household Survey.
- Inuit outside Nunangat: respondents of the APS who identified as Inuit and were not residing in the Inuit Nunangat region (Nunatsiavut, Nunavik, Nunavut and Inuvialuit regions) at the time of the 2011 National Household Survey. Given the small numbers of Ontario Inuit respondents in the APS, the outside Nunangat population is used as a proxy for the Ontario Inuit population.
- Inuit in Ontario: respondents of the APS who identified as Inuit and reported residing in Ontario at the time of the 2011 National Household Survey. When the numbers are reportable, cancer-related risk factors are shown for the Ontario Inuit population.
- Non-Aboriginal Ontarians: respondents in Ontario who did not self-identify as Aboriginal, or who identified as Aboriginal, but were born outside of Canada, the United States, Germany or Greenland.

## Prevalence of Overweight or Obesity

## (BMI 25 or Higher)

- There is convincing evidence that adult body fatness increases the risk of developing colorectal and post-menopausal breast cancers, and probable evidence that it increases the risk of prostate cancer.[3]
- In Ontario in 2010, 8.2% of colorectal cancer cases and 8.0% of female breast cancer cases could be attributed to overweight or obesity.[4]
- The percentage of Ontario adults ages 18 and older who were overweight or obese increased from 60.5% in 2015 to 62.8% in 2017.
- Based on data from the 2015-2017 Canadian Community Health Survey (CCHS), overweight or obesity in Ontario adults ages 25 and older, for 2015 and 2017 combined, did not vary by household income quintile and was higher for:
  - men (68%) versus women (57%) (ages 18 and older, 2017 only);
  - rural (72%) versus urban (63%) residents;
  - less educated people (70%) versus post-secondary graduates (62%);
  - Canadian-born residents (67%) versus immigrants (60%).
- First Nations adults living on-reserve (48.8%) or off-reserve (30.4%) had a higher prevalence of obesity compared to non-Indigenous people (17.4%). A similar pattern was observed for teens.[5]
- Inuit women in Ontario (60%) had a higher prevalence of excess body weight (overweight and obese combined) compared to non-Indigenous women (41%). Inuit men in Ontario (49%) had about the same prevalence of excess body weight as non-Indigenous men (55%).[6]
- The prevalence of obesity was significantly higher in Métis adults (25%) compared with non-Indigenous adults (18%). Métis adolescents (ages 12-17) had a high prevalence of obesity but not significantly higher than non-Indigenous adolescents.[7]

Exhibit 2.2 Prevalence of overweight or obesity in Ontario

| Year | Women (%) | Men (%) | Both (%) |
|---|---|---|---|
| 2015 | 54.6 | 66.4 | 60.5 |
| 2016 | 55.6 | 68.2 | 61.9 |
| 2017 | 57.0 | 68.4 | 62.8 |

Notes: Estimates are adjusted to the age distribution of the 2011 Canadian Standard population.
Overweight and obesity is defined by Body Mass Index (BMI) values, corrected to adjust for underestimation of BMI based on self-reported height and weight by Canadian Community Health Survey respondents.
Overweight and obese (adults ages 18 years and older): BMI 25 or higher.

## Prevalence of Physical Inactivity

- There is convincing evidence that regular moderate-to-vigorous physical activity can reduce the risk of colorectal cancer and probable evidence that it can reduce the risk of breast cancer.[3]
- In 2017, about half (51%) of Ontario adults did not meet the cancer prevention recommendations for physical activity defined as moderate-to-vigorous physical activity for 30 minutes or more each day.
- Based on data from the 2015-2017 CCHS, the prevalence of physical inactivity in Ontario adults ages 25 and older, for 2015 to 2017 combined, was significantly higher in:
    - men (49%) versus women (53%) (ages 18 and older, in 2017);
    - rural (48%) versus urban (51%) residents;
    - immigrants who have been in Canada less than 10 years (63%) or more than 10 years (56%) versus Canadian-born residents (47%);
    - people with lower (57.7%) versus higher (42.1%) household income.
    - people with high school (54%) or lower education (58%) versus post-secondary graduation (48%).
- On-reserve First Nations women were about half as likely to be physically active (27%) compared to off-reserve First Nations women (50%) and non-Indigenous women (48%).[5]
- On-reserve First Nations men (44%) were significantly less likely to be physically active than off-reserve First Nations men (60%) and non-Indigenous men (53%).[5]
- The prevalence of physical inactivity was similar among Métis and non-Indigenous adults.[7]

Exhibit 2.3 Prevalence of physical inactivity in Ontario

| Year | Women (%) | Men (%) | Overall (%) |
|---|---|---|---|
| 2015 | 55.0 | 47.9 | 51.5 |
| 2016 | 53.3 | 44.5 | 49.0 |
| 2017 | 53.0 | 48.6 | 50.9 |

Notes: Estimates are adjusted to the age distribution of the 2011 Canadian Standard population.
Physical inactivity (adults ages 18 years and older): respondents whose levels of physical activity do not meet the cancer prevention recommendation, defined as being moderately to vigorously physically active for 30 minutes or more each day.

## Prevalence of Inadequate Vegetable and Fruit Consumption

- Eating at least 5 servings of vegetables (excluding potatoes) and fruit each day has been shown to be a good marker of overall diet quality. Consuming fruit juice more than once daily was counted as consuming it only once. Consumption of plant foods that contain fibre and other nutrients, like non-starchy vegetables and fruit, can reduce the risk of certain cancers.[3]
- The proportion of Ontario adults ages 18 and older who ate vegetables and fruit fewer than 5 times a day increased from 75.3% in 2015 to 78.1% in 2017.
- Based on data from the 2015-2017 CCHS, the prevalence of inadequate vegetable and fruit consumption in Ontario adults ages 25 and older, for 2015 to 2017 combined, was higher in:
    - men (83%) versus women (74%) (ages 18 and older, in 2017 only);
    - people in the lowest household income quintile (82%) versus the highest household income quintile (74%).
    - people with less than secondary (86%) and secondary education (81%) versus post-secondary graduates (74%).
- On-reserve First Nations men (12%) and women (20%) were significantly less likely to consume at least 2 vegetables and 2 fruit per day compared to those living off-reserve (27% and 40%, respectively), and both groups had significantly lower vegetable and fruit consumption than non-Indigenous men (35%) and women (52%).[5]
- A similar proportion of Métis and non-Indigenous people consume fewer than 5 servings of vegetables and fruit per day.[7]

Exhibit 2.4 Prevalence of inadequate vegetable and fruit consumption in Ontario

| Year | Women (%) | Men (%) | Overall (%) |
|---|---|---|---|
| 2015 | 69.2 | 81.7 | 75.3 |
| 2016 | 71.4 | 84.6 | 77.7 |
| 2017 | 73.9 | 82.6 | 78.1 |

Notes: Estimates are adjusted to the age distribution of the 2011 Canadian Standard population.
Inadequate vegetable and fruit consumption (adults ages 18 and older): Respondents who reported eating vegetables (excluding potatoes) and fruit less than 5 times per day, with consumption of fruit juice more than once daily counted as consuming it only once.

## Prevalence of Excess Alcohol Consumption

- There is convincing evidence that excess alcohol consumption increases the risk of developing colorectal and post-menopausal breast cancers, and probable evidence that it increases the risk of developing pre-menopausal breast cancer.[3]
- In Ontario in 2010, 15.1% of colorectal cancer cases and 7.0% of female breast cancer cases could be attributed to drinking alcohol in excess of the cancer prevention recommendations (defined as more than two drinks per day for men and one drink per day for women).[4]
- Based on data from the 2015-2017 CCHS, the prevalence of Ontario adults ages 25 and older exceeding the cancer prevention recommendations for alcohol consumption for 2015 to 2017 combined did not vary by education level, but was higher in:
    - rural (12%) versus urban residents (8%);
    - people with the highest (14%) versus the lowest household income (4%);
    - Canadian-born residents (12%) versus immigrants who have been in Canada less than or equal to 10 years (2%) or more than 10 years (4%).
- First Nations men on-reserve (25%) and off-reserve (28%) were more likely to binge drink (5 or more alcoholic drinks on 1 occasion at least 2 to 3 times a month) compared to non-Indigenous men (19%). A similar pattern, although with lower prevalence, was observed for First Nations women on-reserve (14%) and off-reserve (11%) compared to non-Indigenous women (6%).[5]
- Inuit men living outside Nunangat (26%) and in Nunangat (20%) had a higher prevalence of binge drinking compared to non-Indigenous men (21%).[6]
- Binge drinking was similar between Inuit men living outside Nunangat (26%), in Nunangat (20%) and non-Indigenous men (21%). Inuit women living outside Nunangat (13%) and in Nunangat (also 13%) were significantly more likely to binge drink compared to non-Indigenous women (9%).[6]
- Métis men (15%) were significantly more likely than non-Indigenous men (10%) to exceed the cancer prevention guideline of no more than 2 alcoholic drinks per day, whereas there was no difference between Métis women (9.6%) and non-Indigenous women (8.5%) in exceeding the cancer prevention guideline of no more than 1 alcoholic drink per day for women.[7]

Exhibit 2.5 Prevalence of alcohol consumption exceeding cancer prevention recommendations in Ontario

| Year | Women (%) | Men (%) | Overall (%) |
|---|---|---|---|
| 2015 | 7.0 | 7.9 | 7.4 |
| 2016 | 7.9 | 8.7 | 8.3 |
| 2017 | 10.1 | 8.8 | 9.4 |

Notes: Estimates are adjusted to the age distribution of the 2011 Canadian Standard population. Alcohol consumption (adults ages 19 and older): Exceeding the cancer prevention recommendations defined as: more than 2 drinks per day for men and more than 1 drink per day for women.

## Prevalence of Tobacco Smoking

- Evidence confirms strong associations between tobacco smoking and the risk of nearly 20 types of cancer, including lung, cervical and colorectal cancers.[2]
    - In Ontario, in 2009, 71.0% of lung cancer cases and 10.7% of colorectal cancer cases could be attributed to smoking tobacco.[4]
    - Two percent of deaths from cervical cancer worldwide can be attributed to smoking, independent of HPV infection.[2,4]
- 17% of Ontario adults ages 20 and older self-reported tobacco smoking in 2017.
- Tobacco smoking prevalence has been declining in Ontario for at least 2 decades.[8]
- Based on data from the 2015-2017 CCHS, tobacco smoking in Ontario adults ages 25 and older for 2015 to 2017 combined was higher in:
    - men (21%) versus women (14%) (ages 20 and older, in 2017);
    - rural (22%) versus urban residents (17%);
    - people in the lowest household income quintile (27%) versus the highest household income quintile (13%);
    - people with less than secondary education (35%) and secondary graduates (26%) versus post-secondary graduates (14%);
    - Canadian-born residents (21%) versus immigrants who came to Canada more than 10 years ago (13%) and immigrants who have been in Canada less than or equal to 10 years (9%).
- The prevalence of smoking among on-reserve First Nations adults (50%) and teens (30%) was higher than those off-reserve (43% and 14%, respectively) and those who were non-Indigenous (22% and 4%, respectively).[5]
- The prevalence of cigarette smoking for off-reserve First Nations adults significantly decreased from 51% in 2007 to 39% in 2013.[5] (Data were unavailable for on-reserve First Nations adults).
- Smoking prevalence was higher for Inuit adults in Ontario (34%) compared to non-Indigenous adults (23%), although this was not statistically significant. Cigarette smoking was significantly more common in Inuit men and women living in Nunangat than Inuit living outside Nunangat or non-Indigenous Ontarians. Three quarters of Inuit men and women living in Nunangat reported smoking daily or occasionally.[6]
- Métis adults (36%) and teens (15%) had a higher prevalence of cigarette smoking compared with non-Indigenous adults (7.2%) and teens (7.2%).[7]
- Smoking rates among Métis adults decreased from 44% in 2007 to 32% in 2014.[7]

Exhibit 2.6 Prevalence of tobacco smoking in Ontario

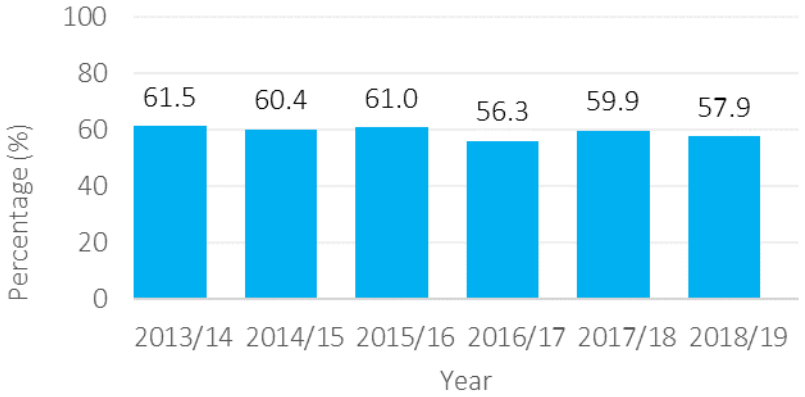
| Year | Women (%) | Men (%) | Overall (%) |
|---|---|---|---|
| 2015 | 15.4 | 21.7 | 18.5 |
| 2016 | 13.9 | 21.3 | 17.5 |
| 2017 | 13.6 | 20.5 | 17.0 |

Notes: Estimates are adjusted to the age distribution of the 2011 Canadian Standard population. Current smoking (adults ages 20 years and older): individuals who are daily or occasional smokers.

# Human Papillomavirus (HPV) Vaccination

- Among infectious agents associated with cancer, HPV accounts for the largest cancer burden in Ontario, an estimated 1,360 cases a year.[9] Evidence confirms strong associations between chronic infections from twelve high-risk HPV types and cervical cancer.[10]
- 57.9% of 12-year-old students received two doses of the HPV vaccine through the school-based immunization program by the end of the 2018/2019 school year; this has not changed substantially since the 2013/2014 school year.[11]
- The national target for HPV vaccination is 90% coverage of 17-year-olds by 2025 for school-based and other public health vaccinations efforts collectively.[12]
- This indicator was rated as room for improvement because Ontario has not achieved the national target.

Exhibit 2.7 Immunization coverage for HPV among students in Ontario, 2013/2014 to 2018/2019 school years




Notes:
Coverage estimates for school years are point-in-time estimates from previous Public Health Ontario annual reports and are not re-calculated, as new estimates are added for the current school year. Students who completed either a valid two-dose or three-dose series were considered up-to-date for all assessment years.

For 2013/14 to 2015/16 school years, HPV coverage estimates represent 13-year-old female cohorts.

For 2016/17 school year, HPV coverage estimate represents 12-year-old male and female cohorts combined.

For 2017/18 and 2018/19 school years, HPV coverage estimates all 12-year-old students (male, female, and unknown gender combined).

# 3. Breast Cancer

Exhibit 3.1 Breast cancer performance summary

| Care Continuum | Bright Spot | Room for Improvement | Not Rated |
|---|---|---|---|
| **Cancer Burden** | • 5-year relative survival | | • Incidence<br>• Mortality<br>• Prevalence |
| **Screening** | • Tissue biopsy for definitive diagnosis within 7 weeks of abnormal breast cancer screening test result<br>• Positive predictive value of screening mammograms | • Screen-eligible people with at least one mammogram in 30 months | |
| **Diagnosis** | • Stage at diagnosis | • Time from diagnosis to first treatment<br>• Stage 1 patients who received imaging to detect metastasis | • Time from suspicion to diagnosis |
| **Treatment** | • Mastectomy with immediate reconstruction<br>• Unplanned emergency department visits after surgery<br>• Unplanned readmissions after surgery | | • Mastectomy with delayed reconstruction<br>• Adjuvant radiation after mastectomy in patients with lymph node involvement<br>• Stage 1 (T1c)-3 and ER/PR/HER2-negative breast cancer patients who received (neo) adjuvant chemotherapy<br>• Stage 1 (T1C)-3 and HER2-positive breast cancer patients who received (neo) adjuvant chemotherapy with trastuzumab |
| **Survivorship Care** | • Mammogram after last local treatment | | |

## Breast Cancer Performance Summary

Bright spots for breast cancer include:

- Survival — 5-year relative survival has increased over time and was 88.4% for the period 2014-2018.
- Follow-up after an abnormal screening mammogram — 76.1% of people who had an abnormal mammogram result and needed a tissue biopsy for definitive diagnosis in 2019 were followed up within 7 weeks of their abnormal result.
- Positive predictive value of screening mammograms — 6.9% of screen-eligible people who had an abnormal screening mammogram result were diagnosed with breast cancer.
- Stage at diagnosis — 5.4% of breast cancers were diagnosed at stage 4. This percentage has increased slightly over time but is still lower than in other provinces.
- Immediate reconstruction following mastectomy — 21% of patients who underwent a mastectomy had immediate reconstruction and this percentage has increased over time.
- Unplanned emergency department visits and readmissions after surgery — 13% of patients had an unplanned ED visit and 2% were readmitted after being discharged from hospital post-surgery.

Areas with room for improvement include:

- Screening participation — 62.2% in 2018-2019 and has been stable since 2012-2013.
- Unnecessary imaging for metastasis in early-stage breast cancer — 48% in 2019 and although it has fallen over time, there is still room for improvement.
- Length of time from diagnosis to first treatment — median is 35 days and has remained stable since 2014.

The Breast Cancer Advisory Committee prioritized the following for improvement:

- Screening participation — has remained stable and there is opportunity to improve participation rates to reach the national target of greater than or equal to 70%.
- Diagnostic phase — long intervals for first presentation (suspicion) to diagnosis (median of 28 days in 2019) and diagnosis to treatment (median of 35 days in 2018).
- Systemic treatment for HER2-positive and triple-negative breast cancer — need to improve access to evidence-based neo-adjuvant therapy and ensure biomarkers are performed on core biopsies to inform treatment decisions.

# Cancer Burden

## Incidence, Mortality and Prevalence

- Breast cancer is the most commonly diagnosed cancer among women in Ontario. Approximately 10,000 people are diagnosed with breast cancer in Ontario each year.[13]
- The incidence rate was 155.7 cases per 100,000 people in 2018 and has remained stable since 2014.
- Breast cancer was also the most commonly diagnosed cancer among First Nations women from 1991-2010, accounting for over 900 new cancer cases.[14]
- Although age-adjusted breast cancer incidence rates among First Nations people have historically been lower than those of other people in Ontario, the rates have increased over time and in 2010, were approaching those of other people in Ontario (Exhibit 3.4).[14]
- Ontario's projected age-standardized incidence rate (ASIR) was the highest of the provinces based on Canadian Cancer Statistics (2019):
    - ASIR was 128.0 for all of Canada (excluding Quebec);
    - the range was 116.8 in New Brunswick to 131.7 in Ontario. [15]
- The mortality rate was 23.7 deaths per 100,000 people in 2018 and has decreased from 25.4 per 100,000 in 2014.
- Breast cancer was the second most common cause of cancer death in both First Nations women and other women in Ontario in the 1990 to 2010 time period. Age-adjusted mortality was lower for First Nations people compared to other people (16 and 19 per 100,000 respectively).[14]
- Ontario's projected age-standardized mortality rate (ASMR) was in the middle of the range of provincial rates reported in Canadian Cancer Statistics (2019):
    - ASMR was 21.8 for Ontario;
    - ASMR was 22.4 for Canada;
    - the range was 16.6 in Prince Edward Island to 26.6 in Newfoundland.[15]
- The number of people living with breast cancer (prevalence) has increased due to decreasing mortality.
- Incidence, mortality and prevalence were not rated because comparisons with other jurisdictions require all three rates to be standardized to the same population and these comparators are not available for all disease sites. Rates from the United States are available but only include data from registries that participate in the Surveillance, Epidemiology and End Results (SEER) program, which covers approximately 34.6% of the US population.[16]

## Exhibit 3.2 Breast cancer incidence and mortality

| Year | Incidence rate per 100,000 | Incident cases | Mortality rate per 100,000 | Deaths |
|---|---|---|---|---|
| 2014 | 154.9 | 9,561 | 25.4 | 1,959 |
| 2015 | 152.8 | 9,539 | 24.8 | 1,941 |
| 2016 | 153.1 | 9,826 | 25.6 | 2,039 |
| 2017 | 152.0 | 9,902 | 25.1 | 2,079 |
| 2018 | 155.7 | 10,305 | 23.7 | 2,003 |

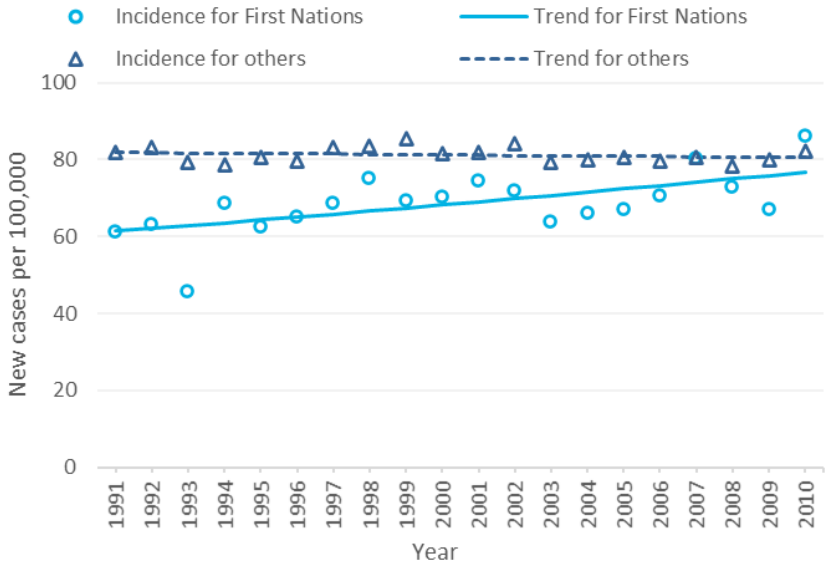
Note: Standardized to Segi (1960) World Population.

## Exhibit 3.3 Breast cancer prevalence

| Year | Prevalence rate per 100,000 | Prevalent cases |
|---|---|---|
| 2014 | 1,062 | 73,697 |
| 2015 | 1,085 | 75,918 |
| 2016 | 1,104 | 78,241 |
| 2017 | 1,118 | 80,365 |
| 2018 | 1,136 | 82,928 |

Note: Standardized to Segi (1960) World Population.
Prevalence is calculated for January 1 of the following calendar year.

## Exhibit 3.4 Age-adjusted breast cancer incidence in First Nations people compared with other people in Ontario




Note: Data table is available in the Technical Supplement.

## Survival

- Observed 5-year survival for breast cancer has increased over time to 82.4% for the period 2014-2018 from 80.4% a decade earlier. Relative survival was 88.4% in 2014-2018. (Relative survival compares survival in people with breast cancer with those without breast cancer and is also referred to as net survival.)
- Ontario's relative survival rate for breast cancer is comparable to rates reported in other provinces and the United States:
    - Canadian Cancer Statistics (2019) reported age-standardized predicted 5-year net survivals for 2012 to 2014 of:
        - 88% for Ontario;
        - 88% for Canada (excluding Quebec);
        - a range of 85% in Prince Edward Island and Newfoundland and Labrador to 90% in Alberta.[15]
    - The North American Association of Central Cancer Registries reported age-standardized 5-year net survivals for the period 2011-2017 of:
        - 87.7% for Ontario;
        - 87.9% for Canada (excluding Quebec);
        - a range of 85.7% in Newfoundland and Labrador to 89.7% in Alberta;
        - 89.7% for the United States.[17]
- The percentage of women with breast cancer surviving 5 years or more was similar for First Nations women (73%) compared with other women in Ontario (77%) in 1991 to 2010.[14]
- Breast cancer survival is rated as a bright spot as Ontario's relative survival rate is in line with the Canadian rate and is improving over time.

Exhibit 3.5 Breast cancer observed and relative survival

| Time period | Observed survival (%) | Relative survival (%) |
|---|---|---|
| 2004 to 2008 | 80.4 | 86.3 |
| 2014 to 2018 | 82.4 | 88.4 |

# Screening

## Screening Participation

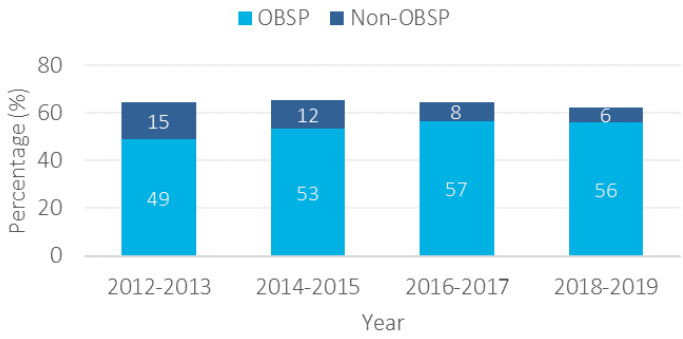
- Regular mammography screening is important for detecting breast cancer early when it is less likely to have spread to other parts of the body and when treatments may be more effective.
- For people ages 50 to 74, regular mammography screening can lower the chance of dying from breast cancer.[18]
- Of the 2.2 million screen-eligible women in 2018-19, about 1.4 million (62.2%) were screened for breast cancer with a mammogram. Of those screened, 90.6% were screened through the Ontario Breast Screening Program (OBSP). Of all people screened for breast cancer, the proportion screened through the OBSP increased from 76.3% in 2012–2013 to 90.6% in 2018–2019,
- Overall screening participation decreased slightly from 64.5% in 2016–2017 to 62.2% in 2018-2019. Although participation decreased, 163,858 more women were screened in 2018-2019 compared to 2012-2013. Because the 30-month reporting period for 2018-2019 extends to June 2020, participation may have been impacted by the directive issued by Ontario's Chief Medical Officer of Health to defer non-emergent health care services during wave 1 of the COVID-19 pandemic, including cancer screening.
- This indicator was rated as room for improvement because performance is below the national target of greater than or equal to 70%.

Exhibit 3.6 Age-adjusted percentage of screen-eligible women (ages 50 to 74) in Ontario with at least one mammogram in a 30-month period

| Year | Women with at least one mammogram in 30 months (%) | Women with at least one mammogram in 30 months (N) | Screen-eligible women |
|---|---|---|---|
| 2012 to 2013 | 64.4 | 1,223,074 | 1,900,105 |
| 2014 to 2015 | 65.3 | 1,325,549 | 2,028,262 |
| 2016 to 2017 | 64.5 | 1,379,106 | 2,136,583 |
| 2018 to 2019 | 62.2 | 1,386,932 | 2,225,120 |

Note: The OBSP recommends that most participants get screened for breast cancer every two years (24 months). This indicator uses a 30-month measurement period to allow participants 6 additional months to complete a mammogram.

Exhibit 3.7 Age-adjusted percentage of screen-eligible women (ages 50 to 74) in Ontario with at least one mammogram in a 30-month period, grouped by OBSP vs non-OBSP




Note: Data table is available in the Technical Supplement.

## Screening Follow-Up

- For every 200 people screened in the OBSP, about 18 are sent for more tests and only one of those will have breast cancer. Not having timely and appropriate follow-up can lead to delays in diagnosis and appropriate treatment and can cause stress for patients and their families.
- In 2019, 76.1% of the 9,483 people who had an abnormal OBSP mammogram result and needed a tissue biopsy for a definitive diagnosis were diagnosed within 7 weeks of their abnormal result.
- This has decreased slightly from 79.7% in 2016.
- The national target is greater than or equal to 90%.
- This indicator was rated as a bright spot as performance is consistently high.

Exhibit 3.8 Percentage of screen-eligible people (ages 50 to 74) in Ontario with abnormal screening mammogram requiring biopsy who were diagnosed within 7 weeks of abnormal screen date

| Year | Diagnosed within 7 weeks of abnormal screen (%) | Diagnosed within 7 weeks (N) | Abnormal screen (ages 50 to 74) |
|---|---|---|---|
| 2016 | 79.7 | 6,414 | 8,052 |
| 2017 | 77.9 | 6,637 | 8,523 |
| 2018 | 77.2 | 7,084 | 9,172 |
| 2019 | 76.1 | 7,212 | 9,483 |

## Screening Quality

- The positive predictive value (PPV) of screening mammography is the likelihood that a participant with an abnormal OBSP screening mammogram result has breast cancer.
- In 2019, 6.9% (PPV) of the 59,399 screen-eligible people who had an abnormal OBSP screening mammogram result were diagnosed with breast cancer.
- As disease prevalence in the screened population increases, so does the PPV of a screening test. Breast cancer prevalence increases with age, so an older screen-eligible population may contribute to a higher PPV.
- The positive predictive value of screening mammography was rated as a bright spot as performance has been consistently high.

Exhibit 3.9 Breast cancer screening (mammogram) positive predictive value

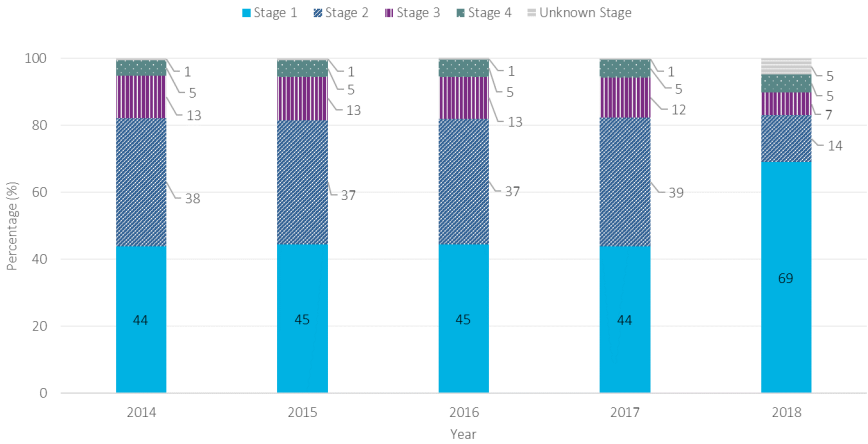
| Year | Diagnosed with breast cancer after abnormal mammogram (%) | Diagnosed with breast cancer (N) | Screen-eligible women with abnormal mammogram |
|---|---|---|---|
| 2016 | 6.5 | 3,447 | 52,982 |
| 2017 | 6.5 | 3,679 | 56,623 |
| 2018 | 6.6 | 3,865 | 58,998 |
| 2019 | 6.9 | 4,114 | 59,399 |

# Diagnosis

## Stage at Diagnosis

- Knowing a patient's clinical cancer stage at diagnosis helps physicians plan appropriate treatment and determine the likely outcome or course of the disease.[19] Tracking the distribution of cancer stages helps cancer agencies evaluate the effectiveness of screening programs and prioritize resources for cancers with higher incidence of advanced disease.[20]
- In 2018, 5.4% of people diagnosed with breast cancers were diagnosed with stage 4 disease; this percentage has increased slightly over time.
- The Canadian Cancer Statistics special report on cancer incidence by stage reported that the percentage of cancer patients who were diagnosed with stage 4 disease varied from 4% in the Northwest Territories to 7% in Saskatchewan (compared to 4.5% in Ontario, in their study); the Canadian average (excluding Quebec) was 4.9%.[21]
- Unpublished results from Module 4 (root causes of cancer diagnosis and treatment delay) of the International Cancer Benchmarking Partnership (ICBP) study found that the proportion of women diagnosed with stage 4 breast cancer in Ontario was among the lowest across participating jurisdictions.
- This indicator was rated as a bright spot because Ontario's percentage of breast cancers diagnosed at stage 4 was lower than other provinces' percentages and similar to the Canadian average.

Exhibit 3.10 Distribution of incident breast cancer cases by stage at diagnosis

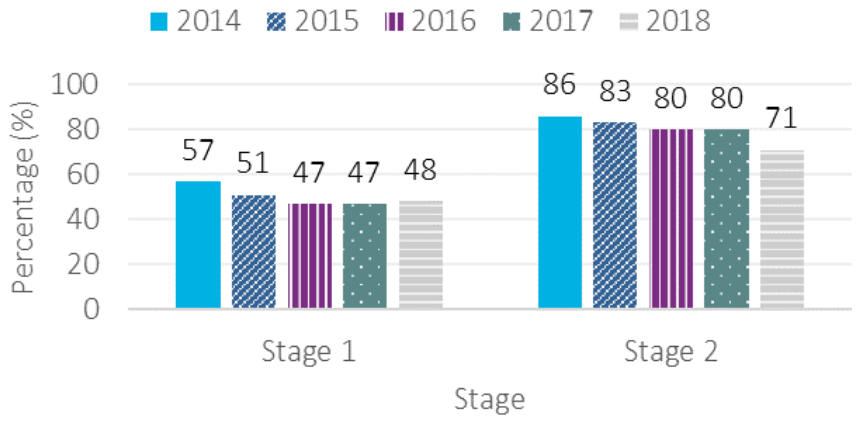



Notes: Unknown stage may be due to limited stage workup or limited documentation within the patient record.
The shift in stage distribution in 2018 was primarily the result of the implementation of the 8th Edition of the American Joint Committee on Cancer (AJCC) Cancer Staging Manual.
Data table is available in the Technical Supplement.

## Imaging Tests for Distant Metastasis in Early-Stage Breast Cancer

- In general, imaging to detect distant metastasis is not recommended for early-stage (stages 1 and 2) breast cancer patients with no symptoms of metastatic disease. This extra imaging does not improve patient care and may delay treatment while the patient undergoes testing.
- 48% of women diagnosed with stage 1 breast cancer received at least 1 imaging test for distant metastasis in 2018.
- This was higher than in one Alberta study (29%)[22] and two US studies (12%[10] and 22%[23]).
- The European Society of Breast Cancer Specialists has set a target of 1% for stage 1 or primary operable stage 2 breast cancer patients receiving imaging for metastasis.[24] Ontario's Breast Cancer Advisory Committee felt that 99% was too high and agreed it may be appropriate for 5-10% of stage 1 breast cancer patients to receive imaging if symptoms are present.
- This indicator was rated as room for improvement although the percentages are declining over time, because Ontario is still well above the percentages reported in other jurisdictions.

Exhibit 3.11 Early-stage (stage 1 and 2) breast cancer patients who received at least one imaging test during staging

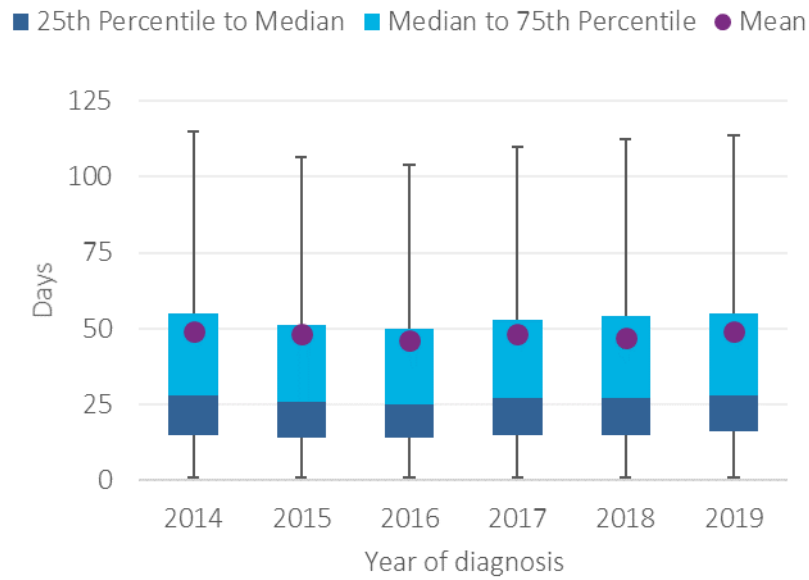



Notes: Shift in stage distribution in 2018 was the result of the implementation of the 8th Edition of the American Joint Committee on Cancer (AJCC) Cancer Staging Manual.
Data table is available in the Technical Supplement.

## Time From First Presentation (Suspicion) to Diagnosis

- In 2019, the median time from first presentation to diagnosis of breast cancer was 28 days.
- Although there was a slight decrease to 25 days in 2016, there has been little change over time.
- Unpublished results from Module 4 of the International Cancer Benchmarking Partnership, which used similar methodology, showed that Ontario had one of the longest diagnostic intervals among participating jurisdictions.
- While the target for time from an abnormal screen to diagnosis is 7 weeks when a biopsy is performed, there is no provincial or national standard for this indicator for people who present to the health care system with symptoms. However, the NHS England has set a target of 28 days from 'referral' to 'being told the results' (the Faster Diagnosis Standard).[25]
- Variation in the definition of the diagnostic interval (e.g., starting at patient-identified symptom observation, first visit, or first imaging) and methods make comparisons and rating this indicator difficult.
- For the CSQI, we defined the diagnostic interval as the time from first presentation to the health care system for a cancer-related encounter to diagnosis, which is consistent with the Aarhus Statement, a series of definitions and recommendations for defining time intervals in the cancer pathway.[26]
- This indicator was not rated but may be rated in the near future when the Canadian Partnership Against Cancer publishes provincial data on this indicator.

Exhibit 3.12 Time from first presentation to diagnosis of breast cancer

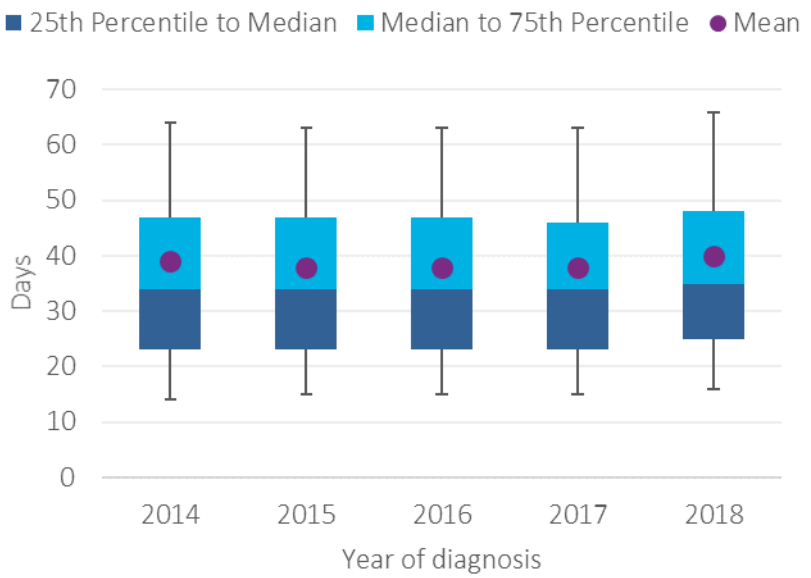



Notes: Range is the 10th to 90th percentiles.
Data table is available in the Technical Supplement.

## Time From Diagnosis to First Treatment

- The median time from diagnosis to first treatment for breast cancer was 35 days in 2018 and has remained stable since 2014.
- Unpublished results from Module 4 of the International Cancer Benchmarking Partnership showed that Ontario had one of the longest pre-treatment intervals among participating jurisdictions. The treatment interval in the study was defined as time from diagnosis to first treatment.
- The median treatment interval (diagnosis to receipt of definitive therapy) in a US study was 32 days for the period 2004 to 2015.[27]
- No targets have been set for this indicator in Ontario or Canada.
- England, Scotland and Northern Ireland have set a target of 31 days from 'decision to treat' to 'start of treatment';[25] Australia has set targets based on the treatment type (e.g., surgery should occur within one month of decision to treat);[28] and the European Society of Breast Cancer Specialists has set a target that 90% of patients should be treated within 6 weeks of their first diagnostic examination date.[24]
- Although there is no target for Ontario and differences in methods and definitions make jurisdictional comparisons problematic, there was consensus to rate this indicator as room for improvement.

Exhibit 3.13 Time from diagnosis to first treatment for breast cancer




Notes: Range is the 10th to 90th percentiles.
Data table is available in the Technical Supplement.

# Treatment

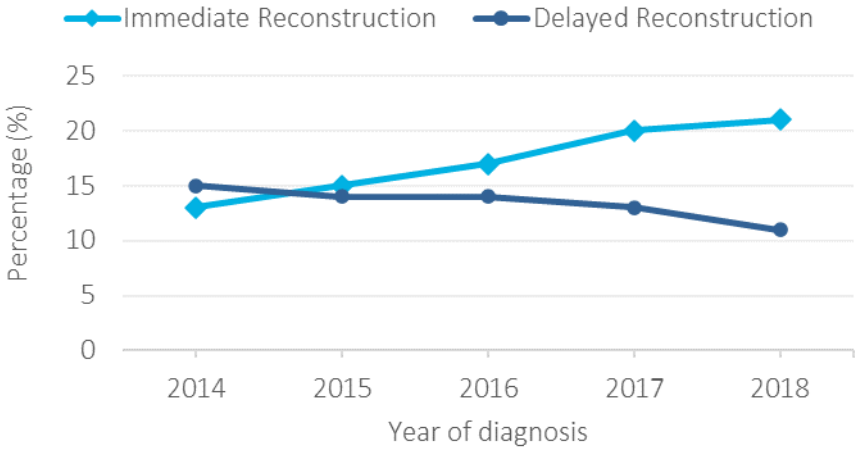
## Reconstruction After Mastectomy - Immediate

- Immediate breast reconstruction after mastectomy results in a better cosmetic outcome and better quality of life for eligible patients compared to delayed reconstruction.[29,30]
- In 2018, 21% of patients who underwent a mastectomy received immediate reconstruction; this percentage increased from 13% in 2014.
- The Ontario percentage is lower than that of Manitoba (31%)[31] and slightly higher than that of New South Wales, Australia (19%).[32]
- There is no target set for this indicator in Ontario.
- The European Society of Breast Cancer Specialists has set a target of 40%[24] and Scotland has set a target of 25%.[33]
- Although Ontario falls below the targets set in Europe, the percentage has been increasing steadily and the consensus was to rate this indicator as a bright spot.

## Reconstruction After Mastectomy - Delayed

- Delayed reconstruction decreased slightly from 14% in 2015 to 11% in 2018; this may be due to the increase in immediate reconstruction.
- Over time, the time to delayed reconstruction has decreased. In 2018, almost all patients who underwent delayed reconstruction did so within two years of their mastectomy. (Data not shown.)
- We could not find population-level comparators for this indicator; however, the Australian study cited above reported a crude delayed breast reconstruction rate of 6% within two years of mastectomy and a median time to delayed breast reconstruction of approximately 15 months.[32]
- This indicator was not rated because we were unable to find comparators or targets from other jurisdictions and it is uncertain what an ideal rate would be, especially with the increase in immediate reconstruction.

Exhibit 3.14 Mastectomy patients with immediate and delayed reconstruction

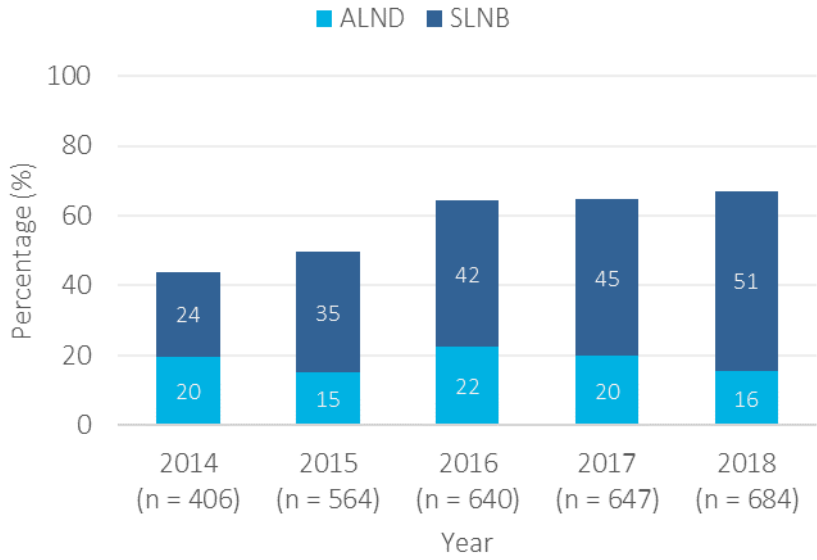



Notes: Immediate reconstruction is within 1 year of diagnosis and delayed reconstruction is within 2 years.
Data table is available in the Technical Supplement.

## Adjuvant Radiation After Mastectomy in Patients With Lymph Node Involvement

- Radiotherapy after mastectomy has been found to reduce local recurrence and improve survival for women with nodal involvement.[34]
- 67% of women with nodal stage greater than or equal to N1 after mastectomy with axillary lymph node dissection (ALND) or sentinel lymph node biopsy (SLNB) received adjuvant radiation in 2018.
- This is an increase of 23% since 2014.
- In Kentucky, of the women with 'N2/N3 nodal disease' who underwent a mastectomy between 2006 and 2015, 67% received adjuvant radiation within one year.[35]
- Ontario does not have a target for this indicator.
- The European Society of Breast Cancer Specialists (EUSOMA) has set a target of 85% for patients with involvement of up to three axillary lymph nodes (pN1).[24]
- This indicator was not rated due to a lack of comparators.

Exhibit 3.15 Patients with lymph node involvement who received adjuvant radiation after mastectomy




Notes: Patients who had SLNB and ALND are included in ALND category.
Data table is available in the Technical Supplement.

## Unplanned Emergency Department Visits and Readmissions Within 30 Days of Discharge From Hospital Post-Surgery

- Unplanned emergency department visits and readmissions provide insight into complications and adverse events following cancer surgeries. Common problems include bleeding, infection, pain and slow recovery of other body functions.[24] Although some complications may require the patient to return to the hospital for unscheduled visits, others may be appropriately managed in different ways.
- In 2019, 13% of patients who had surgery for breast cancer visited the emergency department and 2% were readmitted within 30 days of discharge.
- These rates have remained stable over time.
- The American College of Surgeons National Surgery Quality Improvement Project reported that 3.2% of patients who underwent breast surgery were readmitted within 30 days between 2011 and 2015.[36]
- Ontario does not have targets for these indicators.
- Based on consensus and the low percentages, both indicators were rated as bright spots.

Exhibit 3.16 Unplanned emergency department visits or readmissions within 30 days of discharge from hospital post-surgery: breast cancer

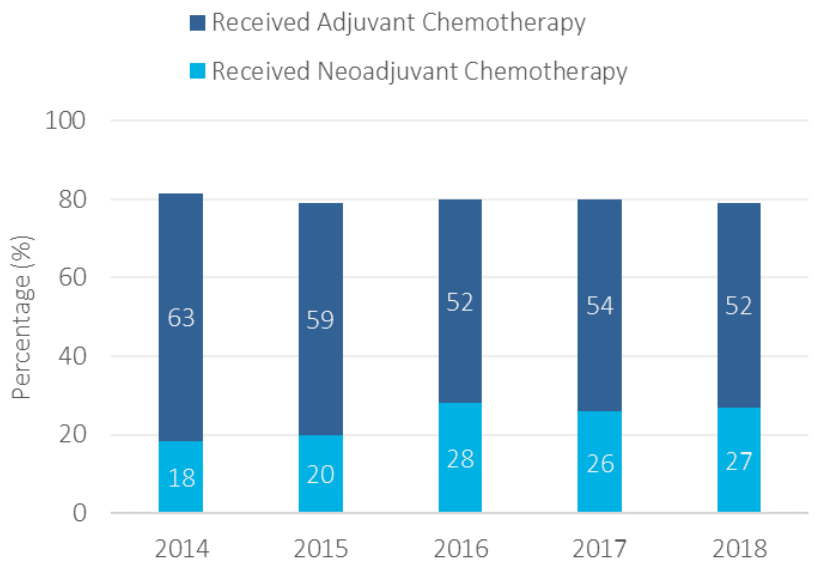
| Year | Unplanned emergency department visits (%) | Readmissions (%) | Patients who had surgeries |
|---|---|---|---|
| 2014 | 14 | 3 | 9,089 |
| 2015 | 13 | 2 | 9,084 |
| 2016 | 13 | 2 | 9,287 |
| 2017 | 13 | 2 | 9,447 |
| 2018 | 13 | 2 | 9,764 |
| 2019 | 13 | 2 | 9,977 |

## (Neo) Adjuvant Chemotherapy for ER/PR/HER2 Negative Stage 1 (T1c) -3 Breast Cancer

- Breast cancer treatment varies considerably depending on the specific type, stage and other factors. These two indicators measuring (neo) adjuvant chemotherapy and (neo) adjuvant chemotherapy with trastuzumab were selected because there are clear treatment guidelines for triple negative and HER2 positive breast cancers.

- In 2018, 79% of women with early-stage, triple-negative breast cancer received (neo) adjuvant chemotherapy.
- This rate has remained stable over time.
- The European Society of Breast Cancer Specialists (EUSOMA) has set a target of 95% but only for estrogen receptor-negative patients and for receipt of adjuvant chemotherapy only.[24]
- Although consensus was that these rates are good, the indicator was not rated because we could not find comparators and it is unclear what the target should be.

Exhibit 3.17 (Neo) adjuvant chemotherapy for ER/PR/HER2 negative stage 1 (T1c)-3 breast cancer



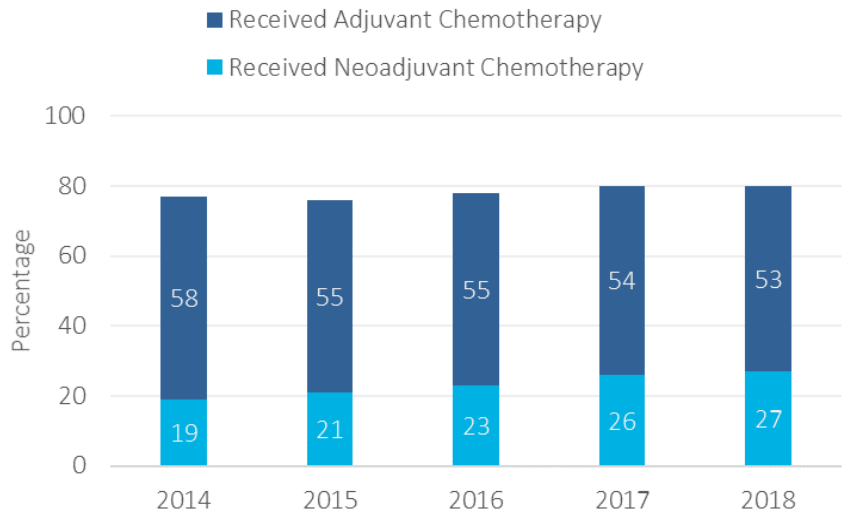

Notes: Patients who received both neo-adjuvant and adjuvant chemotherapy are included in the neo-adjuvant group.
Data table is available in the Technical Supplement.

## (Neo) Adjuvant Chemotherapy With Trastuzumab for Stage 1(T1c)-3 HER2 Positive Breast Cancer

- The addition of trastuzumab to primary chemotherapy improves overall survival in HER2 positive breast cancer.[24]
- In 2018, 81% of women with early-stage HER2 positive breast cancer in Ontario received (neo) adjuvant trastuzumab.
- The rate has remained stable over time.
- Ontario's rate is lower than that of the Netherlands (92%).[26]
- EUSOMA has set a target that 95% of patients with HER2 positive invasive carcinoma treated with neoadjuvant chemotherapy receive neoadjuvant trastuzumab.[24] However, the EUSOMA target suggests that nearly all patients who received chemotherapy should receive trastuzumab; whereas, we exclude T1A and T1B patients as they were not included in the clinical trials.
- Due to a lack of comparators, this indicator was not rated.

Exhibit 3.18 (Neo) adjuvant chemotherapy with trastuzumab for stage 1 (T1c) to stage 3 HER2-positive breast cancer

| Year | Received trastuzumab (%) | Received trastuzumab (N) | Stage 1(T1C)-3 and HER2+ |
|---|---|---|---|
| 2014 | 77 | 869 | 1,125 |
| 2015 | 76 | 878 | 1,154 |
| 2016 | 78 | 932 | 1,198 |
| 2017 | 80 | 864 | 1,075 |
| 2018 | 81 | 926 | 1,148 |




Notes: Patients who received both neo-adjuvant and adjuvant chemotherapy are included in the neo-adjuvant group.
Data table is available in the Technical Supplement.

# Survivorship Care

## Follow-Up Mammogram After Breast Cancer Treatment

- Among breast cancer patients who had their last local treatment from 2014-2018, over 80% received at least 1 mammogram in their 1st and 2nd follow-up years.
- For this indicator, patients were excluded from further analysis if they were diagnosed with a new cancer or new instances of local treatment (radiation or surgery) were observed during the follow-up period. Cancer patients with stage 4 or unknown stage were also excluded.
- Significant variation in guideline-based surveillance for recurrence (defined as receipt of one mammogram, breast ultrasound, or breast MRI per follow-up year) has been reported between British Columbia, Manitoba, Ontario and Nova Scotia.[37] In all provinces, the majority of breast cancer survivors received guideline-based surveillance in each year, with adherence being the highest in Ontario.
- In the United States, 80% (1-year of follow-up) to 86% (5-years of follow-up) of cancer patients received a mammogram during the 13-month period following their index surgery.[38]
- This indicator was rated as a bright spot because the percentage has remained stable over time and Ontario is performing better than other provinces and only slightly worse than the US.

Exhibit 3.19 Follow-up mammograms after breast cancer treatment, by follow-up year

| Year of last local treatment | 1st follow-up year (%) | 2nd follow-up year (%) | 3rd follow-up year (%) | 4th follow-up year (%) | 5th follow-up year (%) |
|---|---|---|---|---|---|
| 2014 | 83 | 83 | 81 | 78 | 75 |
| 2015 | 83 | 83 | 80 | 77 | |
| 2016 | 82 | 82 | 79 | | |
| 2017 | 81 | 81 | | | |
| 2018 | 82 | | | | |

# 4. Cervical Cancer

Exhibit 4.1 Cervical cancer performance summary

| Care Continuum | Bright Spot | Room for Improvement | Not Rated |
|---|---|---|---|
| **Cancer Burden** | • 5-year relative survival | | • Incidence<br>• Mortality<br>• Prevalence |
| **Screening** | • Colposcopy or definitive treatment within 6 months of high-grade abnormal cervical cytology (Pap) test result | • 1 cervical cytology (Pap) test in 42 months<br>• Subsequent cervical cytology (Pap) test within 42 months of normal result | |
| **Diagnosis** | • Stage at diagnosis | • Time from diagnosis to first treatment | • Patients who received pre-treatment MRI |
| **Treatment** | • Time from start of radiation therapy to completion<br>• Surgeries performed by a gynecologic oncologist<br>• Unplanned readmissions after surgery | • Patients who received definitive radiotherapy with concurrent platinum-based chemotherapy (cisplatin)<br>• Unplanned emergency department visits after surgery | • Surgeries performed using "open" techniques |

## Cervical Cancer Performance Summary

Bright spots for cervical cancer include:

- For First Nations people, the incidence of cervical cancer dropped significantly from 20.4 cases per 100,000 people in 1991-1992 to 7.4 cases per 100,000 people in 2009-2010.
- Five-year relative survival has improved between 2004-2008 (66.9%) and 2014-2018 (69.9%).
- Follow-up within 6 months of high-grade abnormal cervical cytology test result — 85.7% of patients received colposcopy or definitive treatment in 2019.
- Stage at diagnosis — 8.1% of patients were diagnosed at stage 4, which is lower than in other provinces, and the percentage diagnosed at stage 1 has increased from 64% in 2014 to 83% in 2019.
- Time from start of radiation therapy to completion — 92% of patients completed radiation therapy within 56 days.
- Surgeries performed by a gynecologic oncologist — 83% of surgeries and percentage has increased over time.
- Unplanned readmissions after surgery — 4% of patients affected, with a reduction of more than 50% over 5 years, and currently similar to US rates.

Areas with room for improvement include:

- HPV immunization coverage — 57.9% of the grade 7 cohort was fully vaccinated during the 2018/2019 school year — the target population for HPV vaccination has changed over time making time trends difficult to evaluate.
- Screening participation — 57.4% of screen-eligible people in Ontario had at least one cervical cytology (Pap) test in 42 months in 2017–2019 and this percentage decreased from 67.0% in 2008–2010.
- Screening retention — 58.3% of screen-eligible people who had a normal cervical cytology (Pap) test result had a subsequent Pap test within 42 months in 2016 and this percentage decreased from 62.3% 2013.
- Time from diagnosis to first treatment — median is 63 days and increased by 9 days over five years.
- Unplanned emergency department visits after surgery — 21% of patients affected and although it has dropped over time, it is still high.

The Gynecologic Cancers Advisory Committee prioritized the following for improvement:

- HPV immunization coverage — there is opportunity to improve vaccine uptake and address vaccine hesitancy to work toward the national target of 90% of 17-year-olds being fully vaccinated for HPV.
- Screening participation and retention — further efforts are required to improve cervical screening participation and retention.

# Cancer Burden

## Incidence, Mortality and Prevalence

- Cervical cancer is an uncommon cancer in Ontario: it is the 17th most common cancer among women and there are approximately 600 new cases each year. Worldwide, cervical cancer has the 4th highest incidence rate of all cancers among women.[13]
- The incidence rate increased from 9.9 cases per 100,000 people in 2014 to 12.1 cases per 100,000 people in 2018.
- The incidence of cervical cancer among First Nations people was higher than that for other women (11.0 versus 6.9 cases per 100,000 people between 1991 and 2010). However, the rate for First Nations people has decreased from 20.4 cases per 100,000 people in 1991-1992 to 7.4 cases per 100,000 people in 2009-2010, which are the most recent data available (Exhibit 4.4).[14]
- Ontario's projected age-standardized incidence rate (ASIR) was the same as the national rate based on the Canadian Cancer Statistics (2019)[15]:
    - ASIR was 7.2 for Ontario (standardized to Canadian population and, therefore, different from CSQI rate);
    - ASIR was 7.2 for all of Canada combined (excluding Quebec);
    - the range was 4.8 in New Brunswick to 11.4 in Newfoundland.
- The age-standardized mortality rate decreased from 2.7 deaths per 100,000 people with cervical cancer in 2016 to 2.1 deaths per 100,000 people with cervical cancer in 2018.
- Ontario's projected age-standardized mortality rate (ASMR) was the same as the national rate based on the Canadian Cancer Statistics (2019)[15]:
    - ASMR was 2.0 for Ontario;
    - ASMR was 2.0 for all of Canada combined;
    - the range was 0.8 in Newfoundland to 3.7 Saskatchewan.
- Prevalence has remained steady: decreasing mortality rates are being offset by increasing incidence rates.

Exhibit 4.2 Cervical cancer incidence and mortality

| Year | Incidence rate per 100,000 | Incident cases | Mortality rate per 100,000 | Deaths |
|---|---|---|---|---|
| 2014 | 9.9 | 494 | 2.6 | 165 |
| 2015 | 11.2 | 547 | 2.8 | 159 |
| 2016 | 11.6 | 576 | 2.7 | 172 |
| 2017 | 11.6 | 574 | 2.3 | 153 |
| 2018 | 12.1 | 605 | 2.1 | 143 |

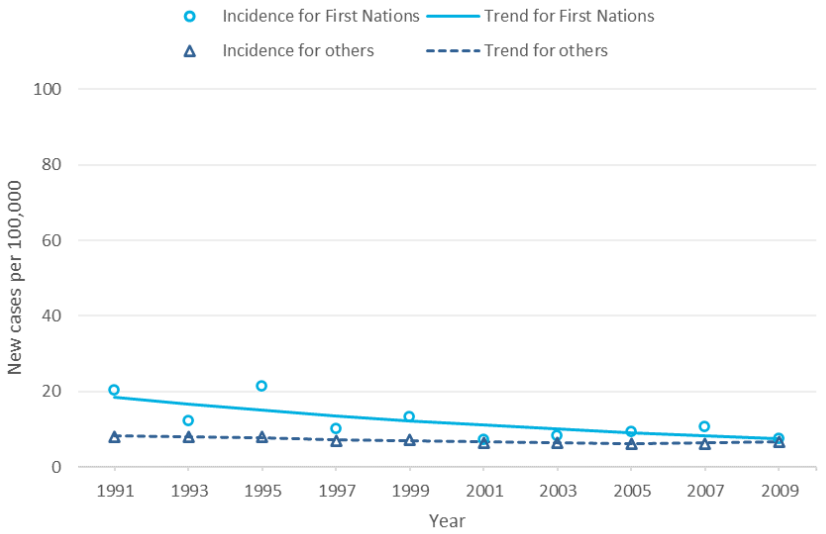
Note: Standardized to Segi (1960) World Population.

## Exhibit 4.3 Cervical cancer prevalence

| Year | Prevalence per 100,000 people | Prevalent cases |
|---|---|---|
| 2014 | 59 | 4,094 |
| 2015 | 59 | 4,121 |
| 2016 | 58 | 4,158 |
| 2017 | 58 | 4,195 |
| 2018 | 59 | 4,298 |

Note: Standardized to Segi (1960) World Population.
Prevalence is calculated for January 1 of the following calendar year.

## Exhibit 4.4 Age-adjusted cervical cancer incidence in First Nations women compared with other women in Ontario




Note: Data table is available in the Technical Supplement.

## Survival

- Over the past decade, 5-year observed and relative survival for cervical cancer has improved, 74.2% and 69.9%, respectively, for 2014-2018.
- First Nations people had poorer cervical cancer survival compared to other people: 56% compared to 68% survival among people with a cervix ages 15 to74 for 1991 to 2009.[14] (Rates are different from above due to different ages included and different standard populations used.)
- Although cervical cancer survival in Ontario is lower than the national average (72% for 2012-2014)[14], it is among the highest of the 71 countries participating in CONCORD-3, a large international study (range 50%-70% for 2012 to 2014)[39].
- This indicator was rated as a bright spot because it has shown some improvement over time and is higher than other jurisdictions. Further analysis of recent data is required to understand lower survival rates among First Nations people compared to other people in Ontario.

Exhibit 4.5 Cervical cancer observed and relative survival

| Time period | Observed survival (%) | Relative survival (%) |
|---|---|---|
| 2004 to 2008 | 71.2 | 66.9 |
| 2014 to 2018 | 74.2 | 69.9 |

# Screening

## Screening Participation

- Regular cervical screening, in alignment with the recommended screening age and interval, can find abnormal cells that could become cancer (called pre-cancer). Finding pre-cancer and treating it can prevent people with a cervix from getting cervical cancer.
- 57.4% of the 4.6 million screen-eligible people in Ontario had at least one cervical cytology (Pap) test in the 42-month period of 2017 to 2019.
- Between the 2008 to 2010 period and the 2017 to 2019 period, participation in cervical screening decreased from 67.0% to 57.4%.
- Two important factors have likely contributed to the observed decrease. The first is the extension of the recommended screening interval from 1 year to 3 years in 2011. The second is the impact of the COVID-19 pandemic. Because the reporting period for 2017-2019 extends to June 2020 and cervical screening requires in-person visits to a primary care provider, the emergence of COVID-19 in Ontario at the beginning of 2020 would have impacted the participation rate in the 2017–2019 reporting period.
- This indicator was rated as room for improvement because of the decrease over time.

Exhibit 4.6 Age-adjusted percentage of screen-eligible women (ages 21 to 69) in Ontario who completed at least one cytology (Pap) test in a 42-month period

| Year | Screened (%) | Screened (N) | Eligible for screening |
|---|---|---|---|
| 2008 to 2010 | 67.0 | 2,749,146 | 4,073,174 |
| 2011 to 2013 | 64.6 | 2,743,279 | 4,236,781 |
| 2014 to 2016 | 61.1 | 2,702,255 | 4,433,146 |
| 2017 to 2019 | 57.4 | 2,658,121 | 4,643,394 |

## Screening Retention

- 58.3% of screen-eligible people who had a normal cervical cytology (Pap) test result in 2016 had a subsequent cervical cytology test within 42 months.
- From 2013 to 2016 the rate varied from 62.3% to 58.3%. Although the percentage varied over time, an average of 1,300 more screen-eligible people were retained each year from 2013 to 2016.
- Two important factors have likely contributed to performance on this indicator. The first is the extension of the recommended screening interval from 1 year to 3 years in 2011. The second is the impact of the COVID-19 pandemic. Because the reporting period for this measure extends to June 2020 and cervical screening requires in-person visits to a primary care provider, the emergence of COVID-19 in Ontario at the beginning of 2020 would have impacted the retention rate in the 2017–2019 reporting year.
- Screening retention is important for Ontarians to receive the full benefits of screening, therefore this indicator was rated as room for improvement.

Exhibit 4.7 Percentage of screen-eligible people (ages 21–66) in Ontario who had a subsequent cytology test (Pap) within 42 months of a normal cytology test result

| Year | Test within 42 months of normal result (%) | Subsequent test within 42 months (N) | Normal test result (N initially screened) |
|---|---|---|---|
| 2013 | 62.3 | 438,353 | 703,055 |
| 2014 | 60.3 | 445,386 | 738,911 |
| 2015 | 62.2 | 556,072 | 893,625 |
| 2016 | 58.3 | 443,551 | 760,805 |

## Screening Follow-Up

- 85.7% of screen-eligible people who had a high-grade abnormal cervical cytology (Pap) test result in 2019 underwent colposcopy or definitive treatment within 6 months of the abnormal screen.
- From 2016 to 2019, the percentage of people with a high-grade abnormal cervical cytology test result who underwent colposcopy or definitive treatment within 6 months of their result varied from 84.4% to 86.4%.
- Abnormal cervical cytology follow-up was rated as a bright spot as the rates have been consistently high.

Exhibit 4.8 Percentage of screen-eligible people (ages 21-69) in Ontario with a high-grade cervical dysplasia on a cytology (Pap) test who underwent colposcopy or definitive treatment within six months of the high-grade abnormal screen date

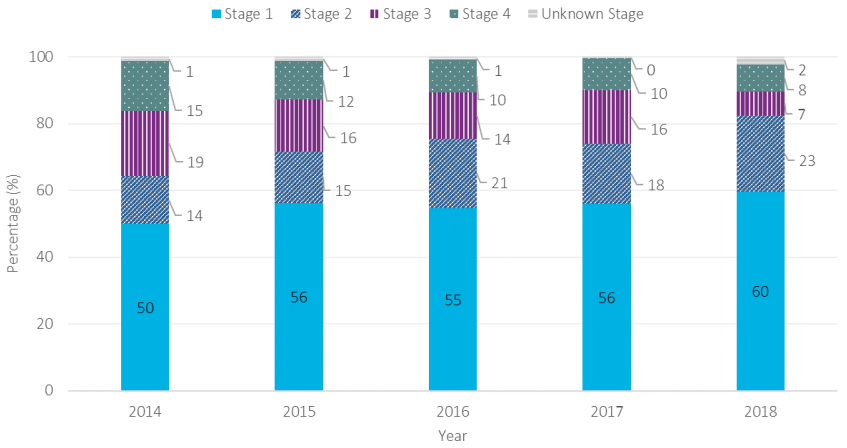
| Year | Followed up within 6 months (%) | Underwent colposcopy or definitive treatment within 6 months (N) | High-grade cervical dysplasia on cytology test |
|---|---|---|---|
| 2016 | 84.4 | 3,884 | 4,604 |
| 2017 | 86.4 | 4,721 | 5,467 |
| 2018 | 86.4 | 4,919 | 5,692 |
| 2019 | 85.7 | 4,592 | 5,361 |

# Diagnosis

## Stage at Diagnosis

- 8% of women diagnosed with cervical cancer in 2018 were diagnosed with stage 4 disease.
- This represents a decrease of about 7% since 2014.
- During the same period, diagnoses with stage 1 and 2 cervical cancer increased from 64% to 83%.
- Based on Canadian Cancer Statistics for 2011-2015, the percentage of cervical cancer patients diagnosed with stage 4 disease in Ontario (12.1%) was lower than in Saskatchewan (16.7%) and British Columbia (13.3%) and higher than in Alberta (10.1%), Manitoba (8.7%), Nova Scotia (10.5%) and Canada overall (11.8%).
- The indicator was rated as a bright spot because the percentage of stage 4 cancers has decreased and is in line with the Canadian average.

Exhibit 4.9 Distribution of incident cervical cancer cases by stage at diagnosis




Notes: Unknown stage may be due to limited stage workup or limited documentation within the patient record.

Implementation of the American Joint Committee on Cancer (AJCC) Cancer Staging Manual, 8th Edition in 2018 resulted in stage shifts.

Data table is available in the Technical Supplement.

Exhibit 4.10 Jurisdictional comparators for incident cervical cancer cases by stage at diagnosis, 2011-2015[21]

| | Stage 1 (%) | Stage 2 (%) | Stage 3 (%) | Stage 4 (%) | Unknown stage (%) |
|---|---|---|---|---|---|
| Canada | 54.4 | 13.4 | 16.5 | 11.8 | 3.8 |
| British Columbia | 54.8 | 10.2 | 18.7 | 13.3 | 3.0 |
| Alberta | 54.7 | 7.4 | 14.9 | 10.1 | 12.8 |
| Saskatchewan | 45.2 | 14.2 | 21.4 | 16.7 | 2.4 |
| Manitoba | 43.5 | 23.9 | 21.7 | 8.7 | 2.2 |
| Ontario | 56.0 | 14.4 | 15.6 | 12.1 | 1.9 |
| Nova Scotia | 50.0 | 21.1 | 15.8 | 10.5 | 2.6 |
| Prince Edward Island | 50.0 | 25.0 | 25.0 | 0.0 | 0.0 |
| Newfoundland | 64.3 | 17.9 | 7.1 | 3.6 | 7.1 |
| Territories | 66.7 | 0.0 | 33.3 | 0.0 | 0.0 |

Note: No data for Quebec and New Brunswick.

## Patients Receiving Pre-Treatment MRI

- For women with early-stage cervical cancers, MRI is helpful for determining the appropriateness of surgery versus primary chemoradiation and for planning radiation treatment.
- 67% of treated cervical cancer patients received a pre-treatment MRI in 2019.
- The percentage increased from 61% in 2014 to 69% in 2017, then decreased to 67% by 2019.
- NHS Scotland reported guideline adherence of 94.3% among women diagnosed between 2016 and 2017.[40]
- Scotland has set a target of 95% for patients receiving definitive treatment, excluding all stage 1A disease.
- Consensus was that we do not have enough information to rate this indicator; although the rate has dropped 2% since 2017, it has also increased by 6% since 2014.

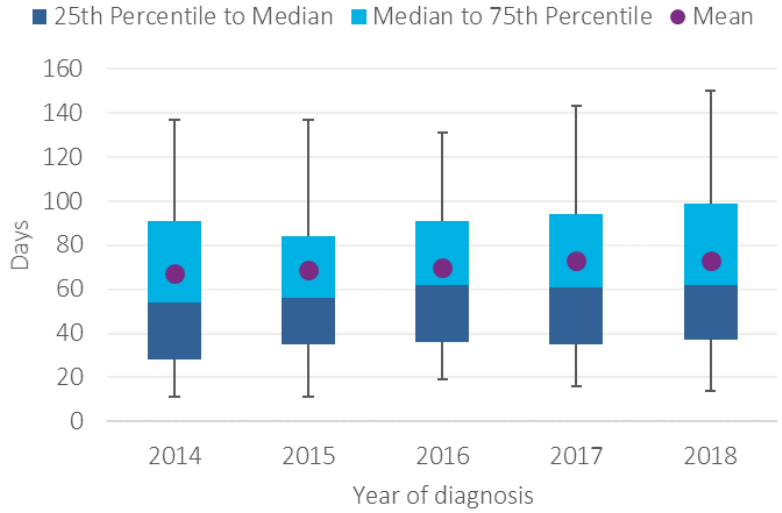
Exhibit 4.11 Treated early-stage cervical cancer patients who received a pre-treatment MRI

| Diagnosis year | Pre-treatment MRI (%) | Pre-treatment MRI (N) | Treated patients |
|---|---|---|---|
| 2014 | 61 | 219 | 357 |
| 2015 | 59 | 230 | 387 |
| 2016 | 65 | 254 | 388 |
| 2017 | 69 | 295 | 427 |
| 2018 | 65 | 268 | 415 |
| 2019 | 67 | 321 | 474 |

## Time from Diagnosis to First Treatment

- A shorter time from diagnosis to first treatment (time to treatment) is desired to reduce patient anxiety and improve survival outcomes.
- The median time from diagnosis to first treatment increased from 54 days in 2014 to 63 days in 2019.
- The median time to treatment varied depending on the first intervention: surgery was 79 days, radiation was 49 days, and chemotherapy was 36 days.
- The median time to treatment decreased with increasing stage at diagnosis, from 49 days for stage 1 to 35 days for stage 4.
- Ontario's performance is lower than Taiwan and South Carolina but better than Brazil.
    - In Taiwan, 96.4% of women diagnosed between 2004 and 2010 received treatment within 90 days.[41]
    - In South Carolina, the median time to treatment was 21 days among women diagnosed with invasive cervical cancer between 2001 and 2016.[42]
    - In Brazil, the median time to treatment was 114 days among women diagnosed between 2012 and 2014.[43]
- The NHS has set a target of 1 month from diagnosis to start of treatment for cervical cancer.[44]
- Although Ontario has not met the NHS target, performance compared to other jurisdictions was mixed so this indicator was not rated.

Exhibit 4.12 Time from diagnosis to first treatment for cervical cancer




Notes: Range is the 10th to 90th percentiles.
Data table is available in the Technical Supplement.

# Treatment

## Unplanned Emergency Department Visits Within 30 Days of Discharge from Hospital Post-Surgery

- 21% of women who underwent surgery for cervical cancer in 2019 had an unplanned emergency department (ED) visit within 30 days of discharge.
- This rate has decreased from 27% in 2014.
- A study from North Carolina reported a 30-day ED visit rate of 12.1% after surgery for a gynecologic malignancy between 2012-2013.[45]
- Although the rate of ED visits has decreased over time, there was consensus that there is room for improvement.

## Readmissions within 30 Days of Discharge From Hospital Post-Surgery

- 4% of women who underwent surgery for cervical cancer in 2019 were readmitted within 30 days of discharge.
- Readmissions decreased from 9% in 2014.
- In the United States, 5.6% of patients having major abdominal/pelvic surgery for a gynecologic cancer (ovarian, uterine, or cervical) were readmitted within 30 days (including indicated and potentially avoidable readmissions), based on NSQIP data (2015-2017).[46]
- Readmission within 30 days of discharge post-surgery is rated as a bright spot because the rate has decreased since 2014 and Ontario's performance is similar to the US.

Exhibit 4.13 Unplanned emergency department visits and readmissions within 30 days of discharge from hospital post-surgery: cervical cancer

| Year | Unplanned emergency department visits (%) | Readmissions (%) | Patients who had surgeries |
|---|---|---|---|
| 2014 | 27% | 9% | 173 |
| 2015 | 18% | 5% | 208 |
| 2016 | 25% | 5% | 201 |
| 2017 | 20% | 6% | 223 |
| 2018 | 22% | 4% | 229 |
| 2019 | 21% | 4% | 278 |

## Surgeries Performed Using Open Technique

- 54% of surgeries for cervical cancer were performed using open technique in 2019.
- The sharp increase from 34% in 2018 was attributable to increasing evidence that open technique offers better cancer-specific survival outcomes than minimally invasive techniques.[47]
- Ontario's rate is lower than the Netherlands' and higher than Sweden's:
    - In the Netherlands, 67% of adult women newly diagnosed with early-stage cervical cancer between 2010 and 2017 who underwent radical hysterectomy underwent abdominal, or open (rather than laparoscopic), radical hysterectomy.[48]
    - In Sweden, 27% of women diagnosed between 2011 and 2017 who underwent surgery underwent surgery performed using open technique.[49]
- This indicator was not rated as it is unclear at this point what an optimal rate would be.

Exhibit 4.14 Surgeries performed using open technique

| Diagnosis year | Open technique (%) | Open technique (N) | Surgeries |
|---|---|---|---|
| 2014 | 40 | 69 | 173 |
| 2015 | 33 | 67 | 207 |
| 2016 | 35 | 69 | 200 |
| 2017 | 33 | 74 | 222 |
| 2018 | 34 | 78 | 229 |
| 2019 | 54 | 149 | 277 |

## Surgeries Performed by a Gynecologic Oncologist

- In Ontario, gynecologic oncologists are trained to perform oncologic resection and nodal assessment for cervical cancer and all cervical cancers are to be managed by a gynecologic oncologist, as stated in the Ontario Health (Cancer Care Ontario) Organizational Guideline for Gynecologic Oncology Services in Ontario.[50]
- 83% of cervical cancer surgeries were performed by a gynecologic oncologist in 2019.
- The rate increased from 70% in 2014.
- In a single-centre study from Japan, 66% of women who underwent a radical hysterectomy between 2005 and 2010 were treated by a gynecologic oncologist.[51]
- The European Society of Gynecological Oncology (ESGO) set a target of 100% of surgeries should be performed or supervised by a certified gynecologic oncologist or trained surgeon whose practice is at least 80% gynecological cancer or who has completed an ESGO accredited fellowship.[52]
- Although Ontario did not achieve the target set by the ESGO, this indicator was rated as a bright spot because Ontario's performance has improved since 2014.

Exhibit 4.15 Surgeries performed by a gynecologic oncologist

| Year | Surgeries performed by gynecologic oncologist (%) | Surgeries performed by gynecologic oncologist (N) | Surgeries |
|---|---|---|---|
| 2014 | 70 | 130 | 185 |
| 2015 | 77 | 167 | 217 |
| 2016 | 72 | 163 | 227 |
| 2017 | 78 | 195 | 250 |
| 2018 | 78 | 197 | 251 |
| 2019 | 83 | 242 | 291 |

## Patients With Definitive Radiotherapy Receiving Concurrent Platinum-Based Chemotherapy

- Receiving chemotherapy in addition to radiotherapy has been shown to improve survival for cervical cancer patients.[53]
- 84% of cervical cancer patients (excluding stage 4) received 1+ cycle of cisplatin during definitive radiotherapy and 71% received 4+ cycles, in 2019.
- The percentage receiving at least 4 cycles has decreased from 78% in 2014.
- Sensitivity analysis was performed restricting to stage 2 and 3 patients who did not receive surgery: in 2019, 90% received 1+ cycle of cisplatin and 74% received 4+ cycles.
- Ontario's performance is similar to other jurisdictions:
  - In Scotland, 86% of women who underwent radical radiotherapy between 2016 and 2017 received concurrent platinum-based chemotherapy.[40]
  - In Australia (South West Sydney), 97% of women underwent chemoradiotherapy with cisplatin.[54]
  - In Japan, 80% of women diagnosed with cervical cancer received a cisplatin-based regimen for concurrent chemoradiotherapy.[55]
- Scotland has set a target of 70% for this indicator.
- This indicator is rated as room for improvement because although Ontario has achieved Scotland's target, the rates have been decreasing.

Exhibit 4.16 Patients with definitive radiotherapy receiving concurrent platinum-based chemotherapy

| Year | Received 1+ cycle of cisplatin (%) | Received 4+ cycles of cisplatin (%) | Stage 1 to 3 patients who received definitive radiotherapy |
|---|---|---|---|
| 2014 | 88 | 78 | 159 |
| 2015 | 84 | 76 | 164 |
| 2016 | 86 | 79 | 162 |
| 2017 | 83 | 75 | 187 |
| 2018 | 89 | 75 | 166 |
| 2019 | 84 | 71 | 175 |

## Time From Start of Radiation Therapy to Completion

- Radiation treatment that extends beyond 56 days has been shown to decrease survival.
- 92% of cervical cancer patients completed radiation treatment within 56 days in 2019.
- This is an increase from 84% in 2014.
- Ontario's rate is slightly lower than Scotland's and higher than Australia's.
    - In Scotland, 96% of women who underwent radical radiotherapy completed treatment within 56 days, in 2016-17.[40]
    - In Australia (South West Sydney), 73% of women who underwent chemoradiotherapy completed radiotherapy within 56 days, in 2005 to 2011.[54]
- Scotland has set a target that 90% of women who undergo radical radiotherapy should complete their treatment within 56 days.
- This indicator is rated as a bright spot given that Ontario achieved the target set by NHS Scotland.

Exhibit 4.17 Time from start of radiation therapy for cervical cancer patients to completion

| Year | Completed within 56 days (%) | Completed within 56 days (N) | Received radiation therapy | Median (interquartile range) days |
|---|---|---|---|---|
| 2014 | 84 | 132 | 158 | 49 (44, 53) |
| 2015 | 84 | 134 | 160 | 49 (43, 53) |
| 2016 | 85 | 134 | 157 | 49 (43, 52) |
| 2017 | 81 | 146 | 180 | 48 (43, 54) |
| 2018 | 84 | 142 | 170 | 48 (43, 53) |
| 2019 | 92 | 182 | 198 | 45 (43, 51) |

# 5. Colorectal Cancer

Exhibit 5.1 Colorectal cancer performance summary

| Care Continuum | Bright Spot | Room for Improvement | Not Rated |
|---|---|---|---|
| **Cancer Burden** | • 5-year relative survival | | • Incidence<br>• Mortality<br>• Prevalence |
| **Screening** | • Follow-up colonoscopy within 6 months of abnormal fecal test result<br>• Hospitalization for bowel perforation within 7 days of outpatient colonoscopy | • Proportion of eligible participants overdue for colorectal cancer screening | |
| **Diagnosis** | | • Time from diagnosis to first treatment<br>• Rectal cancer patients who receive pre-treatment MRI | • Stage at diagnosis |
| **Treatment** | • Rectal cancer surgery resection reports with positive margins<br>• Colon cancer surgery reports with 12 or more nodes examined | | • Unplanned emergency department visits after surgery<br>• Unplanned readmissions after surgery |
| **Survivorship Care** | | • At least 1 colonoscopy within 18 months of initial surgery | |

## Colorectal Cancer Performance Summary

Bright spots for colorectal cancer include:

- 5-year relative survival for both cancers of the colon (67.0%) and rectum (68.4%) have improved and are high compared to other jurisdictions.
- Colorectal cancer screening follow-up — a low percentage (14.9%) of people ages 50 to 74 years who had an abnormal fecal test result *did not* have a follow-up colonoscopy within 6 months, and this percentage has decreased (improved) from 20.3% in 2016.
- Colonoscopy quality — the rate of admission to hospital with a bowel perforation within 7 days of outpatient colonoscopy was 0.30 per 1,000 colonoscopies in 2019, remaining well below Ontario's target of less than 1 per 1,000 colonoscopies.
- Rectal cancer surgery resection reports with positive margins — at 8.4%, Ontario is performing better than its target of 10%.
- Colon cancer surgery reports with 12 or more lymph nodes examined — at 94%, Ontario has exceeded its target of 90% and is performing better than other jurisdictions.

Areas with room for improvement include:

- 5-year survival for First Nations people in Ontario was lower than for other people in Ontario, 50% and 54%, respectively.
- Colorectal cancer incidence was higher for First Nations people compared to other people in Ontario in 1991 to 2010, While incidence rates fell for other people in Ontario, they continued to rise for First Nations people.
- The proportion of Ontarians overdue for colorectal cancer screening was rated as room for improvement because rates were stable at about 38% from 2016-2019. Implementation of the FIT in June 2019 is expected to improve screening participation rates; however, uptake will require time and will be impacted by COVID-19.
- Stage at diagnosis — 21.5% of colon cancers and 18.5% of rectal cancers were diagnosed at stage 4.
- Time from diagnosis to first treatment — Ontario's time to first treatment is longer than that of other jurisdictions.
- Rectal cancer patients who receive a pre-treatment MRI — at 77.4%, there is room for improvement.
- Colonoscopy in survivorship — 74.2% of colorectal cancer survivors underwent a colonoscopy within 18 months of their surgical treatment, per guideline recommendations.

The Gastrointestinal Cancers Advisory Committee prioritized the following for improvement:

- Overdue for colorectal cancer screening — rates have been stable at about 38% since 2016.
- Stage at diagnosis — 20% of colorectal cancer patients are diagnosed at stage 4 and some people are diagnosed in emergency departments; we need to understand why this is the case.
- First Nations people have worse survival and increasing incidence — why is this the case?
- Readmissions post-surgery — preventing readmissions would improve patient experience, reduce anxiety post-surgery and reduce emergency room and hospital resource use.

# Cancer Burden

## Incidence, Mortality and Prevalence

- Colorectal cancer is the fourth most commonly diagnosed cancer in Ontario, with approximately 7,700 new cases each year.[13]
- Colorectal cancer was the second most commonly diagnosed cancer among First Nations people from 1991 to 2010, with approximately 1000 new cases over this time period.[14]
- Incidence rates decreased from 54.9 cases per 100.000 people in 2014 to 50.4 cases per 100,000 people in 2018.
- Incidence rates are higher in men than in women and higher for colon cancer than rectal cancer.
- While rates increased among First Nations people, they decreased for other people in Ontario between 1991 and 2010 (Exhibits 5.6 and 5.7). Historically, First Nations people have had higher colorectal cancer incidence rates than other people in Ontario.
- Ontario's age-standardized incidence rate (ASIR) for colorectal cancer was the lowest among the provinces (excluding Quebec) based on ICBP SURVMARK-2 data[56]:
    - ASIR was 53.6 for Ontario;
    - ASIR was 60.4 for all of Canada (excluding Quebec);
    - the range was 53.6 in Ontario to 74.0 in Saskatchewan;
    - Ontario's ASIR was also among the lowest internationally with a range from 56.5 in the United Kingdom to 81.1 in Denmark.
- Mortality rates also decreased from 19.3 per 100,000 in 2014 to 17.0 per 100,000 in 2018.
- Colorectal cancer was the second leading cause of cancer death in both First Nations people and other people in Ontario (24 and 18 cases per 100,000 people, respectively, in men; 14 and 12 cases per 100,000 people, respectively, in women).[14]
- Ontario's age-standardized mortality rate (ASMR) was below the national rate based on ICBP SURVMARK-2 data:[56]
    - ASMR was 18.0 for Ontario;
    - ASMR was 19.1 for all of Canada (excluding Quebec);
    - the range was 17.1 in Alberta to 23.8 in Manitoba;
    - Ontario's ASMR was also among the lowest internationally with a range from 19.1 in Canada and Australia to 24.5 in Norway.

Exhibit 5.2 Colorectal cancer incidence and mortality

| Year | Incidence rate per 100,000 | Incident cases | Mortality rate per 100,000 | Deaths |
|---|---|---|---|---|
| 2014 | 54.9 | 7,740 | 19.3 | 3,172 |
| 2015 | 53.8 | 7,772 | 18.5 | 3,113 |
| 2016 | 52.4 | 7,685 | 18.2 | 3,165 |
| 2017 | 51.8 | 7,768 | 17.3 | 3,107 |
| 2018 | 50.4 | 7,718 | 17 | 3,137 |

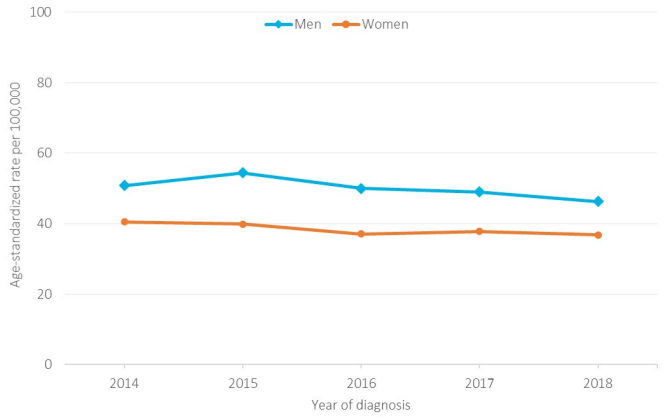
Note: Standardized to Segi (1960) World Standard Population.

## Exhibit 5.3 Colorectal cancer prevalence

| Year | Prevalence rate per 100,000 | Prevalent cases |
|---|---|---|
| 2014 | 339 | 46,286 |
| 2015 | 341 | 46,968 |
| 2016 | 339 | 47,411 |
| 2017 | 337 | 47,814 |
| 2018 | 307 | 47,799 |

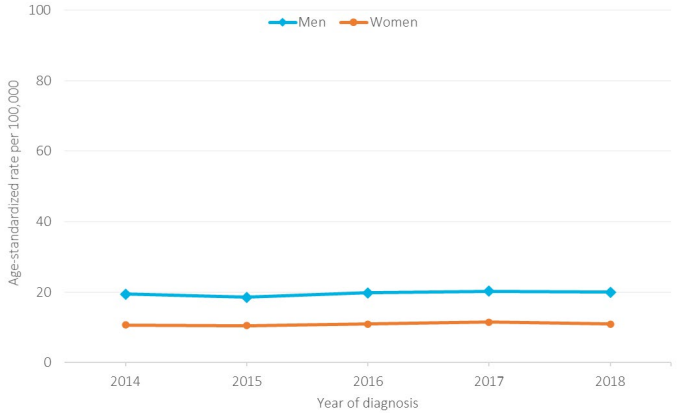
Note: Standardized to Segi (1960) World Population.
Prevalence is calculated for January 1 of the following calendar year.

## Exhibit 5.4 Age-standardized incidence rate for colon cancer



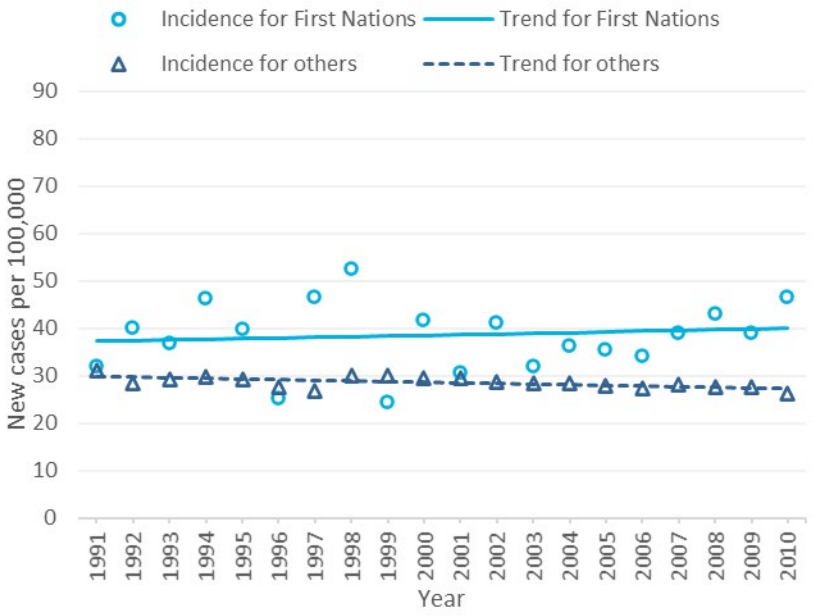

Notes: Colon cancer includes rectosigmoid junction.
Data table is available in the Technical Supplement.

## Exhibit 5.5 Age-standardized incidence rate for rectal cancer



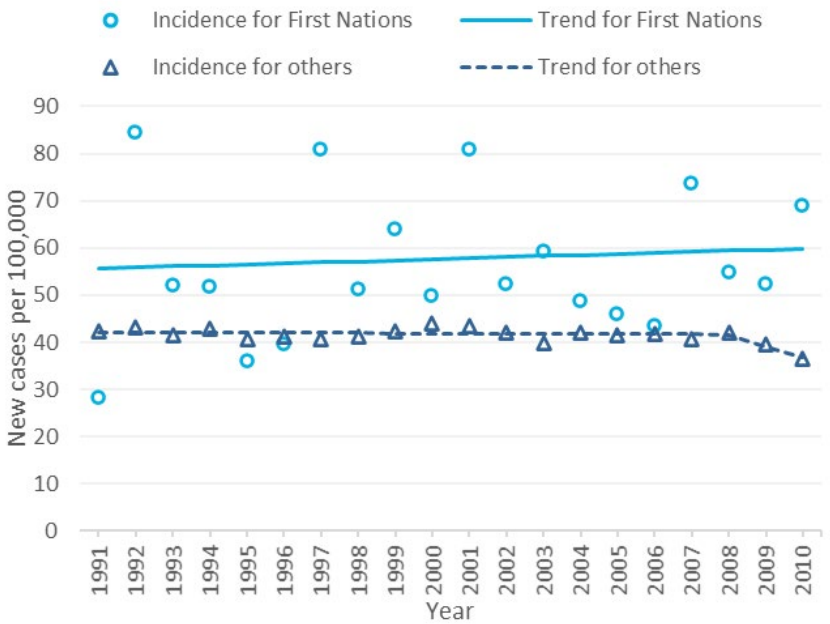

Note: Data table is available in the Technical Supplement.

## Exhibit 5.6 Age-adjusted colorectal cancer incidence in First Nations women compared with other women in Ontario




Note: Data table is available in the Technical Supplement.

## Exhibit 5.7 Age-adjusted colorectal cancer incidence in First Nations men compared with other men in Ontario




Note: Data table is available in the Technical Supplement.

## Survival

- Relative survival increased for both colon and rectal cancers over the course of a decade: by 2 percent for colon cancer to 67.0% in 2014-2018 and by 4 percent for rectal cancer to 68.4% in 2014-2018.
- Ontario's age-standardized relative survival for colorectal cancer was the highest among the provinces (excluding Quebec) based on ICBP SURVMARK-2 data:
    - For Ontario, the rates were 68.7, 68.3 and 68.6 for colorectal, colon and rectal cancer, respectively.
    - Rates ranged from 68.7 in Ontario to 62.4 in Nova Scotia for colorectal cancer; from 68.3 in Ontario to 62.4 in Nova Scotia for colon cancer; and from 68.6 in Ontario to 60.5 in Nova Scotia for rectal cancer.
    - Ontario's age-standardized relative survival was also among the highest internationally. Rates ranged from 70.9 in Australia to 60.0 in the United Kingdom for colorectal cancer; from 70.8 in Australia to 59.0 in the United Kingdom for colon cancer; and from 70.8 in Australia to 62.1 in the United Kingdom for rectal cancer.[57]
- 5-year survival is lower for First Nations people in Ontario compared with other people in Ontario: 50% and 54%, respectively.[14]
- Colorectal cancer survival was rated as a bright spot as Ontario's relative survival rate is among the highest rates of comparable national and international jurisdictions and is improving over time. However, survival for First Nations people needs improvement.

Exhibit 5.8 Colon cancer and rectal cancer observed and relative survival

| Disease site | Time period | Observed survival (%) | Relative survival (%) |
|---|---|---|---|
| Colon | 2004 to 2008 | 54.0 | 64.9 |
| | 2014 to 2018 | 56.2 | 67.0 |
| Rectum | 2004 to 2008 | 56.1 | 64.2 |
| | 2014 to 2018 | 61.9 | 68.4 |

Note: Colon cancer includes rectosigmoid junction.

# Screening

## Screening Participation

- Regular colorectal cancer screening is important because when colon cancer is diagnosed early, it is more likely to be cured. Also, screening can sometimes help prevent colon cancer by finding polyps that could turn into cancer.
- The fecal immunochemical test (FIT) is a screening test for people at average risk of developing colorectal cancer (ages 50 to 74 with no parent, brother, sister or child who has been diagnosed with colorectal cancer). As of June 2019, Ontario transitioned from using the guaiac fecal occult blood test (gFOBT) to using the FIT as Ontario's recommended colorectal cancer screening test.
- FIT offers several advantages over gFOBT. Patients prefer FIT because it is easier to use. FIT is also better at detecting colon cancer and some pre-cancerous polyps than gFOBT.[58,59,60]
- Instead of measuring colorectal cancer screening participation, Ontario measures the proportion of people who are overdue for colorectal cancer screening. Ontario uses this measure to account for people who do not require screening because they have had a flexible sigmoidoscopy or colonoscopy for other reasons.
- 38.8% of the approximately 4.5 million screen-eligible people ages 50 to 74 were overdue for colorectal (bowel) cancer screening in 2019: they had not completed a FIT or FOBT within the last 2 years, nor had they had a flexible sigmoidoscopy or colonoscopy for screening or diagnostic reasons within the past 10 years.
- This indicator was rated as room for improvement because the rates were stable from 2016 to 2019.
- Implementation of the FIT in June 2019 is expected to improve screening participation rates; however, uptake will require time and will be impacted by COVID-19.

Exhibit 5.9 Age-adjusted percentage of screen-eligible individuals (ages 50–74) in Ontario who were overdue for colorectal cancer screening

| Year | Overdue for screening (%) | Overdue for screening (N) | Eligible for screening (N) |
|---|---|---|---|
| 2016 | 38.6 | 1,623,066 | 4,226,604 |
| 2017 | 38.1 | 1,631,726 | 4,322,898 |
| 2018 | 38.4 | 1,671,957 | 4,411,978 |
| 2019 | 38.8 | 1,712,810 | 4,499,836 |

## Screening Follow-Up

- People with abnormal fecal test results are more likely to have colorectal cancer than people at average risk for colorectal cancer or even people with certain gastrointestinal symptoms.
- Timely follow-up with a colonoscopy after an abnormal fecal test result is important because it leads to faster diagnosis and treatment and finding cancer when it is less advanced. Timely follow-up is also important because people with abnormal fecal test results may be worried about a possible cancer diagnosis.
- 14.9% of people ages 50 to 74 years who had an abnormal fecal test result did not have a follow-up colonoscopy within 6 months of their abnormal result in 2019.
- Performance on this indicator has improved since 2016, when 1 in 5 people (20.3%) did not have a follow-up colonoscopy within 6 months of their abnormal fecal test.
- This indicator was rated as a bright spot because the proportion of people without a follow-up colonoscopy within 6 months of their abnormal fecal test result has been decreasing (improving) over time, especially between 2018 and 2019.

Exhibit 5.10 Percentage of screen-eligible individuals (ages 50-74) in Ontario with an abnormal fecal test result who did not undergo colonoscopy within 6 months of the abnormal fecal test result

| Year | No follow-up (%) | No follow-up (N) | Abnormal fecal test (N) |
|---|---|---|---|
| 2016 | 20.3 | 4,395 | 21,684 |
| 2017 | 19.8 | 4,471 | 22,546 |
| 2018 | 19.8 | 4,289 | 21,690 |
| 2019 | 14.9 | 3,711 | 24,873 |

## Colonoscopy Quality

- Although colonoscopy is a safe test, there is a very small risk of perforation of the bowel, which may need to be fixed with surgery. A low perforation rate indicates high-quality care.
- The rate of admission to hospital with a perforation within 7 days of outpatient diagnostic or therapeutic colonoscopy was 0.30 per 1,000 colonoscopies (141 perforations per 476,270 colonoscopies) in 2019.
- From 2016 to 2019, the number of colonoscopy-related bowel perforations in Ontario improved (decreased) from 0.35 per 1,000 colonoscopies (164 perforations per 469,361 colonoscopies) and has remained stable since 2018.
- Ontario's perforation rate is well below the Ontario Health (Cancer Care Ontario) target of less than 1 perforation per 1,000 colonoscopies.[61]
- This indicator was rated as a bright spot because it is well below the Ontario target.

Exhibit 5.11 Number of outpatient colonoscopies in Ontario followed by hospital admissions for perforation within 7 days per 1,000 colonoscopies

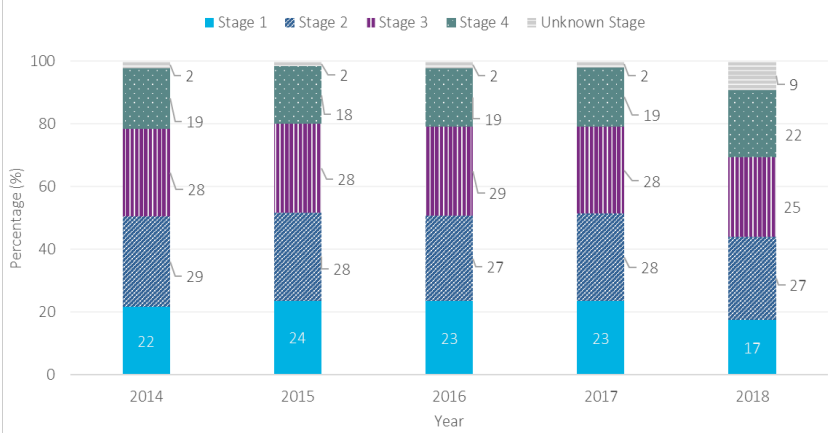
| Year | Hospital admissions for perforation rate per 1,000 | Hospital admissions for perforation (N) | Outpatient colonoscopies (N) |
|---|---|---|---|
| 2016 | 0.35 | 164 | 469,361 |
| 2017 | 0.36 | 168 | 462,373 |
| 2018 | 0.29 | 138 | 469,382 |
| 2019 | 0.30 | 141 | 476,270 |

# Diagnosis

## Stage at Diagnosis

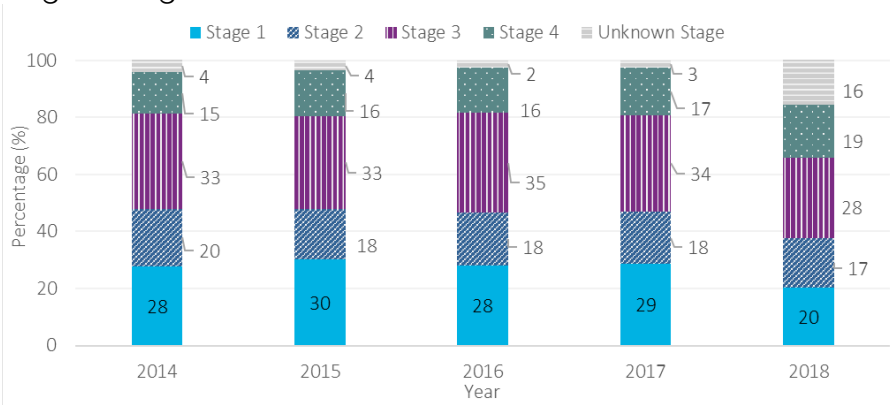
- 21.5% of colon cancers and 18.5% of rectal cancers were diagnosed at stage 4 in 2018.
- The percentage of colorectal cancers (separate data not available) diagnosed at stage 4 was among the lowest for jurisdictions participating in Module 4 of the International Cancer Benchmarking Partnership (ICBP):
    - 21% in Ontario;
    - 22% in Canada;
    - international range was 21% in Australia to 30% in the United Kingdom.
- The Ontario percentage of stage 4 rectal cancers was lower than in other jurisdictions as reported by ICBP:
    - 18% in Ontario;
    - 19% in Canada;
    - the international range was 18% in Australia to 25% in Norway.[56]
- This indicator was not rated due to missing stage data for both colon and rectal cancers in 2018 which makes the time trends difficult to interpret.

Exhibit 5.12 Distribution of incident colon cancer cases by stage at diagnosis




Notes: Unknown stage may be due to limited stage workup or limited documentation within the patient record.
Shift in stage distribution in 2018 was the result of the implementation of the 8th Edition of the American Joint Committee on Cancer (AJCC) Cancer Staging Manual.
Data table is available in the Technical Supplement.

## Exhibit 5.13 Distribution of incident rectal cancer cases by stage at diagnosis

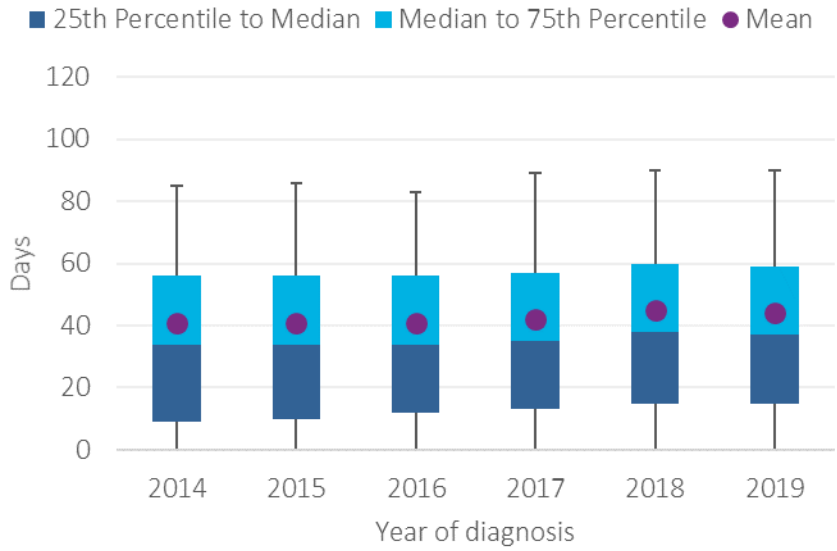



Notes: Unknown stage may be due to limited stage workup or limited documentation within the patient record.
Shift in stage distribution in 2018 was the result of the implementation of the 8th Edition of the American Joint Committee on Cancer (AJCC) Cancer Staging Manual.
Data table is available in the Technical Supplement.

## Time From Diagnosis to First Treatment

- The median time from diagnosis to first treatment for colorectal cancer in 2019 was 37 days. This is an increase of 3 days since 2014.
- Module 4 of the ICBP study reported that the median treatment interval among people diagnosed with colorectal cancer ranged from 14 days in Denmark and Wales to 34 in Manitoba and 35 days in Ontario (based on ICBP methods).[62]
- This indicator was rated as room for improvement because Ontario's time to first treatment is longer than that of other jurisdictions.

Exhibit 5.14 Time from diagnosis to first treatment for colorectal cancer




Notes: Range is the 10th to 90th percentiles.
Data table is available in the Technical Supplement.

## Rectal Cancer Patients Who Received a Pre-Treatment MRI

- Imaging, including MRI, is recommended for local staging and assessing treatment options (e.g., neoadjuvant therapy) for patients diagnosed with rectal cancer.[63]
- 77.4% of patients with rectal cancer received a pelvic MRI prior to first treatment in 2019 (any time between diagnosis and treatment).
- The percentage has remained stable since an increase in 2016.
- Ontario's percentage is below that of the Netherlands: 92.6% of patients who underwent local excision or TME surgery for primary cT1-2 rectal cancer underwent MRI for clinical staging in 2018.[64]
- There is currently no target set for this indicator in Ontario.
- This indicator was rated as room for improvement because the percentage has remained unchanged over time.

Exhibit 5.15 Rectal cancer patients who received a pelvic MRI prior to first treatment

| Year | Received pre-treatment MRI (%) | Received pre-treatment MRI (N) | Treated rectal cancer patients |
|---|---|---|---|
| 2015 | 73.0 | 1,056 | 1,446 |
| 2016 | 77.5 | 1,217 | 1,571 |
| 2017 | 76.9 | 1,221 | 1,588 |
| 2018 | 77.5 | 1,221 | 1,576 |
| 2019 | 77.4 | 1,274 | 1,645 |

Note: This indicator differs from that reported in the Surgical Quality Indicators (SQI) Report (87.2% in 2019) because the SQI indicator includes only QBP surgeries, includes MRI with or without TRUS, and is based on a time frame of 6 months prior to the QBP surgery.

# Treatment

## Rectal Cancer Surgery Resection Reports With Positive Margins

- Surgery is the primary treatment for patients with rectal cancer; other forms of treatment, such as radiation or chemotherapy, are often used to complement surgical treatment.
- Patients with negative margins for rectal cancer resections have been shown to have decreased local recurrence rates and increased survival as compared with patients with positive margins.[65]
- 8.4% of rectal cancer surgery resections had positive margins (circumferential radial margins) in 2019.
- The percentages fluctuated between 2014 and 2019, with the latest change being an increase from 6.3% in 2018 to 8.4% in 2019.
- Similar findings have been reported in the SQI report with the percentages fluctuating between 7% to 8% between 2017 to 2020.
- Ontario's performance falls below that of Scotland:
    - In Scotland, 6% of patients having rectal surgery in 2015/16 had positive margins.[66]
- Ontario has set a target of 10% for this indicator; Scotland's target is 5% (95% clear margins).
- This indicator was rated as a bright spot because Ontario is well below its target.

Exhibit 5.16 Rectal cancer surgery resection reports with involved (positive) circumferential/radial margins by calendar year

| Year | Positive margins (%) | Positive margins (N) | Rectal cancer surgeries |
|---|---|---|---|
| 2015 | 7.5 | 110 | 1,466 |
| 2016 | 8.7 | 126 | 1,442 |
| 2017 | 7.3 | 98 | 1,338 |
| 2018 | 6.3 | 80 | 1,278 |
| 2019 | 8.4 | 103 | 1,222 |

## Colon Cancer Surgery Reports With 12 or More Nodes Examined

- Checking lymph nodes for cancer cells allows for more accurate staging of the cancer. Determining the right stage is crucial to ensuring the most appropriate care (radiation, chemotherapy or none) is received post-surgery and to determine the prognosis.[17]
- In 2008, Cancer Care Ontario released a guideline recommending that for colon cancer patients, 12 or more lymph nodes be removed and examined to adequately stage colorectal cancer[17], recognizing that this is not possible for 100% of patients.
- In 94% of colon cancer surgeries, 12 or more lymph nodes were examined. The percentage increased from 92% in 2015.
- Ontario is performing better than other jurisdictions including Scotland (89% in 2015-2016[18]) and the United States (92.1% in 2015).[67] In Canada, CPAC reported a range of 71.4% in Nova Scotia to 91.0% in Manitoba for 2014; Ontario's percentage was 88.1% based on the CPAC methods for this indicator.[68]
- Ontario has set a target of 90% for this indicator.
- This indicator was rated as bright spot because Ontario has exceeded its target and is performing better than other jurisdictions.

Exhibit 5.17 Colon cancer surgeries with 12 or more nodes examined by calendar year

| Year | 12 nodes examined (%) | 12 nodes examined (N) | Colon cancer surgery reports |
|---|---|---|---|
| 2015 | 92 | 3,432 | 3,722 |
| 2016 | 93 | 3,428 | 3,675 |
| 2017 | 94 | 3,410 | 3,610 |
| 2018 | 94 | 3,332 | 3,541 |
| 2019 | 94 | 3,238 | 3,438 |

## Unplanned Emergency Department Visits Within 30 Days of Discharge from Hospital Post-Surgery

- 21% of colon cancer patients and 29% of rectal cancer patients who underwent surgery had an unplanned emergency department (ED) visit with 30 days of discharge from hospital in 2019.
- For rectal cancer, unplanned ED visits decreased by 3% from 2014; for colon cancer, there was no change.
- This indicator was not rated as there is currently no target for it and we were unable to find appropriate comparators.

## Readmissions Within 30 Days of Discharge from Hospital Post-Surgery

- 7% of colon cancer patients and 13% of rectal cancer patients were readmitted within 30-days.
- For rectal cancer, readmissions have decreased slightly since 2014; for colon cancer, there has been some fluctuation in the percentage but no change from 2014.
- Ontario seems to be performing better that the US for rectal cancer readmissions.
    - In the US, 28% (open), 28% (laparoscopic) and 33% (robotic) of patients who underwent proctectomy for rectal cancer were readmitted within 30 days (of those in the American College of Surgeons NSQIP proctectomy targeted database).[69]
- 30-day readmissions among patients who underwent surgery for rectal cancer is rated as a bright spot given that Ontario's performance has improved since 2014, and Ontario is performing better than the comparators found. This indicator was not rated for colon cancer due to the lack of comparators.

Exhibit 5.18 Unplanned emergency department visits and readmissions within 30 days of discharge from hospital post-surgery: colon cancer

| Year | Unplanned emergency department visits (%) | Readmissions (%) | Patients who had surgeries |
|---|---|---|---|
| 2014 | 20.7 | 7.6 | 3,843 |
| 2015 | 21.7 | 7.7 | 3,747 |
| 2016 | 22.7 | 8.6 | 3,671 |
| 2017 | 21.0 | 8.4 | 3,658 |
| 2018 | 21.0 | 7.3 | 3,516 |
| 2019 | 20.5 | 7.3 | 3,598 |

Exhibit 5.19 Unplanned emergency department visits and readmissions within 30 days of discharge from hospital post-surgery: rectal cancer

| Year | Unplanned emergency department visits (%) | Readmissions (%) | Patients who had surgeries |
|---|---|---|---|
| 2014 | 32.4 | 13.9 | 1,159 |
| 2015 | 32.4 | 15.1 | 1,078 |
| 2016 | 33.2 | 15.3 | 1,198 |
| 2017 | 29.6 | 14.3 | 1,169 |
| 2018 | 27.7 | 12.1 | 1,146 |
| 2019 | 29.1 | 12.8 | 1,160 |

# Survivorship Care

## Follow-Up Colonoscopy Within 18 Months of Initial Surgery

- Ontario guidelines for colorectal cancer (OH-CCO) currently recommend colonoscopy within one year of surgery for stage 1 to 3 survivors.[70]
- 71.3% of colorectal cancer patients who became survivors in 2018 had received at least 1 colonoscopy within 18 months of their initial surgery.
- For this indicator, patients who were diagnosed with a new cancer or who received treatment within 18 months of their initial surgery were excluded.
- This indicator has remained stable since 2014.
- Ontario is performing better than North Carolina (42%, 1999-2002)[71], Netherlands (45%, 2005-2015)[72], and Japan (73%, 2013).[73]
- Although Ontario is performing better than other jurisdictions, there was consensus that there is still room for improvement.

Exhibit 5.20 Follow-up colonoscopy within 12 and 18 months of initial surgery

| Year | Colonoscopy within 18 months of initial surgery (%) | Colonoscopy within 12 months of initial surgery (%) | Survivors at 12 months |
|---|---|---|---|
| 2014 | 74.1 | 38.7 | 2,564 |
| 2015 | 75.6 | 39.4 | 2,509 |
| 2016 | 74.3 | 37.1 | 2,502 |
| 2017 | 74.7 | 41.6 | 2,500 |
| 2018 | 71.3 | 37.9 | 2,201 |

Notes: Last year of reporting is 2018 to allow for sufficient follow-up time. Number of survivors (denominator) at 18 months is lower due to some people restarting treatment between 12 and 18 months.

# 6. Lung Cancer

Exhibit 6.1 Lung cancer performance summary

| Care Continuum | Bright Spot | Room for Improvement | Not Rated |
|---|---|---|---|
| **Cancer Burden** | • 5-year relative survival | | • Incidence<br>• Mortality<br>• Prevalence |
| **Diagnosis** | | • Time from diagnosis to first treatment<br>• NSCLC patients who received PET-CT scan prior to radical treatment<br>• Brain MRI for stage 1 lung cancer | • Stage at diagnosis |
| **Treatment** | • 30- and 90-day post-surgery mortality<br>• Stage 3 NSCLC patients who received immunotherapy following chemoradiation<br>• Limited-stage SCLC patients who received chemoradiation | • Cancer patients screened for tobacco use | • Cancer patients screened for tobacco use<br>• Unplanned emergency department visits or readmissions after surgery<br>• Stage 1 patients who had surgery or SABR within 180 days of diagnosis<br>• Stage 2 NSCLC patients who received a post-surgery medical oncology consultation<br>• Stage 1 patients treated with SABR who received a surgical consultation |

## Lung Cancer Performance Summary

Bright spots for lung cancer include:

- 5-year relative survival — at 26.7%, 5-year survival is poor for lung cancer, however, Ontario's rate is higher than other jurisdictions and has improved over time.
- Post-surgery mortality rates — at both 30 days (0.8%) and 90 days (2.8%), rates are lower than in other jurisdictions.
- Patients with stage 3 non-small cell lung cancer (NSCLC) receiving guideline-recommended immunotherapy following chemoradiation — 63% of patients received immunotherapy, which has been found to improve progression-free survival.
- Limited-stage small cell lung cancer (SCLC) patients receiving chemoradiation — 66% of patients received chemoradiation, which improves survival and local control.

Areas with room for improvement include:

- Lung cancer incidence is increasing among First Nations women at an alarming rate.
- Screening patients for tobacco use — 56% of all new ambulatory cancer patients were screened in December 2020 compared to about 70% prior to March 2020.
- NSCLC patients receiving a necessary positron emission tomography-computed tomography (PET-CT) scan prior to radical treatment — 82% percent of patients received a PET-CT scan prior to radical treatment, which is lower than the Ontario target of 90%.
- Stage 1 NSCLC patients receiving unnecessary brain imaging to detect metastases — the rate was 26% in 2018 and similar to rates in the United States, but still too high.
- Time from diagnosis to first treatment — the median time in 2018 was 43 days, it has not changed since 2014, and is higher than in other jurisdictions.

The Thoracic Cancer Advisory Committee prioritized the following for improvement:

- Screening for tobacco use — although Ontario met the gold standard for implementation of smoking cessation in cancer care, this indicator was prioritized due to the drop since the COVID-19 pandemic and the importance of smoking cessation in improving treatment effectiveness and survival.
- Stage 1 surgical consultation before SABR — this indicator was not rated but was prioritized as a patient-centred indicator that enables patients to make informed treatment decisions.
- NSCLC stage 2 post-surgery medical oncology consultation - not rated but prioritized for the same reason as above.

# Cancer Burden

## Incidence, Mortality and Prevalence

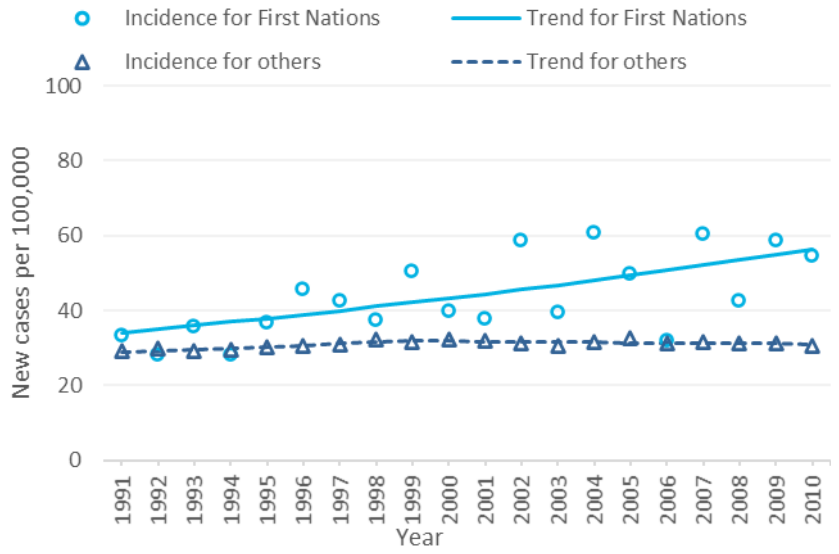
- Lung cancer is the second most common cancer in Ontario, with approximately 9,000-10,000 people diagnosed each year.[13]
- The incidence rate decreased from 61.4 per 100,000 in 2014 to 57.6 per 100,000 in 2018.
- Age-standardized lung cancer incidence rates were higher in men than in women, at 60.2% and 55.8%, respectively, in 2018.
- For First Nations people, lung cancer was the most commonly diagnosed cancer between 1991 and 2010, accounting for over 1,000 new cases over that period.[14]
    - Lung cancer incidence increased among First Nations women but remained steady for other Ontario women.
    - For both First Nations and other men, lung cancer incidence decreased at a similar rate.
- Ontario's age-standardized incidence rate (ASIR) was the lowest among the provinces (excluding Quebec) based on International Cancer Benchmarking Partnership (ICBP) SURVMARK-2 data[74]:
    - ASIR was 59.3 for Ontario
    - ASIR was 63.5 for all of Canada (excluding Quebec)
    - the range was 59.3 in Ontario to 84.6 in New Brunswick
    - Ontario's ASIR was also among the lowest internationally. The ASIR ranged from 49.2 in Australia to 72.0 in Denmark.

Exhibit 6.2 Lung cancer incidence and mortality

| Year | Incidence rate per 100,000 | Incident cases | Mortality rate per 100,000 | Deaths |
|---|---|---|---|---|
| 2014 | 61.4 | 8,985 | 44.1 | 6,826 |
| 2015 | 59.8 | 9,004 | 42.9 | 6,836 |
| 2016 | 59.1 | 9,079 | 41.4 | 6,793 |
| 2017 | 59.5 | 9,519 | 40.1 | 6,872 |
| 2018 | 57.6 | 9,473 | 39.5 | 6,970 |

Note: Standardized to Segi (1960) World Population.

Exhibit 6.3 Age-adjusted lung cancer incidence in First Nations women compared with other women in Ontario




Note: Data table is available in the Technical Supplement.

- Age-standardized mortality rates for lung cancer decreased from 44.1 per 100,000 in 2014 to 39.5 per 100,000 in 2018.
- Although mortality for lung cancer was the highest of all cancers for both First Nations people and other people in Ontario, mortality rates were higher for First Nations people:[14]
    - 33 per 100,000 among First Nations women and 23 per 100,000 for other women;
    - 44 per 100,000 among First Nations men and 39 per 100,000 for other men.
- Ontario's age-standardized mortality rate (ASMR) was among the lowest in Canada (excluding Quebec) based on ICBP SURVMARK-2 data[57]:
    - ASMR was 43.6 for Ontario;
    - ASMR was 45.8 for all of Canada (excluding Quebec);
    - the range was 42.4 in British Columbia to 63.5 in Nova Scotia;
    - Ontario's ASMR was also among the lowest internationally with a range from 33.8 in Australia to 55.4 in Denmark.
- The number of people living with lung cancer has increased despite decreasing incidence and mortality rates because the decrease in mortality is greater than the decrease in incidence.

Exhibit 6.4 Lung cancer prevalence

| Year | Prevalence rate per 100,000 | Prevalent cases |
|---|---|---|
| 2014 | 143 | 19,585 |
| 2015 | 148 | 20,406 |
| 2016 | 152 | 21,252 |
| 2017 | 159 | 22,519 |
| 2018 | 164 | 23,716 |

Notes: Standardized to Segi (1960) World Population.
Prevalence is calculated for January 1 of the following calendar year.

## Survival

- Five-year survival following a lung cancer diagnosis is poor because most lung cancers are found at a late stage when they are hard to treat.
- Observed survival for lung cancer increased from 15.3% for 2004-2008 to 21.9% for 2014-2018. Adjusting for age and underlying causes of death, relative survival increased from 18.6% in the earlier period to 26.7% a decade later.
- Ontario's 5-year relative survival was among the highest in Canada (excluding Quebec) based on ICBP SURVMARK-2 data:
    - 22.3 for Ontario;
    - 22.6 for all of Canada (excluding Quebec);
    - range from 24.9 in New Brunswick to 19.3 in Nova Scotia;
    - it was also among the highest internationally, with a range from 22.6 in Canada to 14.7 in the United Kingdom.
- 5-year survival was slightly lower for First Nations people compared to other people in Ontario: 14% and 17%, respectively.[14]
- Lung cancer survival was rated as a bright spot because survival has increased by 8% over a decade and is higher than in other jurisdictions.

Exhibit 6.5 Lung cancer observed and relative survival

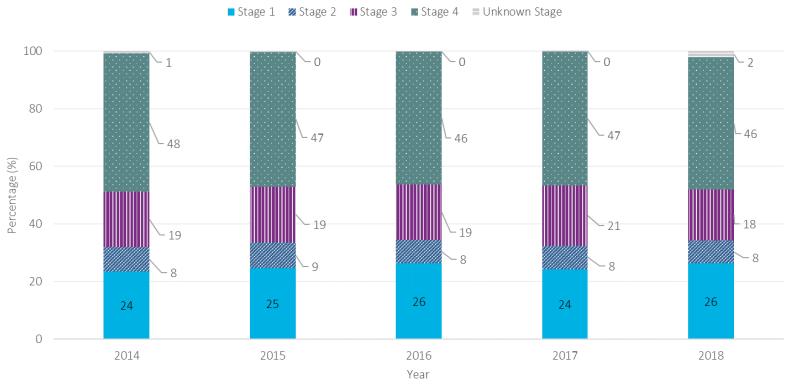
| Time period | Observed survival (%) | Relative survival (%) |
|---|---|---|
| 2004 to 2008 | 15.3 | 18.6 |
| 2014 to 2018 | 21.9 | 26.7 |

# Diagnosis

## Stage at Diagnosis

- 45.8% of lung cancers were diagnosed at stage 4 in 2018.
- The proportion diagnosed at stage 4 appears to be stable over time and possibly declining slightly.
- The proportion of patients diagnosed at stage 4 in Ontario is the same as the national average and is among the lowest proportions reported internationally.
- This indicator was not rated due to difficulty determining time trends and comparing performance to other jurisdictions because of changes to staging in 2018.

Exhibit 6.6 Distribution of incident lung cancer cases by stage at diagnosis




Note: Data table is available in the Technical Supplement.

Exhibit 6.7 Jurisdictional comparators for incident lung cancer cases by stage at diagnosis[21]

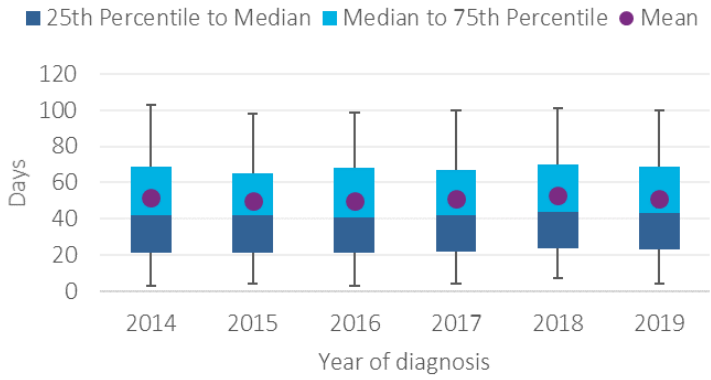
| Jurisdiction | Stage 1 | Stage 2 | Stage 3 | Stage 4 | Stage unknown |
|---|---|---|---|---|---|
| Canada | 20.7 | 8.4 | 19.7 | 49.6 | 1.6 |
| British Columbia | 18.0 | 8.1 | 20.5 | 49.1 | 4.4 |
| Alberta | 20.2 | 8.6 | 17.9 | 52.4 | 1.0 |
| Saskatchewan | 16.2 | 6.5 | 19.4 | 56.7 | 1.2 |
| Manitoba | 22.2 | 9.1 | 19.2 | 48.9 | 0.6 |
| Ontario | 21.4 | 8.6 | 19.9 | 49.1 | 0.9 |
| New Brunswick | 25.7 | 9.7 | 20.5 | 43.5 | 0.5 |
| Nova Scotia | 22.6 | 8.0 | 17.4 | 50.4 | 1.4 |
| Prince Edward Island | 17.6 | 8.3 | 24.1 | 49.1 | 0.9 |
| Newfoundland | 22.1 | 8.5 | 21.1 | 46.8 | 1.5 |
| Territories | 13.0 | 10.9 | 30.4 | 43.5 | 2.2 |

Note: No data for Quebec

## Time from Diagnosis to First Treatment

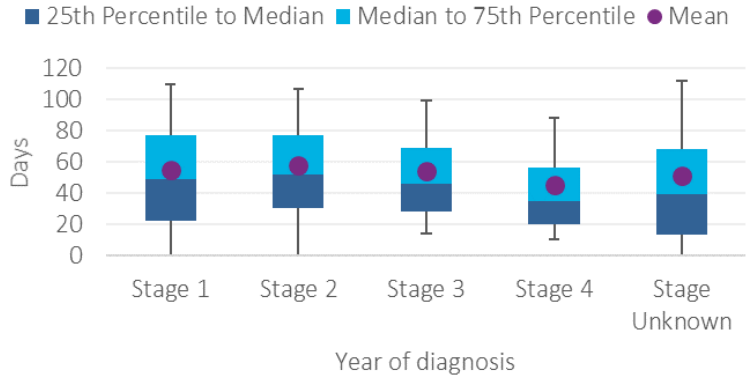
- The median time from lung cancer diagnosis to the start of first treatment was 43 days in 2019 and has remained stable since 2014.
- Time to treatment did not vary by type of first treatment (surgery, radiation or systemic therapy) but did vary by stage at diagnosis, with higher stages having shorter times to treatment. (Exhibit 6.9)
- Ontario's diagnosis to treatment interval for lung cancer is long compared to other jurisdictions.
    - It was among the longest of 10 jurisdictions from Canada, Europe and Australia participating in an ICBP study of patients diagnosed between 2012 and 2015.[75]
    - In a 2018 systematic review of 52 studies, the median time from diagnosis to treatment was 27 days.[76]
    - Ontario's time intervals of 49 days for stage 1 and 52 days for stage 2 are longer than the 41 day interval for stage 1 and 2 lung cancers reported in a US study between 2004 to 2015.[27]
- Ontario does not have a target for time from diagnosis to treatment but does have targets for other intervals in the diagnostic phase.
- The National Health Service (NHS) target is 1 month,[44] and Australia's target is 6 weeks.[77]
- This indicator was rated as room for improvement because Ontario's treatment interval is long compared to other jurisdictions.

Exhibit 6.8 Time from diagnosis to first treatment for lung cancer




Notes: Range is the 10th to 90th percentiles.
Data table is available in the Technical Supplement.

Exhibit 6.9 Time from diagnosis to first treatment by stage at diagnosis for lung cancer




Notes: Range is the 10th to 90th percentiles.
Data table is available in the Technical Supplement.

## Non-Small Cell Lung Cancer (NSCLC) Patients Who Had PET-CT Prior to the Start of Radical Treatment

- In Ontario, a positron emission tomography-computed tomography (PET-CT) scan is recommended only in situations where evidence shows it improves patient care and outcomes. PET-CT scanning typically takes place at a decision point for a patient's treatment. For example, for people with non-small cell lung cancer, a PET-CT scan helps to determine whether radical treatment (i.e., treatment intended to cure the disease) is appropriate. If radical treatment is determined not to be beneficial, then the patient avoids a significant unnecessary procedure and the associated recovery.
- 82% of NSCLC patients received a PET-CT within 3 months before the start of radical treatment in 2019 and this percentage has remained stable since 2014.
- Ontario's percentage is lower than Scotland's, where 98% of NSCLC patients being treated with curative intent received a PET-CT in 2015.[78]
- Ontario has set a target of 90% and NHS Scotland has set a target of 95% for this indicator.
- This indicator was rated as room for improvement because Ontario has not achieved its target of 90% and the percentage has not improved since 2014.

Exhibit 6.10 NSCLC patients who had PET-CT within 3 months prior to starting radical treatment

| Year | PET-CT prior to radical treatment (%) | PET-CT prior to radical treatment (N) | Received radical treatment |
|---|---|---|---|
| 2014 | 83 | 2,289 | 2,767 |
| 2015 | 82 | 2,318 | 2,840 |
| 2016 | 83 | 2,497 | 2,999 |
| 2017 | 82 | 2,683 | 3,258 |
| 2018 | 83 | 2,746 | 3,327 |
| 2019 | 82 | 2,818 | 3,426 |

Notes: Excludes patients who only had non-palliative systemic treatment. The methods for this indicator have changed since it was reported in CSQI 2019: the time period is now 3 months regardless of treatment type and OHIP PET-CT billing codes now include only those relevant to lung cancer.

## Stage 1 Non-Small Cell Lung Cancer (NSCLC) Patients Who Received a Brain MRI Prior to Treatment

- Magnetic resonance imaging (MRI) of the brain is considered unnecessary imaging for stage 1 NSCLC patients as the risk of brain metastasis is very low.
- 26% of stage 1 NSCLC lung cancer patients received a brain MRI before starting treatment in 2018, a decrease of 10% from 2014.
- Ontario's rate is similar to those reported in the United States, where 25% of stage 1A NSCLC lung cancer patients diagnosed between 2004 and 2013 underwent brain imaging, defined as head CT or brain MRI, within 1 month prior to and 3 months after diagnosis.[79]
- This indicator was rated as room for improvement based on consensus that the rate is still too high, despite having improved over time and being similar to rates reported in the United States.

Exhibit 6.11 Brain MRI for stage 1 NSCLC patients prior to treatment

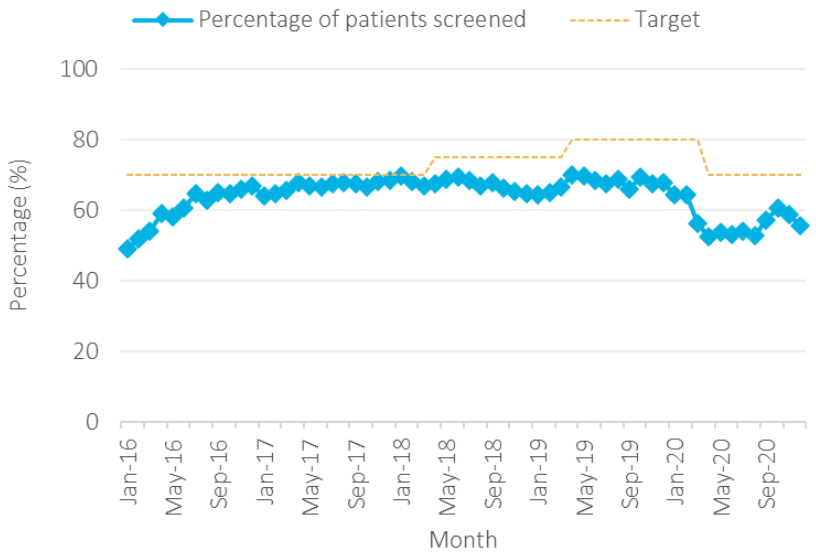
| Year | Patients who had a brain MRI (%) | Patients who had a brain MRI (N) | Number of treated stage 1 NSCLC patients |
|---|---|---|---|
| 2014 | 36 | 574 | 1,023 |
| 2015 | 40 | 665 | 1,650 |
| 2016 | 33 | 599 | 1,805 |
| 2017 | 28 | 449 | 1,630 |
| 2018 | 26 | 486 | 1,886 |

# Treatment

## Cancer Patients Screened for Tobacco Use

- Smoking cessation is important for cancer patients because it improves the effectiveness of cancer treatments and contributes to better survival outcomes, reducing mortality by about 40%.[80]
- In December 2020, the proportion of new ambulatory cancer patients screened for tobacco use in Ontario's regional cancer centres was 56%.
- This proportion reached a high of 70% in April 2019 and remained relatively stable until March 2020 (when Ontario directed health care services to respond to the COVID-19 pandemic).
- Ontario has met the gold standard for implementation of smoking cessation in cancer care based on the pan-Canadian smoking cessation action framework and its accompanying implementation checklist.[81]
- This indicator was rated as room for improvement due to the decrease during the COVID-19 pandemic and its importance in improving outcomes.

Exhibit 6.12 Reported tobacco screening among new ambulatory cancer patients, 2016 to 2020




Note: Data table is available in the Technical Supplement.

## Stage 1 Lung Cancer Patients Who Received Surgery or Stereotactic Ablative Radiotherapy (SABR) Within 180 Days of Diagnosis

- Patients with early-stage lung cancer require treatment in a timely fashion, otherwise they are at risk of progressing to a higher stage and receiving inappropriate treatment. In some cases, patients would be at risk for distant metastasis that would render them incurable.
- 57% of stage 1 lung cancer patients received surgery within 180 days of diagnosis in 2018, which was similar to the proportion in 2014 (59%).
- The proportion of these patients receiving SABR has increased over time, partly due to a shift from standard radiotherapy to SABR.
- The proportion receiving neither surgery nor radiation decreased slightly from 13% in 2014 to 10% in 2018.
- The time from diagnosis until receipt of SABR was longer than that for surgery, but the time to receive SABR decreased from a median of 82 days in 2014 to 65 days in 2018 (Exhibit 6.14).
    - Some delay is expected because of the need for patients to have a consultation with a surgeon before being referred to radiation oncology (if not a good candidate for surgery).
- This indicator was not rated because we were unable to find jurisdictional comparators.

Exhibit 6.13 Patients with stage 1 lung cancer who received surgery or SABR within 180 days of diagnosis

| Year | Surgery (%) | Radiation – SABR (%) | Radiation - not SABR (%) | No surgery or radiation (%) | Number of stage 1 patients |
|---|---|---|---|---|---|
| 2014 | 59 | 8 | 22 | 13 | 1,777 |
| 2015 | 58 | 16 | 17 | 11 | 1,815 |
| 2016 | 57 | 19 | 16 | 11 | 1,976 |
| 2017 | 52 | 23 | 14 | 13 | 1,810 |
| 2018 | 57 | 26 | 9 | 10 | 2,028 |

Note: Surgery and SABR/radiation are not mutually exclusive

Exhibit 6.14 Time from diagnosis to surgery or radiation for patients with stage 1 lung cancer

| Year | Surgery median (range), days | Radiation (SABR) median (range), days |
|---|---|---|
| 2014 | 41 (0, 71) | 82 (58, 109) |
| 2015 | 39 (0, 63) | 76 (53, 117) |
| 2016 | 39 (0, 68) | 75 (53, 109) |
| 2017 | 43 (0, 68) | 63 (46, 98) |
| 2018 | 45 (0,70) | 65 (45, 100) |

Note: Lower quartile aligns with emergent surgeries (surgery date = diagnosis date)

## Stage 1 Lung Cancer Patients Who Received a Thoracic Surgery Consultation Before Starting Stereotactic Ablative Radiotherapy (SABR)

- Patients who receive SABR for stage 1 NSCLC should see a thoracic surgeon before starting SABR to determine if surgery is a treatment option for them.
- 67% of stage 1 lung cancer patients who received SABR had a consultation with a thoracic surgeon before receiving radiation in 2018.
- This proportion has decreased from 72% in 2014 but has increased slightly since a drop to 65% in 2015.
- This indicator was not rated because we were unable to find jurisdictional comparators.

Exhibit 6.15 Stage 1 lung cancer patients who received a thoracic surgery consultation before starting SABR

| Year | Stage 1 patients who received thoracic surgery consultation prior to SABR (%) | Stage 1 patients who received thoracic surgery consultation prior to SABR (N) | Stage 1 patients treated with SABR |
|---|---|---|---|
| 2014 | 72 | 108 | 151 |
| 2015 | 65 | 202 | 311 |
| 2016 | 64 | 257 | 404 |
| 2017 | 64 | 293 | 457 |
| 2018 | 67 | 383 | 575 |

## Unplanned Emergency Department Visits Within 30 Days of Discharge from Hospital Post-Surgery

- 23% of patients had an unplanned emergency department (ED) visit within 30 days of being discharged from hospital post-surgery in 2019; this percentage has remained stable since 2014, when it was also 23%.
- This indicator was not rated because we were not able to find jurisdictional comparators.

## Readmissions Within 30 Days of Discharge From Hospital Post-Surgery

- 6.2% of patients were readmitted to a hospital within 30 days of being discharged from hospital post-surgery in 2019; this proportion has remained stable since 2014 (6.9%).
- Ontario's proportion is lower than those of the United States and the United Kingdom.
    - In the United States, 8.2% of patients who underwent lobectomy for lung cancer between 2012 and 2017 were readmitted within 30 days;[14] 10.2% of patients who had a thoracotomy (50% of whom were cancer patients) were readmitted in 2010-2011.[82]
    - In the United Kingdom, 11% of patients who underwent surgical resection for lung cancer (excluding carcinoids) between May and July 2017 were readmitted within 30 days; the percentage varied from 3% to 24% across the 6 centres included in this multicentre study.[83]
- This indicator was rated as a bright spot because Ontario's performance has remained stable since 2014 and is better than the comparators found.

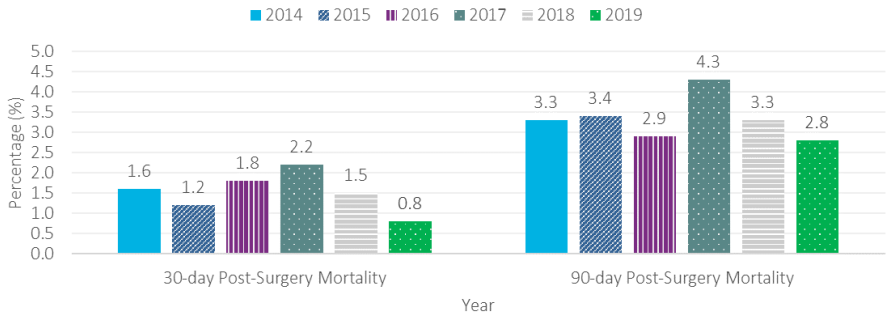
Exhibit 6.16 Unplanned emergency department visits or readmissions within 30 days of discharge from hospital post-surgery: lung cancer

| Year | Unplanned emergency department visits (%) | Readmissions (%) | Patients who had surgeries |
|---|---|---|---|
| 2014 | 23 | 6.9 | 1,895 |
| 2015 | 24 | 7.0 | 1,876 |
| 2016 | 25 | 7.5 | 1,906 |
| 2017 | 25 | 8.0 | 2,051 |
| 2018 | 23 | 6.9 | 2,095 |
| 2019 | 23 | 6.2 | 2,079 |

## 30-Day and 90-Day Post-Surgery Mortality

- In 2019 the 30- and 90-day post-surgery mortality rates were 0.8% and 2.8%, respectively.
- Rates have remained stable over time.
- Ontario's rate is lower than those reported for Denmark, Scotland and the United Kingdom.
    - In Denmark, 2.1% of patients who underwent a first resection between 2007 and 2011 died within 30 days; 5% died within 90 days.[84]
    - In Scotland, 1.5% of patients died within 30 days of surgery in 2015; 3.9% died within 90 days.[78]
    - In the United Kingdom, 3% of patients who underwent surgery between 2004 and 2010 died within 30 days of surgery; 6% died within 90 days.[85]
- NHS Scotland has set a target of less than 5% for 30-day post-surgery mortality.[78]
- This indicator was rated as a bright spot because Ontario has achieved the target set by Scotland and is performing better than other jurisdictions.

Exhibit 6.17 30-day and 90-day post-surgery mortality




Notes: Based on 2,066 surgeries in 2014, increasing to 2,141 in 2019.
Data table is available in the Technical Supplement.

## Stage 2 NSCLC Patients Who Received a Post-Surgery Medical Oncology Consultation

- Patients with stage 2 NSCLC should have the opportunity to discuss chemotherapy with a medical oncologist to inform their treatment decision.[86]
- 80% of stage 2 NSCLC patients received a medical oncology consultation after surgery in 2018.
- The proportion has been stable over time.
- This indicator was rated as a bright spot due to the improvement over time (Exhibit 6.18).

Exhibit 6.18 Stage 2 NSCLC patients who received a post-surgery medical oncology consultation

| Year | Medical oncology consultation (%) | Medical oncology consultation (N) | Stage 2 NSCLC patients who had surgery |
|---|---|---|---|
| 2014 | 77 | 319 | 414 |
| 2015 | 79 | 306 | 387 |
| 2016 | 75 | 271 | 360 |
| 2017 | 83 | 293 | 352 |
| 2018 | 80 | 286 | 358 |

## Stage 3 NSCLC Patients Who Received Immunotherapy Following Chemoradiation

- The PACIFIC trial, an international multi-centre trial (2017), found that patients who received immunotherapy (durvalumab) following chemoradiation had better progression-free survival.[87]
- 54% of stage 3 NSCLC patients received immunotherapy after completing primary chemoradiation in 2018.
- The proportion increased to 63% in 2019 and may be higher once staging data for 2019 are complete.
- In 2014, no stage 3 NSCLC patients received immunotherapy.
- In a European study, 85.6% of patients who received definitive platinum-based chemoradiation between 2009 and 2019 and were eligible to receive durvalumab consolidation immunotherapy per the PACIFIC trial criteria received it.[88] This study included only those eligible to receive durvalumab consolidation immunotherapy, which makes comparison difficult, as we did not apply study eligibility criteria.
- This indicator is rated as a bright spot because Ontario adapted practice based on the trial results soon after its publication.

Exhibit 6.19 Stage 3 NSCLC patients who received immunotherapy following chemoradiation

| Year | Immunotherapy after chemoradiation (%) | Immunotherapy after chemoradiation (N) | Stage 3 NSCLC patients who received chemoradiation |
|---|---|---|---|
| 2014 | 0 | 0 | 402 |
| 2015 | 5 | 18 | 389 |
| 2016 | 9 | 36 | 423 |
| 2017 | 19 | 83 | 429 |
| 2018 | 54 | 247 | 456 |
| 2019 | 63 | 210 | 331 |

Note: Stage 3 cases for 2019 may be undercounted due to changes in staging in 2018.

## Limited-Stage Small Cell Lung Cancer (SCLC) Patients Who Received Chemoradiation

- Chemotherapy in combination with radiotherapy is the standard of care for limited-stage SCLC as it improves survival and local control.[89]
- 66% of limited-stage SCLC patients received chemoradiation in 2018.
- This proportion increased from 58% in 2014.
- Ontario's percentage was similar to that reported for Calgary: 62% of limited-stage SCLC patients managed at a tertiary cancer centre underwent chemoradiation between 2010 and 2016.[90]
- This indicator was rated as a bright spot because performance has improved since 2014 and Ontario's percentage is similar to that of Calgary.

Exhibit 6.20 Limited-stage SCLC patients who received chemoradiation

| Year | Chemoradiation (%) | Chemoradiation (N) | Limited-stage SCLC patients |
|---|---|---|---|
| 2014 | 58 | 109 | 189 |
| 2015 | 58 | 114 | 195 |
| 2016 | 64 | 114 | 179 |
| 2017 | 63 | 134 | 212 |
| 2018 | 66 | 121 | 184 |

Note: Limited-stage SCLC patients who undergo surgery first will not be captured in these data and some patients will be too ill to receive chemoradiation.

# 7. Prostate Cancer

Exhibit 7.1 Prostate cancer performance summary

| Care Continuum | Bright Spot | Room for Improvement | Not Rated |
|---|---|---|---|
| **Cancer Burden** | | • 5-year relative survival | • Incidence<br>• Mortality<br>• Prevalence |
| **Diagnosis** | | • Time from diagnosis to first treatment<br>• Low-risk patients who received a bone scan | • Stage at diagnosis |
| **Treatment** | • Low-risk patients who received no treatment<br>• Saw urologist and radiation oncologist prior to treatment<br>• pT2 radical prostatectomy reports with positive margins<br>• Unplanned readmissions after surgery<br>• High-risk patients who received ADT while undergoing radiotherapy | • Unplanned emergency department visits after surgery | • pT3 radical prostatectomy reports with positive margins<br>• New mCSPC - ADT with concurrent ARAT therapies |

## Prostate Cancer Performance Summary

Bright spots for prostate cancer include:

- Low-risk patients not receiving treatment — 85% of low-risk patients with localized prostate cancer had no record of treatment in 2018, as recommended.
- Patients with localized prostate cancer who had consultations with both a urologist and radiation oncologist prior to treatment — 68% in 2018, up from 60% in 2014.
- Positive surgical margins — 21% of prostatectomies for tumours localized to the prostate (pT2) had positive surgical margins, close to Ontario's target of 20%. Positive margins were lower for laparoscopic/robotic surgeries (17%) compared to an open approach (26%).
- Unplanned hospital readmission after surgery for prostate cancer — only 4% of patients were readmitted within 30 days of surgery, which is in line with other jurisdictions.
- A very high percentage (92%) of high-risk patients received androgen deprivation therapy (ADT) while undergoing radiotherapy, treatment that is known to improve outcomes.

Areas with room for improvement include:

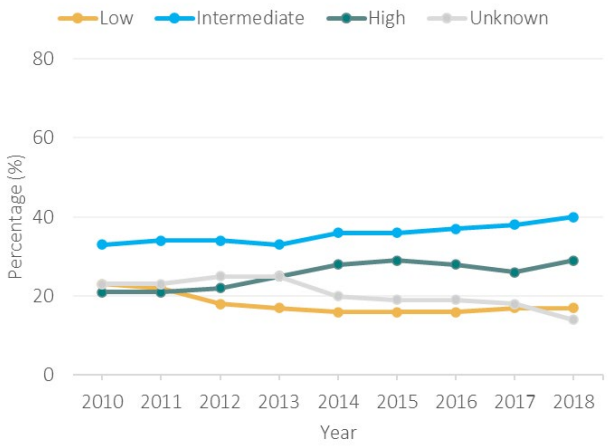
- 5-year relative survival for prostate cancer is high (91.9%) compared to other cancers because the disease is often found early. However, the declining survival rates in Ontario are very concerning and need further investigation.
- Low-risk patients should not generally receive bone scans to detect metastasis; however, in Ontario, 9% still received one. There was consensus that the percentage should be lower.
- The time from prostate cancer diagnosis to start of first treatment was 73 days in 2019. Although this is a reduction of 5 days since 2014, this is still a lengthy time for patients to be waiting for treatment. Higher-risk patients had a shorter time to treatment (49 days); however, further analysis is required to determine appropriate treatment intervals by risk level.
- The percentage of unplanned ED visits after surgery has increased over time to 25% in 2019 and is higher than the 12% achieved in other jurisdictions.

The Genitourinary Cancers Advisory Committee prioritized the following for improvement:

- Survival — relative 5-year survival has decreased from 95.2% in 2004-2008 to 91.9% a decade later (2104-2018).
- Stage 4 at diagnosis — the percentage of patients diagnosed at stage 4 has increased over time and requires further investigation. Prostate cancer incidence is also increasing overall.

- Prostate Specific Antigen (PSA) testing — given the priorities above, the Genitourinary Cancers Advisory Committee was unanimous in proposing that Ontario's policies regarding PSA testing, which is used to detect prostate cancer at early stages and is not covered by OHIP, be revisited.

Exhibit 7.2 Prostate cancer patients by diagnosis year and risk group




Note: In 2018, there were 1,584 low risk, 3,682 intermediate risk, 2,664 high risk, and 1,317 unknown prostate cancer patients.

Exhibit 7.3 Prostate cancer risk definitions

| Risk category | Definition |
|---|---|
| Low | Gleason Score ≤6 and PSA <10 ng/mL |
| Intermediate | Gleason = 7 and PSA < 10 ng/mL<br>OR<br>Gleason ≤ 7 and PSA = 10-20 ng/mL |
| High | Gleason = 8, 9, 10 or<br>PSA > 20 ng/mL |

# Cancer Burden

## Incidence, Mortality and Prevalence

- Prostate cancer is the most commonly diagnosed cancer among people with a prostate in Ontario, with 8500 new cases each year.[13]
- It was also the most commonly diagnosed cancer for First Nations people with a prostate from 1991 to 2010.[14]
- The incidence rate has increased from 118.4 per 100,000 in 2014 to 135.2 per 100,000 in 2018.
- Ontario's projected age-standardized incidence rate (ASIR) was among the highest of the provinces' rates based on Canadian Cancer Statistics (2019):[15]
    - ASIR was 121.8 for Ontario;
    - ASIR was 118.1 for all of Canada (excluding Quebec);
    - the range was 92.0 in Prince Edward Island to 137.8 in Alberta;
- The mortality rate was 16.9 per 100,000 in 2018 and has remained stable since 2014.
- Prostate cancer was the third leading cause of cancer death among people with a prostate.
- Ontario's projected age-standardized mortality rate (ASMR) was among the highest of the provinces based on Canadian Cancer Statistics (2019):[15]
    - ASMR was 21.3 for Ontario;
    - ASMR was 22.2 for all of Canada;
    - the range was 9.8 in Quebec to 29.8 in Saskatchewan.
- These cancer burden indicators are not rated.

Exhibit 7.4 Prostate cancer incidence and mortality

| Year | Incidence rate per 100,000 | Incident cases | Mortality rate per 100,000 | Deaths |
|---|---|---|---|---|
| 2014 | 118.4 | 7,548 | 17.1 | 1,468 |
| 2015 | 119.7 | 8,398 | 16.6 | 1,465 |
| 2016 | 124.3 | 9,171 | 16.9 | 1,568 |
| 2017 | 131.3 | 9,720 | 17 | 1,612 |
| 2018 | 135.2 | 8,528 | 16.9 | 1,657 |

Note: Standardized to Segi (1960) World Population.

Exhibit 7.5 Prostate cancer prevalence

| Year | Prevalence rate per 100,000 | Prevalent cases |
|---|---|---|
| 2014 | 1,109 | 74,574 |
| 2015 | 1,081 | 73,394 |
| 2016 | 1,050 | 72,314 |
| 2017 | 1,026 | 71,645 |
| 2018 | 1,013 | 72,146 |

Notes: Standardized to Segi (1960) World Population.
Prevalence is calculated for January 1 of the following calendar year.

## Survival

- Survival rates for prostate cancer are generally high because it is often found early, before it has grown or spread to other parts of the body, and when effective treatments are available.
- Relative 5-year survival for prostate cancer decreased from 95.2 for 2004-2008 to 91.9% a decade later (for 2014-2018).
- 5-year observed survival decreased from 82.6% to 81.8% between these same periods, despite advances in treatment.
- First Nations men have a lower survival rate for prostate cancer compared with other men in Ontario: 74% and 82%, respectively.[14]
- Ontario's projected (using actual data up to 2015) 5-year relative survival rate for prostate cancer reported in the 2019 Canadian Cancer Statistics report was 93% for Ontario, compared to 93% for Canada as a whole; the provincial range was from 90% in Saskatchewan to 94% in New Brunswick.[15]
- Relative survival for prostate cancer was rated as room for improvement because the rate is declining despite advances in treatment.

Exhibit 7.6 Prostate cancer observed and relative survival

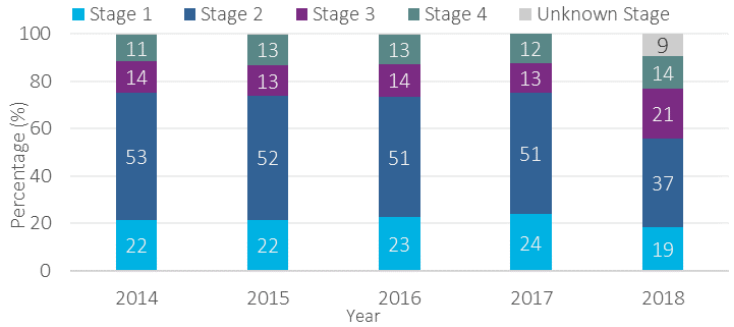
| Time period | Observed survival (%) | Relative survival (%) |
|---|---|---|
| 2004 to 2008 | 82.6 | 95.2 |
| 2014 to 2018 | 81.8 | 91.9 |

# Diagnosis

## Stage at Diagnosis

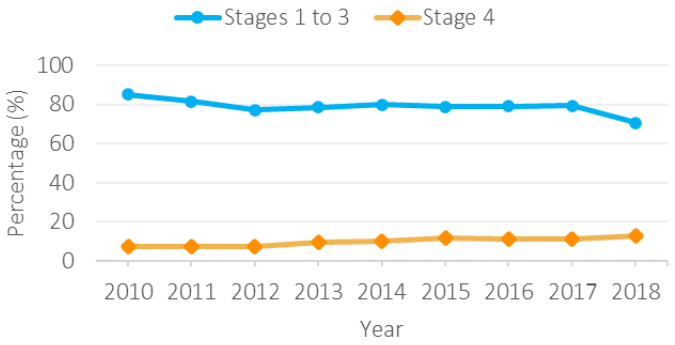
- 14% of people diagnosed with prostate cancer were diagnosed with stage 4 disease in 2018; this proportion has increased over time from about 11% in 2014.
- In Canada, the percentage of prostate cancer patients diagnosed with stage 4 disease varied from 6% in Prince Edward Island to 14% in the territories, compared to 8% in Ontario.[21]
- This indicator was not rated because implementation of the AJCC 8th edition in 2018 made interpreting time trends problematic.

Exhibit 7.7 Distribution of incident prostate cancer cases by stage at diagnosis




Notes: Unknown stage may be due to limited stage workup or limited documentation within the patient record.
Shift in stage distribution in 2018 was the result of the implementation of the 8th Edition of the American Joint Committee on Cancer (AJCC) Cancer Staging Manual.
Data table is available in the Technical Supplement.

Exhibit 7.8 Stage of prostate cancer cases over time

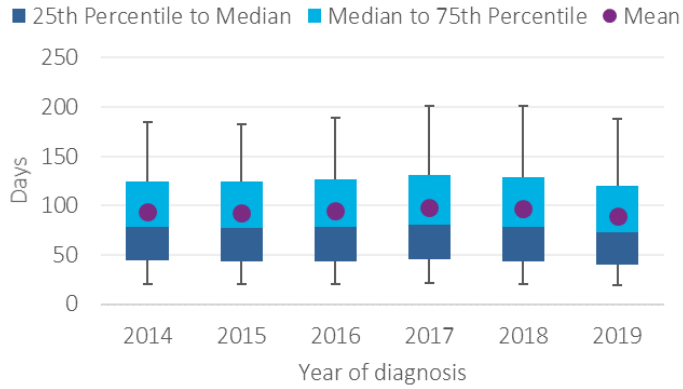



Note: Data table is available in the Technical Supplement.

## Time from Diagnosis to First Treatment

- The median time from diagnosis to first treatment for prostate cancer was 73 days in 2019 and decreased by 5 days since 2014.
- Time to treatment decreased with increasing risk; the median time to treatment for high-risk patients was 49 days. (Exhibit 7.10)
- Ontario's median time from diagnosis to treatment is similar to times to treatment in the United States:
  - 3 months among men who underwent radical prostatectomy for intermediate- and high-risk prostate cancer between 2010 and 2016[91];
  - 79 days from diagnosis to definitive treatment between 2004 and 2015.[27]
- Targets set by other countries include:
  - 1 month from diagnosis to treatment in England (NHS target)[44]
  - 3 months from diagnosis to surgery, chemotherapy and other drug treatments in Australia[92]
- This indicator was rated as room for improvement because the median time from diagnosis to treatment is still long, although it has decreased since 2014.

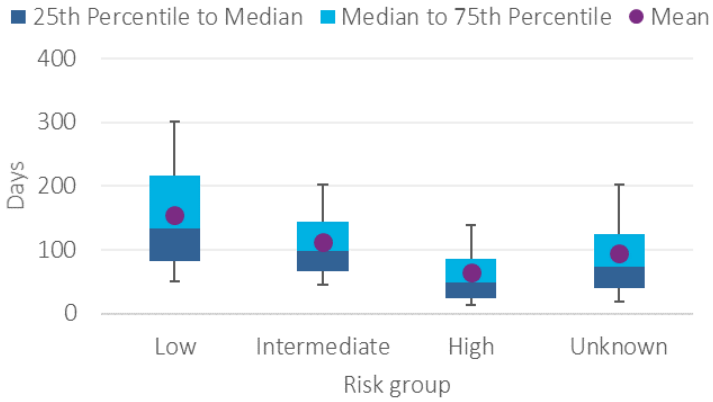
Exhibit 7.9 Time from diagnosis to first treatment for prostate cancer




Notes:

Range is the 10th percentile to 90th percentile.
Data table is available in the Technical Supplement.

Exhibit 7.10 Time from diagnosis to first treatment, by risk group




Note: Data table is available in the Technical Supplement.

## Low-Risk Prostate Cancer Patients Who Received a Bone Scan

- Metastases are rare in people with low-risk prostate cancer, so bone scans are not recommended for these patients.
- 9% of low-risk prostate cancer patients received a bone scan within 6 months of diagnosis in 2018.
- This percentage has remained relatively stable since 2014, with a high of 12% in 2014.
- Ontario's percentage is lower than in the United States:
  - 15% in North Carolina and Louisiana (2004-2009)[93];
  - 19% of men residing in urban areas and 11% of men residing in rural areas[94]
- This indicator was rated as room for improvement despite Ontario having a lower percentage than the US because most low-risk patients should not routinely undergo a bone scan according to clinical guidelines.

Exhibit 7.11 Low-risk prostate cancer patients who received a bone scan

| Year | Bone scan (%) | Bone scan (N) | Low-risk patients |
|---|---|---|---|
| 2014 | 10 | 122 | 1,174 |
| 2015 | 12 | 136 | 1,161 |
| 2016 | 10 | 133 | 1,307 |
| 2017 | 10 | 152 | 1,512 |
| 2018 | 9 | 140 | 1,585 |

# Treatment

## Unplanned Emergency Department Visits within 30 Days of Discharge from Hospital Post-Surgery

- In 2019, 26% of prostate cancer patients had an unplanned emergency department (ED) visit following their cancer surgery, representing an increase of 2% from 2014.
- In a recent systematic review and meta-analysis of 60 studies published between 2000 and 2020, the 30-day unplanned ED visit rate was 12% following prostatectomy for prostate cancer.[95]
- 30-day unplanned ED visits was rated as room for improvement given that Ontario's rate has increased since 2014 and is well above the rate reported in the meta-analysis.

## Readmissions Within 30 Days of Discharge From Hospital Post-Surgery

- 4% of prostate cancer patients had an unplanned hospital readmission following their cancer surgery in 2019; this rate has remained stable since 2014.
- In a recent systematic review and meta-analysis of 60 studies published between 2000 and 2020, the 30-day readmission rate was 4% following prostatectomy for prostate cancer.[95]
- 30-day readmission was rated as a bright spot because the rate has remained stable since 2014 and is the same as that reported in the meta-analysis.

Exhibit 7.12 Unplanned emergency department visits or readmissions within 30 days of discharge from hospital post-surgery: prostate cancer

| Year | Unplanned emergency department visits (%) | Readmissions (%) | Patients who had surgeries |
|---|---|---|---|
| 2014 | 24 | 4 | 1,992 |
| 2015 | 24 | 4 | 2,046 |
| 2016 | 26 | 4 | 2,136 |
| 2017 | 27 | 4 | 2,151 |
| 2018 | 26 | 3 | 2,158 |
| 2019 | 26 | 4 | 1,703 |

## Low-Risk Localized Prostate Cancer Patients Who Received No Treatment

- Many prostate cancer cases are of a slow-growing type and therefore will not cause harm if left untreated. To mitigate the risks associated with over-treatment, active surveillance (monitoring the patient closely and providing treatment only if the disease progresses) is recommended for many men with low-risk prostate cancer.[96]
- 85% of low-risk localized prostate cancer patients had no record of treatment (i.e., active surveillance, watchful waiting) in Ontario in 2018, an increase of 13% from 2014.
- Ontario is performing better than the Canadian average, Australia and the US.
    - In Canada, 70% of men with low-risk prostate cancer had no record of treatment across all provinces combined in 2013.[97]
    - In Australia, 25% of men diagnosed with low-risk prostate cancer between 2008 and 2012 received no treatment with curative intent at 12 months follow-up.[98]
    - In the US, 35% of men with T1 or T2, PSA ≤15, Gleason ≤7 [3 + 4] prostate cancer received no treatment within six months of diagnosis in 2013.[99]
- This indicator was rated as a bright spot because Ontario is performing better than the Canadian average and other jurisdictions.

Exhibit 7.13 Low-risk prostate cancer localized patients with no record of treatment

| Year | No treatment (%) | No treatment (N) | Low-risk localized patients |
|---|---|---|---|
| 2014 | 72 | 846 | 1,174 |
| 2015 | 79 | 919 | 1,161 |
| 2016 | 82 | 1,073 | 1,307 |
| 2017 | 85 | 1,288 | 1,512 |
| 2018 | 85 | 1,352 | 1,585 |

## Positive Margins Following Radical (or Total) Prostatectomy: pT2 and pT3

- One of the main goals of radical prostatectomy is to completely remove the cancer with negative margins while preserving urinary and erectile functions.[100] Positive margins increase the risk of biochemical recurrence[101] and may increase the need for secondary treatment.

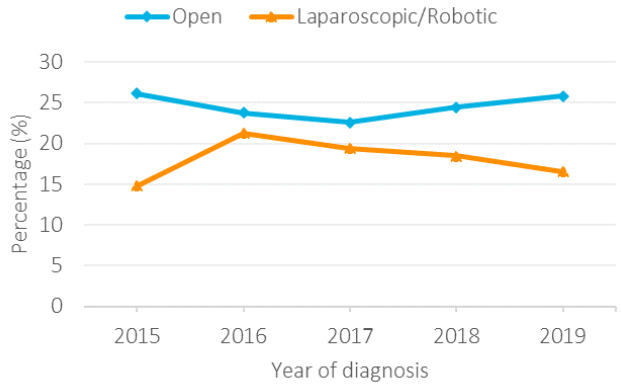
pT2 Positive Margins

- pT2 refers to pathologic staging of the cancer when the tumour is located only in the prostate.
- 21% of radical prostatectomy pathology reports for pT2 prostate cancer showed positive margins in 2019.
- This rate has remained stable since 2014.
- The rate of pT2 positive margins was higher for open compared with laparoscopic or robotic approaches at 26% and 17%, respectively, in 2019.
- Ontario is performing better than Italy (38% in 2011-2017)[102] and worse than Norway (15% in 2013 to 2015, age < 75).[103]
- Ontario has set a target of 20% for pT2 positive margins after surgery.
- This indicator was rated as a bright spot because Ontario is close to its target.

Exhibit 7.14 Positive margins following radical (or total) prostatectomy: pT2

| Year | Synoptic reports with positive margins (%) | Synoptic reports with positive margins (N) | pT2 synoptic reports |
|---|---|---|---|
| 2015 | 21 | 282 | 1,351 |
| 2016 | 22 | 299 | 1,346 |
| 2017 | 21 | 274 | 1,322 |
| 2018 | 22 | 291 | 1,321 |
| 2019 | 21 | 239 | 1,124 |

Exhibit 7.15 pT2 pathology reports with positive margins, by surgical approach




Notes: 3-7% of pT2 synoptic reports had an unknown surgical approach from 2015-2019.
Data table is available in the Technical Supplement.

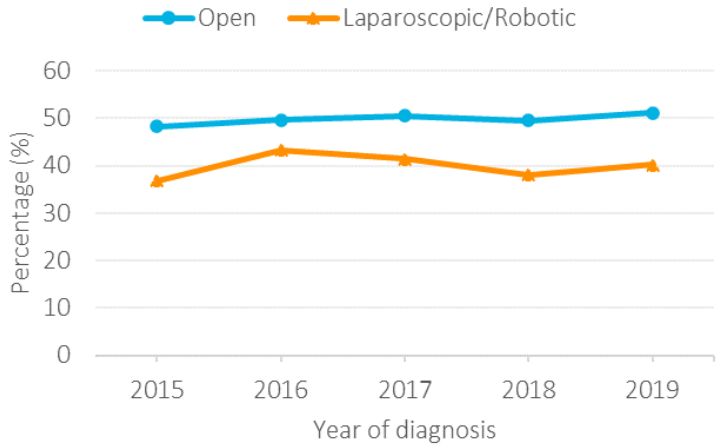
pT3 Positive Margins

- pT3 refers to pathologic staging when the tumour has grown outside of the prostate on one or both sides (extraprostatic extension).
- 46% of pT3 radical prostatectomy pathology reports showed positive margins in 2019.
- Rates have remained stable since 2015.
- Rates were higher for open approaches (51%) compared with laparoscopic or robotic approaches (40%) in 2019.
- Although there are comparators for this indicator, they are specifically for pT3a (43% in Italy,[102] 30% in Norway[103]) and pT3b (19% in Italy[102]), making comparisons difficult.
- Ontario has set a target of 40% for pT3 positive margins.
- The pT3 positive surgical margins was not rated as we do not have sufficient data to assess performance.

Exhibit 7.16 Positive margins following radical (or total) prostatectomy: pT3

| Year | Synoptic reports with positive margins (%) | Synoptic reports with positive margins (N) | pT3 synoptic reports |
|---|---|---|---|
| 2015 | 44 | 459 | 1,042 |
| 2016 | 47 | 534 | 1,125 |
| 2017 | 47 | 514 | 1,090 |
| 2018 | 45 | 545 | 1,217 |
| 2019 | 46 | 518 | 1,126 |

Exhibit 7.17 pT3 pathology reports with positive margins, by surgical approach




Notes: 2-3% of pT3 synoptic reports from 2015-2019 had an unknown surgical approach.
Data table is available in the Technical Supplement.

## High-Risk Prostate Cancer Patients Receiving Adjuvant ADT While Undergoing Radiotherapy

- In high-risk prostate cancer patients, radiotherapy with adjuvant androgen deprivation therapy (ADT) is associated with improved outcomes.
- 92% of high-risk prostate cancer patients were treated with radiotherapy while receiving concurrent ADT in 2018.
- These proportions have remained stable since 2014.
- Ontario is performing better than the Netherlands and Australia.
    - In the Netherlands, 83% of high-risk patients received (neo-) adjuvant and concurrent ADT in combination with external beam radiotherapy.[104]
    - In Australia, 84% of men with intermediate or high-risk prostate cancer treated with definitive external beam radiotherapy received ADT between 2010 and 2015.[105]
- This indicator was rated as a bright spot because the proportions have remained high and Ontario is performing well compared to other jurisdictions.

Exhibit 7.18 High-risk prostate cancer patients receiving adjuvant ADT while undergoing radiotherapy

| Year | Concurrent ADT & radiotherapy (%) | Concurrent ADT & radiotherapy (N) | High-risk patients on radiotherapy |
|---|---|---|---|
| 2014 | 90 | 511 | 570 |
| 2015 | 93 | 642 | 693 |
| 2016 | 91 | 657 | 719 |
| 2017 | 92 | 678 | 738 |
| 2018 | 92 | 799 | 871 |

## New Metastatic Castration-Sensitive Prostate Cancer (mCSPC) Patients Who Received ADT With Concurrent Androgen Receptor Axis-Targeted Therapies (ARAT)

- Patients with mCSPC have improved survival when treated with androgen deprivation therapy (ADT) combined with ARAT.
- 26% of mCSPC patients receiving ADT were treated with concurrent ARAT in 2018.
- The percentage increased by 11% from 2017 to 2018 following the approval of ARAT.
- This indicator was not rated due to insufficient data.

Exhibit 7.19 mCSPC patients treated with ARAT

| Year | ARAT concurrent with ADT ( %) | ARAT concurrent with ADT (N) | mCSPC patients |
|---|---|---|---|
| 2014 | 2 | 6 | 312 |
| 2015 | 4 | 13 | 362 |
| 2016 | 3 | 13 | 391 |
| 2017 | 15 | 57 | 383 |
| 2018 | 26 | 129 | 496 |

## Consultations With Both a Urologist and a Radiation Oncologist Prior to Treatment

- It is recommended that all patients with newly diagnosed, clinically localized prostate cancer be assessed by both a urologist and a radiation oncologist prior to treatment, to support informed decision-making.
- 68% of patients undergoing therapy for localized prostate cancer in 2018 had consultations with both a urologist and a radiation oncologist prior to treatment.
- This percentage has increased by 8% since 2014.
- Consultations with both a urologist and a radiation oncologist increased with increasing age and with increasing risk category (data not shown).
- In the United States, 61.5% of patients consulted a radiation oncologist within 9 months of being diagnosed by a urologist between 2004 and 2007.[106]
- This indicator was rated as a bright spot because Ontario's performance has improved over time.

Exhibit 7.20 Consulted with both a urologist and a radiation oncologist prior to treatment

| Year | Consulted with both specialists prior to treatment (%) | Consulted with both specialists prior to treatment (N) | Patients undergoing therapy for localized prostate cancer |
|---|---|---|---|
| 2014 | 60 | 2,332 | 3,866 |
| 2015 | 62 | 2,528 | 4,050 |
| 2016 | 63 | 2,688 | 4,293 |
| 2017 | 66 | 3,090 | 4,698 |
| 2018 | 68 | 3,420 | 5,011 |

# 8. End-of-Life Care

## End-of-Life Care Performance Summary

- Although the end-of-life care indicators were analysed by disease site, there was consensus across the Cancer Advisory Committees that for end-of-life care, the specific cancer becomes a less important factor in providing high-quality, appropriate care. As such, these indicators are reported across disease sites.
- It was noted that end-of-life care indicators extend beyond the cancer system indicators; quality improvement efforts will likely require a multi-pronged approach. These CSQI indicators and other cancer-specific indicators will be important for monitoring progress towards providing high-quality, supportive end-of-life care for cancer patients.
- Future work should include a broader and deeper examination of end-of-life care, including indicators that help us understand and plan for better integration of care and better patient and family experience.

Not Rated

- Systemic treatment in the last 30 days of life is a measure of aggressive end-of-life care. In Ontario, 16% to 38% of patients (depending on the disease site) who had a medical oncology visit in the last year of life received palliative antineoplastic systemic treatment at the end of life. This indicator was not rated because differences in study methods make comparisons to other jurisdictions difficult.

Room for Improvement

- Emergency department (ED) visits at the end of life is a measure of aggressive end-of-life care. Roughly 55% of cancer patients had at least one ED visit in the last 30 days of life; this is higher than the benchmark of 34% set by Barbera et al.[107], suggesting that Ontario has substantial room for improvement.
- Physician home visits at the end of life is a measure of supportive care. Although Ontario's rates of 30% to 36% of patients receiving such visits (depending on disease site) are near the benchmark set by Barbera et al., consensus across the Cancer Advisory Committees was that we could do better.

Priorities for Improvement

- End-of-life care was identified as a priority for improvement by all the Cancer Advisory Committees (across all disease sites). Further analyses and engagement with the programs, including the Ontario Palliative Care Network, are required to better understand the issues and determine action.

## Emergency Department Visits in the Last 30 Days of Life

- Emergency department (ED) visits at the end of life (EOL) is an indicator of aggressive end-of-life care. It is expected that there will be some appropriate use of EDs by cancer patients at the end of life; the goal is to reduce the number of visits through effective palliative services.
- The percentage of patients who had ED visits at EOL varied from 47% for rectal cancer patients to 56% for prostate cancer patients.
- The percentages increased over time, except for rectal and lung cancers, which decreased.
- In an analysis of 33 regions in 4 provinces, Barbera et al. set a benchmark of 34% for ED visits at the end of life. The range for the 33 regions was 30.7% in Nova Scotia to 47.9% in Ontario.[107]
- Using the 10th decile in an analysis of SEER-Medicare claims, Earle et al. set a benchmark of less than 4% of patients should have multiple ED visits at the end of life; however, this was for multiple ED visits, included only patients aged 65 and older and was based on data from 1991-1996.[108]
- There was consensus across the Cancer Advisory Committees that this indicator be rated as room for improvement because the rates have not improved over time and Ontario is performing below the benchmark set by Barbera et al.

Exhibit 8.1 Emergency department visits in the last 30 days of life, by disease site

| Year | Breast (%) | Cervical (%) | Colon (%) | Rectum (%) | Lung (%) | Prostate (%) |
|---|---|---|---|---|---|---|
| 2015 | 52 | 53 | 52 | 48 | 58 | 55 |
| 2016 | 53 | 48 | 52 | 46 | 58 | 55 |
| 2017 | 53 | 48 | 53 | 49 | 57 | 55 |
| 2018 | 53 | 52 | 52 | 47 | 58 | 56 |
| 2019 | 55 | 55 | 54 | 47 | 54 | 56 |

## Systemic Treatment in the Last 30 Days of Life

- Systemic treatment in the last 30 days of life is an indicator of aggressive end-of-life care and has been found not to improve quality of life. It may even worsen quality of life for patients with good performance status.[109]
- 16% to 38% of patients (depending on the disease site) who had a medical oncology visit in the last year of life received palliative antineoplastic systemic treatment at the end of life.
- It is difficult to make comparisons to other jurisdictions due to differences in methods, definitions of systemic treatment, time periods and the specific cancers included, however, comparisons may be helpful as a starting point for future work.
- The Canadian Partnership Against Cancer has reported on end-of-life indicators but only for individuals starting a new treatment regimen in the last 30 days of life.[110]
- For breast cancer, Ontario's percentage of 35% is well above those reported for Sweden (23%),[111] France (21%)[112] and Denmark (16%).[113]
- For colorectal cancer, Ontario's percentage was higher than Australia's (18% in the last two weeks of life, 2005-2007)[114] and Italy's (7.1% in the last 14 days, 2007-2014).[115]
- Using the 10th decile in the analysis of SEER-Medicare claims for patients ages 65 and older, Earle et al. set a benchmark of less than 10% for patients receiving systemic treatment in the last 14 days of life.[108]
- This indicator was not rated due to difficulty finding appropriate comparators.

Exhibit 8.2 Systemic treatment in the last 30 days, of life, by disease site

| Year | Breast (%) | Cervical (%) | Colorectal (%) | Lung (%) | Prostate (%) |
|---|---|---|---|---|---|
| 2015 | 36 | | 29 | 25 | 19 |
| 2016 | 38 | | 29 | 26 | 19 |
| 2017 | 41 | | 25 | 31 | 24 |
| 2018 | 37 | | 30 | 28 | 22 |
| 2019 | 35 | | 28 | 31 | 25 |
| 2015-2019 | 38 | 16 | 28 | 28 | 22 |

Notes: Percentage for cervical cancer is aggregated due to small number of cases.
Systemic treatment refers to receiving palliative antineoplastic systemic treatment.

## Physician Home Visits in the Last 30 Days of Life

- Physician home visits at the end of life is an indicator of supportive end-of-life care.
- 30% to36% of cancer patients (depending on the disease site) received at least one physician home visit at the end of life.
- It is difficult to make jurisdictional comparisons since other jurisdictions largely report visits within 2 weeks of death.
- In a study of end-of-life cancer care in 2004-2009, Ontario's percentage of 24.2% (in that study) was higher than those of BC (21.4%) and Nova Scotia (23.9%) for physician home visits in the last two weeks of life.[107]
- Using the top decile in an analysis of 33 regions in 4 provinces, Barbera et al. set a benchmark of 34% (in the last 2 weeks of life).[107]
- Ontario's performance is above the benchmark set by Barbera et al. for colorectal and lung cancers and is slightly below for breast, cervical and prostate cancers.
- Although Ontario's performance is above or close to the benchmark set by Barbera et al., consensus across the Cancer Advisory Committees was that there is still room for improvement.

Exhibit 8.3 Physician home visits in the last 30 days of life, by disease site

| Year | Breast (%) | Cervical (%) | Colorectal (%) | Lung (%) | Prostate (%) |
|---|---|---|---|---|---|
| 2015 | 28 | 34 | 31 | 33 | 25 |
| 2016 | 33 | 39 | 34 | 36 | 29 |
| 2017 | 32 | 34 | 35 | 36 | 30 |
| 2018 | 31 | 37 | 36 | 35 | 29 |
| 2019 | 30 | 32 | 36 | 35 | 30 |

# 9. Ontario Cancer System Performance Summary

## Summary of Results for Common Indicators Across Disease Sites

- A summary of ratings for common indicators across disease sites is provided in Exhibit 9.1.
- Although cancer incidence was not rated, it is important to note that incidence rates have been stable for breast cancer, are decreasing for colorectal and lung cancers, and are increasing for cervical and prostate cancers.
- Five-year relative survival has improved for breast, cervical, colorectal and lung cancers and is declining for prostate cancer. Ontario's 5-year survival rates for breast, cervical, colorectal and lung cancers are among the highest in the world.
- Patients diagnosed with a lower cancer stage at diagnosis have better survival. For breast and cervical cancers, very few patients are diagnosed at stage 4; screening programs contribute to earlier detection of these cancers. For colorectal, lung and prostate cancers, survival was not rated as implementation of changes to staging criteria in 2018 makes interpretation of time trends difficult.
- The time interval from diagnosis to treatment was rated as room for improvement across all disease sites. Although Ontario has longer times to first treatment compared to other jurisdictions, we also have the highest survival rates, and we need to understand this better.
- Unplanned readmissions following discharge from hospital post-surgery were lower for breast, cervical and prostate cancers compared to other jurisdictions.
- Unplanned emergency department visits following discharge from hospital post-surgery were lower for breast cancer and higher for cervical and prostate cancers compared to other jurisdictions.
- Emergency department visits and physician home visits in the last 30 days of life, indicators of aggressive and supportive end-of-life care, were rated as room for improvement across all disease sites.
- The need to increase appropriate use of imaging (e.g., to inform treatment decisions) and reduce inappropriate use of imaging (e.g., imaging to detect metastases in early-stage cancers) was highlighted.

Exhibit 9.1 Summary of ratings for common indicators across disease sites

| Care Continuum | Bright Spot | Room for Improvement | Not Rated |
|---|---|---|---|
| **Cancer Burden** | **5-year relative survival**<br>breast, cervical, colorectal, lung | **5-year relative survival**<br>prostate | |
| **Diagnosis** | **Stage at diagnosis**<br>breast, cervical | **Time from diagnosis to first treatment**<br>all sites | **Stage at diagnosis**<br>colorectal, lung, prostate |
| **Treatment** | **Unplanned ED visits after surgery**<br>breast<br><br>**Unplanned readmissions after surgery**<br>breast, cervical, prostate | **Unplanned ED visits after surgery**<br>cervical, prostate | **Unplanned ED visits after surgery**<br>colorectal, lung<br><br>**Unplanned readmissions after surgery**<br>colorectal, lung |
| **End-of-Life**<br>(last 30 days) | | **ED visits EOL**<br>all sites<br><br>**Physician home visits EOL**<br>all sites | **Systemic treatment EOL**<br>all sites |

## Summary of Results for Disease Site-Specific Indicators

- Summaries of the ratings for disease site-specific indicators across the care continuum are provided in Exhibit 9.2.
- The prevalence of modifiable risk factors for cancer is generally high and is higher in First Nations, Inuit and Métis peoples compared to non-Indigenous people. Tobacco smoking is decreasing except among First Nations women for whom rates are increasing. However, these data are a decade old and more up to date data are needed. Indigenous specific solutions to risk factor prevention are proposed in Path to Prevention.[116]
- HPV immunization coverage presents an opportunity for improvement and a concerted effort will need to be made to account for the pause in school-based vaccination program caused by the COVID-19 pandemic.
- Participation in breast cancer screening from 2012–2013 to 2018–2019 and the proportion of people overdue for colorectal cancer screening from 2016 to 2019 were stable. Participation in cervical screening decreased from 2008-2010 to 2017-2019. Positive predictive value of screening mammography, hospitalization for bowel perforation within 7 days of outpatient colonoscopy, and follow-up of abnormal breast, cervical and colorectal screening results were all rated as bright spots as performance was consistently high.
- In the diagnostic phase, indicators across disease sites suggest that there is room for improvement on ensuring patients receive necessary imaging and do not receive unnecessary imaging.
- The majority of treatment indicators were rated as bright spots. It appears that once patients start treatment, they receive high-quality care.
- Indicators that measure adherence to new evidence and guidelines suggest that Ontario has rapid uptake.
- Indicators that measure concurrent or sequential treatments or consultations across treatment modalities/specialties suggest that these treatments and consultations are occurring, particularly for chemoradiation. These are also important indicators of patient-centred care.
- For survivorship care, a high percentage of breast cancer survivors received mammograms following the end of their treatment whereas the percentage of colorectal cancer survivors who received a colonoscopy following surgery needs improvement.

Exhibit 9.2 Summary of ratings for disease site-specific indicators

| Care Continuum | Bright Spot | Room for Improvement | Not Rated |
|---|---|---|---|
| **Prevention** | | • HPV vaccination rates | Prevalence of:<br>• Overweight or obesity<br>• Physical inactivity<br>• Inadequate vegetable and fruit consumption<br>• Excess alcohol consumption<br>• Tobacco smoking |
| **Screening** | • Tissue biopsy for definitive diagnosis within 7 weeks of abnormal breast cancer screening test result<br>• Positive predictive value of screening mammograms<br>• Colposcopy or definitive treatment within 6 months of high-grade abnormal cervical cytology (Pap) test result<br>• Follow-up colonoscopy within 6 months of abnormal fecal test result<br>• Hospitalization for bowel perforation within 7 days of outpatient colonoscopy | • Screen-eligible people with at least one mammogram in 30 months<br>• 1 cervical cytology (Pap) test in 42 months<br>• Subsequent Pap test within 42 months of normal result<br>• Proportion of eligible participants overdue for colorectal cancer screening | |
| **Diagnosis** | | • Stage 1 breast cancer patients who received imaging to detect metastasis | • Time from first presentation (suspicion) to diagnosis of breast cancer |

| Care Continuum | Bright Spot | Room for Improvement | Not Rated |
|---|---|---|---|
| | | • Brain MRI for stage 1 lung cancer<br>• Low-risk prostate cancer patients who received a bone scan<br>• Cervical cancer patients who received pre-treatment MRI<br>• Rectal cancer patients who received pre-treatment MRI<br>• NSCLC patients who received PET-CT scan prior to radical treatment | |
| **Treatment** | • Low-risk prostate cancer patients who received no treatment | • Cancer patients screened for tobacco use | |
| *Radiation* | • Time from start of radiation therapy for cervical cancer patients to completion | | |
| *Surgery* | • Mastectomy with immediate reconstruction<br>• Cervical cancer surgeries performed by a gynecologic oncologist<br>• Rectal cancer surgery resection reports with positive margins<br>• Colon cancer surgery reports with 12 or more lymph nodes examined<br>• pT2 radical prostatectomy | | • Mastectomy with delayed reconstruction<br>• Adjuvant radiation after mastectomy in patients with lymph node involvement<br>• Cervical cancer surgeries performed using "open" technique<br>• pT3 radical prostatectomy reports with positive margins |

| Care Continuum | Bright Spot | Room for Improvement | Not Rated |
|---|---|---|---|
| | reports with positive margins<br>• 30- and 90-day post-surgery mortality for lung cancer patients | | |
| *Systemic* | | | • Stage 1 (T1c)-3 and ER/PR/HER2-negative breast cancer patients who received (neo) adjuvant chemotherapy<br>• Stage 1 (T1C)-3 and HER2-positive breast cancer patients who received (neo) adjuvant chemotherapy with trastuzumab<br>• New mCSPC prostate cancer patients who received ADT with concurrent ARAT therapies |
| *Chemo-radiation* | • Stage 3 NSCLC patients who received immunotherapy following chemoradiation<br>• Limited-stage SCLC patients who received chemoradiation<br>• High-risk prostate cancer patients who received ADT while undergoing radiotherapy<br>• Prostate cancer patients who had consultations with urologist and radiation oncologist prior to treatment | • Cervical cancer patients who received definitive radiotherapy with concurrent platinum-based chemotherapy (cisplatin) | • Lung cancer stage 1 patients who had surgery or SABR within 180 days of diagnosis<br>• Lung cancer stage 1 patients treated with SABR who received a surgical consult<br>• Lung cancer stage 2 NSCLC patients who received a post-surgery medical oncology consultation |

| Care Continuum | Bright Spot | Room for Improvement | Not Rated |
|---|---|---|---|
| **Survivorship Care** | • Mammogram after last local treatment | • Colonoscopy within 18 months of initial surgery | |

## Data Issues in Measuring Ontario's Cancer System Performance

- The conclusions drawn from the CSQI are only based on the indicators for which we had data available.
- Cancer recurrence and patient quality of life are important cancer outcomes; however, we lack these data.
- In addition, the two-year time lag for staging data makes it difficult to assess how the system is performing when treatment protocols, evidence and practice are changing rapidly.
- The data for First Nations, Inuit and Métis peoples are limited and about a decade old. This currently limits our ability to assess health equity for these priority populations.
- We are limited in our ability to perform health equity analyses because we do not currently have person-level equity data and must rely on geographic area-level analyses (e.g., the Ontario Marginalization Index). For the indicators reported here, particularly the treatment indicators, we require person-level data to apply inclusion and exclusion criteria accurately and ensure that we are able to draw conclusions at the patient level and move beyond analyses comparing geographic areas.
- Another health equity limitation is our need for data that are gender inclusive with consistent definitions or a primary source of gender data.
- Symptom burden was identified as important across disease sites. Although we have reported on symptom burden and management indicators in the past, the Cancer Advisory Committees suggested that we work toward creating more meaningful and actionable indicators that make the best use of our data.

## Next Steps

- The purpose of this report was to highlight where Ontario's cancer system is performing well and where there is room for improvement.
- Priorities have been identified for each of the disease sites; however, additional analyses are required to examine performance on these indicators in more detail to enable us to better understand root causes and where variation exists. For indicators that do not require stage data, analyses to produce more timely data will be helpful. Further engagement with the Cancer Advisory Committees, clinical and program leadership and, in some cases, other stakeholders is required.
- Discussions about the impact of COVID-19 on the priorities identified in this report will also be important in determining next steps.

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