Cancer System Quality Index 2021

Technical Supplement: Methods and Data Tables

November 2021

CQCO Cancer Quality Council of Ontario

Ontario Health

Preface

This document is a technical supplement to the Cancer System Quality Index (CSQI) 2021. It contains both methods for the analyses in CSQI 2021 and the data for the graphs, The chapters and sections in this report are sequenced in the same order as they appear in the report. The exhibit number each data table matches that of the graph it corresponds to in CSQI 2021.

Efforts have been made to make this document as gender inclusive as possible. Where historical data sources, such as the Canadian Community Health Survey or the Registered Persons Database, contain data for only some genders, we report on those genders as they are in the source data.

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.

Inquiries about the CSQI 2021, including the methodology, may be directed to cqco@ontariohealth.ca

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Abbreviations

Abbreviation	Meaning
ADT	Androgen Deprivation Therapy
ALND	Axillary Lymph Node Dissection
ALR	Activity Level Reporting (Regional Cancer Centres outpatient treatment data)
CCI	Canadian Classification of Health Interventions
CSI	Collaborative Staging Integration (cancer staging database)
DAD	Discharge Abstract Database (inpatient hospital database)
EBRT	External Beam Radiation Therapy
ER	Estrogen Receptor
FOBT	Fecal Occult Blood Test
FIT	Fecal Immunochemical Test
HER2	Human Epidermal Growth Factor Receptor 2
ICD-O-3	International Classification of Diseases for Oncology, version 3
IMRT	Intensity-Modulated Radiation Therapy
IRS	Indian Registration System
mCSPC	Metastatic Castration-Sensitive Prostate Cancer
MIS	Management Information System
MO	Medical Oncologist
NACRS	National Ambulatory Care Reporting System (outpatient hospital database)
NDFP	New Drug Funding Program

Abbreviation	Meaning
ODB	Ontario Drug Benefits
OCR	Ontario Cancer Registry
ODB	Ontario Drug Benefit
OHIP	Ontario Health Insurance Program (physician billing database)
P10	Tenth Percentile
P25	Twenty-Fifth Percentile
P75	Seventy-Fifth Percentile
P90	Ninetieth Percentile
PR	Progesterone Receptor
RO	Radiation Oncologist
RPDB	Registered Persons Database
SEER	Surveillance, Epidemiology, and End Results
SNLB	Sentinel Lymph Node Biopsy

Section A: Methods

1. Common Methods

1.1 Cancer cohort methodology

Incident cancer cohorts were used for indicators related to diagnosis and treatment and include patients diagnosed with a new primary cancer during the reporting period 2014-2019.

Description	Patients diagnosed with cancer. These methods apply to all the disease-site-specific incident cohorts. Methods used to narrow the cohort to specific disease sites (breast, cervical, colorectal, lung and prostate) are below.
Inclusion Criteria	• Incident case diagnosed between January 1, 2014 and December 31, 2019 • Cases with SEER behavior code 3 (malignant, primary site)
Exclusion Criteria	• Patients with a clinical diagnosis only, defined as diagnoses without pathological confirmation • Patients with invalid or missing OHIP health card numbers • Patients with missing or non-Ontario postal codes • Patients ages 18 and younger or 105 and older at diagnosis • Patients diagnosed at autopsy or whose date of death was on or before their date of diagnosis
Data Sources	• Ontario Cancer Registry (OCR) • Registered Persons Database (RPDB)

1.2 Disease-site-specific cancer cohort methodology

Breast Cancer	Cases with SEER recode 26000: o includes ICD-O-3 topography C50 (breast) o excludes histologies for mesotheliomas (9050-9055), Kaposi sarcoma (9140), and tumours of haematopoietic and lymphoid tissues, and other miscellaneous histologies (9590-9992) Includes only people coded as female on the OCR First breast cancer case in the time period specified
Cervical Cancer	Cases with SEER recode 27010: o includes the ICD-O-3 topography C53 (cervix) o excludes histologies for mesotheliomas (9050-9055), Kaposi sarcoma (9140), and tumours of haematopoietic and lymphoid tissues, and other miscellaneous histologies (9590-9992) First cervical cancer case in the time period specified Includes patients with squamous cell carcinoma, adenocarcinoma, or adenosquamous carcinoma
Colorectal Cancer	Cases with SEER recodes 21041, 21043-21049, 21051, and 21052 Includes ICD-O-3 topographies: o C180 (cecum), o C182 (ascending colon), o C183v(hepatic flexure), o C184 (transverse colon), o C185 (splenic flexure), o C186 (descending colon), o C187 (sigmoid colon), o C188/C189/C260 (large intestine not otherwise specified), o C199 (rectosigmoid junction o C209 (rectum) Includes first colon or rectal cancer case in the time period specified Excludes histologies for: mesotheliomas (9050-9055), Kaposi sarcoma (9140), and tumours of haematopoietic and lymphoid tissues, and other miscellaneous histologies (9590-9992)

Lung Cancer	Cases with SEER recode 22030: o includes the ICD-O-3 topography C34 (lung) o excludes histologies for mesotheliomas (9050-9055) and tumours of haematopoietic and lymphoid tissues, and other miscellaneous histologies (9590-9992) Includes first lung cancer case in the time period specified Excludes patients with carcinoid tumors (8240-8249) or histologies not related to primary lung cancer
Prostate Cancer	Cases with SEER recode 28010: o includes the ICD-O-3 topography C619 (prostate) o excludes histologies for mesotheliomas (9050-9055), Kaposi sarcoma (9140), and tumours of haematopoietic and lymphoid tissues, and other miscellaneous histologies (9590-9992) Includes first prostate cancer case in the time period specified Includes patients with squamous cell carcinoma, adenocarcinoma, or adenosquamous carcinoma Includes only patients coded as male on the OCR
Data Availability and Limitations	Staging data were not complete at the time of analysis for cases diagnosed in 2019. Thus, stage-based indicators for patients diagnosed in 2019 should be interpreted cautiously. Cervical cancer staging data for 2019 appeared to be complete.

1.3 Common methods applied for diagnosis, treatment, survivorship and end-of-life indicators by data source

ALL	• Only those with valid OHIP number are included • Only those residing in Ontario (based on first digit of postal code) are included • Those who died prior to the reporting period are excluded for that period
ALR	• The most recently submitted record is used to account for data resubmissions: *methodology key = 4* • Analyses on treatments include only treatments for which patient was present: *patient present status = yes*
OCR	• Incident cases (incident case status = I) • Malignant cases (behaviour code = 3) • Confirmed cases (method of confirmation: 1 to 7 or 8 with pathology report)

1.4 Cancer burden methods

- On October 29, 2014, the Ontario Cancer Registry Information System (OCRIS) was formally decommissioned and replaced with the new Ontario Cancer Registry (OCR). This change brings the registry in line with current Canadian and U.S. standards for tracking cancer incidence. The OCR now conforms to specific standards as set out by the National Cancer Institute's Surveillance, Epidemiology and End Results (NCI SEER) program for counting multiple primary cancer sites, which most Canadian provinces and U.S. states now use. The adoption of specific NCI SEER standards with the new OCR has resulted in an increase in the incidence number of certain types of cancer reported in Ontario. However, this change in number is due to how cancers are being counted; it does not mean that more people in Ontario are being diagnosed with cancer or dying of cancer. This change impacts cancer incidence for 2010 and beyond, as such direct comparisons with incidence for 2009 and years prior should not be made.
- Cancers were defined using U.S. Surveillance, Epidemiology and End Results (SEER) Site Recode definitions. Cancer definitions using SEER Site Recode may differ from definitions in other published analyses, especially for cancers of the colon and rectum, and lung cancer.
- For most cancer types, the full site grouping name outlined by the SEER site recode variable definitions was used. Short titles for the following cancers, however, were used for graphing purposes:
    - Lung and bronchus (ICD-O-3 code C34.0–C34.9): short title "Lung"
    - Colon and rectum (ICD-O-3 code C18.0–C18.9, C19.9, C20.9, C26.0): short title "Colorectal"
- Standardizing rates to a standard population adjusts for differences in the population age distribution over time and across geographic areas.
- Due to changes in diagnostic practices or rules of coding and registration, temporal trends should be interpreted with caution.

1.5 Cancer incidence in Ontario

Calculation	Age standardized incidence rate (by cancer type): 1. Multiply the age-specific incidence rate in a given age group by the standard population in that age group 2. Sum the values from step 1 across all the age groups 3. Divide the value from step 2 by the total population in the standard population 4. Multiple the value from step 3 by 100,000 to get the rate per 100,000 Rates were standardized using 1960 World Standard Population as the standard population.
Data Sources	SEER*Stat incidence tables. Population data: Ontario population estimates by age and sex, and 1960 World Standard Population (both available in SEER*Stat).
Considerations	For comparability to other jurisdictions, only people aged 25 and older were included in the calculations.

1.6 Cancer incidence among First Nations people in Ontario

Calculation	Age standardized incidence rate (by cancer type): 1. Multiply the age-specific incidence rate in a given age group by the standard population in that age group 2. Sum the values from step 1 across all the age groups 3. Divide the value from step 2 by the total population in the standard population 4. Multiple the value from step 3 by 100,000 to get the rate per 100,000 <u>Analysis</u>: • Breast cancer was only examined among females • ICD-O-3 topography codes were used to assign disease sites: cancer of the female breast (C50.0-C50.9), cervix (C53.0-53.9), colorectal (C18.0–C20.9, C26.0), lung (C34.0–C34.9), prostate (C61.9), by sex, Ontario, 1991-2010. • Rates were standardized using 1960 World Standard Population as the standard population. Observed incidence rates were based on the National Cancer Institute's Surveillance, Epidemiology and End Results (NCI SEER) program standards for counting multiple primary cancers, which were adopted by the Ontario Cancer Registry for cases diagnosed in 2010 and beyond. • Trend in incidence over time was analyzed using Joinpoint regression software. Statistical significance was determined if the trend (slope of the line) was significantly different from zero.
Data Sources	• Ontario Cancer Registry • Population data: Registered Persons Database (RPDB) and Indian Registration System (IRS) from Institute for Clinical Evaluative Sciences • The IRS was linked to the RPDB to identify First Nations people in Ontario. This linked file was then linked to OCR to identify First Nations in Ontario with a cancer diagnosis between 1991 and 2010.
Data Availability and Limitations	IRS only includes Registered First Nations; therefore, this analysis does not include non-Registered First Nations in Ontario.

1.7 Cancer mortality in Ontario

Calculation	Age standardized mortality rate (by cancer type) 1. Multiply the age-specific mortality rate in a given age group by the standard population in that age group 2. Sum the values from step 1 across all the age groups 3. Divide the value from step 2 by the total population in the standard population 4. Multiple the value from step 3 by 100,000 to get the rate per 100,000 Rates were standardized using 1960 World Standard Population as the standard population.
Data Sources	SEER*Stat mortality tables. Population data: Ontario population estimates by age and sex, and 1960 World population (both available in SEER*Stat).
Considerations	For comparability to other jurisdictions, only people aged 25 and older were included in the calculations.

1.8 Cancer mortality among First Nations people in Ontario

Calculation	Age standardized incidence rate (by cancer type) 1. Multiply the age-specific incidence rate in a given age group by the standard population in that age group 2. Sum the values from step 1 across all the age groups 3. Divide the value from step 2 by the total population in the standard population 4. Multiple the value from step 3 by 100,000 to get the rate per 100,000 Rates were standardized using 1960 World Standard Population as the standard population. Analysis: • Breast cancer was only examined among females • For all cancers (ICD-10 codes: C00–C97), cancer of the female breast (C50), cervix (53.0-53.9), colorectal (C18-C20, C26.0), lung (C34), prostate (C61), by sex, Ontario, 1991-2010.
?Data Sources	Ontario Cancer Registry Population data: Registered Persons Database (RPDB) and Indian Registration System (IRS) from Institute for Clinical Evaluative Sciences The IRS was linked to the RPDB to identify First Nations people in Ontario. This linked file was then linked to OCR to identify First Nations in Ontario with a cancer diagnosis between 1991 and 2010.
Considerations	• The use of a standard population allows mortality rates to be compared across time periods and jurisdictions by adjusting for differences in the population age distribution over time and across geographic areas. Cancers were defined using Surveillance, Epidemiology and End Results (SEER) Cause of Death Recode definitions. Cancer definitions using SEER Recode may differ from definitions in other published analyses.
Data Availability and Limitations	IRS only includes Registered First Nations; therefore, this analysis does not include non-Registered First Nations in Ontario.

1.9 Cancer survival in Ontario

Calculation	Five-year relative survival ratio (age-standardized): • Percentage of people alive at least 5 years after diagnosis, as compared to the expected number in each age group. • Age-standardized to the International Cancer Survival Standards (ages 15+). Standard 1 was used for all cancers except cervix, which uses Standard 2.
Data Sources	SEER*Stat survival tables. Population data: International Cancer Survival Standards 1 & 2 (both available in SEER*Stat).
Considerations	• Site-specific survival was calculated by requiring that the site of interest (e.g. breast) matches the first primary cancer site. • Survival was calculated in SEER*Stat using the period method. The period method uses only the most recent interval survival estimate of cases diagnosed in different calendar years (cross-sectional estimate of survival). The estimate of period 5-year survival from cases diagnosed between 2004 and 2008 uses the first year interval survival from patients diagnosed in 2008, the two-year interval survival from patients diagnosed in 2007, and so on. Because period uses only the most recent survival experience, when there is an increasing trend in survival it provides a more up-to-date measure of recent survival (Brenner et al. 2002). The method implemented in SEER*Stat differs slightly from Brenner et al., (See Cronin et al., 2003 (PDF, 504 KB) for more information).

1.10 Cancer survival among First Nations people in Ontario

Calculation	Five-year survival (age-standardized): • Percentage of people alive at least 5 years after diagnosis • Age-standardized to the International Cancer Survival Standards (ages 15 to 74) • Survival was only analyzed among people 15 to 74 years of age. Data quality was poor outside of that age range. Percent survival was age-standardized to the International Cancer Survival Standard (ages 15 to 74).
Data Sources	Ontario Cancer Registry Population data: Registered Persons Database (RPDB) and Indian Registration System (IRS) from Institute for Clinical Evaluative Sciences The IRS was linked to the RPDB to identify First Nations people in Ontario. This linked file was then linked to OCR to identify First Nations in Ontario with a cancer diagnosis between 1991 and 2010.
Data Availability and Limitations	While relative survival is a stronger measure of survival experience, not all the information required for a relative survival ratio was available.

1.11 Cancer Prevalence in Ontario

Calculation	Ten year prevalence: • Calculated as the number or proportion of Ontarians diagnosed with cancer within the previous ten years who were still alive on a given date. • A person diagnosed with more than one type of cancer (e.g., breast and colorectal cancer) in that ten-year period will be included in the count for each cancer diagnosed. If a person is diagnosed with more than one of the same cancer (e.g., a person with two colorectal cancers), only one cancer will be included in the prevalence estimate.
Data Sources	• SEER*Stat incidence, mortality and population tables.
Considerations	Prevalence describes the number of people or proportion of a population diagnosed with cancer who are still alive at a given time. It includes those diagnosed within a specific period (such as within the past 10 years), including those who have been recently diagnosed. Prevalence depends on both incidence and mortality: increasing incidence and decreasing mortality can both contribute to increasing prevalence.

2. Prevention

2.1 Percentage of Ontario adults (ages 18 and older) who are overweight or obese according to self-reported height and weight

Calculation	Divide the numerator by the denominator and multiply the result by 100
Denominator	Weighted total population ages 18 and older in the reporting period
Numerator	Those in the denominator with BMI (corrected) 25.0 or more.

Inclusion Criteria	Denominator inclusions:
	• Population is age-standardized to the 2011 Canadian population using the age groups from the CCHS person-level sampling strategy: 18–34, 35–49, 50–64, 65 and over
	• Definition of "adult" applies to individuals ages 18 and older.
	• Socio-demographic characteristics were defined as follows:
	  o Urban/rural residence: respondents living within any Census Metropolitan Area (CMA) or Census Agglomeration (CA) were considered "urban residents"– and those living outside of any CMA or CA were classified as "rural residents".
	  o Household income quintile: sorts respondents' derived household income into quintiles based on the ratio of household income to the low income cut-off (LICO) for the household size and community. Starting in 2011, Statistics Canada imputed all missing household incomes to account for the one-third of missing responses to the income question. In 2017, the derived variable only calculated income deciles. Deciles were combined to create quintiles.
	  o Education: highest level of education attained by the respondent, according to three categories: less than secondary school graduation; secondary school graduation or some post-secondary education; and post-secondary graduation.
	  o Immigration status: distinguishes immigrants at different times since immigration from the Canadian-born population, according to three categories: Canadian–born; immigrant > 10 years in Canada; and immigrant ≤ 10 years in Canada. The years since immigration refers to the first time the respondent arrived into Canada (excluding holidays) to live as a landed immigrant, by claiming refugee status, with a work permit or with a study permit.
	  o Socio-demographic characteristics were analyzed for adults ages 25 and older to restrict the sample to those who have likely completed their education and reached their adult socio-demographic status.

	○ Socio-demographic were compared against the following reference variables: urban areas for analyses by urban/rural residence, income quintile 5 (Q5) for analyses by household income quintile, post-secondary graduate for analyses by education status and Canadian-born for analyses by immigration status. Numerator inclusions: • Survey Question – Overweight/obesity (Height and weight module; Main activity module) – Canadian Community Health Survey: ○ How tall are you without shoes on? ○ How much do you weigh? ○ Are you pregnant? • BMI is categorized using standard international weight cutoffs. • BMI (corrected) is calculated as follows: ○ Men: BMI (corrected)=-1.07575+[1.07592×BMI (self-reported)] ○ Women: BMI (corrected)=-0.12374+[1.05129×BMI (self-reported)]
Numerator Exclusions	• Respondents in the non-response categories (refusal, don't know, and not stated) for required questions. • Respondents who were pregnant at the time of the survey. • The calculation of BMI excluded respondents less than three feet (0.914 m) tall or those greater than six feet 11 inches (2.108 m).
Data Sources	Canadian Community Health Survey 2015–2017. Statistics Canada, Ontario Share File, Ontario Ministry of Health and Long-Term Care.
Data Availability and Limitations	• Beginning in 2015, the Canadian Community Health Survey (CCHS) underwent major changes in the design of the survey and collection of data. As a result, no comparisons should be made to previous years of the CCHS for any variables. • The CCHS excludes individuals living on Indian Reserves and on Crown Lands, institutional residents, full-time members of the Canadian Forces, and residents of certain remote regions. • CCHS data on modifiable risk factors are self-reported. Respondents of self-reported surveys tend to under-report behaviours that are socially undesirable or unhealthy (alcohol use, tobacco use, etc.) and over-report behaviours that are socially desirable (physical activity, vegetable and fruit consumption, etc.). • For body composition, BMI is calculated using sex-specific correction equations for adjusting self-reported measures of BMI developed by Statistics Canada to provide more accurate estimates of overweight and obesity prevalence in the population; BMI classifications used here may be limited in

	determining health risks for muscular adults, naturally lean adults, young adults who have not reached full growth, seniors, and certain racial/ethnic groups.

2.2 Percentage of Ontario adults (age 18 and older) who report that they consume vegetables (excluding potatoes) or fruit less than 5 times a day

Calculation	Divide the numerator by the denominator and multiply the result by 100.
Denominator	Weighted total population ages 18 and older in the reporting period
Numerator	Those in the denominator who eat vegetables (excluding potatoes) and fruits less than five times per day
Inclusion Criteria	Denominator inclusions: • Population is age-standardized to the 2011 Canadian population using the age groups from the CCHS person-level sampling strategy: 18–34, 35–49, 50–64, 65 and over. • Definition of "adult" applies to individuals ages 18 and older. • Socio-demographic characteristics were defined as follows: o Urban/rural residence: respondents living within any Census Metropolitan Area (CMA) or Census Agglomeration (CA) were considered "urban residents"– and those living outside of any CMA or CA were classified as "rural residents". o Household income quintile: sorts respondents' derived household income into quintiles based on the ratio of household income to the low income cut-off (LICO) for the household size and community. Starting in 2011, Statistics Canada imputed all missing household incomes to account for the one-third of missing responses to the income question. In 2017, the derived variable only calculated income deciles. Deciles were combined to create quintiles. o Education: highest level of education attained by the respondent, according to three categories: less than secondary school graduation; secondary school graduation or some post-secondary education; and post-secondary graduation. o Immigration status: distinguishes immigrants at different times since immigration from the Canadian-born population, according to three categories: Canadian–born; immigrant > 10 years in Canada; and immigrant ≤ 10 years in Canada. The years since immigration refers to the first time the respondent arrived into Canada (excluding holidays) to live as a landed immigrant, by claiming refugee status, with a work permit or with a study permit. o Socio-demographic characteristics were analyzed for adults ages 25 and older to restrict the sample to those who have likely completed their education and reached their adult socio-demographic status. o Socio-demographic were compared against the following reference variables: urban areas for analyses by urban/rural residence, income quintile 5 (Q5) for analyses by household income

	quintile, post-secondary graduate for analyses by education status and Canadian-born for analyses by immigration status. Numerator inclusions: • Respondents who reported consuming fruit juice more than once daily were considered as having consumed it only once. • Survey Question – Vegetable and fruit consumption (Fruit and vegetable consumption module) – Canadian Community Health Survey: o In the last month, how many times per day, per week or per month did you drink 100% PURE fruit juices, such as pure orange juice, apple juice or pure juice blends? Do not include fruit-flavored drinks with added sugar or fruit punch. o In the last month, not counting juice, how many times did you eat fruit? Please remember to include frozen, dried or canned fruit. o In the last month, how many times did you eat dark green vegetables such as broccoli, green beans, peas and green peppers or dark leafy greens including romaine or spinach? Please remember to include (frozen or canned vegetables and) vegetables that were cooked in soups or mixed in salad. o In the last month, how many times did you eat orange-coloured vegetables such as carrots, orange bell pepper, sweet potatoes, pumpkin or squash? (Please remember to include frozen or canned vegetables and vegetables that were cooked in soups or mixed in salad). o Excluding the green and orange vegetables as well as the potatoes you have already reported, in the last month, how many times did you eat OTHER vegetables? Examples include cucumber, celery, corn, cabbage and vegetable juice.
Numerator Exclusions	All calculations excluded respondents in the non-response categories (refusal, don't know, and not stated) for required questions.
Data Sources	Canadian Community Health Survey 2015–2017. Statistics Canada, Ontario Share File, Ontario Ministry of Health and Long-Term Care.
Data Availability and Limitations	• Beginning in 2015, the Canadian Community Health Survey (CCHS) underwent major changes in the design of the survey and collection of data. As a result, no comparisons should be made to previous years of the CCHS for any variables. • The CCHS excludes individuals living on Indian Reserves and on Crown Lands, institutional residents,

	full-time members of the Canadian Forces, and residents of certain remote regions. • CCHS data on modifiable risk factors are self-reported. Respondents of self-reported surveys tend to under-report behaviours that are socially undesirable or unhealthy (alcohol use, tobacco use, etc.) and over-report behaviours that are socially desirable (physical activity, vegetable and fruit consumption, etc.).

2.3 Percentage of Ontario adults (ages 18 and older) who report levels of physical activity that do not meet the cancer prevention recommendation to be moderately to vigorously physically active for 30 minutes or more each day

Calculation	Divide the numerator by the denominator and multiply the result by 100.
Denominator	Weighted total population ages 18 and older in the reporting period
Numerator	Those in the denominator who were on average moderately or vigorously physically active for less than 30 minutes each day)
Inclusion Criteria	Denominator inclusions: • Population is age-standardized to the 2011 Canadian population using the age groups from the CCHS person-level sampling strategy: 18–34, 35–49, 50–64, 65 and over • Definition of "adult" applies to individuals ages 18 and older. • Socio-demographic characteristics were defined as follows: o Urban/rural residence: respondents living within any Census Metropolitan Area (CMA) or Census Agglomeration (CA) were considered "urban residents"– and those living outside of any CMA or CA were classified as "rural residents". o Household income quintile: sorts respondents' derived household income into quintiles based on the ratio of household income to the low income cut-off (LICO) for the household size and community. Starting in 2011, Statistics Canada imputed all missing household incomes to account for the one-third of missing responses to the income question. In 2017, the derived variable only calculated income deciles. Deciles were combined to create quintiles. o Education: highest level of education attained by the respondent, according to three categories: less than secondary school graduation; secondary school graduation or some post-secondary education; and post-secondary graduation. o Immigration status: distinguishes immigrants at different times since immigration from the Canadian-born population, according to three categories: Canadian–born; immigrant > 10 years in Canada; and immigrant ≤ 10 years in Canada. The years since immigration refers to the first time the respondent arrived into Canada (excluding holidays) to live as a landed immigrant, by claiming refugee status, with a work permit or with a study permit. o Socio-demographic characteristics were analyzed for adults ages 25 and older to restrict the sample to those who have likely completed their education and reached their adult socio-demographic status. o Socio-demographic were compared against the following reference variables: urban areas for analyses by urban/rural residence, income quintile 5 (Q5) for analyses by household income

	quintile, post-secondary graduate for analyses by education status and Canadian-born for analyses by immigration status. Numerator inclusions: • Physical activity includes active transportation, sports and recreation and/or other physical activity, such as household chores. • Survey Question – Physical activity (Physical activities – adults 18 years and older module) – Canadian Community Health Survey: o In the last 7 days, did you use active ways like walking or cycling to get to places such as work, school, the bus stop, the shopping centre or to visit friends? o In the last 7 days, did you do sports, fitness or recreational physical activities, organized or non-organized, that lasted a minimum of 10 continuous minutes? Examples are walking, home or gym exercise, swimming, cycling, running, skiing, dancing and all team sports. o In the last 7 days, did you do any other physical activities while at work, in or around your home or while volunteering? Examples are carrying heavy loads, shoveling, and household chores such as vacuuming or washing windows. Please remember to only include activities that lasted a minimum of 10 continuous minutes. o Did any of these recreational/other physical activities make you sweat at least a little and breathe harder? o How much time in total, in the last 7 days, did you spend doing these activities? Please only include activities that lasted a minimum of 10 continuous minutes.
Numerator Exclusions	All calculations excluded respondents in the non-response categories (refusal, don't know, and not stated) for required questions.
Data Sources	Canadian Community Health Survey 2015–2017. Statistics Canada, Ontario Share File, Ontario Ministry of Health and Long-Term Care.
Data Availability and Limitations	• Beginning in 2015, the Canadian Community Health Survey (CCHS) underwent major changes in the design of the survey and collection of data. As a result, no comparisons should be made to previous years of the CCHS for any variables. • CCHS excludes individuals living on Indian Reserves and on Crown Lands, institutional residents, full-time members of the Canadian Forces, and residents of certain remote regions. • CCHS data on modifiable risk factors are self-reported. Respondents of self-reported surveys tend to under-report behaviours that are socially undesirable or unhealthy (alcohol use, tobacco use, etc.) and over-report behaviours that are socially desirable (physical activity, vegetable and fruit consumption, etc.).

2.4 Percentage of Ontario adults (ages 19 and older) who report consuming alcohol at levels that exceed the cancer prevention recommendation for alcohol consumption

Calculation	Divide the numerator by the denominator and multiply the result by 100.
Denominator	Weighted total population aged 19 and older in the reporting period
Numerator	Those in the denominator who on average exceed the maximum recommended alcohol consumption for cancer prevention
Inclusion Criteria	Denominator inclusions: • Population is age-standardized to the 2011 Canadian population using the age groups from the CCHS person-level sampling strategy for alcohol consumption: 19–34, 35–49, 50–64, 65 and over. • Definition of "adult" applies to individuals aged 19 and older to match Ontario's legal drinking age. • Socio-demographic characteristics were defined as follows: o Urban/rural residence: respondents living within any Census Metropolitan Area (CMA) or Census Agglomeration (CA) were considered "urban residents"– and those living outside of any CMA or CA were classified as "rural residents". o Household income quintile: sorts respondents' derived household income into quintiles based on the ratio of household income to the low income cut-off (LICO) for the household size and community. Starting in 2011, Statistics Canada imputed all missing household incomes to account for the one-third of missing responses to the income question. In 2017, the derived variable only calculated income deciles. Deciles were combined to create quintiles. o Education: highest level of education attained by the respondent, according to three categories: less than secondary school graduation; secondary school graduation or some post-secondary education; and post-secondary graduation. o Immigration status: distinguishes immigrants at different times since immigration from the Canadian-born population, according to three categories: Canadian–born; immigrant > 10 years in Canada; and immigrant ≤ 10 years in Canada. The years since immigration refers to the first time the respondent arrived into Canada (excluding holidays) to live as a landed immigrant, by claiming refugee status, with a work permit or with a study permit. o Socio-demographic characteristics were analyzed for adults aged 25 and older to restrict the sample to those who have likely completed their education and reached their adult socio-demographic status. o Socio-demographic were compared against the following reference variables: urban areas for analyses by urban/rural residence, income quintile 5 (Q5) for analyses by household income

	quintile, post-secondary graduate for analyses by education status and Canadian-born for analyses by immigration status. Numerator inclusions: • The maximum recommended alcohol consumption for men is two drinks per day and for women is one drink per day, as specified by the World Cancer Research Fund and the American Institute for Cancer Research. • Survey Question – Alcohol consumption (Alcohol use module; Alcohol use during the past week module; Main activity module) – Canadian Community Health Survey: o A 'drink' refers to: ▪ a bottle or small can of beer, cider or cooler with 5% alcohol content, or a small draft; ▪ a glass of wine with 12% alcohol content; ▪ a glass or cocktail containing 1½ oz. of a spirit with 40% alcohol content. o Thinking back over the past week, did you have a drink of beer, wine, liquor or any other alcoholic beverage? o Starting with yesterday, how many drinks did you have? o Are you pregnant?
Exclusion Criteria	Numerator exclusions: • All calculations excluded respondents in the non-response categories (refusal, don't know, and not stated) for required questions.
Data Sources	• Canadian Community Health Survey 2015–2017. Statistics Canada, Ontario Share File, Ontario Ministry of Health and Long-Term Care.
Data Availability and Limitations	• Beginning in 2015, the Canadian Community Health Survey (CCHS) underwent major changes in the design of the survey and collection of data. As a result, no comparisons should be made to previous years of the CCHS for any variables. • The CCHS excludes individuals living on Indian Reserves and on Crown Lands, institutional residents, full-time members of the Canadian Forces, and residents of certain remote regions. • CCHS data on modifiable risk factors are self-reported. Respondents of self-reported surveys tend to under-report behaviours that are socially undesirable or unhealthy (alcohol use, tobacco use, etc.) and over-report behaviours that are socially desirable (physical activity, vegetable and fruit consumption, etc.).

2.5 Percentage of Ontario adults (aged 20 years and older) who report that they are current tobacco smokers

Calculation	Divide the numerator by the denominator and multiply the result by 100.
Denominator	Weighted total population aged 20 years and older in the reporting period
Numerator	Those in the denominator who smoke daily or occasionally
Inclusion Criteria	Denominator inclusions: • Population is age-standardized to the 2011 Canadian population using the age groups from the CCHS person-level sampling strategy for current tobacco smoking: 20–34, 35–49, 50–64, 65 and older. • Definition of "adult" applies to individuals aged 20 and older for smoking-related indicators. • Socio-demographic characteristics were defined as follows: o Urban/rural residence: respondents living within any Census Metropolitan Area (CMA) or Census Agglomeration (CA) were considered "urban residents"– and those living outside of any CMA or CA were classified as "rural residents". o Household income quintile: sorts respondents' derived household income into quintiles based on the ratio of household income to the low income cut-off (LICO) for the household size and community. Starting in 2011, Statistics Canada imputed all missing household incomes to account for the one-third of missing responses to the income question. In 2017, the derived variable only calculated income deciles. Deciles were combined to create quintiles. o Education: highest level of education attained by the respondent, according to three categories: less than secondary school graduation; secondary school graduation or some post-secondary education; and post-secondary graduation. o Immigration status: distinguishes immigrants at different times since immigration from the Canadian-born population, according to three categories: Canadian–born; immigrant > 10 years in Canada; and immigrant ≤ 10 years in Canada. The years since immigration refers to the first time the respondent arrived into Canada (excluding holidays) to live as a landed immigrant, by claiming refugee status, with a work permit or with a study permit. o Socio-demographic characteristics were analyzed for adults aged 25 and older to restrict the sample to those who have likely completed their education and reached their adult socio-demographic status. o Socio-demographic were compared against the following reference variables: urban areas for analyses by urban/rural residence, income quintile 5 (Q5) for analyses by household income quintile, post-secondary graduate for analyses by education status and Canadian-born for analyses by immigration status.

	Numerator inclusions: • Physical activity includes active transportation, sports and recreation and/or other physical activity, such as household chores.
Exclusion Criteria	Numerator exclusions: • All calculations excluded respondents in the non-response categories (refusal, don't know, and not stated) for required questions. • Survey Question – Smoking (Smoking module) – Canadian Community Health Survey: o At the present time, do you smoke cigarettes every day, occasionally or not at all?
Data Sources	• Canadian Community Health Survey 2015–2017. Statistics Canada, Ontario Share File, Ontario Ministry of Health and Long-Term Care.
Data Availability and Limitations	• Beginning in 2015, the Canadian Community Health Survey (CCHS) underwent major changes in the design of the survey and collection of data. As a result, no comparisons should be made to previous years of the CCHS for any variables. • The CCHS excludes individuals living on Indian Reserves and on Crown Lands, institutional residents, full-time members of the Canadian Forces, and residents of certain remote regions. • CCHS data on modifiable risk factors are self-reported. Respondents of self-reported surveys tend to under-report behaviours that are socially undesirable or unhealthy (alcohol use, tobacco use, etc.) and over-report behaviours that are socially desirable (physical activity, vegetable and fruit consumption, etc.).

2.6 Modifiable risk factors among First Nations people

Calculation	Percentage of First Nation and non-Indigenous adults in Ontario (aged 20 and older) who report that they are currently smoking • Current smoking (adults) calculation: 1. Divide the weighted number of adults aged 20 years and older who smoke daily or occasionally by the weighted total population aged 20 years and older 2. Multiply the value from step 1 by 100 • Percentage of First Nation non-smokers and non-Indigenous non-smokers in Ontario (age 15 and older) who report being exposed to second-hand smoke in the home • Second-hand smoke (adults) calculation: 1. Divide the weighted number of adults aged 20 years and older who do not smoke daily or occasionally and are exposed to second-hand smoke in their home, vehicle or public spaces by the weighted total population age 20 years and older who do not smoke daily or occasionally 2. Multiply the value from step 1 by 100 • Second-hand smoke (teens) calculation: 1. Divide the weighted number of teens aged 12 to 19 years who do not smoke daily or occasionally and are exposed to second-hand smoke in their home, vehicle or public spaces by the weighted total population aged 12 to 19 years who do not smoke daily or occasionally 2. Multiply the value from step 1 by 100 Percentage of First Nation adults and non-Indigenous adults in Ontario (age 19 and older) who abstained from alcohol in the previous 12 months • Alcohol consumption (adults) calculation: 1. Divide the weighted number of adults aged 19 years and older who exceed the maximum recommended alcohol consumption for cancer prevention by the weighted total population aged 19 years and older

	2. Multiply the value from step 1 by 100 Percentage of First Nation and non-Indigenous adults in Ontario (aged 18 years or older) who had excess body weight • Obese (adults) calculation: 1. Divide the weighted number of adults aged 18 years and older with BMI 30.0 or greater by the weighted total population aged 18 years and older 2. Multiply the value from step 1 by 100 a. Respondents who were pregnant at the time of the survey were excluded. b. The calculation of BMI excluded respondents less than 3 feet (0.914 m) tall or those greater than 6 feet 11 inches (2.108 m). c. BMI is categorized using standard international weight cutoffs. • Obese (adolescents) calculation: 1. Divide the weighted number of adolescents aged 12 to 17 with BMI classified as obese by the Cole Classification System by the weighted total population aged 12 to 17 years 2. Multiply the value from step 1 by 100 Percentage of First Nation and non-Aboriginal adults (age 18 and older) in Ontario who report eating at least 2 vegetables and 2 fruits per day • Vegetable and fruit consumption - less than 5 times per day (adults) calculation: 1. Multiply the weighted number of adults aged 18 years and older eating vegetables (excluding potatoes) and fruit less than 5 times per day by the eighted total population aged 18 years and older 2. Multiply the value from step 1 by 100 a. Consuming at least two vegetables and two fruits a day was chosen for the comparison between First Nations (on- and off-reserve) and non-Indigenous adults to ensure comparability between different surveys (CCHS and RHS). In the First Nations RHS Phase II, respondents are asked whether they consumed certain food groups "several times per

	day", whereas respondents to the CCHS were asked to enter the number of times per day they ate certain foods. b. Starches such as potatoes were included in vegetable and fruit consumption for the comparison between First Nations (on- and off-reserve) and non- Indigenous adults because the First Nations RHS Phase II does not explicitly exclude starches as a vegetable c. Intake of fruit juice was not included in vegetable and fruit intake for the comparison between First Nations (on- and off-reserve) and non- Indigenous adults. General exclusions: d. All calculations excluded respondents in the non-response categories (refusal, don't know, and not stated) for required questions. General analytic notes: e. All estimates of proportion for adults (apart from those for specific age groups) are age-standardized to the age distribution of the Inuit population living outside Nunangat from the 2006 Census, using age groups 15 to 24, 25 to 55, 55 to 64 and 65 and older. This technique adjusts for the differing age distributions of Inuit and non-Indigenous Ontarians (Inuit being younger), allowing us to compare estimates between the 2 populations without bias due to the differing age structures.
Considerations	First Nation identity was defined as follows: • A respondent is classified as First Nation (Off-reserve, CCHS) if they self-identity as a First Nation, or First Nation in combination with any other Aboriginal identity (Métis or Inuit), and are born in Canada, United States, Greenland, or Germany. A respondent is classified as First Nation (On-reserve, RHS) if they live in a First Nation community surveyed by the First Nations Regional Health Survey (Phase 2). • Non-Indigenous Ontarians: In this report, this population is defined as respondents in Ontario who did not self-identify as Indigenous, or who identified as Indigenous, but were born outside of Canada, the United States, Germany or Greenland. Other Notes: • For obesity, BMI classifications used here may be limited in determining health risks for muscular adults, naturally lean adults, young adults who have not reached full growth, seniors and certain racial/ethnic groups.

	• The definition of "adult" applies to individuals aged 20 and older, with the exceptions of overweight/obesity at aged 18 and older to match BMI classifications. Survey Questions – Aboriginal Peoples Survey (APS) and Canadian Community Health Survey: • Indigenous Identity (Socio-demographics characteristics module): o Are you First Nation? o Are you Métis? o Are you Inuk/Inuit? o In what country were you born? • Non- Indigenous Identity (Socio-demographics characteristics module): o Derived variable about Indigenous identity o In what country were you born? • Smoking (Smoking module): o At the present time, do you smoke cigarettes daily, occasionally or not at all? • Second-hand smoke exposure (Smoking module): o Including both household members and regular visitors, does anyone smoke inside your home, every day or almost every day? • Obesity (Height and weight module): o How tall are you without shoes on? o How much do you weigh? o Are you pregnant? • Vegetable and fruit consumption (Fruit and vegetable consumption module): o Not counting juice, how often do you usually eat fruit? o How often do you usually eat green salad? o How often do you usually eat potatoes, not including French fries, fried potatoes, or potato chips? o How often do you usually eat carrots? o Not counting carrots, potatoes or salad, how many servings of other vegetables do you usually eat? • Physical activity: o In the past 12 months have you participated in the following activities o In the past 12 months, how many times did you participate in these activities? o How much time do you generally spend doing the activity in the average session?

Data Sources	Canadian Community Health Survey half-survey annual waves 2007–2013. Statistics Canada, Ontario Share File, Ontario Ministry of Health and Long-Term Care. First Nations Regional Health Survey (RHS) Phase 2 2008/10. First Nations Information Governance Centre.
Data Availability and Limitations	• As of 2011, the CCHS restricted the question about Aboriginal identity to those born in Canada, the US, Germany or Greenland. Therefore, an individual was considered 'Aboriginal' only if they were born in one of these countries and self-identified as Aboriginal for all survey years (2007-2014). Respondents in survey years prior to 2011 who identified as Aboriginal and were born outside these countries are included with 'non-Aboriginal Ontarians'. • The Canadian Community Health Survey (CCHS) excludes individuals living on Indian Reserves and on Crown Lands, institutional residents, full-time members of the Canadian Forces, and residents of certain remote regions. • CCHS and RHS data on modifiable risk factors are self-reported. Respondents of self-reported surveys tend to under-report behaviours that are socially undesirable or unhealthy (e.g. tobacco use) and over-report behaviours that are socially desirable (e.g. vegetable and fruit consumption). • The survey questions and response categories included in the CCHS and the RHS are not identical, thus the definition of some indicators had to be tailored in order to make the estimates for on- and off-reserve First Nations and non-Indigenous comparable. Notably, the threshold for adequate vegetable and fruit intake was four times per day for First Nations indicators, rather than five times per day.

2.7 Modifiable risk factors among Inuit in Ontario, Inuit inside Nunangat and Inuit outside Nunangat

Calculation	Percentage of Inuit in regions of Canada and non-Indigenous adults in Ontario (aged 20 and older) who report that they are currently smoking • Current smoking (adults) calculation: 1. Divide the weighted number of adults aged 20 years and older who smoke daily or occasionally by the weighted total population aged 20 years and older 2. Multiply the value from step 1 by 100 Percentage of Inuit non-smokers in regions of Canada and non-Indigenous non-smokers in Ontario (age 15 and older) who report being exposed to second-hand smoke in the home • Second-hand smoke (adults) calculation: 1. Divide the weighted number of adults aged 20 years and older who do not smoke daily or occasionally and are exposed to second-hand smoke in their home, vehicle or public spaces by the weighted total population age 20 years and older who do not smoke daily or occasionally 2. Multiply the value from step 1 by 100 • Second-hand smoke (teens) calculation: 1. Divide the weighted number of teens aged 12 to 19 years who do not smoke daily or occasionally and are exposed to second-hand smoke in their home, vehicle or public spaces by the weighted total population aged 12 to 19 years who do not smoke daily or occasionally 2. Multiply the value from step 1 by 100 Percentage of Inuit adults in Canada in regions of Canada and non-Indigenous adults in Ontario (age 19 and older) who abstained from alcohol in the previous 12 months • Alcohol consumption (adults) calculation: 1. Divide the weighted number of adults aged 19 years and older who exceed the maximum recommended alcohol consumption for cancer prevention by the weighted total population aged 19 years and older

	2. Multiply the value from step 1 by 100 Percentage of Inuit in regions of Canada and non-Indigenous adults in Ontario (aged 18 years or older) who had excess body weight • Obese (adults) calculation: 1. Divide the weighted number of adults aged 18 years and older with BMI 30.0 or greater by the weighted total population aged 18 years and older 2. Multiply the value from step 1 by 100 o Respondents who were pregnant at the time of the survey were excluded. o The calculation of BMI excluded respondents less than 3 feet (0.914 m) tall or those greater than 6 feet 11 inches (2.108 m). o BMI is categorized using standard international weight cutoffs. • Obese (adolescents) calculation: 1. Divide the eighted number of adolescents aged 12 to 17 years with BMI classified as obese by the Cole Classification System by the weighted total population aged 12 to 17 years 2. Multiply the value from step 1 by 100 Percentage of Inuit in regions of Canada and non-Indigenous adults in Ontario (aged 16 years or older) living in food secure households • Vegetable and fruit consumption - less than 5 times per day (adults) calculation 1. Divide the weighted number of adults aged 18 years and older eating vegetables (excluding potatoes) and fruit less than 5 times per day by the weighted total population aged 18 years and older 2. Multiply the value from step 1 by 100 o Respondents who reported consuming fruit juice more than once daily were considered as having consumed it only once.

	General exclusions: • All calculations excluded respondents in the non-response categories (refusal, don't know, and not stated) for required questions. General analytic notes: • All estimates of proportion for adults (apart from those for specific age groups) are age-standardized to the age distribution of the Inuit population living outside Nunangat from the 2006 Census, using age groups 15 to 24, 25 to 55, 55 to 64 and 65 and older. This technique adjusts for the differing age distributions of Inuit and non-Indigenous Ontarians (Inuit being younger), allowing us to compare estimates between the 2 populations without bias due to the differing age structures.
Considerations	Inuit identity was defined as follows: • Inuit in Nunangat: In this report, this population is defined as respondents of the 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: In this report, this population is defined as 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: In this report, this population is defined as 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-Indigenous Ontarians: In this report, this population is defined as respondents in Ontario who did not self-identify as Indigenous, or who identified as Indigenous, but were born outside of Canada, the United States, Germany or Greenland. Other Notes:

	• For obesity, BMI classifications used here may be limited in determining health risks for muscular adults, naturally lean adults, young adults who have not reached full growth, seniors and certain racial/ethnic groups.
	• The definition of "adult" applies to individuals aged 20 and older, with the exceptions of overweight/obesity at aged 18 and older to match BMI classifications.
	
	Survey Questions – Aboriginal Peoples Survey (APS) and Canadian Community Health Survey:
	
	• Indigenous Identity (Socio-demographics characteristics module):
	  o Are you First Nation?
	  o Are you Métis?
	  o Are you Inuk/Inuit?
	  o In what country were you born?
	• Non- Indigenous Identity (Socio-demographics characteristics module):
	  o Derived variable about Indigenous identity
	  o In what country were you born?
	• Smoking (Smoking module):
	  o At the present time, do you smoke cigarettes daily, occasionally or not at all?
	• Second-hand smoke exposure (Smoking module):
	  o Including both household members and regular visitors, does anyone smoke inside your home, every day or almost every day?
	• Obesity (Height and weight module):
	  o How tall are you without shoes on?
	  o How much do you weigh?
	  o Are you pregnant?

Data Sources	Canadian Community Health Survey (CCHS) half-survey annual release, 2012. Statistics Canada, Ontario Share File, Ontario Ministry of Health and Long-Term Care. Aboriginal Peoples Survey (APS), 2012. Statistics Canada.
Data Availability and Limitations	• As of 2011, the CCHS restricted the question about Indigenous identity to those born in Canada, the U.S., Germany or Greenland. Therefore, an individual would have been considered 'non- Indigenous' if they were NOT born in one of these countries and self-identified as Indigenous in 2012. • CCHS and APS data on modifiable risk factors are self-reported. Respondents of self-reported surveys tend to under-report behaviours that are socially undesirable or unhealthy (e.g., tobacco use) and over-report behaviours that are socially desirable (e.g., vegetable and fruit consumption).

	• The APS does not have any questions related to vegetable and fruit consumption or physical activity. • Small sample sizes of Inuit living in Ontario necessitated the use of 'outside Inuit Nunangat' as a proxy for Ontario. Even in the 'Outside Inuit Nunangat' population, the sample size of Inuit was too small to report the prevalence of several risk factors in Inuit populations, and compromises on the definition of certain indicators were made. For example, we measured food security (as opposed to food insecurity) because the sample size for Inuit living outside Nunangat was too small to report on Inuit living in food insecure households.

2.8 Modifiable risk factors among Métis people in Ontario

Calculation	Percentage of Métis and non-Indigenous adults in Ontario (aged 20 and older) who report that they are currently smoking • Current smoking (adults) calculation 1. Divide the weighted number of adults aged 20 years and older who smoke daily or occasionally by the weighted total population aged 20 years and older 2. Multiply the value from step 1 by 100 Percentage of Métis non-smokers and non-Indigenous non-smokers in Ontario (age 15 and older) who report being exposed to second-hand smoke in the home • Second-hand smoke (adults) calculation: 1. Divide the weighted number of adults aged 20 years and older who do not smoke daily or occasionally and are exposed to second-hand smoke in their home, vehicle or public spaces by the weighted total population age 20 years and older who do not smoke daily or occasionally 2. Multiply the value from step 1 by 100 • Second-hand smoke (teens) calculation: 1. Divide the weighted number of teens aged 12 to 19 years who do not smoke daily or occasionally and are exposed to second-hand smoke in their home, vehicle or public spaces by the weighted total population aged 12 to 19 years who do not smoke daily or occasionally 2. Multiply the value from step 1 by 100 Percentage of Métis adults and non-Indigenous adults in Ontario (aged 19 and older) who abstained from alcohol in the previous 12 months • Alcohol consumption (adults) calculations:

	1. Multiple the weighted number of adults aged 19 years and older who exceed the maximum recommended alcohol consumption for cancer prevention) / (Weighted total population aged 19 years and older 2. Multiply the value from step 1 by 100 Percentage of Métis and non-Indigenous adults in Ontario (aged 18 years or older) who had excess body weight • Obese (adults) calculation 1. Divide the weighted number of adults aged 18 years and older with BMI 30.0 or greater by the Weighted total population aged 18 years and older 2. Multiply the value from step 1 by 100 o Respondents who were pregnant at the time of the survey were excluded. o The calculation of BMI excluded respondents less than 3 feet (0.914 m) tall or those greater than 6 feet 11 inches (2.108 m). o BMI is categorized using standard international weight cutoffs. • Obese (adolescents) calculation: 1. Divide the weighted number of adolescents aged 12 to 17 years with BMI classified as obese by the Cole Classification System by the weighted total population aged 12 to 17 years 2. Multiply the value from step 1 by 100 Percentage of Métis and non-Indigenous adults in Ontario (aged 16 years or older) living in food secure households • Vegetable and fruit consumption - less than 5 times per day (adults) calculation: 1. Divide the weighted number of adults aged 18 years and older eating vegetables (excluding potatoes) and fruit less than 5 times per day by the weighted total population aged 18 years and older 2. Multiply the value from step 1 by 100

	○ Respondents who reported consuming fruit juice more than once daily were considered as having consumed it only once. General exclusion: • All calculations excluded respondents in the non-response categories (refusal, don't know, and not stated) for required questions. General analytic notes: • All estimates of proportion for adults (apart from those for specific age groups) are age-standardized to the age distribution of the Ontario Indigenous identity population (on- and –off reserve) in the 2006 Census, using age groups 18 to 24, 25 to 44, 45 to 64, and 65 and older. This technique adjusts for the differing age distributions of Métis and non-Indigenous Ontarians (Métis being younger), allowing us to compare estimates between the 2 populations without bias due to the differing age structures.
Considerations	Métis identity was defined as follows: • A person was classified as Métis if they self-identity as a Métis, or Métis in combination with any other Indigenous identity (First Nation or Inuit), and are born in Canada, United States, Greenland, or Germany • Non-Indigenous Ontarians were categorized as non- Indigenous if they did not identify as Indigenous or if they were not born in Canada, United States, Germany, or Greenland. Socio-demographic characteristics: • Geography: boundaries for North and South Ontario were based on the Local Health Integration Networks (LHINS). LHINs 13 and 14 (North East and North West, respectively) represented "North residents". LHINs 1 to 12 represented "South residents." • Income quintile: Reported or derived household income for each respondent adjusted for household size and community, sorted from highest to lowest and divided into 5 categories ("quintiles") so that about the same number of Ontario households is in each category (about 20% in each). Quintile 1 includes approximately 20% of households with lowest incomes, and quintile 5 includes the approximately 20% of households with highest incomes.

	• Education: highest level of education attained by the respondent, according to 3 categories: less than secondary school graduation; secondary school graduation and/or some post-secondary education; and post-secondary graduation.
	  o Education and income were analyzed for adults aged 25 and older to restrict the sample to those who have likely completed their education and reached their adult socio-demographic status. Residence (based on LHIN) was analyzed for adults aged 20 and older.
	
	Other Notes:
	• For obesity, BMI classifications used here may be limited in determining health risks for muscular adults, naturally lean adults, young adults who have not reached full growth, seniors and certain racial/ethnic groups.
	
	• The definition of "adult" applies to individuals aged 20 and older, with the exceptions of overweight/obesity at aged 18 and older to match BMI classifications.
	
	Survey Questions – Aboriginal Peoples Survey (APS) and Canadian Community Health Survey:
	
	• Indigenous Identity (Socio-demographics characteristics module):
	  o Are you First Nation?
	  o Are you Métis?
	  o Are you Inuk/Inuit?
	  o In what country were you born?
	• Non- Indigenous Identity (Socio-demographics characteristics module):
	  o Derived variable about Indigenous identity
	  o In what country were you born?
	• Smoking (Smoking module):
	  o At the present time, do you smoke cigarettes daily, occasionally or not at all?
	• Second-hand smoke exposure (Smoking module):
	  o Including both household members and regular visitors, does anyone smoke inside your home, every day or almost every day?
	• Obesity (Height and weight module):
	  o How tall are you without shoes on?
	  o How much do you weigh?
	  o Are you pregnant?

	• Alcohol consumption (Alcohol use module):
	  ○ Questions on alcohol use during the past year and during the past week.
	  ○ Are you pregnant?
	• Vegetable and fruit consumption (Fruit and vegetable consumption module):
	  ○ How often do you usually drink fruit juices such as orange, grapefruit or tomato?
	  ○ Not counting juice, how often do you usually eat fruit?
	  ○ How often do you usually eat green salad?
	  ○ How often do you usually eat carrots?
	  ○ Not counting carrots, potatoes or salad, how many servings of other vegetables do you usually eat?
	• Physical inactivity (Physical activities module):
	  ○ Questions about whether an individual participated in any of a list of more than 20 specified physical activities, or any other leisure time physical activities, in the past 3 months, number of times the individual did the activity and amount of time spent.
	  ○ Statistics Canada calculates a Leisure Time Physical Activity Index (PACDPAI) with respondents classified as being "active," "moderately active" or "inactive" based on the total daily energy expenditure values (kcal/kg/day):
	  ▪ Active - respondents who average 3.0 or more kcal/kg/day of energy expenditure
	  ▪ Moderately active - respondents who average 1.5 to 2.9 kcal/kg/day
	  ▪ Inactive - respondents with energy expenditure levels less than 1.5 kcal/kg/day

Data Sources	Canadian Community Health Survey half-survey annual waves 2007–2014. Statistics Canada, Ontario Share File, Ontario Ministry of Health and Long-Term Care.
Data Availability and Limitations	• As of 2011, the CCHS restricted the question about Indigenous identity to those born in Canada, the U.S., Germany or Greenland. Therefore, an individual was considered ' Indigenous ' only if they were born in one of these countries and self-identified as Indigenous for all survey years (2007 to 2014). Respondents in survey years prior to 2011 who identified as Indigenous and were born outside these countries are included with 'non- Indigenous Ontarians'. • The Canadian Community Health Survey (CCHS) excludes individuals living on Indian Reserves and on Crown Lands, institutional residents, full-time members of the Canadian Forces, and residents of certain remote regions. • CCHS data on modifiable risk factors are self-reported. Respondents of self-reported surveys tend to under-report behaviours that are socially undesirable or unhealthy (e.g., tobacco use) and over-report behaviours that are socially desirable (e.g., vegetable and fruit consumption).

3. Breast Cancer

3.1 Age-adjusted percentage of Ontario women, aged 50 to 74, who completed at least 1 mammogram within a 30-month period

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Total number of Ontario screen-eligible women, 50-74 years old in the reporting period
Numerator	Those in the denominator who completed at least one mammogram in a given 30-month period
Inclusion Criteria	Denominator inclusions: • Ontario screen-eligible women 50-74 years old at the index date • Index date was defined as the midpoint in the reporting period, e.g. Jan 1st, 2019 for 2018-2019 • The 2011 Canadian population was used as the standard population for calculating age-standardized rates
Exclusion Criteria	Denominator exclusions: • Women with a missing or invalid HIN, date of birth, postal code or LHIN • Women with a prior diagnosis of invasive or in-situ breast cancer before Jan 1st of the reporting period; prior diagnosis of breast cancer was defined as: ICD-O-3 codes: C50, a morphology indicative of ductal carcinoma in-situ or invasive breast cancer, microscopically confirmed with a path report • Women with a mastectomy before Jan 1 of the reporting period. Mastectomy was defined in OHIP by fee codes E505, E506, E546, R108, R109, and R117 • A small proportion of mammograms performed outside of OBSP as diagnostic tests could not be excluded from the analysis.

Mammogram	• OBSP mammograms for screening purposes were identified in the Integrated Client Management System (ICMS)
	• Non-OBSP mammograms were identified using fee codes in OHIP:
	  o X178 (screening bilateral mammogram)
	  o X185 (diagnostic bilateral mammogram)
	• All mammograms in ICMS were counted, including those with partial views

	Each woman was counted once regardless of the number of mammograms performed in a 30-month period; if a woman had both a program and non-program mammogram within a 30-month period, the program status was selected
Data Sources	• ICMS (Integrated Client Management System): OBSP mammograms and demographics • OHIP CHDB (Claims History Database): Non-OBSP mammogram and mastectomy claims • OCR (Ontario Cancer Registry): Invasive and ductal carcinoma in-situ breast cancers • RPDB (Registered Persons Database): Demographics • Statistics Canada: 2011 Canadian population values
Data Availability and Limitations	• Historical RPDB address information is incomplete; therefore, the most recent primary address was selected for reporting, even for historical study periods • CHDB code X178 for screening bilateral mammography was introduced in October 2010 • CHDB code X185 was used for both screening and diagnostic mammography prior to October 2010; since October 2010, X185 has been used for diagnostic mammography only; however, some screening mammograms after October 2010 may still use X185 for claims

3.2 Percentage of women with early-stage breast cancer who undergo at least one mammogram in their 1st and 2nd follow-up years after their last local treatment

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Total number of Ontario screen-eligible people, 50-74 years old, who had an abnormal OBSP screening mammogram result in the reporting period
Numerator	Those in the denominator who were diagnosed with a screen-detected breast cancer (DCIS or invasive)
Inclusion Criteria	Denominator inclusions: • Average risk people, 50-74 years old, who had an abnormal OBSP mammogram in ICMS • Mammograms were identified by OBSP mammogram records in ICMS for screening purposes • People with abnormal program screening mammograms were identified as those referred for further testing by the screening radiologist in ICMS • All mammograms in ICMS were counted, including those with partial views Numerator inclusion: • All breast cancers reported by OBSP sties were counted
Exclusion Criteria	• People with a missing or invalid HIN, date of birth • People with a final result of "unknown/lost to follow-up"
Data Sources	• ICMS (Integrated Client Management System): OBSP mammograms, demographics, and breast assessments
Data Availability and Limitations	• This indicator includes OBSP mammograms only • There is at least an eight-month reporting lag for this indicator as the regions have up to and including eight months to close off assessment cases and enter the information to the ICMS

3.3 Percentage of Ontario screen-eligible women aged 50 to 74 with an abnormal OBSP screening mammogram result who were diagnosed with breast cancer (ductal carcinoma in situ or invasive) after diagnostic work-up

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Total number of Ontario screen-eligible people, 50-74 years old, with an abnormal OBSP screening mammogram who required a tissue biopsy (core or surgical) for a definitive diagnosis in the reporting period
Numerator	Those in the denominator who were diagnosed within 7 weeks of the abnormal mammogram date
Inclusion Criteria	Denominator inclusions: • Average risk people, aged 50 to 74, who had an abnormal OBSP mammogram in ICMS • Mammograms were identified by OBSP mammogram records in ICMS for screening purposes • People with abnormal program screening mammograms were identified as those referred for further testing by the screening radiologist in ICMS • All mammograms in ICMS were counted, including those with partial views Consideration for numerator: • Date of diagnosis for benign cases was defined as date of last biopsy or procedure with benign finding • Date of diagnosis for breast cancer cases was defined as date of first FNA or tissue (core or open) biopsy procedure for breast cancer
Exclusion Criteria	Denominator exclusions: • People with a missing or invalid HIN, date of birth • People with a final result of "unknown/lost to follow-up"
Data Sources	ICMS (Integrated Client Management System): OBSP mammograms and demographics, assessments, and screen-detected cancer
Data Availability and Limitations	• This indicator includes OBSP mammograms only • There is an eight-month reporting lag for this indicator, as the sites have eight months to close off assessment cases and enter the information in ICMS

3.4 Stage of breast cancer at diagnosis

Calculation	Incident cases with group stage 1, 2, 3 or 4 divided by the denominator, and multiply the result by 100
Denominator	Total number of patients diagnosed with breast cancer (ICD-O-3 topography C50) with: Incident cases (incident case status = I) Malignant cases (behaviour code = 3) Confirmed cases (method of confirmation: 1 to 8 or 9 with pathology report)
Numerator	Number of breast cancer patients in denominator assigned group stage 1, 2 ,3, 4 or unknown.
Exclusion Criteria	Patients aged 18 or younger at diagnosis.
Data Sources	Ontario Cancer Registry (OCR)
Data Availability and Limitations	Case resolution may occasionally result in changes to stage at diagnosis based on new information. Stage at diagnosis is based on the data at the time of analysis.

3.5 3Percentage of patients who received at least one imaging test for distant metastasis

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The total number of breast cancer patients who had breast cancer surgery within 3 months of diagnosis date, in the reporting period
Numerator	Those in the denominator who had at least one imaging test to look for distant metastatic disease between their diagnosis date and 3 months after surgery
Inclusion Criteria	• Breast cancer cohort (see Chapter 1: Cohorts) • Patients with stage: 1, 1A, 1B, 2, 2A, 2B
Exclusion Criteria	• Breast cancer cases that are not the first case for a given patient
Breast Cancer Surgery	• Breast cancer surgery is determined by select CCI codes. • For patients who had more than one surgery on the same breast within the 3 month window, the first surgery after the diagnosis date was used.
Data Sources	• Ontario Cancer Registry (OCR) • Collaborative Staging Integration (CSI) • Discharge Abstract Database (DAD) • National Ambulatory Care Reporting System (NACRS) • Ontario Health Insurance Plan (OHIP)

3.6 Time from breast cancer diagnosis until treatment

Calculation	The time in days from the diagnosis date until the date of the first intervention, reported as a median, 10th percentile, 25th percentile, 75th percentile, and 90th percentile. Subtract the diagnosis date from the earliest of date of surgery, radiation therapy, or systemic therapy
Inclusion Criteria	• Breast Cancer Cohort (see Chapter 1: Cohorts)
Systemic Treatment	• Interventions which occurred within 1 year after diagnosis date were considered. • The following types of agent were used: chemotherapy, targeted therapy, and hormonal therapy
Radiation Treatment	• Interventions which occurred within 1 year after diagnosis date were considered
Surgery	• Main intervention or other interventions which occurred within 1 year after diagnosis date were considered • In DAD, the admission date is considered as the treatment date • In NACRS, the registration date is considered as the treatment date
Data Sources	• Ontario Cancer Registry (OCR) • Discharge Abstract Database (DAD) • National Ambulatory Care Reporting System (NACRS) • Activity Level Reporting (ALR) • Provincial Drug Reimbursement Program (PDRP) • Ontario Drug Benefit (ODB)

3.7 3Percentage of patients diagnosed with breast cancer who had a mastectomy with immediate reconstruction

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of breast cancer patients who had a mastectomy in the reporting period
Numerator	Those in the denominator who had immediate breast reconstruction
Inclusion Criteria	• Breast cancer cohort (see Chapter 1: Cohorts) • Only mastectomies within 1 year of diagnosis were included • In DAD, the admission date was used as the treatment date
Exclusion Criteria	• Patients diagnosed at stage 4
Mastectomy	Mastectomy included the following procedures (CCI codes) in the DAD: • Total excision of the breast using an open approach, or open approach and autograft/local flap (1YM89) • Radical (modified) excision of the breast without tissue, using autograft, using local flap, with tissue expander implantation, with breast prosthesis implantation, or using combined sources of tissue [e.g. local flap and tissue expander] (1YM91LA) • Radical (extended) excision of the breast without tissue, using autograft or using local flap (1YM91TR) • Radical (super [Wangensteen]) excision of the breast without tissue, using autograft or using local flap (1YM91WP)
Immediate Reconstruction Mastectomy	• Breast reconstruction was identified using CCI codes in the DAD • Immediate reconstructions were those that occurred during the same hospitalization as the patient's mastectomy Mastectomy with immediate reconstruction (implants) included the following procedures: • Partial excision of the breast with reconstruction without tissue, with local flap, or using homograft (with implantation of prosthesis and/or tissue expander) (1YM88LAPM, 1YM88LATP, 1YM88LAPME, 1YM88LATPE, 1YM88LAPMK, 1YM88LATPK, 1YM88LAQF, 1YM88LAQFE) • Partial excision of breast with reconstruction using local flap with no implanted device (1YM88LAXXE)

	• Total excision of the breast with reconstruction without tissue, with local flap, or using homograft (with implantation of breast prosthesis or tissue expander) (1YM90LAPM or 1YM90LATP) • Total excision of the breast with reconstruction with no node dissection without tissue, with implantation of prosthesis and expander (1YM90LAQF) • Total excision of the breast with reconstruction with no node dissection using local flap with implantation of prosthesis (1YM90LAQFE) • Total excision of the breast with reconstruction with no node dissection using local flap with no implanted device (1YM90LAXXE) • Radical (modified/extended/super) excision of the breast with reconstruction using local flap or homograft and with implantation breast prosthesis or tissue expander (1YM92^^PME, 1YM92^^PMK, 1YM92^^TPE, 1YM92^^TPK) • Radical (modified) excision of the breast with reconstruction using local flap with implantation of prosthesis and expander (1YM92LAQFE) Mastectomy with immediate reconstruction (microvascular) included the following procedures: • Partial excision of the breast with reconstruction using free flap (with implantation of prosthesis or tissue expander, or with no implanted device) (1YM88LAPMF, 1YM88LATPF, 1YM88LAXXF) • Partial excision of the breast with reconstruction using free flap with implantation of prosthesis and expander (1YM88LAQFF) • Total excision of the breast with reconstruction using free flap (with implantation of prosthesis or tissue expander, or with no implanted device) (1YM90LAPMF, 1YM90LATPF, 1YM90LAXXF) • Total excision of the breast with reconstruction using combined sources of tissue with no implanted device (1YM90LAXXQ) • Radical (modified/extended/super) excision of the breast with reconstruction using free flap and with implantation breast prosthesis, tissue expander, or no implanted device (1YM92^^XXF, 1YM92^^PMF, 1YM92^^TPF) • Radical (super [Wagensteen]) excision of the breast with reconstruction using combined sources of tissue (e.g. free and pedicled TRAM flap) with no implanted device (1YM92WPXXQ) Mastectomy with immediate reconstruction (non-microvascular) included the following procedures:

	• Partial excision of the breast with reconstruction using distant pedicled flap (with implantation of prosthesis or tissue expander, or with no implanted device) (1YM88LAPMG, 1YM88LATPG, 1YM88LAXXG) • Partial excision of the breast with reconstruction using distant pedicled flap with implantation of prosthesis and expander (1YM88LAQFG) • Total excision of the breast with reconstruction using distant pedicled flap (with implantation of prosthesis or tissue expander, or with no implanted device) (1YM90LAPMG, 1YM90LATPG, 1YM90LAXXG) • Total excision total of the breast with reconstruction with no node dissection using distant pedicled flap with implantation of prosthesis and expander (1YM90LAQFG) • Radical (modified/extended/super) excision of the breast with reconstruction using distant pedicled flap and with implantation breast prosthesis, tissue expander, or no implanted device (1YM92^^XXG, 1YM92^^PMG, 1YM92^^TPG) • Radical (modified/extended) excision of the breast with reconstruction using combined sources of tissue (e.g. free and pedicled TRAM flap) with no implanted device (1YM92LAXXQ and 1YM92TRXXQ) • Radical (modified) excision of the breast with reconstruction using distant pedicled flap with implantation of prosthesis and expander (1YM92LAQFG) • Radical (modified/extended) excision of the breast with reconstruction using local flap with no implanted device (1YM92LAXXE and 1YM92TRXXE)
Data Sources	• Ontario Cancer Registry (OCR) • Collaborative Staging Integration (CSI) • Discharge Abstract Database (DAD)

3.8 Percentage of breast cancer patients who had a mastectomy with delayed reconstruction

Calculation	Divide the numerator by the denominator, and multiply the result by 10
Denominator	The number of breast cancer patients who had a mastectomy in the reporting period
Numerator	Those in the denominator who had a reconstruction surgery within 2 years of mastectomy surgery
Inclusion Criteria	• Breast cancer cohort (see Chapter 1)
Exclusion Criteria	• Patients diagnosed at stage 4
Mastectomy	• Only mastectomies within 1 year of diagnosis were included • In DAD, the admission date is considered as the treatment date • In NACRS, the registration date is considered as the treatment date Mastectomy included the following procedures: • Total excision of the breast using an open approach, or open approach and autograft/local flap (1YM89) • Radical (modified) excision of the breast without tissue, using autograft, using local flap, with tissue expander implantation, with breast prosthesis implantation, or using combined sources of tissue [e.g. local flap and tissue expander] (1YM91LA) • Radical (extended) excision of the breast without tissue, using autograft or using local flap (1YM91TR) • Radical (super [Wangensteen]) excision of the breast without tissue, using autograft or using local flap (1YM91WP)
Immediate Reconstruction Mastectomy	*Refer to "3.10. Percentage of patients diagnosed with breast cancer who had a mastectomy with immediate reconstruction" for a complete definition.*
Lumpectomy	Lumpectomy included the following CCI procedures: • Partial excision of the nipple using an open excisional approach [including procedures with full thickness autograft, split thickness autograft, or local flap for closure] (1YK87LA)

	• Total excision of nipple with reconstruction using an open approach with full thickness autograft, local skin flap, or combined local flap and autograft (1YK90LA) • Partial excision of the lactiferous duct using an open approach (1YL87LA) • Total excision of the lactiferous duct using an open approach (1YL89LA)
Delayed Breast Reconstruction	Delayed reconstruction after mastectomy included open approach procedures (subset of procedures under the CCI code 1YM80) for the: • repair of breast using free flap or distant pedicled flap (with implantation of breast prosthesis, prosthesis and expander, tissue expander, or no device implantation); • repair of breast without tissue, autograft, or local flap (with implantation of breast prosthesis, tissue expander or prosthesis and expander); or, • repair of breast using homograft (with implantation of breast prosthesis or tissue expander).
Data Sources	• Ontario Cancer Registry (OCR) • Collaborative Staging Integration (CSI) • Discharge Abstract Database (DAD) • National Ambulatory Care Reporting System (NACRS)

3.9 Percentage of breast cancer patients treated with mastectomy with involvement of axillary lymph nodes who received adjuvant radiation

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of breast cancer patients who had mastectomy with involvement of axillary lymph nodes in the reporting period
Numerator	Patients in the denominator who received adjuvant radiation
Inclusion Criteria	• Breast cancer cohort (see Chapter 1)
Exclusion Criteria	• Patients diagnosed with stage 4 breast cancer
Mastectomy	Mastectomy was defined using the following CCI codes: • Total excision of the breast using an open approach, or open approach and autograft/local flap (1YM89) • Radical (modified) excision of the breast without tissue, using autograft, using local flap, with tissue expander implantation, with breast prosthesis implantation, or using combined sources of tissue [e.g. local flap and tissue expander] (1YM91LA) • Radical (extended) excision of the breast without tissue, using autograft or using local flap (1YM91TR) • Radical (super [Wangensteen]) excision of the breast without tissue, using autograft or using local flap (1YM91WP) Only mastectomies within 1 year of diagnosis were included The admission date was used as the treatment date
Involvement of Axillary Lymph Nodes	• Patients who had a mastectomy with sentinel lymph node biopsy (SLNB) or axillary lymph node dissection (ALND) at the time of mastectomy, or mastectomy followed by ALND within 8 months of the surgery with nodal stage greater and/or equal to N1 were included
Radiation Treatment	• The first radiation treatment within 1 year of mastectomy surgery date • Adjuvant radiation treatment is identified by treatment intent

Data Sources	• Ontario Cancer Registry (OCR) • Collaborative Staging Integration (CSI) • Discharge Abstract Database (DAD) • National Ambulatory Care Reporting System (NACRS) • Activity Level Reporting (ALR) • Ontario Health Insurance Plan (OHIP) • Pathology (PATH)

3.10 Unscheduled emergency department visit or readmission within 30 days of discharge following breast cancer surgery

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of breast cancer patients who had surgery in the reporting period
Numerator	Those in the denominator who had an unscheduled emergency department visit or hospital readmission within 30 days after discharge from surgery
Inclusion Criteria	Breast cancer cohort (see Chapter 1)
Exclusion Criteria	Patients diagnosed at stage 4
Surgery	Only the first breast surgery for each patient was included
Unscheduled ED Visit	Registration date of the visit (NACRS) is within 1-30 days after the discharge date following surgery
Unplanned Readmission Visit	Admission date (DAD) is within 1-30 days after the discharge date post-surgery and is not coded as a planned readmission from acute care
Data Sources	• Ontario Cancer Registry (OCR) • Collaborative Staging Integration (CSI) • Discharge Abstract Database (DAD) • National Ambulatory Care Reporting System (NACRS)

3.11 3Percentage of stage 1 to 3 ER/PR/HER2 negative breast cancer patients who received (neo) adjuvant chemotherapy

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The total number of females diagnosed with stage 1 to 3 ER/PR/HER2 negative breast cancer in the reporting period
Numerator	Those in the denominator who received neoadjuvant or adjuvant chemotherapy
Tumour ER, PR, and HER2 Status	• CSI Site-Specific-Factor-16 (CS-SSF16) negative for ER and PR and HER2 - code 000 • The CS-SSF16 is defined based on the following Site-Specific-Factors for breast: SSF1 - ER test results SSF2 - PR test results SSF15 - summary of test results of the Immunohistochemistry (IHC), Fluorescent In Situ Hybridization (FISH), Chromogenic In Situ Hybridization (CISH), or other/unknown HER2 tests.
Chemotherapy Treatment	• The admission date was considered the treatment date • Neoadjuvant chemotherapy: patient received chemotherapy between diagnosis date and first breast related surgery date • Adjuvant chemotherapy: patient received chemotherapy within 6 months of the first breast surgery date
Data Sources	• Ontario Cancer Registry (OCR) • Collaborative Staging Integration (CSI) • Activity Level Reporting (ALR)

3.12 3Percentage of stage 1 (T1C) to 3 HER2 positive breast cancer patients who received (neo) adjuvant chemotherapy and trastuzumab

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of breast cancer patients who were stage 1 to 3, Human Epidermal Growth Factor Receptor 2 (HER2) positive and Estrogen Receptor (ER) negative and Progesterone Receptor (PR) negative in the reporting period
Numerator	Of those patients described above, the number who received neoadjuvant or adjuvant chemotherapy with trastuzumab
Inclusion Criteria	Breast cancer cohort (see Chapter 1)
Tumors HER2 Status	In CSI, the Site-Specific-Factor-15 indicates the test results for HER2 biomarker (code 010 = HER2 positive)
Chemotherapy Treatment Definition	• The admission date is considered the treatment date • Neoadjuvant chemotherapy — received between diagnosis date and first breast-related surgery date • adjuvant chemotherapy — received within 6 months of the first breast surgery date • Chemotherapy with trastuzumab (targeted therapy) — trastuzumab was received within 3 months of first chemotherapy date
Data Sources	• Ontario Cancer Registry (OCR) • Collaborative Staging Integration (CSI) • Activity Level Reporting (ALR) • Provincial Drug Reimbursement Program (PDRP)

3.13 Percentage of breast cancer survivors who had at least 1 mammogram test per year in their first to fifth follow-up years

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of patients diagnosed with breast cancer who became survivors in the reporting period
Numerator	Number of patients among the denominator who have one or more mammogram in the follow-up years NOTE: Follow-up years are calculated from the date of last treatment in the year that the patient first became a survivor

Inclusion Criteria	• Patients with a breast cancer diagnosis:
	  ○ Breast cancer: C50 (ICD-O-3 site)
	  ○ SEER Recode = 26000
	  ○ ICD-O-3 histology not in (8240, 8241, 8242, 8243, 8245, 8246, 8249, 8150, 8152, 8153, 8154, 8155, 8156, 8157)
	• Patients with a cancer diagnosis on or after April 1, 2006
	• Patients who completed local treatment (radiation and/or surgery) in the reporting timeframe

Exclusion Criteria	• Patients with multiple primaries • Patients who have not completed initial treatment or received treatment (radiation or surgery) in the follow-up years (Refer to treatment definitions below for more details) • Patients diagnosed with stage 4 cancer or cancer cases with unknown stage • Patients with bilateral mastectomy
Radiation Treatment	• Radiation treatment visits were extracted from ALR based on a unique combination of a patient HCN, facility number, and visit date • The most recent records in ALR containing a flag for radiation treatment • Total radiation treatment visits (R15) greater than or equal to 1
Surgery	• Surgeries were extracted from the DAD, NACRS, and OHIP based on unique combination of a patient HCN, facility number, and visit date. • Visits were considered surgery-related if the patient had a confirmed breast cancer diagnosis in the OCR and the CCI code found in the intervention fields of DAD and NACRS contained any of the following: 1YM87, 1YM88, 1YM89, 1YM90, 1YM91, or 1YM92. • Cancer surgeries identified in OHIP were included if the patient had a confirmed breast cancer diagnosis in the OCR and the fee code contained any of the following: R107, R108, R109, R111, R117, R148, or R149.

	• Records were excluded if there was any indication that the procedure was abandoned, cancelled, or performed outside of the hospital. • In the DAD, all dates from the admission to the discharge date are considered treatment dates. • In NACRS, the registration date is a proxy for the treatment visit date. • In OHIP, the service date is considered the treatment date. • Only records where the DAD admission date, NACRS registration date or OHIP service date occurred within one year of the patients' diagnosis date (i.e., from Day 0 or diagnosis date to Day 365) are considered definitive cancer surgeries as part of initial treatment. Subsequent surgical treatments which may indicate recurrence would not include this restriction.
Mammogram	Mammogram records for valid breast cancer patients were identified from OHIP using the following fee schedule codes: • X184: Diagnostic radiology-mammogram-unilateral • X185: Diagnostic radiology-mammogram-bilateral • X172: Mammogram - no signs or symptoms - unilateral • X178: Mammogram - no signs or symptoms - bilateral • X194: Diag. radiology misc. exams addl coned magnifn views.2film • J863: Implement technical fee for scintimammography • J663: Implement technical fee for scintimammography • X184: Diagnostic radiology-mammogram-unilateral • X185: Diagnostic radiology-mammogram-bilateral • X172: Mammogram - no signs or symptoms - unilateral • X178: Mammogram - no signs or symptoms - bilateral • X194: Diag. radiology misc. exams addl coned magnifn views.2film • J863: Implement technical fee for scintimammography • J663: Implement technical fee for scintimammography • Q002: Mammography preventive care service enhancement
Data Sources	• Ontario Cancer Registry (OCR) • Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS) • Activity Level Reporting (ALR) • Ontario Health Insurance (OHIP) • Collaborative Staging Reporting Database

4. 3Cervical Cancer

4.1 Age-adjusted percentage of Ontario screen-eligible women, aged 21 to 69, who completed at least 1 Pap test in a 42-month period

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of Ontario screen-eligible women, aged 21-69 in the reporting period
Numerator	Those in the denominator who have completed at least one cytology test in a 42-month period
Inclusion Criteria	Denominator inclusions: • Ontario screen-eligible women aged 21 to 69 at the index date • Index date was defined as the midpoint of a reporting period, e.g. July 1st 2015 for 2014-2016 • The 2011 Canadian population was used as the standard population for calculating age-standardized rates • The RPDB address closest to the index date was used to assign postal code Numerator inclusions: • Identifying cytology tests: o Cytology tests were identified through CytoBase o Cytology tests were also identified using fee codes through OHIP ▪ E430A: add-on to a003, a004, a005, a006 when pap performed outside hospital ▪ G365A: Periodic-pap smear ▪ E431A: When Papanicolaou smear is performed outside of hospital, to G394. ▪ G394A: Additional for follow-up of abnormal or inadequate smears ▪ L713A: Lab.med.-anat path,hist,cyt-cytol-gynaecological specimen ▪ L733A: Cervicovaginal specimen (monolayer cell methodology) ▪ L812A: Cervical vaginal specimens including all types of cellular abnormality, assessment of flora, and/or cytohormonal evaluation ▪ Q678A: Gynaecology – pap smear – periodic – nurse practitioners • All cytology tests in CytoBase were counted, including those with inadequate specimens • Each woman was counted once regardless of the number of cytology tests performed in a 42-month time frame

	• CytoBase - cytology tests • OHIP's CHDB (Claims History Database) – cytology tests, colposcopy procedures, treatment procedure claims, hysterectomy claims • OCR (Ontario Cancer Registry) - resolved invasive cervical cancers • RPDB (Registered Persons Database) - Demographics
Exclusion Criteria	Denominator exclusions: • Women with a missing or invalid HIN, date of birth, or postal code • Women diagnosed with an invasive cervical cancer prior to January 1st of the reporting period, e.g. January 1st 2014 for 2014-2016; prior diagnosis of cervical cancer was defined as: ICD-O-3 codes C53, a morphology indicative of cervical cancer, microscopically confirmed with a path report • Women who had a colposcopy and/or treatment within 2 years prior to January 1st of the reporting period • Colposcopy and/or treatment were identified through OHIP, using the following fee codes:
Colposcopy	• Z731: Initial investigation of abnormal cytology of vulva and/or vagina or cervix under colposcopic technique with or without biopsy(ies) and/or endocervical curetting • Z787: Follow-up colposcopy with biopsy(ies) with or without endocervical curetting • Z730: Follow-up colposcopy without biopsy with or without endocervical curetting
Treatment	• Z732: Cryotherapy • Z724: Electro • Z766: Electrosurgical Excision Procedure (LEEP) • S744: Cervix - cone biopsy - any technique, with or without D&C • Z729: Cryoconization, electroconization or CO2 laser therapy with or without curettage for premalignant lesion (dysplasia or carcinoma in-situ), out-patient procedure • Women with a hysterectomy prior to January 1st of the reporting period • Women with a hysterectomy were identified through OHIP, using the following fee codes: o E862A: When hysterectomy is performed laparoscopically, or with laparoscopic assistance o P042A: Obstetrics – labour – delivery – caesarean section including hysterectomy o Q140A: Exclusion code for enrolled female patients aged 35-70 with hysterectomy o S710A: Hysterectomy - with or without adnexa (unless otherwise specified) – with omentectomy for malignancy o S727A: Ovarian debulking for stage 2C, 3B or 4 ovarian cancer and may include hysterectomy o S757A: Hysterectomy – with or without adnexa (unless otherwise specified) – abdominal – total or subtotal

	○ S758A: Hysterectomy - with or without adnexa (unless otherwise specified) – with anterior and posterior vaginal repair and including enterocoele and/or vault prolapse repair when rendered ○ S759A: Hysterectomy - with or without adnexa (unless otherwise specified) – with anterior or posterior vaginal repair and including enterocoele and/or vault prolapse repair when rendered ○ S762A: Hysterectomy - with or without adnexa (unless otherwise specified) – radical trachelectomy - excluding node dissection ○ S763A: Hysterectomy - with or without adnexa (unless otherwise specified) – radical (Wertheim or Schauta) - includes node dissection ○ S765A: Amputation of cervix ○ S766A: Cervix uteri - Exc - cervical stump – abdominal ○ S767A: Cervix uteri - exc - Cervical stump – vaginal ○ S816A: Hysterectomy - with or without adnexa (unless otherwise specified) - vaginal
Data Sources	• CytoBase: cytology tests • OHIP's CHDB (Claims History Database): cytology tests, colposcopy procedures, treatment procedure claims, hysterectomy claims • OCR (Ontario Cancer Registry): resolved invasive cervical cancers • RPDB (Registered Persons Database): demographics
Data Availability and Limitations	• Pap test results are available in CytoBase only • CytoBase includes only Pap tests analyzed in community-based laboratories in Ontario; Pap tests analyzed in Ontario hospitals and Community Health Centres are not captured in CytoBase • It is difficult to determine whether a Pap test in CytoBase and/or OHIP was done for screening or diagnostic purposes, and therefore, some Pap tests included in these analyses may have been performed for diagnostic purposes

4.2 Percentage of Ontario screen-eligible women, age 21 to 69, who had a subsequent cervical cytology (Pap) test within 42 months of a normal Pap test result

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Total number of Ontario screen-eligible individuals, 50-74 years old, with an abnormal fecal test result in the reporting period
Numerator	Those in the denominator who did not undergo colonoscopy within six months of the abnormal fecal result
Inclusion Criteria	Denominator inclusions: • Individuals, 50–74 years old at the abnormal fecal test result date • Index (reporting) date was defined as the abnormal fecal test result date • Fecal tests were identified by records in LRT or FIT DSP • Abnormal fecal test result date was defined using the lab report date in LRT and result report date in FIT DSP • If a person had multiple abnormal fecal tests during the reporting period, only their first abnormal fecal test was included Numerator inclusions: • Individuals with an abnormal fecal test result who did not have a follow-up colonoscopy within 6 months of the abnormal fecal test result • Colonoscopy was identified in OHIP by fee codes Z555A, Z491A-Z499A, or in CIRT or GI Endoscopy DSP Consideration: Only CCC program data are included in the calculation
Exclusion Criteria	Denominator exclusions: • Individuals with a missing or invalid HIN, date of birth or postal code • Individuals with an invasive colorectal cancer before the fecal test result date; prior diagnosis of colorectal cancer was defined as: ICD-O-3 codes C18.0, C18.2-C18.9, C19.9, C20.9, a morphology indicative of colorectal cancer, microscopically confirmed with a path report • Individuals with a total colectomy before the fecal test result date; total colectomy was identified in OHIP by fee codes S169A, S170A and S172A

	• Colonoscopies performed within one day of the abnormal fecal test result date • Abnormal fecal tests with follow-up colonoscopies performed in an inpatient setting
Data Sources	• LRT (Laboratory Reporting Tool): CCC FOBTs • FIT DSP (Data Submission Portal): FITs • OHIP CHDB (Claims History Database): Colonoscopy claims and total colectomy claims • CIRT (Colonoscopy Interim Reporting Tools): CCC program colonoscopy records • GI Endoscopy DSP (Gastrointestinal Endoscopy Data Submission Portal): hospital colonoscopy records • OCR (Ontario Cancer Registry): Resolved invasive colorectal cancers • RPDB (Registered Persons Database): Demographics • PCCF+: Residence information
Data Availability and Limitations	Historical RPDB address information is incomplete; therefore, the most recent primary address was selected for reporting, even for historical study periods

4.3 Percentage of Ontario screen-eligible women with high-grade cervical dysplasia on a Pap test, age 21 to 69, who underwent colposcopy or definitive treatment within 6 months of the high-grade abnormal screen date

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of Ontario screen-eligible people with a cervix, aged 21 to 69, with a high-grade cervical abnormality on a cytology test in the reporting period
Numerator	Those in the denominator who underwent colposcopy or definitive treatment within 6 months of the high-grade abnormal screen date
Inclusion Criteria	Denominator inclusions: • Index date was defined as the date of the most recent high-grade cervical abnormality per person by date of specimen collection in CytoBase in each calendar year • High-grade cervical dysplasia was defined as: • Cytology test category – Version 2 o ASC-H – 4.4.5 o AGC – 4.5.1, 4.5.2, 4.5.3, 4.5.4, 4.5.5, 4.5.7, 4.5.9, 4.5.10,4.5.11,4.5.12,4.5.13 o Adeno in-situ – 4.5.8, 4.6 o AGC – 4.5.1, 4.5.2, 4.5.3, 4.5.4, 4.5.5, 4.5.7, 4.5.9, 4.5.10,4.5.11,4.5.12,4.5.13 o Adeno in-situ – 4.5.8, 4.6 o HSIL – 4.8 • Each person with a cervix was counted once in a given year regardless of the number of tests performed • The RPDB address closest to the index date was used to assign postal code Numerator inclusions: • Colposcopy was defined using the following fee codes in OHIP o Z731: Initial investigation of abnormal cytology of vulva and/or vagina or cervix under colposcopic technique with or without biopsy(ies) and/or endocervical curetting o Z787: Follow-up colposcopy with biopsy(ies) with or without endocervical curetting o Z730: Follow-up colposcopy without biopsy with or without endocervical curetting

	• If no record was found for a subsequent colposcopy after the high-grade cervical abnormality cytology test, other definitive procedures were included; these procedures were identified through OHIP claims as
	  ○ Z732: Cryotherapy
	  ○ Z724: Electro
	  ○ Z766: Electrosurgical Excision Procedure (LEEP)
	  ○ S744: Cervix - cone biopsy - any technique, with or without D&C
	  ○ Z729: Cryoconization, electroconization or CO2 laser therapy with or without curettage for premalignant lesion (dysplasia or carcinoma in-situ), out-patient procedure
	• If no record was found for a colposcopy or one of the procedures listed above, the person with a cervix was still assumed to be followed up provided if a hysterectomy was performed within six months following the high-grade abnormal cytology test
	• If a person with a cervix had multiple colposcopies or multiple procedures, the earliest colposcopy or procedure was selected

Exclusion Criteria	Denominator exclusions:
	• People with a cervix with a missing or invalid HIN, date of birth, or postal code
	• People with a cervix who died during the follow-up period
	• People with a cervix diagnosed with an invasive cervical cancer before the index date; prior diagnosis of cervical cancer was defined as: ICD-O-3 codes C53, a morphology indicative of cervical cancer, microscopically confirmed with a path report
	• If a person with a cervix had a colposcopy within +/- 7 days of the cytology test, the cytology test was assumed to be completed concurrently with colposcopy and not a cytology test that was followed up by colposcopy. This cytology test should not be defined as an index cytology test and therefore was removed.
	• People with a cervix with a hysterectomy before the index cytology date
	• People with a cervix with a hysterectomy were identified through OHIP, using the following fee codes.
	  ○ E862A: When hysterectomy is performed laparoscopically, or with laparoscopic assistance
	  ○ P042A: Obstetrics – labour – delivery – caesarean section including hysterectomy
	  ○ Q140A: Exclusion code for enrolled female patients aged 35-70 with hysterectomy
	  ○ S710A: Hysterectomy - with or without adnexa (unless otherwise specified) – with omentectomy for malignancy
	  ○ S727A: Ovarian debulking for stage 2C, 3B or 4 ovarian cancer and may include hysterectomy

	○ S757A: Hysterectomy – with or without adnexa (unless otherwise specified) – abdominal – total or subtotal ○ S758A: Hysterectomy - with or without adnexa (unless otherwise specified) – with anterior and posterior vaginal repair and including enterocoele and/or vault prolapse repair when rendered ○ S759A: Hysterectomy - with or without adnexa (unless otherwise specified) – with anterior or posterior vaginal repair and including enterocoele and/or vault prolapse repair when rendered ○ S762A: Hysterectomy - with or without adnexa (unless otherwise specified) – radical trachelectomy - excluding node dissection ○ S763A: Hysterectomy - with or without adnexa (unless otherwise specified) – radical (Wertheim or Schauta) - includes node dissection ○ S765A: Amputation of cervix ○ S766A: Cervix uteri - exc - cervical stump – abdominal ○ S767A: Cervix uteri - exc - cervical stump – vaginal ○ S816A: Hysterectomy - with or without adnexa (unless otherwise specified) – vaginal
Data Sources	• CytoBase: Cytology tests • OHIP CHDB (Claims History Database): Previous cytology tests, colposcopies, definitive procedure claims, hysterectomy claims • OCR (Ontario Cancer Registry): Resolved invasive cervical cancers • RPDB (Registered Persons Database): Demographics
Data Availability and Limitations	• Cytology test results are available in CytoBase only • CytoBase includes only cytology tests analyzed in community-based laboratories in Ontario; cytology tests analyzed in Ontario hospitals and Community Health Centres are not captured in CytoBase • It is difficult to determine whether a cytology test in CytoBase and/or OHIP was done for screening or diagnostic purposes, and therefore, some cytology tests included in these analyses may have been performed for diagnostic purposes

4.4 Stage of cervical cancer at diagnosis

Calculation	Incident cases with group stage 1, 2, 3 or 4 divided by the denominator, and multiply the result by 100
Denominator	Total number of patients diagnosed with cervical cancer (ICD-O-3 topography C53) with:
Numerators	Number of cervical cancer patients in denominator assigned group stage 1,2,3,4 or unknown.
Exclusion Criteria	Patients aged 18 or younger at diagnosis.
Data Sources	Ontario Cancer Registry (OCR)
Data Availability and Limitations	Case resolution may occasionally result in changes to stage at diagnosis based on new information. Stage at diagnosis is based on the data at the time of analysis.

4.5 Percentage of cervical cancer patients who received a pre-treatment MRI

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of cervical cancer patients diagnosed in the reporting period who received treatment
Numerator	Those in the denominator who received a pelvic MRI before the treatment start date
Inclusion Criteria	Denominator inclusions: • Cervical cancer patients identified in the Cervical Cancer Cohort (see Chapter 1) • Patients who received either surgery, curative-intent radiation, or curative-intent chemotherapy within 1 year after diagnosis Numerator inclusions: • Patients who received a pelvic MRI between 2 months before diagnosis and the start of first treatment, inclusive
Exclusion Criteria	• Patients diagnosed with stage 4 cervical cancer
Surgery	• DAD or NACRS procedure codes 1RN89, 1RN91, 1RM89, or 1RM91 • Surgery was not abandoned • Surgery date within 1 year of diagnosis
Radiation Therapy	• ALR with total radiation treatments (R15) greater than or equal to 1 • Radiation applied to the pelvis • Radiation date within 1 year of diagnosis
Systemic Treatment	Systemic therapy from ALR, ODB, NDFP, DAD, or NACRS within 1 year of diagnosis ALR o ALR with oral or non-oral antineoplastic systemic therapy treatment (S25 count greater than or equal to 1) o Systemic therapy agent classified as anti-neoadjuvant DAD or NACRS o CCI codes 1ZZ35HAM0-9, 1ZZ35YAM0-9, or 1ZZ35CAM0-9 NDFP o Policy for cervical cancer ODB

	○ Systemic agent classified as anti-neoadjuvant
Pelvic MRI	• OHIP billing codes X465, X461, X451, X455 • DAD or NACRS CCI code 3OT40
Denominator Exclusions	Patients diagnosed with stage 4 cervical cancer
Surgery	• DAD or NACRS procedure codes 1RN89, 1RN91, 1RM89, or 1RM91 • Surgery was not abandoned • Surgery date within 1 year of diagnosis
Radiation Treatment	• ALR with total radiation treatment visits (R15) greater than or equal to 1 • Radiation applied to the pelvis • Radiation date within 1 year of diagnosis
Systemic Treatment	• Systemic therapy from ALR, ODB, NDFP, DAD, or NACRS within 1 year of diagnosis • ALR ○ ALR with oral or non-oral antineoplastic systemic therapy treatment (S25 count greater than or equal to 1) ○ Systemic therapy agent classified as anti-neoadjuvant ○ Methodology key = 4 ○ Patient present status = yes • DAD or NACRS ○ CCI codes 1ZZ35HAM0-9, 1ZZ35YAM0-9, or 1ZZ35CAM0-9 ○ Responsibility for payment = Ontario (01) ○ Province issuing health card number = Ontario • NDFP ○ Policy for cervical cancer • ODB ○ Systemic agent classified as anti-neoadjuvant
Pelvic MRI	• OHIP billing codes X465, X461, X451, X455 • DAD or NACRS code 3OT40

Data Sources	Discharge Abstract Data (DAD) National Ambulatory Care Reporting System (NACRS) Activity Level Reporting (ALR) NDFP ODB
Data Availability and Limitations	Staging information for 2019 was incomplete

4.6 Time from diagnosis of cervical cancer to first treatment

Calculation	The time in days from the diagnosis date until the date of the first intervention, reported as a median, 10th percentile, 25th percentile, 75th percentile, and 90th percentile.
Inclusion Criteria	• Includes cervical cancer patients identified in the Cervical Cancer Cohort (see Chapter 1) • Includes patients who received either surgery, radiation, or systemic therapy within 1 year after diagnosis
Surgery Treatment	• DAD or NACRS procedure codes 1RN89, 1RN91, 1RM89, or 1RM91 • Surgery was not abandoned • Surgery date within 1 year of diagnosis
Radiation Treatment	• ALR with total radiation treatment visits (R15) greater than or equal to 1 • Radiation applied to the pelvis • Radiation date within 1 year of diagnosis

Systemic Treatment	Systemic therapy from ALR, ODB, NDFP, DAD, or NACRS within 1 year of diagnosis
	• ALR
	  o ALR with oral or non-oral antineoplastic systemic therapy treatment (S25 count greater than or equal to 1)
	  o Systemic therapy agent classified as anti-neoadjuvant
	• DAD or NACRS
	  o Intervention code 1ZZ35HAM0-9, 1ZZ35YAM0-9, or 1ZZ35CAM0-9
	• NDFP
	  o Policy for cervical cancer
	• ODB
	  o Systemic agent classified as anti-neoadjuvant

Data Sources	• Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS) • Activity Level Reporting (ALR) • NDFP • ODB

4.7 Unplanned emergency department visits or readmissions after surgery for cervical cancer

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of cervical cancer patients diagnosed in the reporting period who received surgery
Numerator	Those in the denominator who had an unscheduled emergency department visit or a hospital admission within 30 days of discharge after surgery
Inclusion Criteria	• Includes cervical cancer patients identified in the Cervical Cancer Cohort (see Chapter 1) • Includes patients who received surgery within 1 year after diagnosis
Surgery Treatment	• DAD or NACRS procedure codes 1RN89, 1RN91, 1RM89, or 1RM91 • Surgery was not abandoned
Unscheduled ED Visit	• NACRS Registration date is within 30 days of the date of discharge from surgery, inclusive • Excludes planned ED visits (ED visit indicator = 1 or Scheduled ED visit indicator = N) • Visit MIS functional centre starts with 7*310 • Excludes patients who registered in the ED but left before being seen (visit disposition not equal to 02)
Hospital Admission	• DAD admission date is within 30 days of the date of discharge from surgery, inclusive • Unplanned readmission (readmit code not equal to 1 – planned)
Data Sources	• Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS)
Data Availability and Limitations	Most patients had one cervical resection surgery

4.8 Proportion of cervical cancer patients receiving surgery who received open surgery

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of cervical cancer patients diagnosed in the reporting period who received surgery
Numerator	Those in the denominator whose surgery was performed using an open technique
Inclusion Criteria	• Includes cervical cancer patients identified in the Cervical Cancer Cohort (see Chapter 1) • Includes patients who received surgery within 1 year after diagnosis
Surgery Treatment	• DAD or NACRS procedure codes 1RN89, 1RN91, 1RM89, or 1RM91 • Surgery was not abandoned • Surgery date within 1 year of diagnosis
Open Surgery	Procedures performed through the abdomen were classified as open o 1RM91LA: Excision radical, uterus and surrounding structures using abdominal approach (e.g. Wertheim operation) o 1RN91LA: Excision radical, cervix using open [abdominal] approach o 1RN89LA: Excision total , cervix open approach without tissue o 1RM89LA: Excision total, uterus and surrounding structures using open approach
Minimally Invasive Surgery	Minimally invasive techniques included all procedures done laparoscopically or vaginally o 1RM91AA: Excision radical, uterus and surrounding structures using combined laparoscopic and vaginal approach o 1RM91CA: Excision radical, uterus and surrounding structures using vaginal approach (e.g. Schauta operation) o 1RM91DA: Excision radical, uterus and surrounding structures using endoscopic (laparoscopic) approach o 1RN91AA: Excision radical, cervix using combined endoscopic (laparoscopic) and per orifice (vaginal) approach o 1RN91CR: Excision radical, cervix using per orifice [vaginal] approach with incision o 1RM89AA: Excision total, uterus and surrounding structures using combined laparoscopic and vaginal approach o 1RM89CA: Excision total, uterus and surrounding structures using vaginal approach

	○ 1RM89DA - Excision total, uterus and surrounding structures using endoscopic (laparoscopic) approach
Data Sources	• Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS)
Data Availability and Limitations	• Only the first surgical resection was considered. Most patients had one cervical resection surgery.

4.9 Percentage of cervical cancer surgeries performed by a gynecological oncologist

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of cervical cancer patients diagnosed in the reporting period who received surgery
Numerator	Those in the denominator whose surgery was performed by a gynecologic oncologist
Inclusion Criteria	• Includes cervical cancer patients identified in the Cervical Cancer Cohort (see Chapter 1) • Includes patients who received surgery within 1 year after diagnosis
Gynecologic Oncologist	The surgeon was considered a gynecologic oncologist (rather than a general surgeon or a general obstetrician/gynecologist) if the surgeon billed at least 1 chemotherapy code within the year before surgery • OHIP billing codes for chemotherapy include G381, G281, G345, G359, G075, G382, G388
Surgery Treatment	• DAD or NACRS CCI codes 1RN89, 1RN91, 1RM89, or 1RM91 • Surgery was not abandoned • Surgery date within 1 year of diagnosis
Data Sources	• Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS) • Ontario Health Insurance (OHIP)
Data Availability and Limitations	• Most patients only had one cervical resection surgery. Only the first surgical resection was considered

4.10 Percentage of cervical cancer patients who received definitive radiotherapy and concurrent platinum-based chemotherapy (and cycles)

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of cervical cancer patients diagnosed in the reporting period who received definitive radiotherapy
Numerator 1 – overall	Those in the denominator who received concurrent platinum-based chemotherapy
Numerator 2 – at least 4 cycles	Those in the denominator who received at least 4 cycles of concurrent platinum-based chemotherapy
Inclusion Criteria	Includes cervical cancer patients identified in the Cervical Cancer Cohort (see Chapter 1)
Exclusion Criteria	Excludes patients diagnosed stage 4 Excludes patients who started treatment with palliative-intent chemotherapy or radiation
Surgery Treatment	• DAD or NACRS CCI procedure codes 1RN89, 1RN91, 1RM89, or 1RM91 • Surgery was not abandoned • Surgery date within 1 year of diagnosis
Radiation Treatment	• ALR with total radiation treatment visits (R15) greater than or equal to 1 • Radiation applied to the pelvis • Radiation date within 1 year of diagnosis
Systemic Treatment	• ALR with S25 count greater than or equal to 1 • Systemic therapy agent classified as anti-neoadjuvant • Chemotherapy date within 1 year of diagnosis • Chemotherapy was cisplatin • To be concurrent, all chemotherapy treatment dates were included if they occurred between 7 days prior to the start of radiation and 7 days after the end of radiation
Data Sources	• Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS) • Activity Level Reporting (ALR)

4.11 Time from start of radiation therapy for cervical cancer to completion and percent completed within target

Calculation 1	Divide the numerator by the denominator, and multiply the result by 100
Calculation 2	The time in days from the start of external beam radiation until the last date of brachytherapy, reported as a median, 25th percentile, 75th percentile, and 90th percentile
Denominator	The number of cervical cancer patients diagnosed in the reporting period who received external beam radiation and brachytherapy
Numerator	Those in the denominator who completed both external beam radiation and brachytherapy within the target of 56 days
Inclusion Criteria	• Cervical cancer patients identified in the Cervical Cancer Cohort (see Chapter 1)
Exclusion Criteria	• Patients who received surgery within the first year of diagnosis • Patients who started brachytherapy before external beam radiation therapy (EBRT)
Surgery Treatment	• DAD or NACRS procedure codes 1RN89, 1RN91, 1RM89, or 1RM91 • Surgery was not abandoned • Surgery date within 1 year of diagnosis • Responsibility for payment = Ontario (01) • Province issuing health card number = Ontario
Radiation Treatment	• ALR with total radiation treatment visits (R15) greater than or equal to 1 • Radiation applied to the pelvis • Radiation date within 1 year of diagnosis • Methodology key = 4 (most recently submitted record – to account for data resubmissions) • Patient present status = yes • All patients received both EBRT and brachytherapy • EBRT included radiation techniques intensity-modulated radiotherapy (IMRT), stereotactic radiation, and no special technique • Brachytherapy was restricted only to the technique brachytherapy • All radiation treatments observed after a gap of 2 months were considered a new course of therapy and were omitted

Data Sources	• Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS) • Activity Level Reporting (ALR)

5. Colorectal Cancer

5.1 Age-adjusted percentage of Ontarians, aged 50 to 74, who were overdue for colorectal cancer screening

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of Ontario screen-eligible individuals, 50–74 years old in the reporting period
Numerator	Those in the denominator who were overdue for colorectal screening by the end of the calendar year

Inclusion Criteria	Denominator inclusions:
	• Ontario residents aged 50 to 74 at the index date
	• Index date was defined as January 1 of a given year
	
	Numerator inclusions:
	• Individuals were considered overdue for colorectal screening if they:
	  o did not have a fecal test (gFOBT or FIT) with a valid test result within the last two years (Jan 1 of the previous year to Dec 31st of the calendar year of interest) AND
	  o did not have a colonoscopy in the last ten years (Jan 1 nine years prior to the calendar year of interest to Dec 31st of the calendar year of interest) AND
	  o did not have a flexible sigmoidoscopy in the last ten years (Jan 1 nine years prior to the calendar year of interest to Dec 31st of the calendar year of interest)
	  For example: at the end of 2018, an individual would be considered overdue for colorectal screening if he or she did not have a gFOBT test in 2017-2018, or a colonoscopy in 2009-2018, or a flexible sigmoidoscopy in 2009-2018
	• Identifying fecal tests:
	  o FITs were identified in FIT DSP
	  o Program CCC gFOBTs were identified in LRT or in OHIP by fee code L179A (ColonCancerCheck Fecal Occult Blood Testing) and completed by December 23, 2019
	  o Non-program gFOBTs were identified in OHIP by fee code L181A (Lab Med - Biochem -Occult Blood) and completed by December 23, 2019
	• Fecal tests with either normal or abnormal results were considered valid and were included

	• If a gFOBT identified in LRT occurred within (±) 2 days of a gFOBT identified in OHIP for the same individual, they were considered to be the same test • All gFOBTs identified in OHIP and not in LRT were considered "valid" • Colonoscopies were identified in OHIP by fee codes Z555A, Z491A-Z499A, or in CIRT or GI Endoscopy DSP • Flexible sigmoidoscopies were identified in OHIP by fee code Z580A • Multiple claims with the same Health Insurance Number (HIN) and service date were assumed for a single procedure • Each individual was counted once regardless of the number of tests performed
Exclusion Criteria	Denominator exclusions: • Individuals with a missing or invalid HIN, date of birth, or postal code • Individuals with an invasive colorectal cancer prior to Jan 1 of the calendar year of interest; prior diagnosis of colorectal cancer was defined as: ICD-O-3 codes C18.0, C18.2-C18.9, C19.9, C20.9, a morphology indicative of colorectal cancer, microscopically confirmed with a path report • Individuals with a total colectomy prior to Jan 1 of the calendar year; total colectomy was defined in OHIP by fee codes S169A, S170A, S172A
Data Sources	• LRT (Laboratory Reporting Tool): CCC gFOBTs • FIT DSP (Data Submission Portal): FITs • OHIP CHDB (Claims History Database): Total colectomy claims, CCC and non-CCC gFOBTs, colonoscopy claims, flexible sigmoidoscopy claims • CIRT (Colonoscopy Interim Reporting Tool): CCC program colonoscopy records • GI Endo DSP (Gastrointestinal Endoscopy Data Submission Portal): Hospital colonoscopy records • OCR (Ontario Cancer Registry): Resolved invasive colorectal cancers • RPDB (Registered Persons Database): Demographics • PCCF+: Residence
Data Availability and Limitations	• Historical RPDB address information is incomplete; therefore, the most recent primary address was selected for reporting, even for historical study periods • gFOBTs in hospital labs could not be captured • A small proportion of fecal tests performed as diagnostic tests could not be excluded from the analysis

5.2 Percentage of screen-eligible Ontarians with an abnormal fecal occult blood test (FOBT) result, aged 50 to 74, who did not undergo colonoscopy within 6 months

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Total number of Ontario screen-eligible individuals, 50-74 years old, with an abnormal fecal test result in the reporting period
Numerator	Those in the denominator who did not undergo colonoscopy within six months of the abnormal fecal result
Inclusion Criteria	Denominator inclusions: • Individuals, 50–74 years old at the abnormal fecal test result date • Index (reporting) date was defined as the abnormal fecal test result date • Fecal tests were identified by records in LRT or FIT DSP • Abnormal fecal test result date was defined using the lab report date in LRT and result report date in FIT DSP • If a person had multiple abnormal fecal tests during the reporting period, only their first abnormal fecal test was included Numerator inclusions: • Individuals with an abnormal fecal test result who did not have a follow-up colonoscopy within 6 months of the abnormal fecal test result • Colonoscopy was identified in OHIP by fee codes Z555A, Z491A-Z499A, or in CIRT or GI Endoscopy DSP
Exclusion Criteria	Denominator exclusions: • Individuals with a missing or invalid HIN, date of birth or postal code • Individuals with an invasive colorectal cancer before the fecal test result date; prior diagnosis of colorectal cancer was defined as: ICD-O-3 codes C18.0, C18.2-C18.9, C19.9, C20.9, a morphology indicative of colorectal cancer, microscopically confirmed with a path report • Individuals with a total colectomy before the fecal test result date; total colectomy was identified in OHIP by fee codes S169A, S170A and S172A • Colonoscopies performed within one day of the abnormal fecal test result date

	• Abnormal fecal tests with follow-up colonoscopies performed in an inpatient setting
Data Sources	• LRT (Laboratory Reporting Tool): CCC FOBTs • FIT DSP (Data Submission Portal): FITs • OHIP CHDB (Claims History Database): Colonoscopy claims and total colectomy claims • CIRT (Colonoscopy Interim Reporting Tools): CCC program colonoscopy records • GI Endoscopy DSP (Gastrointestinal Endoscopy Data Submission Portal): hospital colonoscopy records • OCR (Ontario Cancer Registry): Resolved invasive colorectal cancers • RPDB (Registered Persons Database): Demographics • PCCF+: Residence information
Data Availability and Limitations	• Historical RPDB address information is incomplete; therefore, the most recent primary address was selected for reporting, even for historical study periods

5.3 Number of outpatient colonoscopies followed by hospital admissions for perforation within 7 days of procedure, per 1,000

Calculation	Divide the numerator by the denominator, and multiply the result by 1000
Denominator	Total number of outpatient colonoscopies performed in the reporting period
Numerator	Those in the denominator admitted to a hospital for perforation within 7 days of colonoscopy
Inclusion Criteria	Denominator inclusions: • Individuals, age 18 and older who had at least one colonoscopy in the reporting period • Colonoscopy was identified in OHIP by fee codes Z555A, Z491A-Z499A • Outpatient colonoscopies only, defined by linking OHIP claims to CIHI NACRS records Numerator inclusions: • Colonoscopy perforation was defined when a patient was admitted to hospital with T812, K631, K650, K658, K659, S36510, S36511, S36991 as one of the diagnosis codes, and associated with diagnosis type 1, 6, W, X, Y, or M within 7 days following the colonoscopy, AND with any of the following conditions: o Patients with a diagnosis code Y604 (unintentional cut, puncture, perforation or hemorrhage during endoscopic examination) o Patients with no other procedures done o Patients with procedures performed during the hospitalization that would likely be done to support perforation (e.g., surgery). The definition excludes patients with colorectal cancer undergoing surgery that could be used to treat colorectal cancer
Exclusion Criteria	Denominator exclusions: • Individuals with a missing or invalid HIN, date of birth • Individuals with a total colectomy before the colonoscopy date; total colectomy was identified in OHIP by fee codes S169A, S170A and S172A Numerator exclusions: • Patients with a second colonoscopy during admission • Patients with splenectomy, control of bleeding outside of the colon, cancer of GI tract

	• Patients with procedure codes suggesting hospital admission was for reasons other than to treat perforation
Data Sources	• OHIP's CHDB (Claims History Database): Colonoscopy claims • CIHI DAD/NACRS: Inpatient/outpatient colonoscopy and hospital location • CIHI DAD: Perforation-related hospital admissions and colorectal cancer diagnoses • OCR (Ontario Cancer Registry): Resolved invasive colorectal cancers • RPDB (Registered Persons Database): Demographics • PCCF+: Residence information
Data Availability and Limitations	• Emergency department visits and same-day surgeries are included in the same NACRS file used to identify inpatient or outpatient colonoscopies

5.4 Stage of colorectal cancer at diagnosis

Calculation	Incident cases with group stage 1, 2, 3 or 4 divided by the denominator, and multiply the result by 100
Denominator	Total number of patients diagnosed with colorectal cancer (ICD-O-3 topography codes C18-C20, C260) OCR inclusions (see Chapter 1)
Numerators	Number of colorectal cancer patients in denominator assigned group stage 1,2,3,4 or unknown.
Exclusion Criteria	Cases aged 18 and younger at diagnosis.
Data Sources	Ontario Cancer Registry (OCR)
Data Availability and Limitations	Case resolution may occasionally result in changes to stage at diagnosis based on new information. Stage at diagnosis is based on the data at the time of analysis.

5.5 Time from diagnosis of colorectal cancer to start of first treatment

Calculation	The time in days from the diagnosis date until the date of the first intervention, reported as a median, 10th percentile, 25th percentile, 75th percentile, and 90th percentile
Inclusion Criteria	• Includes colorectal cancer patients identified in the Colorectal Cancer Cohort (see Chapter 1) • Includes patients who received either surgery, radiation, or systemic therapy within 1 year after diagnosis
Surgery Treatment	• DAD or NACRS procedure codes Colon cancer: 1NK87DN,1NK87RE,1NM87DA,1NM87DE,1NM87DF,1NM87DN,1NM87DY,1NM87DX,1NM87GB,1NM87LA,1NM87PN,1NM87RD,1NM87RE,1NM87RN,1NM87TF,1NM87TG,1NM87WJ,1NM89DF,1NM89DX,1NM89GB,1NM89RN,1NM89TF,1NM89WJ,1NM91DE,1NM91DY,'1NM91DF,1NM91DN,1NM91DX,1NM91RD,1NM91RE,1NM91RN,1NM91TF,1NM91TG Rectal cancer: 1NQ89SFXXG,1NQ90LAXXG,1NQ89KZXXG,1NQ87CA,1NQ87DA,1NQ87DE,1NQ87DF,1NQ87LA,1NQ87PB,1NQ87PF,1NQ87RD,1NQ89GV,1NQ89KZ,1NQ89SF,1NQ89AB,1NQ89LH,1NQ89LHXXG,1NQ89RSXXG,1NQ87TF,1NQ89RS,1NQ87DX,1NQ87PN,1NQ87CAFA, excluding 1NQ87BA with extent = TM • Surgery was not abandoned • Surgery date within 1 year of diagnosis
Radiation Treatment	• ALR with total radiation treatment visits (R15) greater than or equal to 1 • Radiation applied to the pelvis • Radiation date within 1 year of diagnosis

Systemic Treatment	Systemic therapy from ALR, ODB, NDFP, DAD, or NACRS within 1 year of diagnosis
	• ALR
	  ○ ALR patient (case) who received oral or non-oral antineoplastic systemic treatment (S25 count greater than or equal to 1)
	  ○ Systemic therapy agent classified as anti-neoadjuvant
	• DAD or NACRS
	  ○ Intervention code 1ZZ35HAM0-9, 1ZZ35YAM0-9, or 1ZZ35CAM0-9
	• NDFP
	  ○ Policy for cervical cancer

	• ODB ○ Systemic agent classified as anti-neoadjuvant
Data Sources	• Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS) • Activity Level Reporting (ALR) • NDFP • ODB

5.6 Percentage of rectal cancer patients who received a pelvic MRI prior to first treatment

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Total number of patients diagnosed with cancer in calendar years 2015 -2019 that meet the following conditions: • Diagnosis of rectal cancer [ICD-O-3 site code C20.9]. • Were treated with rectal surgery, systemic therapy (chemotherapy, targeted therapy, immunotherapy), or radiation.
Numerator	Number of rectal cancer patients from denominator that received an MRI prior to first treatment. MRI can occur any time between diagnosis and first treatment. Pre-operative MRI billing codes in OHIP: • MRI -Pelvis: 'X461','X465'
Exclusion Criteria	Patients aged 18 and younger at diagnosis
Data Sources	Pathology Data Mart

5.7 Percentage of rectal cancer surgery resection reports with involved (positive) circumferential radial margins

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Patients who had a rectal cancer resection. Primary tumor site is one of the following: • Rectosigmoid • Rectum
Numerator	Number of rectal cancer resection reports with positive Radial/Mesenteric/Circumferential margins (margins involved by invasive carcinoma)
Exclusion Criteria	Excludes: • All non-cancer cases • Reports not received in discrete data field format (i.e. Narrative reports) • ICD-O-3 behaviors of 0 (benign), 1 (borderline), 6 (metastatic), and 2 (in situ). • Consults • All report types other than surgical pathology reports; (i.e., biopsies are excluded) • Reports from private labs and pediatric hospitals • Reports where margin involvement by invasive carcinoma is not identified or margin involvement cannot be accessed) • Reports that contain information on both colon and rectal resection
Data Sources	Pathology Data Mart

5.8 Percentage of colon cancer surgery reports with 12 or more nodes examined

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Patients that had colon cancer resection and information on removal of lymph nodes was specified, or no lymph nodes were submitted or found. Primary tumor site specified on pathology report is one of the following: • Cecum • Right (ascending) colon • Hepatic flexure • Transverse colon • Splenic flexure • Left (Descending) colon • Sigmoid colon • Colon, Not Otherwise Specified • Ileocecal valve
Numerator	Reports where field "Regional Lymph Nodes Examined" is stated with numeric value 12 or greater.
Exclusion Criteria	Excludes: • All non-cancer cases • Reports not received in discrete data field format (i.e. Narrative reports) • ICDO-3 behaviors of 0 (benign), 1 (borderline), 6 (metastatic), and 2 (in situ). • Consults • All report types other than surgical pathology reports; (i.e. Biopsies are excluded) • Reports from private labs and pediatric hospitals • Reports that have both colon and rectum locations marked. • Reports where no tumor site is specified; • Reports where no information on lymph nodes was specified • Reports that contain information on both colon and rectal resection
Data Sources	Pathology Data Mart

5.9 Unplanned ED visits or readmissions after colorectal cancer surgery

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of colorectal cancer patients diagnosed in the reporting period who received surgery
Numerator	Those in the denominator who had an unscheduled emergency department visit or a hospital admission within 30 days of discharge after surgery
Inclusion Criteria	• Includes colorectal cancer patients identified in the Cervical Cancer Cohort (see Chapter 1) • Includes patients who received surgery within 1 year after diagnosis
Surgery Treatment	• DAD or NACRS procedure codes Colon cancer: 1NK87DN,1NK87RE,1NM87DA,1NM87DE,1NM87DF,1NM87DN,1NM87DY,1NM87DX,1NM87GB,1NM87LA,1NM87PN,1NM87RD,1NM87RE,1NM87RN,1NM87TF,1NM87TG,1NM87WJ,1NM89DF,1NM89DX,1NM89GB,1NM89RN,1NM89TF,1NM89WJ,1NM91DE,1NM91DY,'1NM91DF,1NM91DN,1NM91DX,1NM91RD,1NM91RE,1NM91RN,1NM91TF,1NM91TG Rectal cancer: 1NQ89SFXXG,1NQ90LAXXG,1NQ89KZXXG,1NQ87CA,1NQ87DA,1NQ87DE,1NQ87DF,1NQ87LA,1NQ87PB,1NQ87PF,1NQ87RD,1NQ89GV,1NQ89KZ,1NQ89SF,1NQ89AB,1NQ89LH,1NQ89LHXXG,1NQ89RSXXG,1NQ87TF,1NQ89RS,1NQ87DX,1NQ87PN,1NQ87CAFA, excluding 1NQ87BA with extent = TM • Surgery was not abandoned • Surgery date within 1 year of diagnosis
Unscheduled ED Visit	Unscheduled emergency department visit from NACRS • Registration date is within 30 days of the date of discharge from surgery, inclusive • Excludes planned ED visits (ED visit indicator = 1 or Scheduled ED visit indicator = N) • Visit MIS functional centre starts with 7*310 • Excludes patients who registered in the ED but left before being seen (visit disposition not equal to 02)
Hospital Admission	Hospital readmissions from DAD • Admission date is within 30 days of the date of discharge from surgery, inclusive

	• Readmission was not planned: readmit code not equal to 1
Data Sources	• Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS)

5.10 Percentage of patients who received follow-up colonoscopy within 18 months of initial colorectal cancer surgery

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of colorectal cancer patients who became survivors in the reporting period and had initial surgery
Numerator	Those in the denominator who had a surveillance colonoscopy within 18 months from initial surgery

Inclusion Criteria	Denominator inclusions:
	• Patients with a colorectal cancer diagnosis (SEER Recodes 21041, 21043, 21044, 21045, 21046 21047, 21048, 21049, 21051):
	  o ICDO-3 site: C18, C19, C20, C260
	  o Exclude: Appendix (C181), Anus, Anal canal and Anorectum (C210 – C212, C218)
	  o ICD-O-3 histology not in (8240, 8241, 8242, 8243, 8245, 8246, 8249, 8150, 8152, 8153, 8154, 8155, 8156, 8157)
	• Patients who underwent initial surgery, and who completed treatment (systemic, radiation, and surgery) in the reporting timeframe (Refer to Summary of Treatment Definitions below for more details)

Exclusion Criteria	Denominator exclusions: • Patients whose most recent cancer diagnosis was prior to April 1, 2006 • Patients who were diagnosed with a new primary cancer during the follow-up period • Patients who restarted treatment (systemic, radiation or surgery) in the follow-up years (Refer to Systemic Treatment, Radiation Treatment and Surgery sections below for more details) • Patients with stage 0, 1 and 4 cancer, and those with an unknown stage

Surgery Treatment	• Surgery treatment visits were extracted from the OHIP data.
	• Procedures in OHIP were considered a cancer surgery treatment if the patient had a confirmed colorectal cancer diagnosis in the OCR and the fee code contained any of the following:
	  o **Colon:** S162, S166, S167, S168, S169, S170, S171, S172, S177, S188, S195, S213, S214, S215, S216, S217, S249, Z765
	  o **Rectum:** S213, S214, S215, S216, S217, S167, S171, S177, S249
	  o Note: Surgical procedures specific to the rectum overlap completely with the colon-specific procedures.
	• The OHIP service date was considered the treatment date.
	• Only records where the OHIP service date occurred within one year of the patients' diagnosis date (i.e., from Day 0 or diagnosis date to Day 365) are considered definitive cancer surgeries as part of

	initial treatment. Subsequent surgical treatments which may indicate recurrence would not include this restriction.
Radiation Treatment	• Radiation treatment visits were extracted from the ALR. • A visit is defined as a unique combination of a patient HCN, facility number, and visit date. • The most recent records in the ALR containing a flag for radiation treatment visits (R15) greater than or equal to 1 were included. Only treatment records flagged as valid and for a treatment activity where the patient was present were included.
Systemic Treatment	• Systemic treatment visits were extracted from ALR, DAD and NACRS. • A visit is defined as a unique combination of a patient HCN, facility number, and visit date. • In ALR, the most recent records containing an antineoplastic systemic treatment flag for oral or non-oral treatment (S25_CNT≥1) were considered treatment activity records. Additionally, only activity records where the drug used was considered chemotherapy, immunotherapy, or targeted therapy were included. (Drug list available upon request). • In NACRS and DAD, the records where the intervention fields contain total body antineoplastic pharmacotherapy CCI codes were included. • For both DAD and NACRS, CCI procedure codes that identified total pharmacotherapy performed using immunostimulant or immunosuppressive agents were not considered systemic treatment activity. Additionally, records that contained flags for cancelled interventions due to contraindication and for Bacillus Calmette-Guérin (BCG) instillations (i.e., treatment for benign tumours) were excluded. • In the DAD, all dates from the admission to the discharge date are considered treatment dates. • In NACRS, the registration date is a proxy for the treatment date.
Colonoscopy	Colonoscopies were identified using OHIP physician claims, and were defined using the following fee codes • E630: Endoscopic placement of stent in colon-add • E685: Intestinesendo total excis greater than 3cm sessile polyps • E687: Digest.syst. Exc.of obstruct.tumour w laser debulking..add • E705: Digest.syst.intest.endosc.into terminal ileumadd. • E717: Intestine -endosc-colonoscopy-biopsy/coagul • E740: Intestine end sigmoid to hepatic flexure add • E747: Intestine-endoscopy-sigmoid.to caecum add to z512/z555 • E749: Digest syst.-when z512555580 performed out hosp....add • E785: Multiple screening biopsies more than 34 • Z494: Hereditary or other bowel disorders assoc w. incr risk malig

	• Z496: Presence of signs or symptoms - sigmoid to descending colon • Z497: Confirmatory colonoscopy - sigmoid to descending colon • Z498: Surveillance colonoscopy - sigmoid to descending colon • Z499: Colonoscopy - absence of signs or symptoms family history • Z513: Intestines-colonoscope-hydrostatic-pneumat. Dialat colonstri • Z555: Intestines-endoscopy-colonoscopy into descending colon • Z570: Intestines-excision-fulguration of polyps thro.colonoscope • Z571: Intestines-exc.-polyps thro. Colonoscope
Data Sources	• Ontario Cancer Registry (OCR) • Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS) • Activity Level Reporting (ALR) • Ontario Health Insurance (OHIP) • Collaborative Staging Reporting Database • eClaims (NDFP)

6. Lung Cancer

6.1 6Stage of lung cancer at diagnosis

Calculation	Incident cases with group stage 1, 2, 3 or 4 divided by the denominator, and multiply the result by 100
Denominator	Total number of patients diagnosed with lung cancer (ICD-O-3 topography C34) with: Incident cases (incident case status = I) Malignant cases (behaviour code = 3) Confirmed cases (method of confirmation: 1 to 8 or 9 with pathology report)
Numerators	Number of lung cancer patients in denominator assigned group stage 1,2,3,4 or unknown
Exclusion Criteria	Patients aged 18 or younger at diagnosis
Data Sources	Ontario Cancer Registry (OCR)
Data Availability and Limitations	Case resolution may occasionally result in changes to stage at diagnosis based on new information. Stage at diagnosis is based on the data at the time of analysis.

6.2 Time from diagnosis of lung cancer to start of first treatment

Calculation	The time in days from the diagnosis date until the date of the first intervention, reported as a median, 10th percentile, 25th percentile, 75th percentile, and 90th percentile
Inclusion Criteria	Denominator inclusions: • Lung cancer patients identified in the Lung Cancer Cohort (see Chapter 1) • Patients who received either surgery, radiation, or systemic therapy within 1 year after diagnosis
Surgery Treatment	• DAD or NACRS procedure codes 1GM87DA, 1GM87LA, 1GR87DA, 1GR87NW, 1GR87QB, 1GT87DA, 1GT87NW, 1GT87QB, 1GN92LA, 1GR91NW, 1GR91NWXXA, 1GR91NWXXF, 1GR91NWXXG, 1GR91NWXXL, 1GR91NWXXN, 1GR91NWXXQ, 1GR91QB, 1GR91QBXXA, 1GR91QBXXF, 1GR91QBXXG, 1GR91QBXXN, 1GR91QBXXQ, 1GT91NW, 1GT91NWXXF, 1GT91NWXXG, 1GT91NWXXN, 1GT91NWXXQ, 1GT91QB, 1GT91QBXXF, 1GT91QBXXG, 1GT91QBXXN, 1GT91QBXXQ, 1GR89DA, 1GR89NW, 1GR89QB, 1GT89DA, 1GT89NW, 1GT89QB • Surgery was not abandoned • Surgery date within 1 year of diagnosis • Responsibility for payment = Ontario (01) • Province issuing health card number = Ontario
Radiation Treatment	• ALR with total radiation treatment visits (R15) greater than or equal to 1 • Radiation applied to the chest • Radiation date within 1 year of diagnosis
Systemic Treatment	Systemic therapy from ALR, ODB, NDFP, DAD, or NACRS within 1 year of diagnosis ALR • ALR with oral or non-oral antineoplastic systemic therapy treatment (S25 count greater than or equal to 1) • Systemic therapy agent classified as anti-neoadjuvant DAD or NACRS • Intervention code 1ZZ35HAM0-9, 1ZZ35YAM0-9, or 1ZZ35CAM0-9 • Responsibility for payment = Ontario (01) • Province issuing health card number = Ontario NDFP • Policy for lung cancer

	ODB • Systemic agent classified as anti-neoadjuvant
Data Sources	• Ontario Cancer Registry (OCR) • Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS) • Activity Level Reporting (ALR) • NDFP • ODB

6.3 Percentage of non-small cell lung cancer patients who had a PET-CT scan prior to radical treatment

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of non-small cell lung cancer patients diagnosed in the reporting period who received radical treatment
Numerator	Those in the denominator who received a PET-CT scan within 3 months prior to starting radical treatment, inclusive
Inclusion Criteria	Denominator inclusions: • Lung cancer patients identified in the Lung Cancer Cohort (see Chapter 1)

Exclusion Criteria	Denominator exclusions:
	• Patients with small cell lung cancer (8002, 8041-8045)
	• Patients with stage 4 lung cancer
	• Patients who received radical treatment
	  o Treatment started with surgery; or
	  o Treatment started with non-palliative-intent chemotherapy or radiation

Surgery Treatment	• DAD or NACRS procedure codes 1GM87DA, 1GM87LA, 1GR87DA, 1GR87NW, 1GR87QB, 1GT87DA, 1GT87NW, 1GT87QB, 1GN92LA, 1GR91NW, 1GR91NWXXA, 1GR91NWXXF, 1GR91NWXXG, 1GR91NWXXL, 1GR91NWXXN, 1GR91NWXXQ, 1GR91QB, 1GR91QBXXA, 1GR91QBXXF, 1GR91QBXXG, 1GR91QBXXN, 1GR91QBXXQ, 1GT91NW, 1GT91NWXXF, 1GT91NWXXG, 1GT91NWXXN, 1GT91NWXXQ, 1GT91QB, 1GT91QBXXF, 1GT91QBXXG, 1GT91QBXXN, 1GT91QBXXQ, 1GR89DA, 1GR89NW, 1GR89QB, 1GT89DA, 1GT89NW, 1GT89QB • Surgery was not abandoned • Surgery date within 1 year of diagnosis
Radiation Treatment	• ALR with total radiation treatment visits (R15) greater than or equal to 1 • Radiation applied to the chest • Radiation date within 1 year of diagnosis • Intent was not palliative

Systemic Treatment	• ALR with oral or non-oral systemic treatment (S25 count greater than or equal to 1) • Systemic therapy agent classified as anti-neoadjuvant • Intent was not palliative
PET-CT	• OHIP billing codes J700, J706, J709 • PET Registry (includes Registry, Access, and Insurance datasets)
Data Sources	• Ontario Cancer Registry (OCR) • Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS) • Activity Level Reporting (ALR) • Ontario Health Insurance (OHIP) • PET Registry (includes Registry, Access, and Insurance datasets)
Data Availability and Limitations	• Staging information for 2019 was incomplete

6.4 Percentage of new ambulatory lung cancer patients who were screened for tobacco use

Calculation	Divide the numerator by the denominator and multiply the result by 100.
Denominator	Total number of new ambulatory cancer cases in the reporting period.
Numerator	Those in the denominator who were screened for tobacco use.
Inclusion Criteria	• Data undergoes general quality assurance checks by the Informatics team as outlined in the Master List of QA checks in the online Databook guide. • Both the numerator and denominator are subject to restrictions as determined through consultation between Ontario Health (Cancer Care Ontario), the Smoking Cessation Advisory Committee and the RCC Smoking Cessation Champions.
Exclusion Criteria	• Data are limited to cases that have a confirmed cancer or benign diagnosis (ICD C000–D489). • Additional primaries for the same patient within 12 months of the initial primary and tobacco screening that occurred more than 60 days after the patients' first visit to the cancer centre were excluded. • Tobacco screening that occurred at a non-RCC site (satellite site), and clinic visits flagged as inpatient visits were excluded.
Data Sources	• Data Holding Area (Production environment)
Data Availability and Limitations	• The data available is representative of smoking cessation activities that RCC staff document and their IT team is able to submit through ALR. Data collection and submission may be affected by issues in staff training, compliance with recording smoking cessation activity or IT limitations at specific RCCs.

6.5 Percentage of stage 1 non-small cell lung cancer (NSCLC) patients who received a brain MRI prior to treatment

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of non-small cell lung cancer patients diagnosed in the reporting period who received radical treatment
Numerator	Those in the denominator who received a brain MRI scan within 2 months prior to starting treatment, inclusive
Inclusion Criteria	Denominator inclusions: • Lung cancer patients identified in the Lung Cancer Cohort (see Chapter 1) • Patients received treatment with any combination of surgery, systemic therapy, or radiation within 1 year of diagnosis • Stage 1
Exclusion Criteria	Denominator exclusions: • Patients with small cell lung cancer (ICD-O 8002, 8041-8045)
Surgery Treatment	• DAD or NACRS procedure codes 1GM87DA, 1GM87LA, 1GR87DA, 1GR87NW, 1GR87QB, 1GT87DA, 1GT87NW, 1GT87QB, 1GN92LA, 1GR91NW, 1GR91NWXXA, 1GR91NWXXF, 1GR91NWXXG, 1GR91NWXXL, 1GR91NWXXN, 1GR91NWXXQ, 1GR91QB, 1GR91QBXXA, 1GR91QBXXF, 1GR91QBXXG, 1GR91QBXXN, 1GR91QBXXQ, 1GT91NW, 1GT91NWXXF, 1GT91NWXXG, 1GT91NWXXN, 1GT91NWXXQ, 1GT91QB, 1GT91QBXXF, 1GT91QBXXG, 1GT91QBXXN, 1GT91QBXXQ, 1GR89DA, 1GR89NW, 1GR89QB, 1GT89DA, 1GT89NW, 1GT89QB • Surgery was not abandoned • Surgery date within 1 year of diagnosis • Responsibility for payment = Ontario (01) • Province issuing health card number = Ontario
Radiation Treatment	• ALR with total radiation treatment visits (R15) greater than or equal to 1 • Radiation applied to the chest • Radiation date within 1 year of diagnosis
Systemic Treatment	Systemic therapy from ALR, ODB, NDFP, DAD, or NACRS within 1 year of diagnosis ALR • ALR with oral or non-oral antineoplastic systemic therapy treatment (S25 count greater than or equal to 1) • Systemic therapy agent classified as anti-neoadjuvant

	DAD or NACRS • Intervention code 1ZZ35HAM0-9, 1ZZ35YAM0-9, or 1ZZ35CAM0-9 • Responsibility for payment = Ontario (01) • Province issuing health card number = Ontario NDFP • Policy for lung cancer ODB Systemic agent classified as anti-neoadjuvant
Brain MRI	• OHIP billing codes X421 (head MRI, multislice sequence) or X425 (head MRI, repeat) • DAD and NACRS CCI codes 3AN40 (MRI, brain) or 3ER40 (MRI, head)
Data Sources	• Ontario Cancer Registry (OCR) • Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS) • Activity Level Reporting (ALR) • Ontario Health Insurance (OHIP) • Ontario Drug Benefits (ODB) • New Drug Funding Database (NDFP)
Data Availability and Limitations	• Staging information for 2019 was incomplete

6.6 Percentage of stage 1 lung cancer patients who had surgery or stereotactic ablative radiotherapy (SABR) within 180 days of diagnosis

Calculation 1	Divide the numerator by the denominator, and multiply the result by 100
Calculation 2	The average time in days from the diagnosis date until surgery or SABR, reported as a median, 25th percentile, 75th percentile, and 90th percentile
Denominator	• The number of stage 1 lung cancer patients diagnosed in the reporting period
Numerator 1	Those in the denominator who received surgery within 180 days of diagnosis
Numerator 2	Those in the denominator who received stereotactic ablative radiotherapy (SABR) within 180 days of diagnosis
Inclusion Criteria	Denominator inclusions: • Lung cancer patients identified in the Incident Lung Cancer Cohort • stage 1 only
Exclusion Criteria	Denominator exclusions: • Patients diagnosed in 2019 due to incomplete staging
Surgery Treatment	• DAD or NACRS procedure codes 1GM87DA, 1GM87LA, 1GR87DA, 1GR87NW, 1GR87QB, 1GT87DA, 1GT87NW, 1GT87QB, 1GN92LA, 1GR91NW, 1GR91NWXXA, 1GR91NWXXF, 1GR91NWXXG, 1GR91NWXXL, 1GR91NWXXN, 1GR91NWXXQ, 1GR91QB, 1GR91QBXXA, 1GR91QBXXF, 1GR91QBXXG, 1GR91QBXXN, 1GR91QBXXQ, 1GT91NW, 1GT91NWXXF, 1GT91NWXXG, 1GT91NWXXN, 1GT91NWXXQ, 1GT91QB, 1GT91QBXXF, 1GT91QBXXG, 1GT91QBXXN, 1GT91QBXXQ, 1GR89DA, 1GR89NW, 1GR89QB, 1GT89DA, 1GT89NW, 1GT89QB • Surgery was not abandoned • Surgery date within 1 year of diagnosis

Radiation Treatment	• ALR with total radiation treatment visits (R15) greater than or equal to 1 • Radiation applied to the chest • Radiation date within 1 year of diagnosis
Data Sources	• Ontario Cancer Registry (OCR) • Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS) • Activity Level Reporting (ALR)

6.7 Percentage of stage 1 lung cancer patients who received a thoracic surgery consultation before starting stereotactic ablative radiotherapy (SABR)

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Total number of stage 1 lung cancer patients diagnosed in the reporting period who received SABR
Numerator	Those in the denominator who received a consultation or visit with a thoracic surgeon before starting SABR
Inclusion Criteria	Denominator inclusions: • Includes lung cancer patients identified in the Lung Cancer Cohort (see Chapter 1) • Includes only stage 1
Exclusion Criteria	Denominator exclusions: • Excludes patients diagnosed in 2019 due to incomplete staging
Radiation Therapy	• ALR with total radiation treatment visits (R15) greater than or equal to 1 • Radiation applied to the chest • Radiation date within 1 year of diagnosis • Technique = 'stereotactic'

Thoracic Surgery Consultation	Thoracic surgery consultation within 6 months before the SABR start date, inclusive
	• OHIP billing codes for consultation or visit with a general thoracic surgeon include
	  o A645, A646, A643, A644, C645, C646, C643, C644, W645, or W646; or
	  o C935 or A935 with health service provider specialty code 64 (general thoracic surgeon)
	• ALR clinic visits with a health care provider specialty of 'Thoracic surgery'

Data Sources	ALR OHIP

6.8 Unplanned emergency department visits or readmissions after lung cancer surgery

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of lung cancer patients diagnosed in the reporting period who received surgery
Numerator	Those in the denominator who had an unscheduled emergency department visit or a hospital admission within 30 days of discharge after surgery
Inclusion Criteria	Denominator inclusions: • Includes lung cancer patients identified in the Lung Cancer Cohort (see Chapter 1) • Includes patients who received surgery within 1 year after diagnosis
Surgery Treatment	• DAD or NACRS procedure codes 1GM87DA, 1GM87LA, 1GR87DA, 1GR87NW, 1GR87QB, 1GT87DA, 1GT87NW, 1GT87QB, 1GN92LA, 1GR91NW, 1GR91NWXXA, 1GR91NWXXF, 1GR91NWXXG, 1GR91NWXXL, 1GR91NWXXN, 1GR91NWXXQ, 1GR91QB, 1GR91QBXXA, 1GR91QBXXF, 1GR91QBXXG, 1GR91QBXXN, 1GR91QBXXQ, 1GT91NW, 1GT91NWXXF, 1GT91NWXXG, 1GT91NWXXN, 1GT91NWXXQ, 1GT91QB, 1GT91QBXXF, 1GT91QBXXG, 1GT91QBXXN, 1GT91QBXXQ, 1GR89DA, 1GR89NW, 1GR89QB, 1GT89DA, 1GT89NW, 1GT89QB • Surgery was not abandoned • Surgery date within 1 year of diagnosis
Unscheduled Emergency Department Visit	From NACRS: • Registration date is within 30 days of the date of discharge from surgery, inclusive • Excludes planned ED visits (ED visit indicator = 1 or Scheduled ED visit indicator = N) • Visit MIS functional centre starts with 7*310 • Excludes patients who registered in the ED but left before being seen (visit disposition not equal to 02)
Hospital Readmission	Hospital readmissions from DAD • Admission date is within 30 days of the date of discharge from surgery, inclusive • Readmission was unplanned (readmit code not equal to 1)
Data Sources	• Ontario Cancer Registry (OCR) • Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS)
Data Availability and Limitations	• Most patients only had one lung resection surgery

6.9 630- and 90-day post-surgery mortality for lung cancer patients

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	The number of stage 1 lung cancer patients diagnosed in the reporting period who received surgery
Numerator	Those in the denominator who died within 30 days or 90 days of the surgery date
Inclusion Criteria	Denominator inclusions: • Lung cancer patients identified in the Lung Cancer Cohort (see Chapter 1) • Patients who received lung resection surgery within 1 year of diagnosis
Surgery Treatment	• DAD or NACRS procedure codes 1GM87DA, 1GM87LA, 1GR87DA, 1GR87NW, 1GR87QB, 1GT87DA, 1GT87NW, 1GT87QB, 1GN92LA, 1GR91NW, 1GR91NWXXA, 1GR91NWXXF, 1GR91NWXXG, 1GR91NWXXL, 1GR91NWXXN, 1GR91NWXXQ, 1GR91QB, 1GR91QBXXA, 1GR91QBXXF, 1GR91QBXXG, 1GR91QBXXN, 1GR91QBXXQ, 1GT91NW, 1GT91NWXXF, 1GT91NWXXG, 1GT91NWXXN, 1GT91NWXXQ, 1GT91QB, 1GT91QBXXF, 1GT91QBXXG, 1GT91QBXXN, 1GT91QBXXQ, 1GR89DA, 1GR89NW, 1GR89QB, 1GT89DA, 1GT89NW, 1GT89QB • Surgery was not abandoned • Surgery date within 1 year of diagnosis • Responsibility for payment = Ontario (01) • Province issuing health card number = Ontario
Death	• The date of death from the Ontario Cancer Registry was supplemented with the date of death from the Registered Persons Database
Data Sources	• Ontario Cancer Registry (OCR) • Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS) • Registered Persons Database (RPDB)
Data Availability and Limitations	• A patient could have had multiple surgeries

6.10 Percentage of stage 2 non-small cell lung cancer (NSCLC) patients who received a post-surgery medical oncology consultation

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Total number of stage 2 lung cancer patients diagnosed in the reporting period who received lung resective surgery
Numerator	Those in the denominator who received a consultation or visit with a medical oncologist within 3 months after surgery
Inclusions	Denominator inclusions: • Includes lung cancer patients identified in the Lung Cancer Cohort (see Chapter 1) • Includes only stage 2
Exclusions	Denominator exclusions: • Excludes patients diagnosed in 2019 due to incomplete staging • Excludes patients with small cell lung cancer (8002, 8041-8045)
Surgery	DAD or NACRS • Procedure codes (CCI): 1GM87DA, 1GM87LA, 1GR87DA, 1GR87NW, 1GR87QB, 1GT87DA, 1GT87NW, 1GT87QB, 1GN92LA, 1GR91NW, 1GR91NWXXA, 1GR91NWXXF, 1GR91NWXXG, 1GR91NWXXL, 1GR91NWXXN, 1GR91NWXXQ, 1GR91QB, 1GR91QBXXA, 1GR91QBXXF, 1GR91QBXXG, 1GR91QBXXN, 1GR91QBXXQ, 1GT91NW, 1GT91NWXXF, 1GT91NWXXG, 1GT91NWXXN, 1GT91NWXXQ, 1GT91QB, 1GT91QBXXF, 1GT91QBXXG, 1GT91QBXXN, 1GT91QBXXQ, 1GR89DA, 1GR89NW, 1GR89QB, 1GT89DA, 1GT89NW, 1GT89QB • Surgery was not abandoned • Surgery date within 1 year of diagnosis
Medical Oncology Consultation or Visit	ALR • Clinic visit with a health care provider specialty of "medical oncology" • C1S (initial consult) = 1 or C2S (follow-up visit) = 1 • Valid activity flag = 1 A441 Consultation and visits-Medical Oncology-Complex medical specific re-assessment

	A443 Consultation and visits-Medical Oncology-Medical specific assessment A444 Consultation and visits-Medical Oncology-Medical specific re-assessment A445 Consultation and visits- Medical Oncology-Consultation A446 Consultation and visits- Medical Oncology-Repeat consultation A448 Consultation and visits- Medical Oncology-Partial assessment A845 Consultation and visits- Medical Oncology-Limited consultation C441 Consultation and visits-Medical Oncology-Complex medical specific re-assessment C443 Consultation and visits-Medical Oncology-Medical specific assessment C444 Consultation and visits-Medical Oncology-Medical specific re-assessment C445 Consultation and visits- Medical Oncology-Consultation C446 Consultation and visits- Medical Oncology-Repeat consultation C845 Consultation and visits- Medical Oncology-Limited consultation W445 Consultation and visits- Medical Oncology-Consultation W446 Consultation and visits- Medical Oncology-Repeat consultation W765 Consultation and visits-Medical Oncology- Consultation, patient 16 years of age and under W845 Consultation and visits- Medical Oncology-Limited consultation
Data Sources	ALR DAD NACRS

6.11 Stage 3 non-small cell lung cancer (NSCLC) patients who received immunotherapy following chemoradiation

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Total number of stage 3 lung cancer patients diagnosed in the reporting period
Numerator	Those in the denominator who started immunotherapy after completing chemo-radiation
Inclusion Criteria	Denominator inclusions: • Lung cancer patients identified in the Lung Cancer Cohort (see Chapter 1) • Patients received both chemotherapy and radiation within 6 months of diagnosis • Stage 3 only
Exclusion Criteria	Denominator exclusions: • Patients with small cell lung cancer (8002, 8041-8045) • Patients who received surgery within 1 year of diagnosis • Patients diagnosed in 2019 due to incomplete staging
Surgery	• DAD or NACRS procedure codes 1GM87DA, 1GM87LA, 1GR87DA, 1GR87NW, 1GR87QB, 1GT87DA, 1GT87NW, 1GT87QB, 1GN92LA, 1GR91NW, 1GR91NWXXA, 1GR91NWXXF, 1GR91NWXXG, 1GR91NWXXL, 1GR91NWXXN, 1GR91NWXXQ, 1GR91QB, 1GR91QBXXA, 1GR91QBXXF, 1GR91QBXXG, 1GR91QBXXN, 1GR91QBXXQ, 1GT91NW, 1GT91NWXXF, 1GT91NWXXG, 1GT91NWXXN, 1GT91NWXXQ, 1GT91QB, 1GT91QBXXF, 1GT91QBXXG, 1GT91QBXXN, 1GT91QBXXQ, 1GR89DA, 1GR89NW, 1GR89QB, 1GT89DA, 1GT89NW, 1GT89QB • Surgery was not abandoned • Surgery date within 1 year of diagnosis
Radiation Therapy	• ALR with total radiation treatment visits (R15) greater than or equal to 1 • Radiation applied to the chest • Radiation date within 6 months of diagnosis • Radiation treatments occurring after a gap of 7 consecutive days were omitted to ascertain the date radiation therapy ended
Chemotherapy	Chemotherapy from ALR, ODB, or NDFP within 6 months of diagnosis ALR • ALR with oral or non-oral antineoplastic systemic therapy treatment (S25 count greater than or equal to 1)

	• Chemotherapy agent classified as anti-neoadjuvant NDFP • Policy for lung cancer, including vinorelbine, docetaxel, gemcitabine, paclitaxel, or pemetrexed ODB • Chemotherapy agent classified as anti-neoadjuvant • Chemotherapy treatments occurring after a gap of 30 consecutive days were omitted to ascertain the date chemotherapy ended
Immunotherapy	Immunotherapy from ALR, ODB, or NDFP ALR • ALR with S25 count greater than or equal to 1 • Immunotherapy agent classified as anti-neoadjuvant NDFP • Policy for lung cancer, including pembrolizumab, nivolumab, durvalumab, atezolizumab ODB • Immunotherapy agent classified as anti-neoadjuvant • Chemotherapy treatments occurring after a gap of 30 consecutive days were omitted to ascertain the date chemotherapy ended
Data Sources	ALR DAD NACRS NDFP ODB

6.12 Limited stage small cell lung cancer (SCLC) patients who received chemoradiation

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Total number of limited stage small-cell lung cancer patients diagnosed in the reporting period
Numerator	Those in the denominator who received immunotherapy after completing chemo-radiation
Inclusion Criteria	Denominator inclusions: • lung cancer patients identified in the Lung Cancer Cohort (see Chapter 1) • stages 1-3 • patients with small cell lung cancer (ICD-O 8002, 8041-8045)
Exclusion Criteria	Denominator exclusions: • patients diagnosed in 2019 due to incomplete staging • patients who received palliative-intent chemotherapy or radiation therapy
Radiation Therapy	• ALR with total radiation treatment visits (R15) greater than or equal to 1 • Radiation applied to the chest • Radiation date within 1 year of diagnosis • Radiation treatments occurring after a gap of 7 consecutive days were omitted to ascertain the number of radiation treatment visits • Patients who received 1 or 2 fractions were excluded because these were likely palliative
Chemotherapy	from ALR • ALR with S25 count greater than or equal to 1 • Chemotherapy included cisplatin or carboplatin • Treatment visit was within 1 year of diagnosis
Data Sources	ALR DAD NACRS

7. Prostate Cancer

7.1 Stage of cancer at diagnosis

Calculation	Incident cases with group stage 1, 2, 3 or 4 divided by the denominator, and multiply the result by 100
Denominator	Total number of patients diagnosed with prostate cancer (ICD-O-3 topography C61.9) with: Incident cases (incident case status = I) Malignant cases (behaviour code = 3) Confirmed cases (method of confirmation: 1 to 8 or 9 with pathology report)
Numerators	Number of prostate cancer patients in denominator assigned group stage 1,2,3,4 or unknown.
Exclusion Criteria	Patients aged 18 and younger at diagnosis.
Data Sources	Ontario Cancer Registry (OCR)
Data Availability and Limitations	Case resolution may occasionally result in changes to stage at diagnosis based on new information. Stage at diagnosis is based on the data at the time of analysis.

7

7.2 Time from prostate cancer diagnosis to start of first treatment

Calculation	The time in days from the diagnosis date until the date of the first intervention, reported as a median, 10th percentile, 25th percentile, 75th percentile, and 90th percentile
Inclusion Criteria	• Includes prostate cancer patients identified in the Prostate Cancer Cohort (see Chapter 1) • Includes patients who received either surgery, radiation, or systemic therapy within 1 year after diagnosis
Surgery	• DAD or NACRS procedure codes 1QT91PB, 1QT91PK, and 1QT91DA • Surgery was not abandoned or performed outside of submitting hospital • Surgery date within 1 year of diagnosis
Radiation Therapy	• ALR records with total radiation treatment visits (R15) greater than or equal to 1 • Radiation applied to the prostate, bilateral pelvis, right pelvis, or left pelvis • Radiation date within 1 year of diagnosis
Systemic Therapy	Systemic therapy from ALR, ODB, NDFP, DAD, or NACRS within 1 year of diagnosis ALR • Records with oral or non-oral antineoplastic systemic therapy treatment (S25 count greater than or equal to 1) • Systemic therapy agent classified as hormonal therapy, targeted therapy, immunotherapy, or chemotherapy • Methodology key = 4 (most recently submitted record to account for data resubmissions) • Patient present status = yes DAD or NACRS • Included records of total body pharmacotherapy using antineoplastic and immunomodulating agents (subset of the CCI procedure code 1ZZ35). Intervention codes 1ZZ35HAM0-9, 1ZZ35YAM0-9, or 1ZZ35CAM0-9 were used. • Province issuing health card number = Ontario NDFP • Policy for prostate cancer ODB • Systemic agent classified as hormonal therapy, targeted therapy, immunotherapy, or chemotherapy

Data Sources	ALR DAD NACRS NDFP ODB
Data Availability and Limitations	Intervention codes for DAD and NACRS do not have the granularity to distinguish the type of systemic treatment (i.e., chemotherapy, immunotherapy, hormonal, or targeted) a patient received.

7.3 Percentage of low-risk prostate cancer patients who received a bone scan

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Number of low-risk prostate cancer patients
Numerator	Those in the denominator who received a nuclear bone scan within 180 days (about 6 months) after diagnosis
Inclusion Criteria	• Prostate cancer cohort (see Chapter 1) with low-risk disease • Included cases with positive histology or positive microscopic confirmation
Exclusion Criteria	• Patients recorded as metastatic in the diagnostic phase
Low-Risk Prostate Cancer Case	To be classified as a low-risk prostate cancer, all the following criteria must be met: • PSA < 10 ng/mL • Gleason Score ≤ 6

Nuclear Bone Scan	• OHIP fee codes
	  o J850: bone scintigraphy (general survey)
	• CCI procedure codes (DAD/NACRS)
	  o 3WZ70CA: Diagnostic nuclear (imaging) study, musculoskeletal system NEC, using scintigraphy
	  o 3WZ70CC: Diagnostic nuclear (imaging) study, musculoskeletal system NEC, using SPEC tomography (SPECT)
	  o 3WZ70CH: Diagnostic nuclear (imaging) study, musculoskeletal system NEC, using SPEC tomography (SPECT) with CT hybrid technique (single machine)
	  o 3WZ70CG: Diagnostic nuclear (imaging) study, musculoskeletal system NEC, using dual energy (x-ray) absorptiometry

Data Sources	• Ontario Cancer Registry (OCR) • Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS) • Ontario Health Insurance (OHIP) • Collaborative Staging Reporting Database

Data Availability and Limitations	Staging for cases diagnosed in 2019 is currently incomplete in the OCR. As a result, the indicator currently focuses on prostate cancer cases diagnosed in 2014 to 2018. Even with the staging process completed, high volumes of unknown or invalid codes for PSA value and Biopsy Gleason Score is expected. A risk category will not be assigned to a prostate cancer case if the Gleason score, PSA value or both is unknown or invalid. As a result, the number of low-risk prostate cancer cases newly diagnosed in 2014 to 2018 may be underestimated.

7.4 Unplanned emergency department visits or readmissions after prostate cancer surgery

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Total number of prostate cancer patients diagnosed between 2014 and 2019 who received surgery
Numerator	Those in the denominator who had an unscheduled emergency department visit or a hospital admission within 30 days of discharge after surgery
Inclusion Criteria	• Prostate cancer patients identified in the Prostate Cancer Cohort (see Chapter 1) • Patients who received surgery within 1 year after diagnosis
Surgery	• DAD or NACRS procedure codes 1QT91PB, 1QT91PK, and 1QT91DA • Surgery was not abandoned or performed outside of submitting hospital • Surgery date within 1 year of diagnosis • Province issuing health card number = Ontario • First surgery in the diagnosis year was used in the analysis
Unscheduled Emergency Department Visit	from NACRS • Registration date is within 30 days of the date of discharge from surgery, inclusive • Excludes planned ED visits (ED visit indicator = 1 or Scheduled ED visit indicator = N) • Visit MIS functional centre starts with 7*310 • Excludes patients who registered in the ED but left before being seen (visit disposition not equal to 02)
Hospital Readmissions	from DAD • Admission date is within 30 days of the date of discharge from surgery, inclusive • Readmission was unplanned (readmit code not equal to 1)
Data Sources	DAD NACRS

7.5 Percentage of low-risk prostate cancer patients who received no treatment

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Number of low-risk prostate cancer cases (aged ≥ 35) newly diagnosed in the reporting period
Numerator	Those in the denominator with no record of treatment
Inclusion Criteria	• Prostate cancer cohort (see Chapter 1) with low-risk disease • Included cases with positive histology or positive microscopic confirmation • Males, age at diagnosis ≥ 35
Exclusion Criteria	• M1 cases (metastatic during the diagnostic phase) • Cases with invalid PSA values or Biopsy Gleason Score
Low-Risk Prostate Cancer Case	To be classified as a low-risk prostate cancer, all the following criteria must be met: • PSA < 10 ng/mL • Gleason Score ≤ 6
Treatment	Treatment is defined as • Radical prostatectomy and/or • Radiation therapy.
Radical Prostatectomy	• Surgical treatments that occurred within one year of the patient's diagnosis date were included. • Procedure codes used to define radical prostatectomy in OHIP, DAD, and NACRS are available below. o CCI procedure codes (DAD/NACRS) ▪ 1QT91: Excision radical, prostate o OHIP fee codes ▪ S645: perineal prostatectomy ▪ S646: prostatectomy, perineal with vesiculectomy ▪ S651: retropubic prostatectomy (radical, with or without removal of bladder stones) ▪ S653: laparoscopic radical prostatectomy
Radiation Treatment	• Radiation therapy visits with curative or palliative intent that occurred within one year of diagnosis were included. • Body region of treatment was restricted to prostate, bilateral pelvis, left pelvis, or right pelvis.

Data Sources	• Ontario Cancer Registry (OCR) • Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS) • Activity Level Reporting (ALR) • Ontario Health Insurance (OHIP) • Collaborative Staging Reporting Database
Data Availability and Limitations	Staging for cases diagnosed in 2019 is currently incomplete in the OCR. As a result, the indicator currently focuses on prostate cancer cases diagnosed in 2014 to 2018. Even with the staging process completed, high volumes of unknown or invalid codes for PSA value and Biopsy Gleason Score is expected. A risk category will not be assigned to a prostate cancer case if the Gleason score, PSA value or both is unknown or invalid. As a result, the number of low-risk prostate cancer cases (aged ≥ 35) newly diagnosed in 2014 to 2018 may be underestimated.

7.6 Positive margins following radical (or total) prostatectomy: pT2 and pT3

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Total number of reports with pT2 prostatectomy: • Primary tumour was marked as *pT2, pT2a, pT2b,* or *pT2c*. Total number of reports with pT3 prostatectomy: • Primary tumour was marked as *pT3, pT3a,* or *pT3b*.
Numerator	Reports in the denominator with involved margins (i.e., "*Involved by invasive carcinoma*" is checked in the *Margin* section of pathology report)
Inclusion Criteria	Synoptic surgery pathology reports with pT2 or pT3 radical (or total) prostatectomy (refer to "Denominator description" for details)
Exclusion Criteria	• All non-cancer cases • Reports not received in discrete data field format (i.e., narrative reports) • All report types other than radical prostatectomy pathology reports (i.e., biopsies are excluded) • Reports from private labs and pediatric hospitals • Reports with pT4 primary tumor or primary tumor not identified • Reports where margin involvement by invasive carcinoma is not identified or margin involvement cannot be assessed • Cases younger than 18 years at the time of surgical intervention • Cases with missing, invalid, or non-unique OHIP number (OHIP number = 1, 8, 9, 0)
Data Sources	• Pathology Data Mart
Data Availability and Limitations	Data is obtained from Pathology Data Mart where the specimen taken date (surgery date) range was January 1, 2015 to December 31, 2019. There is a three-month lag time in data availability in Pathology Data Mart.

7.7 Percentage of high-risk prostate cancer patients receiving adjuvant androgen deprivation therapy (ADT) while undergoing radiotherapy

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Number of high-risk prostate cancer patients undergoing radiation therapy
Numerator	Those in the denominator who received adjuvant ADT while undergoing radiation therapy
Inclusion Criteria	• Prostate cancer cohort (see Chapter 1) with high-risk disease undergoing curative radiation therapy • Included cases with positive histology or positive microscopic confirmation
Exclusion Criteria	• Patients recorded as metastatic in the diagnostic phase
High-risk Prostate Cancer	To be classified as a high-risk prostate cancer, one of the following criteria must be met: • PSA > 20 ng/mL or • Gleason score ≥ 8
Radiation Treatment	• Radiation therapy visit dates were used to determine radiation course start and end dates. If the gap between sequential visits was greater than 14 days, then the more recent visit and subsequent visits were part of a new course. Only radiation therapy visits that within one year of diagnosis were included. • Body region of treatment was restricted to prostate, bilateral pelvis, left pelvis, or right pelvis. • Only radiation courses with a curative starting intent were included.

ADT	• Medical and surgical ADT was identified using data from the ALR, ODB, DAD, and NACRS.
	• Medical ADT includes luteinizing hormone-releasing hormone (LHRH) agonists and antagonists. Instances where the patient received medical ADT were identified in ALR and the ODB databases using drug identification numbers (DIN). DINs are available upon request.
	• Surgical ADT was defined as a bilateral orchiectomy. The following codes were used to identify this procedure in DAD, NACRS and OHIP.
	  o CCI procedure codes (DAD/NACRS)
	  ▪ 1QM89: Excision total, testis
	  ▪ 1QM91: Excision radiation, testis
	  o OHIP fee codes:
	  ▪ S598: radical orchidectomy for malignancy (unilateral)
	  ▪ S589: orchidectomy (unilateral)

Data Sources	• Ontario Cancer Registry (OCR) • Discharge Abstract Data (DAD)

	• National Ambulatory Care Reporting System (NACRS) • Activity Level Reporting (ALR) • Ontario Drug Benefit (ODB) database • Ontario Health Insurance (OHIP) • Collaborative Staging Reporting Database
Data Availability and Limitations	Staging for cases diagnosed in 2019 is currently incomplete in the OCR. As a result, the indicator currently focuses on prostate cancer cases diagnosed in 2014 to 2018. Even with the staging process completed, high volumes of unknown or invalid codes for PSA value and Biopsy Gleason Score is expected. A risk category will not be assigned to a prostate cancer case if the Gleason score, PSA value or both is unknown or invalid. As a result, the number of low-risk prostate cancer cases newly diagnosed in 2014 to 2018 may be underestimated. Only patients who received the ADT at a Regional Cancer Centre or partner site would be captured through the ALR. The ODB captures ADT for patients 65 years of age or older, residents of long-term care homes and homes for special care, as well as recipients of professional home services and social assistance, and Ontarians in the Trillium Drug Program. Patients who filled their ADT prescription outside of these settings would not be captured.

7.8 New metastatic castration-sensitive prostate cancer (mCSPC) patients who received ADT with concurrent androgen receptor axis-targeted therapies (ARAT)

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Number of mCSPC patients
Numerator	Those in the denominator who received ARAT with ADT
Inclusion Criteria	• Patients in the prostate cancer cohort (see Chapter 1) with metastatic castration-sensitive prostate cancer (mCSPC) • Included cases with positive histology or positive microscopic confirmation
Exclusion Criteria	• mCSPC patients who received radiation therapy and/or radical prostatectomy within one year of diagnosis
mCSPC	mCSPC patients were defined patients with clinical M1 stage who started androgen deprivation therapy (ADT) with luteinizing hormone-releasing hormone (LHRH) agonists/antagonists or had a bilateral orchiectomy ≤120 days (4 months) after diagnosis and did not have radiation to the prostate or a radical prostatectomy within one year of diagnosis.

ADT	• Medical and surgical ADT was identified using data from the ALR, ODB, DAD, and NACRS.
	• Medical ADT includes luteinizing hormone-releasing hormone (LHRH) agonists and antagonists. Instances where the patient received medical ADT were identified in ALR and the ODB databases using drug identification numbers (DIN). DINs are available upon request.
	• Surgical ADT was defined as a bilateral orchiectomy. The following codes were used to identify this procedure in DAD, NACRS and OHIP.
	  o CCI procedure codes (DAD/NACRS)
	  ▪ 1QM89: Excision total, testis
	  ▪ 1QM91: Excision radiation, testis
	  o OHIP fee codes:
	  ▪ S598: radical orchidectomy for malignancy (unilateral)
	  ▪ S589: orchidectomy (unilateral)

Radical Prostatectomy	• Surgical treatments that occurred within one year of the patient's diagnosis date were included.
	• Procedure codes used to define radical prostatectomy in OHIP, DAD, and NACRS are available below.
	  o CCI procedure codes (DAD/NACRS)
	  ▪ 1QT91: Excision radical, prostate

	○ OHIP fee codes ▪ S645: perineal prostatectomy ▪ S646: prostatectomy, perineal with vesiculectomy ▪ S651: retropubic prostatectomy (radical, with or without removal of bladder stones) ▪ S653: laparoscopic radical prostatectomy
Radiation Treatment	• Radiation therapy visits with curative or palliative intent and occurred within one year of diagnosis were included. • Body region of treatment was restricted to prostate, bilateral pelvis, left pelvis, or right pelvis.
ARAT	• ARAT was identified using regimen names (ALR) and DINs (ODB). A full list of regimen names and DINs is available upon request. • Only ARAT start dates on or after a patient's diagnosis date were included. • Patients who received ARAT before or 180 days (about 6 months) after their first recorded date of ADT treatment were counted in the numerator.
Data Sources	• Ontario Cancer Registry (OCR) • Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS) • Ontario Drug Benefit (ODB) database • Activity Level Reporting (ALR) • Ontario Health Insurance (OHIP) • Collaborative Staging Reporting Database
Data Availability and Limitations	Staging for cases diagnosed in 2019 is currently incomplete in the OCR. As a result, the indicator currently focuses on prostate cancer cases diagnosed in 2014 to 2018. ARAT has only recently been approved (from 2018 onwards) as an acceptable treatment for mCSPC patients, so low numbers should not be interpreted as substandard quality of care as it may be related to reimbursement options. A prostate cancer patient is assumed to have mCSPC based on the clinical M staging element available in the Collaborative Staging database, the receipt of LHRH therapies or a bilateral orchiectomy within 4 months of diagnosis, and the absence of radiation therapy and radical prostatectomy in their diagnosis year. Data quality and any deviations from these clinical event definitions (e.g., LHRH received after the 4-month mark) can affect the inclusion of mCSPC patients into the analysis cohort.

7.9 Percentage of prostate cancer patients who received consultations with both a urologist and a radiation oncologist (RO) prior to treatment

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Number of patients treated for localized prostate cancer
Numerator	Those in the denominator who consulted with both a urologist and RO prior to treatment
Inclusion Criteria	• Prostate cancer cohort (see Chapter 1) • Included cases with positive histology or positive microscopic confirmation • Prostate cancer patients who received radical prostatectomy and radical radiotherapy within one year of diagnosis.
Exclusion Criteria	No additional exclusions (refer to prostate cancer cohort in Chapter 1: Cohorts)
Radical Prostatectomy	• Surgical treatments that occurred within one year of the patient's diagnosis date were extracted. • Procedure codes used to define radical prostatectomy in OHIP, DAD, and NACRS are available below. o CCI procedure codes (DAD/NACRS): ▪ 1QT91: Excision radical, prostate o OHIP fee codes ▪ S645: perineal prostatectomy ▪ S646: prostatectomy, perineal with vesiculectomy ▪ S651: retropubic prostatectomy (radical, with or without removal of bladder stones) ▪ S653: laparoscopic radical prostatectomy
Radiation Treatment	• Radiation therapy visits with curative or palliative intent that occurred within one year of diagnosis were included. • Body region of treatment was restricted to prostate, bilateral pelvis, left pelvis, or right pelvis.

Radiation Oncologist Consult	Defined using the following OHIP fee codes:
	• General/Emergency/Out-patient Department codes
	  ○ A345: Radiation oncology consultation
	  ○ A745: Limited consultation, radiation oncology
	  ○ A346: Repeat consultation, radiation oncology
	  ○ A343: Medical specific assessment, radiation oncology
	• Treatment planning service codes
	  ○ X310: Level 1 – Simple radiation treatment planning
	  ○ X311: Level 2 – Intermediate radiation treatment planning
	  ○ X312: Level 3 – Complex radiation treatment planning
	  ○ X313: Level 4 – Full 3D radiation treatment planning

Urologist Consult	Defined using the following OHIP fee codes:
	• General/Emergency/Out-patient Department codes
	  ○ A355: Urology consultation
	  ○ A935: Special surgical consultation, urology
	  ○ A356: Urology repeat consultation
	  ○ A353: Specific assessment, urology
	  ○ A354: Partial assessment, urology
	• Non-Emergency Hospital Inpatient Services
	  ○ C355: Urology consultation
	  ○ C935: Special surgical consultation, urology
	  ○ C356: Urology repeat consultation
	  ○ C353: Specific assessment, urology
	  ○ C354: Specific re-assessment, urology

Data Sources	• Ontario Cancer Registry (OCR) • Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS) • Activity Level Reporting (ALR) • Ontario Health Insurance (OHIP) • Collaborative Staging Reporting Database
Data Availability and Limitations	Staging for cases diagnosed in 2019 is currently incomplete in the OCR. As a result, the indicator currently focuses on prostate cancer cases diagnosed in 2014 to 2018. Even with the staging process completed, high volumes of unknown or invalid codes for PSA value and Biopsy Gleason Score is expected. A risk category will not be assigned to a prostate cancer case if the

	Gleason score, PSA value or both is unknown or invalid. As a result, the number of low-risk prostate cancer cases (aged ≥ 35) newly diagnosed in 2014 to 2018 may be underestimated.

8. End-of-Life Care

8.1 Emergency department visits in the last 30 days of life

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Number of people who died within the specified time period, who had a breast, cervix, colorectal, lung or prostate cancer diagnosis within 5 years of death, and were aged 18 or older at diagnosis
Numerator	Those in the denominator (decedents) who visited the emergency department in their last 30 days of life
Disease Sites Definitions	See Disease-Site-Specific Cancer Cohort definitions (see Chapter 1)
Emergency Department Visits	From NACRS • Visit functional centre starts with 7131, AND • ED visit indicator = 1
Data Sources	• Ontario Cancer Registry (OCR) • Registered Persons Data Base (RPDB) • National Ambulatory Care Reporting System (NACRS)
Data Availability and Limitations	• Inclusion in the decedent cohort is not limited to those whose cause of death is the cancer in question. As a result, some deaths, and emergency department visits in the last 30 days of life, may be related to illness or injury other than the specific cancer. • This analysis does not include Ontario cancer patients who died outside of Ontario, as they would not be identified in the administrative data in Ontario.

8.2 Systemic treatment in the last 30 days of life

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Number of people who died within the specified time period, who had a breast, cervix, colorectal, lung or prostate cancer diagnosis and had a medical oncology (MO) visit in their last year of life
Numerator	Those in the denominator who received palliative antineoplastic systemic treatment in their last 30 days of life
Inclusion Criteria	Patients with a date of death in the period January 1, 2015 to December 31, 2019 People who had a MO visit in their last year of life
Exclusion Criteria	Denominator Exclusions: • Deaths due to suicide or medical assistance in dying (MAID) • Patients who died outside Ontario • Patients younger than 18 years at time of death • Invalid health card number (HCN) • Patients with multiple primaries • Patients who did not have a malignant cancer diagnosis in the Ontario Cancer Registry (OCR) • Diagnosis of cancer based solely on the death certificate • Patients with acute leukemia (e.g., Acute Lymphocytic Leukemia, Acute Myeloid Leukemia. Acute Monocytic Leukemia, Other Acute Leukemia) are excluded. • Patients whose deaths occurred within 30 days of a major cancer-related operative procedure • Patients who did not have a medical oncologist visit/consult in the last year of life Numerator Exclusion: • Hormonal systemic therapy drugs using the ALR antineoplastic classification list (available upon request)
Disease Sites Definitions	See Disease-Site-Specific Cancer Cohort definitions (see Chapter 1)
Medical Oncology (MO) Visits	ALR was the primary source for identifying MO consults (i.e., clinic visits with a "Medical Oncology" specialty provider). In the case no MO consult was found for the patient in ALR, OHIP data was used to supplement. The following fee codes were considered to indicate a MO consult in the OHIP database. • A441: complex medical specific re-assessment • A443: medical specific assessment • A444: medical specific re-assessment • A445: consultation

	• A446: repeat consultation • A448: partial assessment • A845: limited consultation • C845: limited consultation (non-emergency hospital inpatient services) • C441: complex medical specific re-assessment • C443: medical specific assessment • C444: medical specific assessment (non-emergency hospital inpatient services) • C445: consultation (non-emergency hospital inpatient services) • C446: repeat consultation
Systemic therapy	Systemic therapy found in the Activity Level Reporting (ALR) database included chemotherapy, targeted therapy and immunotherapy. Only palliative intent treatments (oral and non-oral) were included. Systemic treatment activity was found using the Discharge Abstract Database (DAD) include inpatient total body pharmacotherapy using antineoplastic and immunomodulating agents (subset of the CCI procedure code 1ZZ35). Procedures marked as cancelled or abandoned were excluded.
Data Sources	• Ontario Cancer Registry (OCR) • Discharge Abstract Data (DAD) • National Ambulatory Care Reporting System (NACRS) • Registered Persons Database (RPDB) • Activity Level Reporting (ALR) • Ontario Health Insurance (OHIP)
Data Availability and Limitations	There is a 6-month delay in the availability of date of death data. Cause of death may not be cancer related; information on cause of death is lagged by at least 2 years. For oral medications or treatments involving injection depots, this indicator would capture the date on which it is received by the patient. However, the quantity that is received or expected duration of the treatment from the dose is not considered. As such, it is possible that oral treatments or injections that overlap with the treatment window (i.e., last 30 days of life) were not captured and we may underestimate systemic treatments received through these modalities. The DAD does not have the granularity to distinguish the type (i.e., chemotherapy, immunotherapy, hormonal, or targeted) or intent of systemic treatment.

8.3 Physician home visits in the last 90 days of life

Calculation	Divide the numerator by the denominator, and multiply the result by 100
Denominator	Number of people who died within the specified time period, who had a breast, cervix, colorectal, lung of prostate cancer within 5 years of death, and was aged 18 or older at diagnosis
Numerator	Those in the denominator (decedents) who received at least one physician home visit in their last 90 days of life.
Physician Home Care Visits	Physician home care visits were defined using the following OHIP fee codes: G511: Telephone management regarding a patient receiving palliative care at home B966: Travel premium for palliative care (billed with B998/B996) B998: Home visit for palliative care between 07:00 and 24:00 (Sat, Sun, and holidays) or B997: Home visit for palliative care between 00:00 and 07:00 A901: House call assessment (GP/FP) B990: Special visit to patient's home (weekday/daytime or elective home visit) B992: Special visit to patient's home (weekday/daytime), with sacrifice to office hours, non-elective B993: Special visit to patient's home (Sat, Sun and holidays) between 07:00 - 24:00, non-elective B994: Special visit to patient's home, non-elective, (weekday/evenings) B996: Special visit to patient's home, night time, first patient of the night A900: Complex house call assessment (GP/FP) B960: Travel premium - Special visit to patient's home (weekday/daytime or elective home visit) B961: Travel premium - Special visit to patient's home (weekday/daytime), with sacrifice to office hours, non-elective B962: Travel premium - Special visit to patient's home, non-elective, (weekday/evenings) B963: Travel premium - Special visit to patient's home (Sat, Sun and holidays) between 07:00 - 24:00, non-elective B964: Travel premium - Special visit to patient's home, night time, first patient of the night B986: Travel premium - Geriatric home visit, weekdays with or without sacrifice to office hours, or Sat, Sun, holidays (07:00 - 24:00) and nights (00:00-07:00) B987: Geriatric home visit, nights (00:00-07:00) B988: Geriatric home visit, weekdays with or without sacrifice to office hours, or Sat, Sun, holidays (07:00 - 24:00)
Disease Site Definitions	See Disease-Site-Specific Cancer Cohort definitions (see Chapter 1)

Data Sources	• Ontario Cancer Registry (OCR) • Registered Persons Data Base (RPDB) • Ontario Health Insurance Plan (OHIP)
Data Availability and Limitations	• Inclusion in the decedent cohort is not limited to those whose cause of death is the cancer in question. As a result, some deaths, and physician home visits in the last 90 days of life, may be related to illness or injury other than the specific cancer. • This analysis does not include Ontario cancer patients who died outside of Ontario, as they would not be identified in the administrative data in Ontario.

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Section B: Data Tables

Prevention

Immunization coverage for human papillomavirus (HPV) among students in Ontario, 2013/2014 to 2018/2019 school years

Year	13-year-old female students (%)	12-year-old male and female students combined (%)	12-year-old students (male, female, and unknown gender combined) (%)
2013/2014	61.5		
2014/2015	60.4		
2015/2016	61.0		
2016/2017		56.3	
2017/2018			59.9
2018/2019			57.9

Note:

- 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.

Breast Cancer

Age-adjusted breast cancer incidence in First Nations people compared with other people in Ontario, per 100,000

Year	Incidence for First Nations people	Trend for First Nations people	Incidence for other people	Trend for other people
1991	61.2	61.4	81.8	81.9
1992	63.0	62.1	83.1	81.8
1993	45.8	62.8	79.4	81.8
1994	68.8	63.6	78.6	81.7
1995	62.6	64.3	80.6	81.6
1996	65.0	65.1	79.7	81.5
1997	68.7	65.9	83.3	81.5
1998	75.2	66.7	83.4	81.4
1999	69.5	67.5	85.4	81.3
2000	70.2	68.3	81.6	81.2
2001	74.5	69.1	82.0	81.2
2002	72.0	69.9	84.3	81.1
2003	63.8	70.7	79.2	81.0
2004	66.0	71.6	80.1	81.0
2005	67.2	72.4	80.5	80.9
2006	70.7	73.3	79.5	80.8
2007	80.2	74.2	80.6	80.7
2008	72.8	75.0	78.4	80.7
2009	66.9	75.9	80.1	80.6
2010	86.1	76.8	82.1	80.5

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

Year	OBSP (%)	Non-OBSP (%)
2012 to 2013	49	15
2014 to 2015	53	12
2016 to 2017	57	8
2018 to 2019	56	6

Distribution of incident breast cancer cases by stage at diagnosis

Year	Stage 1 (%)	Stage 2 (%)	Stage 3 (%)	Stage 4 (%)	Unknown stage (%)
2014	44	38	13	5	1
2015	45	37	13	5	1
2016	45	37	13	5	1
2017	44	39	12	5	1
2018	69	14	7	5	5

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.

Percentage of early-stage (stage 1 and 2) breast cancer patients who received at least one imaging test during staging

Year	Stage 1 (%)	Stage 2 (%)
2014	57	86
2015	51	83
2016	47	80
2017	47	80
2018	48	71

Note:

- 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.

Time from first presentation (suspicion) to diagnosis

Year	Patients	Mean	P25	Median	P75	P10	P90
2014	9,462	49	15	28	55	1	128
2015	9,421	48	14	26	51	1	131
2016	9,734	46	14	25	50	1	121
2017	9,839	48	15	27	53	1	126
2018	10,139	47	15	27	54	1	124
2019	10,450	49	16	28	55	1	128

Note: Range is the 10th to 90th percentiles.

Time from diagnosis to first treatment for breast cancer

Year	Patients	Mean	P25	Median	P75	P10	P90
2014	9,700	39	23	34	47	14	64
2015	9,677	38	23	34	47	15	63
2016	9,979	38	23	34	47	15	63
2017	10,085	38	23	34	46	15	63
2018	10,385	40	25	35	48	16	66
2019	10,887	41	26	36	49	17	67

Note: Range is the 10th to 90th percentiles.

Percentage of mastectomy patients with immediate and delayed reconstruction

Year	Immediate reconstruction (%)	Immediate reconstruction (N)	Delayed reconstruction (%)	Delayed reconstruction (N)
2014	13	423	15	485
2015	15	491	14	442
2016	17	542	14	468
2017	20	654	13	430
2018	21	695	11	356

Note: Immediate reconstruction is within 1 year of diagnosis and delayed reconstruction is within 2 years.

Percentage of patients with lymph node involvement who received adjuvant radiation after mastectomy

Year	Mastectomies with SLNB followed by adjuvant radiation (%)	Mastectomies with SLNB followed by adjuvant radiation (N)	Mastectomies with ALND followed by adjuvant radiation (%)	Mastectomies with ALND followed by adjuvant radiation (N)	Mastectomies with ALND/SLNB and Nodal Stage >= N1 (N)
2014	24	98	20	80	406
2015	35	195	15	85	564
2016	42	268	22	143	640
2017	45	290	20	129	647
2018	51	351	16	107	684

Note: Patients who had SLNB and ALND are included in ALND category

Percentage of patients who received (Neo) adjuvant chemotherapy for ER/PR/HER2 negative stage 1 (T1c)-3 breast cancer

Year	Received adjuvant chemotherapy (%)	Received adjuvant chemotherapy (N)	Received neo-adjuvant chemotherapy (%)	Received neo-adjuvant chemotherapy (N)	ER/PR/HER2 negative stage 1 (T1c)-3 (N)
2014	63	511	18	149	807
2015	59	482	20	162	812
2016	52	436	28	236	833
2017	54	422	26	202	778
2018	52	389	27	200	743

Note: Patients who received both neo-adjuvant and adjuvant chemotherapy are included in the neo-adjuvant group.

Cervical Cancer

Age-adjusted cervical cancer incidence in First Nations women compared with other women in Ontario, per 100,000

Year	Incidence for First Nations women	Trend for First Nations women	Incidence for other women	Trend for other women
1991	20.4	18.4	8.1	8.3
1993	12.1	16.6	7.9	8.0
1995	21.3	15.0	8.1	7.6
1997	10.1	13.6	7.0	7.3
1999	13.1	12.3	7.1	7.0
2001	7.3	11.1	6.5	6.6
2003	8.3	10.1	6.5	6.4
2005	9.3	9.1	6.0	6.1
2007	10.7	8.3	6.2	6.3
2009	7.4	7.5	6.7	6.6

Distribution of incident cervical cancer cases in Ontario by stage at diagnosis

Year	Stage 1 (%)	Stage 2 (%)	Stage 3 (%)	Stage 4 (%)	Stage unknown (%)
2014	50	14	19	15	1
2015	56	15	16	12	1
2016	55	21	14	10	1
2017	56	18	16	10	0
2018	60	23	7	8	2

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.

Time from diagnosis to first treatment for cervical cancer, in days

Year	Patients	Mean	P25	Median	P75	P10	P90
2014	475	67	28	54	91	11	137
2015	516	69	35	56	84	11	137
2016	512	70	36	62	91	19	131
2017	546	73	35	61	94	16	143
2018	551	73	37	62	99	14	150
2019	669	68	35	63	89	6	130

Note: Range is the 10th to 90th percentiles.

Colorectal Cancer

Age-standardized incidence rate per 100,000 for colon cancer

Year	Men	Women
2014	50.8	40.5
2015	54.4	39.9
2016	50	37.1
2017	49	37.8
2018	46.3	36.8

Note: Colon cancer includes rectosigmoid junction

Age-standardized incidence rate per 100,000 for rectum cancer

Year	Men	Women
2014	19.5	10.7
2015	18.6	10.5
2016	19.8	11
2017	20.3	11.5
2018	20	11

Age-adjusted colorectal cancer incidence in First Nations women compared with other women in Ontario, per 100,000

Year	Incidence for First Nations women	Trend for First Nations women	Incidence for other women	Trend for other women
1991	31.9	37.3	31.2	29.9
1992	39.9	37.5	28.4	29.7
1993	36.7	37.6	29.1	29.6
1994	46.2	37.7	29.6	29.4
1995	39.7	37.9	29.3	29.3
1996	25.2	38.0	27.5	29.2
1997	46.5	38.1	26.7	29.0
1998	52.4	38.3	30.0	28.9
1999	24.5	38.4	30.0	28.8
2000	41.6	38.5	29.4	28.6
2001	30.6	38.7	29.6	28.5
2002	41.1	38.8	28.7	28.4
2003	32.0	38.9	28.5	28.2
2004	36.3	39.1	28.4	28.1
2005	35.3	39.2	27.8	28.0
2006	34.2	39.4	27.3	27.8
2007	38.9	39.5	28.1	27.7
2008	43.0	39.6	27.6	27.6
2009	39.0	39.8	27.5	27.4
2010	46.5	39.9	26.2	27.3

Age-adjusted colorectal cancer incidence in First Nations men compared with other men in Ontario, per 100,000

Year	Incidence for First Nations men	Trend for First Nations men	Incidence for other men	Trend for other men
1991	28.3	55.7	42.2	42.2
1992	84.3	55.9	43.3	42.1
1993	52.0	56.1	41.6	42.1
1994	51.9	56.3	42.8	42.1
1995	36.0	56.5	40.7	42.0
1996	39.6	56.7	41.1	42.0
1997	80.9	57.0	40.7	42.0
1998	51.1	57.2	41.3	42.0
1999	64.1	57.4	42.2	41.9
2000	49.8	57.6	44.0	41.9
2001	80.9	57.8	43.5	41.9
2002	52.4	58.1	42.1	41.8
2003	59.3	58.3	40.0	41.8
2004	48.7	58.5	42.0	41.8
2005	46.0	58.7	41.5	41.7
2006	43.5	59.0	41.8	41.7
2007	73.7	59.2	40.8	41.7
2008	55.0	59.4	42.1	41.7
2009	52.3	59.6	39.5	39.1
2010	69.0	59.9	36.5	36.7

Distribution of incident cancer cases by stage at diagnosis: colon

Year	Stage 1 (%)	Stage 2 (%)	Stage 3 (%)	Stage 4 (%)	Stage unknown (%)
2014	22	29	28	19	2
2015	24	28	28	18	2
2016	23	27	29	19	2
2017	23	28	28	19	2
2018	17	27	25	22	9

Notes:

- Unknown stage may be due to limited stage workup or limited documentation.
- Implementation of the 8th Edition of the AJCC Cancer Staging Manual in 2018 resulted in stage distribution shifts.

Distribution of incident cancer cases by stage at diagnosis: rectum

Year	Stage 1 (%)	Stage 2 (%)	Stage 3 (%)	Stage 4 (%)	Stage unknown (%)
2014	28	20	33	15	4
2015	30	18	33	16	4
2016	28	18	35	16	2
2017	29	18	34	17	3
2018	20	17	28	19	16

Notes:

- Unknown stage may be due to limited stage workup or limited documentation.
- Implementation of the 8th Edition of the AJCC Cancer Staging Manual in 2018 resulted in stage distribution shifts.

Time from diagnosis to first treatment for colorectal cancer

Year	Patients	Mean	P25	Median	P75	P10	P90
2014	8,037	41	9	34	56	0	85
2015	8,155	41	10	34	56	0	86
2016	7,954	41	12	34	56	0	83
2017	8,040	42	13	35	57	0	89
2018	7,840	45	15	38	60	0	90
2019	7,683	44	15	37	59	0	90

Note: Range is the 10th percentile to 90th percentile

Lung Cancer

Age-adjusted lung cancer incidence in First Nations women compared with other women in Ontario, per 100,000

Year	Incidence for First Nations women	Trend for First Nations women	Incidence for other women	Trend for other women
1991	33.2	34.2	29.1	28.9
1992	28.3	35.1	29.9	29.3
1993	35.7	36.0	29.3	29.6
1994	28.1	37.0	29.5	30.0
1995	36.6	38.0	30.3	30.4
1996	45.5	39.0	30.5	30.7
1997	42.6	40.0	30.8	31.1
1998	37.3	41.1	32.2	31.5
1999	50.3	42.2	31.6	31.9
2000	39.8	43.3	32.3	31.8
2001	37.6	44.5	31.8	31.7
2002	58.7	45.6	31.2	31.7
2003	39.6	46.9	30.5	31.6
2004	60.9	48.1	31.6	31.5
2005	49.8	49.4	32.6	31.4
2006	31.9	50.7	31.4	31.4
2007	60.4	52.1	31.5	31.3
2008	42.5	53.4	31.3	31.2
2009	58.7	54.9	31.2	31.1
2010	54.6	56.3	30.6	31.1

Incident lung cancer cases by stage at diagnosis and year in Ontario

Year	Stage 1 (%)	Stage 2 (%)	Stage 3 (%)	Stage 4 (%)	Stage unknown (%)
2014	23.5	8.4	19.3	48.1	0.7
2015	24.6	9	19.3	46.7	0.4
2016	26.4	8.1	19.2	46	0.3
2017	24.3	8.3	20.6	46.6	0.3
2018	26.3	7.9	17.8	45.8	2.2

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.

Time from diagnosis to treatment for lung cancer, in days

Year	Patients	Mean	P25	Median	P75	P10	P90
2014	7,983	52	21	42	69	3	103
2015	8,016	50	21	42	65	4	98
2016	8,176	50	21	41	68	3	99
2017	8,414	51	22	42	67	4	100
2018	8,552	53	24	44	70	7	101
2019	8,595	51	23	43	69	4	100

Note: Range for these graphs is the 10th to 90th percentiles.

Time from diagnosis to treatment by stage at diagnosis for lung cancer, in days

Year	Patients	Mean	P25	Median	P75	P10	P90
2014	9,406	55	22	49	77	0	110
2015	3,263	58	30	52	77	0	107
2016	7,789	54	28	46	69	14	99
2017	18,264	45	20	35	56	10	88
2018	2,419	51	13	39	68	0	112
2019	9,406	55	22	49	77	0	110

Note: Range for these graphs is the 10th to 90th percentiles.

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

Month	Patients screened (%)	Target (%)
Jan-16	49	70
Feb-16	52	70
Mar-16	54	70
Apr-16	59	70
May-16	58	70
Jun-16	61	70
Jul-16	65	70
Aug-16	63	70
Sep-16	65	70
Oct-16	65	70
Nov-16	66	70

Month	Patients screened (%)	Target (%)
Dec-16	67	70
Jan-17	64	70
Feb-17	65	70
Mar-17	66	70
Apr-17	68	70
May-17	67	70
Jun-17	67	70
Jul-17	68	70
Aug-17	68	70
Sep-17	67	70
Oct-17	67	70
Nov-17	68	70
Dec-17	69	70
Jan-18	70	70
Feb-18	68	70
Mar-18	67	70
Apr-18	68	75
May-18	69	75
Jun-18	69	75
Jul-18	69	75
Aug-18	67	75
Sep-18	68	75

Month	Patients screened (%)	Target (%)
Oct-18	66	75
Nov-18	65	75
Dec-18	65	75
Jan-19	64	75
Feb-19	65	75
Mar-19	66	75
Apr-19	70	80
May-19	70	80
Jun-19	68	80
Jul-19	68	80
Aug-20	69	70
Sep-20	66	70
Oct-20	69	70
Nov-20	68	70
Dec-20	68	70

30-day and 90-day post-surgery mortality

Year	30-day post-surgery mortality (%)	90-day post-surgery mortality (%)	Patients who had surgeries (N)
2014	1.6	3.3	2,066
2015	1.2	3.4	2,034
2016	1.8	2.9	2,022
2017	2.2	4.3	2,149

Year	30-day post-surgery mortality (%)	90-day post-surgery mortality (%)	Patients who had surgeries (N)
2018	1.5	3.3	2,166
2019	0.8	2.8	2,141

Note: Based on 2,066 surgeries in 2014, increasing to 2,141 in 2019.

Prostate Cancer

Prostate cancer patients by diagnosis year and risk group

Year	Low (%)	Intermediate (%)	High (%)
2010	23	33	21
2011	22	34	21
2012	18	34	22
2013	17	33	25
2014	16	36	28
2015	16	36	29

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

Distribution of incident prostate cancer cases by stage at diagnosis

Year	Stage 1 (%)	Stage 2 (%)	Stage 3 (%)	Stage 4 (%)	Stage unknown (%)
2014	22	53	14	11	0
2015	22	52	13	13	0
2016	23	51	14	13	0
2017	24	51	13	12	0
2018	19	37	21	14	9

Notes:

- Unknown stage may be due to limited stage workup or limited documentation within the patient record.
- Shifts 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.

Stage of prostate cancer cases over time

Year	Stages 1 to 3 (%)	Stage 4 (%)
2010	85.0	7.1
2011	81.6	7.0
2012	77.3	7.4
2013	78.5	9.6
2014	79.9	10.1
2015	78.7	11.7
2016	79.2	11.4
2017	79.4	10.9
2018	70.6	12.7

Time from diagnosis to first treatment for prostate cancer

Year	Patients	Mean	P25	Median	P75	P10	P90
2014	7,198	94	45	78	125	20	185
2015	7,442	93	44	77	125	20	183
2016	7,953	95	44	78	127	21	189
2017	8,666	98	46	81	131	22	201
2018	9,259	97	43	79	129	21	201
2019	8,061	90	40	73	120	19	188

Note: Range is the 10th percentile to 90th percentile

Time from diagnosis to first treatment, by risk group

Risk group	Patients	Mean	P25	Median	P75	P10	P90
Low	6,971	154	82	134	216	50	301
Intermediate	15,828	113	67	98	144	46	202
High	11,833	65	25	49	86	13	139
Unknown	13,947	94	40	74	125	18	202

Percentage of pT2 pathology reports with positive margins, by surgical approach

Year	Laparoscopic or Robotic (%)	Open (%)
2015	15	26
2016	21	24
2017	19	23
2018	18	24
2019	17	26

Note: 3-7% of pT2 synoptic reports had an unknown surgical approach from 2015-2019.

Percentage of pT3 pathology reports with positive margins, by surgical approach

Year	Laparoscopic or Robotic (%)	Open (%)
2015	37	48
2016	43	50
2017	41	50
2018	38	50

Year	Laparoscopic or Robotic (%)	Open (%)
2019	40	51

Note: 2-3% of pT3 synoptic reports had an unknown surgical approach from 2015-2019.

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