The 2015 Cancer System Performance Report

June 2015

Technical Appendix

1. Prevention

Smoking prevalence

Definition: Percentage of population aged 12 years and older in each specified group – daily, occasional, former or never smokers
Numerator: Number of daily, occasional, former, or never smokers, aged 12 years and older
Denominator: Total population aged 12 years and older
Data Source: Canadian Community Health Survey
Measurement timeframe: 2013
CCHS variables: 1. In your lifetime, have you smoked a total of 100 or more cigarettes (about 4 packs)? 2. Have you ever smoked a whole cigarette? 3. At the present time, do you smoke cigarettes daily, occasionally or not at all? 4. Have you ever smoked cigarettes daily?
Stratification variables: Province/territory, Sex
Provinces/territories with data available: AB, BC, MB, NB, NL, NS, NT, ON, PE, QC, SK, NU, YT
Notes: CCHS data are based on a representative sample which is then extrapolated to the overall population.

Human papillomavirus (HPV) vaccination

Definition: The proportion of females in the targeted cohort to receive the first of 3 doses of the HPV vaccination
Numerator: Number of females who have received the first dose of the HPV vaccination through the provincially/territorially organized program
Denominator: Number of females in the target grade/age group in schools where the provincial HPV vaccination program has been offered. It does not necessarily represent the entire female population within the target age range for the province.
Data Source: Pan-Canadian Cervical Screening Network, Prince Edward Island Chief Public Health Office
Measurement timeframe: 2012/2013 or 2013/2014 school year, depending on the province and as indicated in Table 1.1 (approximately September 1st to August 31st)
Stratification variables: Province/territory
Provinces/territories with data available: AB, BC, MB, NB, NL, NS, NT, ON, PE, QC, SK, NU, YT
Province specific notes: NB: Data are for 3rd dose of HPV vaccine. NT: Data reported are based on estimates. ON: Data are for 3rd dose of HPV vaccine. PE: Data are for 3rd dose of HPV vaccine.
General notes: 1. The target grade and age group varies by province/territory; 2. It was not possible to collect standardized data from all provinces and territories. Provincial and territorial programs have different target populations, implementation plans and phases for vaccination. With better collection of standardized data and continued roll-out of HPV vaccination, it is expected that the percentages will increase and inter-provincial/territorial variation will decrease.

Physical activity - Active transportation

Definition: Percentage of adults aged 18 and older who report engaging in physical activity as part of transportation in the past 3 months
Numerator: Number of individuals aged 18 and older who walk/bike to school or work in the past 3 months
Denominator: Total population aged 18 and older who go to school or work

Data Source: Canadian Community Health Survey
Measurement timeframe: 2013
CCHS variables: 1. Was there any time* in the past 3 months when you walked to and from work or school? 2. Was there any time* in the past 3 months when you biked to and from work or school?
*****For those who answered yes to walking or biking for leisure, the beginning of the questions were phrased as follows: 1. Other than the (X) times you already reported walking for exercise was there any other time…"; 2. Other than the (X) times you already reported bicycling was there any other time…"
Stratification variables: Province/territory, age group
Provinces/territories with data available: AB, BC, MB, NB, NL, NS, NT, ON, PE, QC, SK, NU, YT
Notes: CCHS data are based on a representative sample which is then extrapolated to the overall population.

2. Screening

Cervical cancer screening: self-reported

Definition: Age-standardized (2011 standard population) percentage of women aged 18–69 who had at least one Papanicolau (Pap) smear in the past 3 years
Numerator: Total number of women aged 18–69 reporting having had at least one Pap test in the past 3 years
Denominator: Total number of women aged 18–69 (excluding women who have had a hysterectomy)
Data source: Canadian Community Health Survey
Measurement timeframe: 2012, 2013
CCHS variables: 1. Have you ever had a PAP smear test? 2. When was the last time? 3. Have you had a hysterectomy?
Stratification variables: Province/territory, household income, immigration status
Provinces/territories with data available: All for 2012; NB, PE, NL, YT, NT, NU for 2013
Notes: 1. CCHS data is based on a representative sample which is then extrapolated to the overall population. 2. Cervical cancer screening was optional content in CCHS 2013.

Breast cancer screening: self-reported

Definition: Percentage of asymptomatic females aged 50-69 receiving a mammogram within the past 2 years, where asymptomatic is defined as respondents who indicated going for a mammogram for any of the following reasons: 1. Family history; Routine screen/check-up; 2. Age; 3. Hormone replacement therapy (HRT). Mammograms received for any of the following reasons were excluded: lump; breast problem; follow-up to breast cancer treatment; other.
Numerator: Asymptomatic females aged 50 - 69 who indicated going for a mammogram within the past 2 years
Denominator: Total number of asymptomatic females aged 50 - 69
Data source: Canadian Community Health Survey
Measurement timeframe: 2012, 2013
CCHS variables: 1. Have you ever had a mammogram that is, a breast x-ray? 2. Why did you have it? (mark all that apply): family history; part of regular check-up/routine screening; age; HRT; lump; follow-up to breast cancer treatment; breast problem; other; 3. When was the last time?
Stratification variables: Province/territory, household income quintile, immigrant status
Provinces/territories with data available: All provinces and territories for 2012; AB, NB, NS, NT for 2013.
Notes: 1. CCHS data is based on a representative sample which is then extrapolated to the overall population. 2. Breast cancer screening was optional content in CCHS 2013.

Colorectal cancer screening: self-reported

Definition: Percentage of asymptomatic individuals aged 50 - 74 who are up-to-date with their colorectal cancer screening. Up-to-date is defined as having had a screening fecal test (FOBT) in the past 2 years and/or sigmoidoscopy/colonoscopy in the past 5 years, and asymptomatic is defined as respondents who reported having a CRC screening test for any of the following reasons: family history; regular check-up/routine screening; age; race. Colorectal screening received for any of the following reasons were excluded: follow-up of problem; follow-up of colorectal cancer treatment; other.

Numerator: Number of asymptomatic individuals aged 50 - 74 reporting having had an FOBT within the past 2 years and/or a colonoscopy/sigmoidoscopy within the past 5 years
Denominator: Total number of asymptomatic individuals aged 50 - 74
Data source: Canadian Community Health Survey
CCHS variables: 1. Have you ever had an FOBT test? When was the last time? Why did you have it? 2. Have you ever had a colonoscopy or sigmoidoscopy? When was the last time? Why did you have it?
Measurement timeframe: 2012, 2013
Stratification variables: Province/territory, age group, sex, household income quintile, immigrant status
Provinces/territories with data available: All provinces and territories for 2012; AB, MB, QC, NB, PE, NL, YT, NT for 2013
Notes: 1. CCHS data is based on a representative sample which is then extrapolated to the overall population. 2. Colorectal cancer screening was optional content in CCHS 2013.

3. Diagnosis

Breast cancer diagnosis wait time: from abnormal breast screen to resolution

Definition: 1. The median and 90th percentile elapsed time (in weeks) from abnormal breast screen to resolution (test date of definitive diagnosis) 2. The percentage of women for which the above wait time was within target timeframes
Population: Women aged 50 – 69 participating in the organized breast screening program with an abnormal breast screen result (mammogram or clinical breast examination); 1. Requiring a tissue biopsy 2. Not requiring a tissue biopsy
Data source: Provincial breast cancer screening programs
Measurement timeframe: 2012
Data reported: BC, AB, SK, MB, ON, QC, NB, NS, PE, NL, NT
Province specific notes: AB: Wait time data were based on the screening mammograms done by Screen Test, which is part of Alberta Breast Cancer Screening Programs (accounting for about 10% of screening mammograms in Alberta).
SK: Participation rate included patients who have had breast cancer in the past who are allowed to re-screen with the screening Program for breast cancer.
ON: Median and percentile are not available from 2009 onward.
QC: Data are not available for 2004, 2009 and 2011.
NT: 2011 wait time data included one site (Stanton) only.
General notes:
1. Indicator excludes tests beyond 6 months post screen.
2. Time to diagnosis is based on the date of the first pathological biopsy result of breast cancer (excludes fine needle aspiration and all inconclusive procedures) or the date of the last benign test or pathological biopsy.
3. Definitive diagnosis of cancer is the first core or open surgical biopsy that confirms cancer. In rare occasions, fine needle aspiration (FNA) biopsy may also be used as a definitive diagnosis of cancer. Definitive diagnosis of benign cases is the last benign test up to 6 months following an abnormal screen.
4. Tissue biopsy includes open and core needle biopsy.

Colorectal cancer diagnosis wait time: from abnormal fecal test to colonoscopy

Definition: Time (in days) between an abnormal colorectal cancer screening fecal test result and a follow-up screening colonoscopy procedure
Population: Individuals with an abnormal fecal test (for CRC screening) who went on to receive a colonoscopy within 180 days of the fecal test result
Measures: 1. Median 2. 90th percentile 3. Number of individuals having a follow-up colonoscopy within 180 days
Data Source: Reported by the provincial colorectal screening programs through the National Colorectal Cancer Screening Network
Measurement Timeframe: First-round screening tests conducted between January 1, 2011 and December 31, 2012
Data Reported: SK, MB, NS, NL, and PE
Province specific notes:

NL: Referrals for colonoscopy occur after the individual has been contacted by the screening program regarding the abnormal fecal test and a health assessment completed. This may influence median and 90th percentile for wait time from abnormal fecal test to follow-up colonoscopy.
PE: FTg was discontinued by June of 2012 after transition to FTi. FTi was implemented in early 2012.
General Notes:
1. This indicator does not include patients who received a colonoscopy more than 6 months following an abnormal fecal test.
2. The colonoscopy may have been performed inside or outside the Program but only includes individuals whose abnormal fecal test was performed in the screening Program.

Use of PET scans among patients diagnosed with non-small cell lung cancer

Definition: Percentage of patients diagnosed as non-small cell lung cancer (NSCLC), receiving at least one PET scan within three months before and up to one year after diagnosis
Numerator: Number of patients who diagnosed as non-small cell lung cancer and received at least one PET scan with three months before and up to one year after diagnosis
Denominator: Number of patients who were diagnosed as non-small cell lung cancer
Data sources: Provincial cancer agencies
Measurement timeframe: 2009 to 2011 diagnosis year
Stratification variables: province, sex, age group and cancer stage
Provinces submitting data: BC, AB, MB, ON, NB, NS
Province specific notes:
BC: Data were only for NSCLC patients diagnosed in 2010 and 2011, since stage data were not available for 2009. Data may not be complete and comparable with other provinces due to lack of information about surgery for the diagnosis years 2010 and 2011, which were used to determine the treatment modality. Cases with Stage III disease were staged upward to Stage IIIA.
AB: The classification of cancer stage for 2009 were based on AJCC 6th, for 2010 and 2011 were based on AJCC 7th. Cases with Death Certificate Only (DCO) or confirmed by autopsy only were excluded. Cases with stage III were categorized as stage IIIB.
MB: Cases with stage III were categorized as stage IIIB.
NS: Cases with stage III were categorized as stage IIIB.
General notes:
1. Data were collected by treatment modality and stage. Results from treatment modality were combined for reporting. Provinces with no treatment data available (i.e. BC and NB) were partially excluded from the analysis.
2. Invasive Non-Small Cell Lung cancer (NSCLC) incidence cases were defined as C34 with behavior code 3, excluding hematopoietic histology (M-95 to M-98), small cell, neuroendocrine carcinoma and sarcoma codes using International Classification of Diseases for Oncology, Third Edition (ICD-O-3).
3. Only patients with age at diagnosis >=18 were included, who were divided to two groups: 18-69 and 70+.
4. Incidence cases through Death Certificate only (DCO) were excluded.
5. Treatment modality was classified into three groups: first surgery, first radiation therapy and no any treatment.

Distribution of diagnostic PET scans by stage for non-small cell lung cancer cases

Definition: Percentage of diagnostic PET scan by stage for non-small cell lung cancer cases (NSCLC).
Numerator: Number of diagnostic PET scan for non-small cell lung cancer cases for a specific stage.
Denominator: Number of diagnostic PET scan for non-small cell lung cancer cases.

Data sources: Provincial cancer agencies
Measurement timeframe: 2009 to 2011 diagnosis year
Stratification variables: province, sex, age group and cancer stage
Provinces submitting data: BC, AB, MB, ON, NB, NS
Province specific notes:
BC: Data were only for NSCLC cases diagnosed in 20010 and 2011, since stage data was not available for 2009. Data may not be complete and comparable with other provinces due to lack of information about surgery for the diagnosis years 2010 and 2011, which were used to determine if PET scans were for diagnosis. Cases with Stage III disease were staged upward to Stage IIIA.
AB: The classification of cancer stage for 2009 were based on AJCC 6th, for 2010 and 2011 were based on AJCC 7th. Cases with Death Certificate Only (DCO) or confirmed by autopsy only were excluded. Cases with stage III were categorized as stage IIIB.
MB: Cases with stage III were categorized as stage IIIB.
NS: Cases with stage III were categorized as stage IIIB.
NB: Data were not complete and comparable due to lack of radiation therapy information for the diagnosis years, which were used to determine if PET scans were for diagnosis.
General notes:
1. Data were collected by treatment modality and stage. Results from treatment modality were combined for reporting. Provinces with no treatment data available (i.e. BC and NB) were partially excluded from the analysis.
2. Invasive Non-Small Cell Lung cancer (NSCLC) incidence cases were defined as C34 with behavior code 3, excluding hematopoietic histology (M-95 to M-98), small cell, neuroendocrine carcinoma and sarcoma codes using International Classification of Diseases for Oncology, Third Edition (ICD-O-3).
3. Only patients with age at diagnosis >=18 were included, who were divided to two groups: 18-69 and 70+.
4. Incidence cases through Death Certificate only (DCO) were excluded.
5. Diagnostic PET scans was determined by the date in which PET scans occurred and the first date of surgery and/or radiation therapy. There were two scenarios to determine if PET scans were for diagnostic purpose:

   a. For the cases, there were no surgery or radiation therapy within one year of diagnosis, any PET scans happened between 3 months pre-diagnosis and 4 months post diagnosis were considered as diagnostic.
   b. For the cases, there were surgery or radiation therapy within one year of diagnosis, any PET scans happened between 3 months pre-diagnosis and the first surgery or the first radiation therapy were considered as diagnostic.

6. Patients can have multiple scans, each scan is counted.

4. Treatment

4.1 Surgery

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

Definition: The proportion of colon cancer resections for which 12 or more lymph nodes were removed and examined
Numerator: Colon cancer cases diagnosed during the year and resected within 1 year of diagnosis for which 12 or more lymph nodes were removed and examined
Denominator: All colon cancer cases diagnosed in the province during the year and resected within 12 months of diagnosis
Data source: Provincial cancer agencies
Measurement timeframe: 2008, 2009, 2010 and 2011 diagnosis years
Stratification variables: Province, age group, sex
Provinces submitting data: AB, SK, MB, ON, NB, NS, PE, NL
Province specific notes: AB: For 2011, treatment information is based on initially planned treatment to primary site (ACR data). Excludes C18.1 Appendix. CCI codes are not identified in the ACR, as such all coded surgeries were included for complete colon resection. If more than one surgical procedure is performed; the most definitive procedure is documented. The definition of definitive is the surgical procedure with the intent to cure. Through quality assurance, we noticed that a number of the cases coded as surgery on the ACR had CCI codes or Billing codes other than the ones listed. The majority of these cases appear to be cases in which the billing database had 60.5 other resection of the rectum even though the patient only had C18.7 sigmoid colon. However, there are also some cases in which the ACR codes surgery for polypectomy and hence these have also been included. **ON:** Cases for Appendix C18.1 were excluded. **NS**: For 2011, collaborative stage variable used to identify those having a resection. Resections dates manually reviewed from chart review. **PE**: For 2011, cases for Appendix C18.1 were excluded.
General notes:

1. Cases with unknown number of nodes removed and examined were excluded from both numerator and denominator.
2. Cases for patients under 18 years of age (at diagnosis) were excluded.
3. Colon cases defined as ICDO3 codes: C18.0 to C18.9 with behavior code 3.
4. Exclude lymphoma Codes M-95 to M-98. From 2010 onward data also exclude sarcoma codes, neuroendocrine carcinoma, squamous cell carcinoma.
5. Colon resections identified as CCI codes: 1NM87 or 1NM89 or 1NM91 or descriptors listed in Table 1.
6. All resected cases were included, regardless of margin status (due to data limitations).
7. Included cases which last resection date (if multiple) – diagnosis date <=365 days.

Breast cancer resections that are mastectomies

Definition: The percentage of surgical resections among women with unilateral invasive breast cancer that are mastectomies.

Numerator: Women in the denominator who received a mastectomy first as well as women who received breast conserving surgery (BCS) first followed by a mastectomy within one year
Denominator: Women with unilateral invasive breast cancer who received breast conserving surgery and/or a mastectomy
Data source: Hospital Morbidity Database, Canadian Institute for Health Information (CIHI); National Ambulatory Care Reporting System, CIHI; Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec; Alberta Ambulatory Care Reporting System, Alberta Health and Wellness
Measurement timeframe: 2007-08 to 2011-12
Stratification variables: Province/territory
Provinces submitting data: BC, AB, SK, MB, ON, QC, NB, NS, PE, NL and Territories
General notes:
1. The following surgical and diagnostic codes, as documented in hospital patient records and reported to CIHI, were used to identify diagnoses and procedures per the following:
    a. In order to identify a breast cancer diagnosis, the following ICD-10-CA codes were used: C50.00, C50.01, C50.09, C50.10, C50.11, C50.19, C50.20, C50.21, C50.29, C50.30, C50.31, C50.39, C50.40, C50.41, C50.49, C50.50, C50.51, C50.59, C50.60, C50.61, C50.69, C50.80, C50.81, C50.89, C50.90, C50.91, C50.99. Women with unilateral invasive breast cancer were the focus of this analysis (comprising 98% of women with invasive breast cancer).
    b. In order to identify a mastectomy, the following surgical codes were used according to CCI: 1.YM.89 to 1.YM.92.
    c. The following CCI codes were used to identify a breast conserving surgery: 1.YM.87, 1.YM.88.

4.2 Radiation Therapy

Radiation therapy wait time: from ready-to-treat to start of treatment

Definition: 1. The median and 90th percentile elapsed time from ready to treat to start of radiation therapy, measured in days; 2. The percentage of radiation therapy cases for which the above wait time was within target timeframes
Data source: Provincial cancer agencies
Measurement timeframe: 2013 treatment year
Stratification variables: Province, by disease site (all cancers, breast, colorectal, lung, prostate)
Provinces submitting data: BC, AB, SK, MB, ON, NB, NS, PE, NL
Province specific notes: AB: For 2013, data included all cases who had radiation therapy at a Cancer Control Alberta Facility with their first treatment between Jan 1, 2013 - Dec 31, 2013; it includes those who were living in another province at time of diagnosis but receiving radiation therapy in Alberta. Tumor group classification for this indicator is based on referral tumor groups. **SK**: For 2013, data were reported by treatment site, any RT treatment modality was included. **NS**: For 2013, wait time were computed using the same rules for producing wait time for NS Department of Health and Wellness. As such, wait time were based on patient first courses of treatment in the period of interest. **PE:** For 2013, data were based on new treatment starts within the timeframe of 2013. Individual cancer patients could have more than one treatment start in the timeframe and could therefore be counted more than once.

General notes:

1. All behavior codes are included.
2. Cases with treatment done in 2013 are included.
3. To identify breast, colorectal, lung, prostate cancer and all cancers, please include the morphology codes that are currently used within your registry.
4. Of note for breast cancer data, if the province obtains this data from a wait time database as opposed to a registry, then breast cancer cases were to be included per the database definition.
5. There are known discrepancies in the ways in which different provinces measure wait times. One of the key sources of variation is the way the "Ready to Treat" timeframe is defined. Efforts are underway to standardize these definitions. The following section outlines the definitions used by the different provinces.

Provincial definitions:

AB: The date when the patient is physically ready to commence treatment. **BC:** The date at which both oncologist and patient agree that treatment can commence. Being ready to treat requires that all diagnostic tests and procedures required to assess the appropriateness of, indications for, and fitness to undergo radiation therapy are complete. **MB:** The date when a decision has been made by the radiation oncologist and is agreed to by the patient that radiation therapy is appropriate and should commence AND the patient is medically ready to start treatment AND the patient is willing to start treatment. **NB:** The date when any planned delay is over and the patient is ready to begin treatment from both a social/personal and medical perspective. **NL:** The date when all pre-treatment investigations and any planned delay are over, and the patient is ready to begin the treatment process from both a social/ personal and medical perspective. **NS:** The date when all pre-treatment investigations and any planned delay are over, and the patient is ready to begin the treatment process from both asocial/personal and medical perspective. Nova Scotia did not have a ready to treat date until February 2010; a proxy date was used prior to this time. **ON:** The time from when the specialist is confident that the patient is ready to begin treatment to the time the patient receives treatment. **PE:** The date when all pre-treatment investigations and any planned delay are over, and the patient is ready to begin the treatment process from both a social/personal and medical perspective. **QC:** At consultation, the radiation oncologist enters the date at which the patient will be ready to treat on a formulary requesting treatment. **SK:** The date when the patient is ready to receive treatment, taking into account clinical factors and patient preference. In the case of radiation therapy, any preparatory activities (e.g., simulation, treatment planning, dental work) do not delay the ready to treat date.

Pre-operative radiation therapy for stage II or III rectal cancer patients

Definition: Percentage of resected stage II and III rectal cancer cases receiving pre-operative (neo-adjuvant) radiation therapy
Numerator: Stage II and III rectal cancer cases diagnosed during the year receiving pre-operative radiation therapy up to 120 days before resection
Denominator: Stage II and III rectal cancer cases diagnosed in the province during the year and having a rectal resection within one year of diagnosis
Data source: Provincial cancer agencies
Measurement timeframe: 2008, 2009, 2010 and 2011 diagnosis year
Stratification variables: Province, age group, sex
Provinces submitting data: AB, MB, ON, NB, NS, PE, NL

Province specific notes: AB: For 2011, treatment information was based on initially planned treatment to primary site. CCI codes are not identified in the ACR, as such all coded surgeries were included for complete rectum resection. If more than one surgical procedure is performed, the ACR codes the most definitive procedures is documented. The definition of definitive is the surgical procedure with the intent to cure. Cases with radiation therapy after surgery were excluded.
General notes:
1. Rectal cases defined as ICDO3 codes: C19.9 or C20.9, exclude lymphoma codes (M-95 to M-98). 2010 data also exclude sarcoma codes – 8800/3, neuroendocrine carcinoma and squamous cell carcinoma.
2. Included AJCC Group Stage at Diagnosis = II or III.
3. Cases for patients under 18 years of age (at diagnosis) were excluded.
4. Rectal resections defined as CCI codes 1NQ59 or 1NQ87 or 1NQ89 or see list of descriptors listed in Table 2.
5. All resected cases were included regardless of margin status (due to data limitations).
6. Included cases which 1st resection date (if multiple) – diagnosis date <=365 days. 1st resection date – radiation therapy start date<=120 days.

4.3 Systemic Therapy

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

Definition: Percentage of stage II and IIIA non-small cell lung cancer cases receiving chemotherapy following surgical resection
Numerator: Stage II and IIIA non-small cell lung cancer cases diagnosed during the year, resected within one year of diagnosis and starting adjuvant chemotherapy within 120 days of surgery
Denominator: Stage II and IIIA non-small cell lung cancer cases diagnosed in the province during the year and having a lung resection within one year of diagnosis
Data source: Provincial cancer agencies
Measurement timeframe: 2009, 2010 and 2011 diagnosis years
Stratification variables: Province, age group, sex
Provinces submitting data: AB, SK, MB, ON, NS, PE
Province specific notes: AB: For 2011, Treatment information is based on initially planned treatment to the primary site (ACR data). CCI codes are not identified in the ACR, as such all coded surgeries were included for complete lung resection. If more than one surgical procedure is performed; the most definitive procedure is documented. The definition of definitive is the surgical procedure with the intent to cure. SCC were excluded. All coded surgeries were included as complete lung resection. **SK**: Data included SCC in 2011. **NS**: For 2011, collaborative stage variables were used to identify those having resections. Individual chart were reviewed to obtain resection date. **PE:** For 2011, data included squamous cell carcinoma cases.
General notes:
1. Cases for patients under 18 years of age (at diagnosis) were excluded.
2. Non-small cell lung cases were defined as C34.0 to C34.9, with behavior code 3, using International Classification of Diseases of Oncology, Third Edition (ICD-O-3). Histology codes for lymphoma M-95 to M-98, and histology codes for small cell: 8002, 8041, 8043, 8044, 8045, 8073 and 8803 were excluded.

3. For 2010, data excluded sarcoma codes, neuroendocrine carcinoma, and squamous cell carcinoma. For 2011, data excluded sarcoma codes, neuroendocrine carcinoma.
4. Included AJCC Group Stage II and IIIA at Diagnosis.
5. Resections defined as CCI codes: 1GR87, 1GR89, 1GR91, 1GT59, 1GT87, 1GT89 or 1GT91 or descriptors listed in Table 2 below.
6. All resected cases are included regardless of margin status (due to data limitations).
7. Included cases which Last resection date (if multiple) – diagnosis date <=365 days. Chemotherapy start date – last resection date (if multiple) <=120 days.
8. Chemotherapy includes oral (as available in data) and IV chemotherapy.
9. No filter for treatment intent was used, unless otherwise specified by province.

Table 1: Procedure Codes

	Procedure Codes		Diagnostic codes	
Specific Cohort	**CCP**	**CCI**	**ICD-9-CM**	**ICD-10**
Colon cancer resections	57.5*, 57.6*	1.NM.87.^^, 1.NM.89.^^, 1.NM.91.^^	Only colorectal cancer codes	
			153*, 154.0, 154.1 154.2, 154.3. 154.8	C18, C19, C20 C21
Rectal cancer resections	60.2, 60.24, 60.4, 60.5, 60.51, 60.52, 60.53, 60.55, 60.59	1.NQ.87.LA, 1.NQ.87.DA, 1.NQ.87.PF, 1.NQ.87.RD, 1.NQ.87.DF, 1.NQ.89.^^	Only colorectal cancer codes	
			153*, 154.0, 154.1 154.2, 154.3. 154.8	C18, C19, C20 C21

Table 2: Clinical Descriptors

Clinical descriptors for Colon Cancer	Clinical descriptors for Rectal Cancer
right hemicolectomy, left hemicolectomy segmental colectomy partial colectomy transverse colectomy subtotal coloectomy anterior resection (note overlap with rectal cancer below)	anterior resection (overlap with colon cancer above) low anterior resection abdominoperineal resection segmental resection rectum Harmann procedure total proctectomy

5. Person Centred-Perspective

Screening for distress

Definition: Extent to which provinces and their cancer programs have implemented standardized tools to screen for patient-reported symptoms such as emotional and physical distress (including pain)
Extent of Implementation: 1.Province wide implementation*standardized symptom screening undertaken for at least a portion of patients at each provincial cancer centre and data collected centrally; 2.Partial implementation*standardized symptom screening undertaken for at least a portion of patients at selected provincial cancer centres; 3.Not provincially coordinated (some local use possible)*provincially managed implementation of symptom screening does not exist; however, some individual centres/regions may use a screening tool but do not report data at a provincial level
Measurement timeframe: 2007, 2014
Data source: Provincial cancer agencies and programs
Provinces submitting data: BC, AB, SK, MB, ON, QC, NB, NS, PE, NL

6. Research

Adult clinical trial participation

Definition: The ratio of the total number of all patients (≥19 years) newly enrolled in cancer-related therapeutic trials or clinical research studies in 2013 to the projected number of new cancer cases (all ages) in 2013

Numerator: Number of cancer patients (≥19 years) newly enrolled in cancer-related therapeutic clinical trials or clinical research at provincial cancer centres in 2013. For patient enrolled in multiple clinical trials, count all occurrences.

Denominator: Projected number of new invasive cancer cases (all ages) in 2013.

Data source: Numerators were reported by provincial cancer agencies or equivalent to the Canadian Partnership Against Cancer. Denominators were retrieved from "Canadian Cancer Statistics 2013" – Statistics Canada.

Measurement timeframe: 2013

Stratification variables: Province, disease site: 1. All invasive cancers 2. Breast 3. Colorectal 4. Lung; 5. Prostate

Provinces submitting data: All invasive cancers: BC, AB, SK, MB, ON, NB, NS, PE, NL.

By cancer type: BC, AB, SK, MB, NB, NS, PE, NL.

Province specific notes: AB: For 2013, the total number of accruals for cancer patients (>=19 years) included newly enrolled in cancer related therapeutic trials or clinical research who were on the Alberta Cancer Clinical Trials (ACCT) database. If a patient went on multiple clinical trial accruals in the given year, a patient would be counted for each accrual. The ACCT database also includes patients who were living outside of Alberta, as long as they were on a clinical trial in Alberta. The ACCT database includes both females and males in the Breast Tumor Group and may include clinical trials for non-melanoma skin patients.

General note:

1. Projected number of all invasive cancer cases included bladder in-situ.

7. Appropriateness

Breast cancer screening within and outside recommended guidelines

Definition: Percentage of asymptomatic females aged 35+ receiving a mammogram within the past 2 years, where asymptomatic is defined as: Respondents who indicated going for a mammogram for any of the following reasons: Family history; Routine screen/check-up; Age; HRT; and NOT for any of the following reasons: Lump; Breast problem; Follow-up to breast cancer treatment; Other.
Numerator: Asymptomatic females aged 35+ who indicated going for a mammogram within the past 2 years
Denominator: Total number of asymptomatic females aged 35+ receiving a mammogram within the past 2 years
Data source: Canadian Community Health Survey
CCHS Variable: 1.Ever had a mammogram; 2.Reasons for having mammogram (mark all that apply): Family history; Routine screen; Age; HRT; Lump; Follow-up to breast cancer treatment; Breast problem; Other; 3. Last time respondent had undergone a mammogram
Measurement timeframe: 2012
Stratification variables: Province/territory
Provinces submitting data: All provinces and territories
General Notes: CCHS data are based on a representative sample which is then extrapolated to the overall population.

Breast cancer mastectomies performed as day surgery

Definition: Percentage of breast cancer mastectomies done as day surgeries, by province/territory
Numerator: Mastectomies performed as day surgery
Denominator: Total mastectomies
Exclusion: Potential duplicate records are removed from the analysis. Potential duplicate records are identified as discharges with identical values in the following data elements:
1. For HMDB: Institution, health card number, admission date, admission time, discharge date, discharge time, health card province3, birth date, gender, postal code, MRDx/main problem, principal CCI/main intervention
2. For Alberta Ambulatory Care data: INST HEALTH_CARD_ENCRYPT_NUM STDATE STHOUR ENDDATE ENDHOUR DOB SEX POSTCODE MDIAG MINT
3. Invalid Health Card Number (“000000000000”).
4. Health Card Province Code=’CA’.
5. Invalid postal code.
6. Procedures coded as abandoned.
7. Newborns, stillbirths and cadaveric donors.
8. Invalid episode date (i.e., 01JAN9999).
Data source: Hospital Morbidity Database, National Ambulatory Care Reporting System, Canadian Institute for Health Information; Alberta Ambulatory Care Reporting System, Alberta Health and Wellness
Measurement timeframe: 2007/08 to 2011/12 combined fiscal years
Stratification variables: Province/territory
Provinces submitting data: All provinces and Territories
General Notes: 1. Age >= 18 years; 2. Patients receiving a mastectomy anywhere within the discharge

record containing the surgical episode associated with the patient’s first breast resection are considered mastectomy cases

8. Long-Term Outcomes

Age-standardized incidence rates

Definition: The incidence rate that would have occurred if the age distribution in the population of interest was the same as that of the standard, where incidence rate is defined as the number of cases of cancer (malignant neoplasms) newly diagnosed during a year, per 100,000 people at risk
Numerator: Number of new cancer cases (all ages): 1. Breast (female) 2. Colorectal 3. Lung 4. Prostate (male) 5. Pancreas
Denominator: 1. Annual female population estimate in hundreds of thousands; 2, 3, 5. Annual population estimates in hundreds of thousands 4. Annual male population estimate in hundreds of thousands
Age standardization: Direct method using the 2011 Canadian Census population
Data sources: Canadian Cancer Registry (CCR) Database – cancer incidence data; Demography Division of Statistics Canada – population estimates
Measurement timeframe: For overall trends, Canada – 1992 to 2010. By province: 3-year combined (2008 – 2010)
Stratification variables: Province, sex
General notes:
1. World Health Organization, International Classification of Diseases for Oncology, Third Edition (ICD-O-3) and the International Agency for Research on Cancer (IARC) rules for determining multiple primaries sites were used: colorectal (ICD-O-3: C18.0 to C18.9, C19.9, C20.9, C26.0), lung and bronchus (ICD-O-3: C34.0 to C34.9), female breast (ICD-O-3: C50.0 to C50.9), prostate (ICD-O-3: C61.9), pancreas (ICD-O-3: C25.0-C25.9)
2. Joinpoint Regression Program 4.1.1 for Windows was used to analyze linear trends across years. The software takes trend data and fits the simplest joinpoint model that the data allow. The program starts with the minimum number of joinpoints (e.g. 0 joinpoints, which is a straight line) and tests whether more joinpoints are statistically significant and must be added to the model (up to that maximum number). This enables the user to test whether an apparent change in trend is statistically significant. The tests of significance use a Monte Carlo Permutation method. Annual Percent Change (APC) was reported to characterize trends in cancer rates over time. APC assumes that cancer rates are changing at a constant percentage of the rate of the previous year. The minimum and maximum number of joinpoints used in this analysis were 0 and 4 respectively. For further details, refer to the Joinpoint Regression Program documentation (http://surveillance.cancer.gov/joinpoint/).

Age-standardized incidence rates by stage

Definition: The stage-specific incidence rate that would have occurred if the age distribution in the population of interest was the same as that of the standard, where incidence rate is defined as the number of cases of cancer (malignant neoplasms) newly diagnosed during a specific time period, per 100,000 people at risk.
Numerator: Number of new cancer cases for each stage during the given time period.
Denominator: Total population (person-time) at risk for a specific sex during the given time period.
Measurement timeframe: 2010 to 2012 combined
Stratification variables: Province, stage (including stage I, II, III and IV)
Data sources: Reported by provincial cancer agencies.
Provinces submitting data: BC, AB, SK, MB, ON, NB, NS, PE, NL

Age standardization: Direct method using the 2011 Canadian Census population as standard weights
Province specific notes: AB: Hematology, sarcoma and melanoma morphologies were removed from the site-specific cancers.
General notes:
1. World Health Organization, International Classification of Diseases for Oncology, Third Edition (ICD-O-3) and the International Agency for Research on Cancer (IARC) rules for determining multiple primaries sites were used: colorectal (ICD-O-3: C18.0, C18.2 to C18.9, C19.9, C20.9, C26.0), lung and bronchus (ICD-O-3: C34.0 to C34.9), breast (ICD-O-3: C50.0 to C50.9), prostate (ICD-O-3: C61.9).
2. Appendix C18.1 was excluded from colorectal cancer.
3. Sites with histology codes for lymphoma M-95 to M-98, sarcoma codes– 8800/3 were excluded.
4. Cases for patients with age under 18 (not included) at diagnosis were excluded.
5. American Joint Committee on Cancer 7 edition (AJCC 7) was used to classify cancer group stage.

Age-standardized mortality rates

Definition: The mortality rate that would have occurred if the age distribution in the population of interest was the same as that of the standard, where mortality rate is defined as the number of deaths due to cancer (malignant neoplasms) in a year per 100,000 people at risk
Numerator: Number of deaths from cancer (all ages): 1. Breast (female); 2. Colorectal; 3. Lung; 4. Prostate (male); 5. Pancreas
Denominator: 1. Annual female population estimate in hundreds of thousands 2, 3, 5 Annual population estimates in hundreds of thousands; 2. Annual male population estimate in hundreds of thousands
Age standardization: Direct method using the 2011 Canadian Census population
Data sources: Canadian Vital Statistics – Death Database – cancer mortality data; Demography Division of Statistics Canada – population estimates
Measurement timeframe: For overall trends, Canada – 1992 to 2011. By province: 3-year combined (2009 – 2011).
Stratification variables: Province
General notes:
1. Up to the year 1999, causes of death were coded according to World Health Organization (WHO), International Classification of Diseases, Ninth Revision (ICD-9): Colorectal (ICD-9 153-154), lung (ICD-9: 162), female breast (ICD-9: 174), prostate (ICD-9: 185), pancreas (ICD-9: 157) 2. After the year 1999, causes of death were coded according to the World Health Organization (WHO), International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10): Colorectal (ICD-10:C18-C20, C26.0), lung (ICD-10 : C34), female breast (ICD-10: C50), prostate (ICD-10: C61), pancreas (ICD-10: C25)
2. Joinpoint Regression Program 4.1.1 for Windows was used to analyze linear trends across years. The software takes trend data and fits the simplest joinpoint model that the data allow. The program starts with the minimum number of joinpoints (e.g. 0 joinpoints, which is a straight line) and tests whether more joinpoints are statistically significant and must be added to the model (up to that maximum number). This enables the user to test whether an apparent change in trend is statistically significant. The tests of significance use a Monte Carlo Permutation method. Annual Percent Change (APC) was reported to characterize trends in cancer rates over time. APC assumes that cancer rates are changing at a constant percentage of the rate of the previous year. The minimum and maximum number of joinpoints used in this analysis were 0 and 4 respectively. For further details, refer to the Joinpoint Regression Program documentation (http://surveillance.cancer.gov/joinpoint/).

Age-standardized relative survival ratios

Definition: Relative survival ratio (RSR) is the ratio of the observed survival for a group of cancer patients (malignant neoplasms) to the expected survival for members of the general population who have the same main factors affecting survival (sex, age, place of residence) as the cancer patients. The age-standardized RSR is that relative survival that would have occurred if the age distribution of the cancer patients under study had been the same as that of the standard population

Numerator: For period analysis method (2006-2008): Observed cumulative survival probabilities of cancer patients after diagnosis with follow-up in 2006 to 2008 for breast, lung and colorectal; 2005 to 2007 for pancreas. For cohort analysis method (1992-1994): Observed cumulative survival probabilities of cancer patients who were diagnosed during 1992-1994: 1. Breast; 2. Colorectal; 3. Lung; 4. Pancreas

Denominator: Expected survival of comparison population that was alive for 5 years for patients with follow-up in 2006 to 2008 for breast, lung and colorectal; 2005 to 2007 for pancreas.

Age-standardized: For breast, lung and colorectal: age-standardized to people diagnosed with that cancer in Canada between 1992 and 2001. For pancreas, age-standardized to population diagnosed with pancreatic cancer in Canada between 2001 and 2005

Data sources: Breast, lung and colorectal: Canadian Cancer Statistics 2013; Pancreas: Canadian Cancer Registry (annual file, release date 2011); Provincial life tables (provided from Statistics Canada, 2012)

Measurement timeframe: For period analysis method, patients with follow-up during 2006 to 2008 for breast, lung and colorectal; 2005 to 2007 for pancreas. For cohort analysis method, patients diagnosed during 1992 to 1994

Stratification variables: Province

General notes:

1. World Health Organization, International Classification of Diseases for Oncology, Third Edition (ICD-O-3) and the International Agency for Research on Cancer (IARC) rules for determining all primaries sites were used: colorectal (ICD-O-3 C18.0 to C18.9, C19.9, C20.9, C26.0), lung and bronchus (ICD-O-3 C34.0 to C34.9), breast (ICD-O-3 C50.0 to C50.9), pancreas (ICD-O-3: C25.0-C25.9)
2. "Canada" represents all provinces and territories, except Quebec. Data from Quebec have been excluded, in part, because the method of ascertaining the date of cancer diagnosis differs from the method used by other registries and because of issues in correctly ascertaining the vital status of cases.
3. The analysis was conducted using both cohort and period analysis methods (Reference: Brenner H, Gefeller O. An alternative approach to monitoring cancer patient survival. Cancer. 1996; 78:2004 – 10).
4. Expected survival proportions were derived from sex-specific complete provincial life tables produced by Statistics Canada, using the Ederer II approach. (Reference: Ederer F, Heise H. The effect of eliminating deaths from cancer on general population survival rates (methodological note 11, End Results Evaluation section). National Cancer Institute; August 1959)
5. Period analysis was used to estimate the survival for the cases diagnosed 2006 – 2008 for breast, lung and colorectal; 2005 – 2007 for pancreas. Relative survival ratios for 1992 to 1994 were calculated using cohort analysis. For breast, lung and colorectal, these data are based on people aged 15–99 years at diagnosis. Survival ratios for Newfoundland and Labrador are not shown as they are artificially high. For pancreas, these data are based on people aged 15-74, MB, NB and PE has sparse data in some of the age groups, therefore, results were not presented since the estimate would be unstable.