Cancer Stage in Performance Measurement: A First Look

A System Performance Spotlight Report

February 2015

Technical Appendix

Capture of Stage – completeness of stage data

Definition: Percentage of stageable incident cases for which stage data are available in provincial cancer registries
Numerator: Number of stageable incident cases for which stage data are available in the provincial cancer registry
Denominator: Total number of stageable incident cases.
Exclusions:

1. Age (at diagnosis) 0 – 17
2. Non melanoma skin cancer (M8050-8110 with site code C44.0 to C44.9)
3. Colorectal reporting for appendix C18.1
4. For reporting by site - Lymphoma codes M-95 to M-98, sarcoma codes– 8800/3

Data source: Provincial cancer agencies.
Measurement timeframe: 2011 diagnosis years
Stratification variable: Province, cancer type: 1. All cancers 2. Four most common cancers combined: Breast, Prostate, Colorectal, and Lung
Provinces submitting data: BC, AB, SK, MB, ON, NB, NS, PE, NL
Province specific notes: BC: Stage data for all cancers are not available for 2011. Collaborative stage data is collected on only five disease sites in BC - Breast, Cervix, colorectal, Lung and Prostate. Data do not represent all stage 0 cases in BC.
AB: Hematology, sarcoma and melanoma morphologies were removed from the site-specific cancers but included in all cancers. All cases with "NA" stage have been excluded from both the numerator and denominator. All 2011 invasive primaries are collaboratively staged and once coded there should be no cases with missing/not available stage values. Currently "Not Available" indicates the number of cases that have a missing stage at the time of data pull. It also includes skin c44 not basal-squamous that are not staged according to Alberta Cancer Registry (ACR) rules.
ON: Stage information only included collaborative stage; excluded in situ cases.
NB: The counts in "Not Available" category are the number of in situ cases for prostate cancer. NB does not stage in situ prostate cancer. All cancers excluded non-melanoma skin cancer.
NS: The "Not Available" reported are true NAs. In many cases these are histology exclusions which cannot be staged.
PE: Beginning in 2011 PE stopped the collection and staging of in situ cervical cancer.
General notes:
1. The source data for this indicator were submitted by the provincial cancer agencies based on definitions provided by the Canadian Partnership Against Cancer for the distribution of cases by stage.
2. Incident cases that are stageable as per AJCC Cancer Staging Manual 7th Edition are included in denominator. Cases with unknown stage are included in the numerator. Incident cases that could but were not staged due to incomplete coding or data not available are included in the denominator (i.e. Not available).
3. Indicator is based on data reported directly by the provinces for this Report. No separate validation or verification of the submitted data was done.
4. Staging can be based on AJCC TNM staging reported directly by clinicians and/or based on the Collaborative Staging methodology. Data from other staging systems or standards were not included as valid stage data in the indicator.
5. All cancer sites included stage 0 cases.

Capture of Stage – cases for which stage is unknown

Definition: Percentage of stageable incident cases for which stage is recorded as "unknown" in the provincial cancer registry
Numerator: Number of stageable incident cases for which stage is recorded as "unknown" in the provincial cancer registry
Denominator: Total number of stageable incident cases
Data source: Provincial cancer agencies
Measurement timeframe: 2010, 2011 diagnosis year
Stratification variable: Province, cancer type: 1. Breast 2. Colorectal 3. Lung 4. Prostate 5. All other cancers
Provinces submitting data: BC, AB, SK, MB, ON, NB, NS, PE, NL
Province specific notes:
BC: Stage data for all cancers are not available for 2010 and 2011. Collaborative stage data is collected on only five disease sites in BC - – Breast, Cervix, Colorectal, Lung and Prostate. Data do not represent all stage 0 cases.
AB: Hematology, sarcoma and melanoma morphologies were removed from the site-specific cancers but included in all cancers. All cases with "NA" stage have been excluded from the denominator. All 2010 and 2011 invasive primaries are collaboratively stage and once coded these should be no cases with missing/not available stage values. Currently "Not Available" indicates the number of cases that have a missing stage at the time of data pull. It also includes skin c44 not basal-squamous that are not staged according to Alberta Cancer Registry (ACR) rules.
ON: Stage information only included collaborative stage; excluded in situ cases.
NB: The counts in "Not Available" category are the number of in situ cases for prostate cancer. NB does not stage in situ prostate cancer. All cancers excluded non-melanoma skin cancer.
NS: The "Not Available" reported are true NAs. In many cases these are histology exclusions which cannot be staged.
PE: Beginning in 2011 PE stopped the collection and staging of in situ cervical cancer.
General notes:
1. The source data for this indicator were submitted by the provincial cancer agencies based on definitions provided by the Canadian Partnership Against Cancer for the distribution of cases by stage.
2. Invasive incident cases that are stageable as per AJCC Cancer Staging Manual 7th Edition are included in denominator. Cases with unknown stage are included in the numerator. Incident cases that could but were not staged due to incomplete coding or data not available are included in the denominator (i.e. Not available).
3. Indicator is based on data reported directly by the provinces for this Report. No separate validation or verification of the submitted data was done.
4. Staging can be based on AJCC TNM staging reported directly by clinicians and/or based on the Collaborative Staging methodology. Data from other staging systems or standards were not includedas valid stage data in the indicator.
5. The Canadian Partnership Against Cancer has recently launched an initiative to support the implementation of Collaborative Staging across the country. Upon the conclusion of this initiative, complete staging is expected to be available from the participating provinces for the top four disease sites: breast, prostate, lung and colorectal.
6. All cancer sites included stage 0 cases.

Age-standardized incidence rates by stage

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 (age 18+): 1. Breast (female); 2. Colorectal; 3. Lung; 4. Prostate (male)
Denominator: 1. Annual female population estimate in hundreds of thousands 2, 3 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: 2010 diagnosis year
Stratification variables: Province, Stage (stage I, II, III, IV, Unknown, Blank)
Province specific notes:
BC, SK: Stage data for prostate cancer in the Canadian Cancer Registry were incomplete for diagnosis year 2010. Estimates were provided directly by the provincial cancer agency.
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)
2. American Joint Committee on Cancer 7 edition (AJCC 7) was used to classify cancer staging.
3. Stage data are not available for Quebec for 2010
4. The “Unknown” category refers to cases with unknown staging
5. The “Blank” category refers to cases of which the Collaborative Stage (CS) algorithm was not run or resulted in error

Other Prognostic Factors

a. Triple Negative Test Result (ER, PR, HER2) for Breast (female) Cancer

Definition: Percentage of invasive breast cancer diagnosed as triple negative (ER/PR/HER2)
Numerator: All female invasive breast cancer incident cases with negative test result for Estrogen Receptors (ER), Progesterone Receptors (PR) and Human Epidermal Growth Factor Receptor 2 (HER2).
Denominator: All female invasive breast cancer incident cases, excluding invalid ER/PR/HER2 values.
Measurement timeframe: 2010 diagnosis year
Stratification variable: Province
Provinces with data available: BC, AB, SK, MB, ON, NB, NS, PE, NL
Data source: Statistics Canada, Canadian Cancer Registry (CCR)
General notes:

1. Invasive breast cancer incident cases were identified as C50.0 – C50.9, with behavior code 3, using International Classification of Diseases for Oncology, Third Edition (ICD-O-3). Histology type 9050-9055 (mesothelioma) and 9590-9989 (leukemia, lymphoma and multiple myeloma) were excluded.
2. Only female incident cases with age>=20 were included.
3. SSF16 (Site-specific factor 16) in CS (Collaborative Stage) in AJCC 7th (American Joint Committee on Cancer) were used to identify the combination of test results of ER (Estrogen receptor), PR (Progesterone receptor) and HER2 (Human Epidermal growth factor Receptor 2). SSF16 code 000 is for the triple negative test result of ER, PR and HER2, codes 988 and 999 are considered as invalid values, which were excluded from the denominator.
4. Counts were rounded randomly up or down by multiples of 5 to comply with Statistics Canada's confidentiality standards and guidelines. The impact will be greater for provinces with small counts.

b. Distribution of Non-metastatic Prostate Cancer by Risk Category

Definition: Percentage of non-metastatic prostate cancer cases by risk category
Numerator: All male invasive prostate cancer incidence cases by risk category
Denominator: All male invasive prostate cancer incidence cases.
Measurement timeframe: 2010 diagnosis year
Stratification variable: Province
Provinces with data available: BC, AB, SK, MB, ON, NB, NS, PE, NL
Data source: Statistics Canada, Canadian Cancer Registry (CCR)
General notes:

1. Invasive prostate cancer incident cases were identified as C61.9, with behavior code 3, using International Classification of Diseases for Oncology, Third Edition (ICD-O-3). Histology type 9050-9055 (mesothelioma) and 9590-9989 (leukemia, lymphoma and multiple myeloma) were excluded.
2. Only male incident cases with age>=20 were included.

3. Cases with clinical stage T: T0, Tx and error, or with stage M1 (pathological or clinical stage) were excluded.
4. Prostate risk categories were adopted from GUROC (Genitourinary Radiation Oncologists of Canada) Consensus Risk Stratification System. They are three levels: low-, intermediate- and high-risk. The classification is based on the combination of PSA level (Prostate Specific Antigen), Biopsy Gleason Score and clinical stage in AJCC. Specifically, the three risk levels are defined as:

    1) Low risk: if ***ALL*** of the following criteria are met
    - PSA ≤ 10ng/ml
    - Biopsy Gleason Score ≤ 6
    - Clinical Stage T1-T2a

    2) Intermediate risk: if all of the following criteria are met if not low risk
    - PSA ≤ 20ng/ml
    - Biopsy Gleason Score < 8
    - Clinical Stage T1/T2

    3) High risk: if **ANY** of the following criteria are met
    - PSA > 20ng/ml
    - Biopsy Gleason Score ≥ 8
    - Clinical Stage ≥T3

5. SSF1 (Site-specific factor 1) in CS (Collaborative Stage) in AJCC 7th (American Joint Committee on Cancer) was used to extract the PSA values; 988,998 and 999 were considered as invalid values.
6. SSF8 was used to extract biopsy Gleason Score; 988,998 and 999 were considered as invalid values.
7. CS Extension (variable) was used to extract clinical stage T; Stage T2NOS was treated as T2c; 988, 998 and 999 were considered as invalid values.
8. Counts were rounded randomly up or down by multiples of 5 to comply with Statistics Canada's confidentiality standards and guidelines. The impact will be greater for provinces with small counts.

c. Positive Circumferential Resection Margin

Definition: Percentage of invasive rectal cancer incidence cases with positive Circumferential Resection Margin (CRM).
Numerator: All invasive rectum cancer incident cases with positive CRM values.
Denominator: All invasive rectum cancer incident cases with resections, excluding invalid CRM values**.**
Measurement timeframe: 2010 diagnosis year
Stratification variable: Province
Provinces with data available: BC, AB, SK, MB, ON, NB, NS, PE, NL
Data source: Statistics Canada, Canadian Cancer Registry (CCR)
General notes:

1. Invasive rectum cancer incident cases were identified as C19.9 and C20.9, with behavior code 3, using International Classification of Diseases for Oncology, Third Edition (ICD-O-3). Histology type 9050-9055 (mesothelioma) and 9590-9989 (leukemia, lymphoma and multiple myeloma) were excluded.
2. Cases with age<20 were excluded.

3. Cases with positive circumferential resection (CRM) were defined as those having CRM less than 1mm from the edge of the original tumour. SSF6 (Site-specific factor 6) in CS (Collaborative Stage) in AJCC 7th (American Joint Committee on Cancer) were used to identify the CRM for rectum cancer cases. Cases with positive CRM were those coded 000, 001-009; Codes 988, 990, 998 and 999 are considered as invalid values, which were excluded from the denominator.
4. Counts were rounded randomly up or down by multiples of 5 to comply with Statistics Canada's confidentiality standards and guidelines. The impact will be greater for provinces with small counts.